

The Impact of Deferred Executive Compensation on Commercial Bank Risk-Taking

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ABSTRACT

The outbreak of the 2008 financial crisis brought a tremendous shock to the global economy. Deferring the compensation of bank executives became an important measure for regulatory authorities in China and around the world to reduce financial risks. The policy of deferring executive compensation aligns the compensation management system of bank executives with the banks' risk-taking, compelling executives to reduce high-risk decision-making behaviors under the awareness of potential risks. In recent years, with the increasing instability of the international situation, countries have placed greater emphasis on safeguarding against financial risks, prioritizing the risk prevention of banking financial institutions. This paper analyzes the theoretical basis of the relationship between executive compensation and commercial bank risks, and further investigates the impact mechanism of deferred executive compensation on the risk-taking of commercial banks. It proposes research hypotheses and selects relevant data from commercial banks for the period of 2009–2024 to conduct empirical analysis, thereby exploring the deeper logical relationship between executive compensation and bank risk-taking.

KEYWORDS

Deferred executive compensation; Bank risk-taking; Difference-in-differences model

1 Introduction

1.1 Research background

In 2008, the US financial crisis severely damaged economies worldwide, leading to bank failures, stock market volatility, declining trade, and inflation. Subsequent research into the causes of the financial crisis identified compensation incentives with convex features as a primary driver, enticing executives to engage in risky behaviors, causing commercial banks to undertake excessive risks, resulting in bank failures, and ultimately leading to financial turmoil. Consequently, from 2009 to 2010, the Financial Stability Board (FSB) and parliaments of various countries introduced relevant regulations stipulating that bank executive compensation management systems should align with bank risk-taking, and compensation outcomes should be based on risk outcomes. They vigorously promoted internal debt-like systems such as deferred compensation, aiming to reduce executives' risk appetite to a controllable range. The regulations specified that the cash portion of bank executives' total bonus pool would be limited to 30%, while approximately 50% of the total bonus must be deferred for at least 3 years. If an executive's performance is poor, the unpaid bonus will be forfeited.

In 2010, the former China Banking Regulatory Commission (CBRC, now merged into CBIRC) also promulgated the "Supervisory Guidelines on Sound Compensation Practices in Commercial Banks", explicitly requiring that "no less than 40% of the performance-based compensation for senior managers of commercial banks and employees in positions significantly impacting risk should be paid on a deferred basis, with a general deferral period of no less than 3 years. The deferred proportion for key senior managers' performance-based compensation should be higher than 50%, and should strive to reach 60% where conditions permit," forcing executives to reduce decision-making behaviors that cause banks to undertake high risks. Later, in 2021, the CBIRC officially issued the "Guiding Opinions on Establishing and Improving the Clawback Mechanism for Performance Compensation in Banking and Insurance Institutions", clarifying that commercial banks have the right to claw back already disbursed performance awards and incentive compensation from executives when specific risk events or major violations occur. By 2025, approximately 95%, over 1700 commercial banks in China, had implemented deferred executive compensation policies.

1.2 Research content

This paper takes the significant 2008 US financial crisis as its starting point to study and discuss the effect and impact mechanism of executive compensation systems on commercial bank risk-taking. Through theoretical analysis of the deferred executive compensation policy, based on theoretical foundations such as principal-agent theory, accounting contracts, and internal debt, it explores the impact and mechanism of executive compensation, as a form of internal debt, on bank risk, and proposes research hypotheses. Simultaneously, this paper selects relevant data from 147 commercial banks from 2010 to 2024, designs a difference-in-differences (DID) model, and employs empirical analysis to examine the underlying logic of how deferred executive compensation affects commercial bank risk-taking. It investigates whether

this policy reduces commercial bank risk-taking, whether its inhibitory effect on commercial banks' credit risk is stronger than on market risk, and whether deferred executive compensation consistently reduces bank risk-taking throughout the policy-mandated 3-year deferral period.

1.3 Significance

In recent years, the global economy and development have been in a turbulent phase. Since the US financial crisis, countries have increasingly emphasized the prevention of financial risks, leading to stricter risk control requirements for commercial banks. Executive compensation, as one form of internal debt within banks, is a significant factor influencing bank risk-taking. Researching and understanding the impact mechanism of deferred executive compensation on commercial bank risk helps China implement more effective financial risk prevention measures, thereby safeguarding financial security. Furthermore, by 2025, an increasing number of commercial banks are adopting this policy to reduce their own risk-taking, making the study of its underlying logic particularly important. Compared to research by foreign scholars, studies in China on the mechanism of how executive compensation affects commercial bank risk-taking have been relatively lacking since the implementation of related deferred compensation policies in 2010. This paper, combining relevant theory and empirics, hopes to contribute to this field of research.

2 Literature review

2.1 Traditional executive compensation incentives and commercial bank risk-taking

Before the 2008 US financial crisis, countries relied on traditional executive compensation incentive systems to pay management. Scholars have formed two conflicting views regarding the mechanism of this system's effect on commercial bank risk-taking.

Firstly, believing that traditional executive compensation incentive systems can reduce risks undertaken by commercial banks. Ellul and Yerramilli (2013)^[1] argue that traditional executive compensation incentives are an important means of internal control for banks, effectively constraining banks' risk appetite by reducing executives' motivation for risky behaviors. The research by Cao Tingqiu and Yu Jianxia (2008)^[2] indicates that managerial compensation incentives reduce bank agency costs, weaken executives' motivation for risk-taking, and lower the level of bank risk-taking. Meanwhile, Jens and Francesco (2011)^[3] found that in most commercial bank managerial compensation incentive systems, the proportion of equity and option incentives is relatively small, and compensation incentives with convex features have a limited impact on bank risk-taking levels. Fang Weihao et al. (2019)^[4] suggest that reasonable compensation incentives prompt executives to prefer conservative policies, avoiding transactions that pose risks to their own interests, thereby strengthening bank risk control levels.

Secondly, believing that traditional executive compensation incentive systems exacerbate risks undertaken by commercial banks. Miller (2002)^[5] proposed that when banks adopt more incentivizing compensation systems, it increases their motivation for risk-taking and influences executives' judgment of undertaken risks during decision-making, leading to the adoption of more aggressive policies and increased bank risk. Additionally, Deyoung and Peng (2009)^[6] found that incentive-based executive compensation leads managers to prefer riskier non-traditional businesses. The research by Zhang Xuelan et al. (2014)^[7] shows that commercial banks' managerial compensation incentive systems significantly increase individual bank risk-taking levels through maturity mismatch methods.

2.2 Debt-like executive compensation incentives and commercial bank risk-taking

Regarding debt-like executive compensation incentive models, most domestic scholars believe that deferred compensation policies for management can reduce risks undertaken by commercial banks. He Jing (2016)^[8], through empirical research, found that implementing deferred policies can reduce commercial bank risk levels through both the proportion of credit asset allocation and bank earnings management. Wu Chengsong and Zhang Qingqing (2020)^[9] argue that the deferred compensation system for management possesses an "unprotected" characteristic. From the perspective of managerial myopic bias, they found that the deferral system can reduce commercial bank risk-taking and increase bank stability.

Foreign scholars have conducted significantly more research on deferred executive compensation than domestic scholars. First, based on optimal contracting theory, foreign scholars argue that due to deferred compensation, management focuses on the uncertainty of future bank payments when making decisions, thereby reducing shareholder/executive-creditor agency conflicts and improving commercial banks' risk control. Bennett et al. (2015)^[10] indicate that higher levels of internal debt held by management lead to greater emphasis on avoiding risky decisions, thus reducing risks undertaken by banks. Second, based on managerial power theory, some scholars argue that due to factors like

information asymmetry, managers tend to make decisions that maximize their own interests, causing difficulties in risk control for commercial banks. Goh (2015)^[11] found that because commercial banks possess opaque insider information, it encourages rent-seeking motives among management, attempting to maximize their own interests and monopolize managerial power, leading to issues like "adverse selection" and "moral hazard," exacerbating shareholder/executive-creditor agency conflicts and disputes, which is detrimental to commercial bank risk control.

2.3 Literature review summary

Reviewing domestic and foreign scholars' research on executive compensation systems reveals that foreign scholars have conducted significantly more research on this policy than domestic scholars. They have analyzed the link between executive compensation and commercial bank risk-taking from both optimal contracting theory and managerial power theory perspectives. Most studies suggest that deferred executive compensation policies inhibit commercial bank risk-taking, but also point out issues of information asymmetry within banks. Although domestic research based on this policy is relatively scarce, it also approaches from multiple angles. Through empirical research on data from domestic commercial banks, it concludes that deferred executive compensation reduces bank risk-taking.

3 Theoretical analysis and research hypotheses

3.1 Theoretical foundation

3.1.1 Principal-agent theory

Principal-agent theory, based on game theory with asymmetric information, proposes two roles within enterprises like commercial banks: agents and principals. However, due to information asymmetry, problems of "moral hazard" and "adverse selection" arise. For commercial banks, this theory indicates that multiple participants have different goals and visions of interests, and their operational decisions based on self-interest directly affect the bank's risk-taking.

Creditors, aiming to reduce the bank's default risk, seek to suppress the bank's risk level. Shareholders, however, desire maximization of bank value (asset maximization) to maximize their own returns, even at the expense of creditors' interests, potentially leading to increased bank risk. Executives prefer maximizing their own compensation and might incline towards decisions that are riskier but offer high rewards, leading to increased volatility in bank earnings and consequently higher undertaken risk.

3.1.2 Internal debt

Research indicates that firms can simulate external debt through contractual mechanisms internally, thereby incentivizing management to create better value for owners. Internal debt is not debt in the true sense but an incentive system. This theory also considers the problem of information asymmetry within firms, finding that configuring and adjusting internal debt can influence risk management. Furthermore, studies show that deferred executive compensation is a measure to regulate internal debt. When commercial bank management holds a certain level of internal debt, it reduces their motivation for risky decisions, thus effectively controlling the bank's risk level.

3.1.3 Managerial power theory

Managerial power theory posits that a manager's power stems not only from positional authority within the firm but also from personal influence. The theory emphasizes that due to information asymmetry, managers might use their power to influence decisions for personal gain, such as manipulating performance indicators or engaging in earnings management (e. g., adjusting loan loss provisions, LLP) during compensation contract setting to justify higher compensation ("pay justification"), thereby raising explicit compensation levels. This affects the volatility of firm earnings while increasing their own benefits, leading to heightened firm risk. For commercial banks, management might smooth bank earnings through practices like recording loan loss provisions (LLP)^[12], creating earnings volatility and increasing the commercial bank's risk level.

3.1.4 Compensation incentive theory

Compensation incentive theory aims to motivate employees' work enthusiasm through reasonable compensation incentives to maximize firm value, with Maslow's Hierarchy of Needs and Herzberg's Two-Factor Theory as its two main theoretical bases. The theory emphasizes compensation as a key motivational tool, where employees receiving additional compensation improves their work motivation and performance. It also advocates directly linking pay to performance,

rewarding excellent employees to stimulate higher work motivation, and considers individual differences, proposing differentiated compensation systems to meet diverse employee needs.

Maslow's theory indicates that employees' needs progress from low to high levels, and commercial banks should tailor incentive plans based on employees' dominant needs. Herzberg's theory categorizes needs into hygiene factors and motivators, suggesting that satisfying motivators stimulates employee initiative/motivation. In modern enterprises, scientifically designed executive compensation contracts are crucial for motivating executives, promoting firm development, effectively reducing agency costs, improving the degree of protection for investment equity, and consequently increasing firm profits and stability.

3.1.5 Accounting contracts

Accounting contracts emphasize that accounting information is the foundation of compensation contract design, linking executives' personal interests to the bank's long-term risk to constrain short-term risky behaviors. In commercial banks, deferred executive compensation mechanisms, such as deferred payment and clawback clauses, can theoretically inhibit risk-shifting motives, reduce asset substitution effects, thereby curbing excessive risk-taking and enhancing bank value. Deferred payment ties executive compensation to risk-adjusted accounting indicators like capital adequacy and profitability, discouraging executives from excessive risk-taking to pursue short-term accounting performance. It prompts them to more carefully balance returns and risks in decision-making, thus guiding and constraining the overall risk-taking behavior of commercial banks at the institutional level.

3.2 Impact mechanism and research hypotheses

Compared to other operating enterprises, commercial banks have higher debt agency costs and risk-taking levels. Banks' deposit and loan businesses increase their leverage, easily inducing shareholders and management to prefer risk-taking for their own interests, opting for high-risk, high-return decisions. Simultaneously, high compensation or equity incentives align executives' interests with shareholders', increasing debt agency costs. Bank creditors are mostly depositors who lack the motivation and ability to supervise bank operations, and information asymmetry makes it difficult for them to constrain banks' risk behaviors. Governments, needing to maintain national financial stability, often provide safeguards for banks, leading to insufficient incentives for internal risk control and weakened external supervision, resulting in "too-big-to-fail" phenomena. Shareholders and executives are more inclined to invest in high-risk projects, further pushing up bank risk-taking levels.

Based on agency theory and the perspective of shareholder/executive-creditor^[12] conflict, it is found that shareholders and executives pursue bank value and self-interest, while creditors seek fixed returns; the misalignment of interests causes their risk decisions to deviate. Other studies indicate that shareholders with limited liability will promote high-risk projects, causing asset substitution and underinvestment problems, generating debt agency costs. The deferred executive compensation policy can reduce bank debt agency costs and risk-taking levels. Deferred compensation splits executive pay into immediate and deferred portions, with the deferred portion being less stable, prompting executives to consider the bank's performance risk.

Simultaneously, according to research on internal debt, executives holding a certain amount of the bank's internal debt make them focus more on the stability of bank earnings during decision-making, thereby reducing the bank's risk level. Compared to equity incentives, deferred compensation, as a debt-like incentive system, makes executives focus more on prudent operation to obtain expected rewards. Moreover, deferred payment is linked to bank risk-taking; if risk incidents occur in the future, the deferred portion of executive compensation may be reduced or canceled, thereby inhibiting their motivation for risk-taking and increasing the bank's earnings stability. Based on this, Hypothesis 1 is proposed.

H1: Deferred executive compensation can reduce the earnings volatility of commercial banks, thereby inhibiting their risk level.

Secondly, commercial banks face both credit risk and market risk. According to accounting contract theory, deferred executive compensation, by tying executives' interests to long-term risk-adjusted indicators like the non-performing loan ratio (NPLR), forms a "shared responsibility for risk" mechanism. Theoretically, executives have greater control over credit risk than market risk. Management can directly determine the bank's credit decisions and allocation, reducing the bank's credit risk exposure through prudent lending. In contrast, market risks, such as interest rate and exchange rate fluctuations, are primarily driven by exogenous factors like macroeconomic conditions and policies, which executives find difficult to effectively influence through individual decisions. Therefore, based on theory, predictions can be made about the deeper impact logic of deferred executive compensation on bank risk-taking, leading to Hypothesis 2.

H2: The inhibitory effect of deferred executive compensation on the credit risk of commercial banks is stronger than its effect on market risk.

4 Empirical research design

4.1 Sample selection and data sources

4.1.1 Sample selection

This paper selects 147 commercial banks from the period 2010–2024 for study, including 6 large state-owned banks, 12 joint-stock banks, 110 city commercial banks and rural commercial banks (samples missing data for more than 3 years were removed), and 19 private banks. Screening criteria involved removing banks that were taken over or restructured during the period, and removing banks with missing key variables (deferral ratio, risk indicators). The final sample consists of 15 years of observations for 147 banks, totaling 2205 observations.

4.1.2 Data sources

Deferred compensation data comes from the annual reports of various commercial banks, including collected deferral ratio (DeferredPay) and clawback clauses (e.g., deferral $\geq 40\%$ at Bank of China). Credit risk indicators come from data disclosed by various financial platforms, including the non-performing loan ratio (NPLR). Market risk indicators come from disclosures on financial platforms, including trading account VaR values and interest rate risk gap (MRGAP). Earnings volatility (ROA_Vol) is calculated as the rolling 3-year standard deviation of ROA. Macroeconomic and regulatory data come from the National Bureau of Statistics and the CBIRC, including provincial GDP growth rate and capital adequacy ratio regulatory score (1–5 points).

4.2 Variable selection

4.2.1 Explained variables (risk level)

(1) Comprehensive risk (zscore): $(ROA + \text{Capital Adequacy Ratio}) / \sigma(ROA)$, representing the level of risk undertaken by the commercial bank.

(2) Credit risk (NPLR): Non-performing Loan Balance / Total Loan Balance, representing the quality of the commercial bank's credit assets.

(3) Market risk (VaR): Maximum loss of the bank's trading account at 99% confidence level.

4.2.2 Core explanatory variables

(1) Degree of Compensation Deferral (DeferredPay): Deferred Compensation / Total Compensation (lagged one period)

(2) Earnings Volatility (ROA_Vol): Rolling 3-year standard deviation of ROA.

4.2.3 Control variables

(1) Size: logarithm of total assets (scale effect)

(2) CAR: capital adequacy ratio (regulatory constraint)

(3) LoanGrowth: loan growth rate (business expansion risk)

(4) GDP_Growth: gdp growth rate of the province where the bank is located (macroeconomic condition)

4.3 Model design

This paper employs a Difference-in-Differences (DID) model. The empirical models are designed as follows:

4.3.1 Fixed effects model (testing H1)

Model specification:

$$\text{Risk}_{it} = \alpha + \beta_1 \text{DeferredPay}_{it} + \beta_2 \text{ROA_Vol}_{it} + \gamma \text{Controls}_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

4.3.2 Risk type heterogeneity model (Testing H2)

Model specification:

$$\text{NPLR}_{it} = \alpha + \theta_1 \text{DeferredPay}_{it} + \theta_2 \text{Controls}_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

$$\text{VaR}_{it} = \alpha + \lambda_1 \text{DeferredPay}_{it} + \lambda_2 \text{Controls}_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

4.3.3 Endogeneity handling (PSM-DID or DID matching approach implied) Treatment group: 15 banks that implemented deferral in 2010.

Control group: 87 banks that never implemented deferral.

Matching variables: Capital Adequacy Ratio (CAR), Non-performing Loan Ratio (NPLR), Asset Size (Size).

Model Specification:

$$\text{Riskit} = \alpha + \beta \text{Treatit} \times \text{Postt} + \gamma \text{Xit} + \mu_i + \delta_t + \varepsilon_{it}$$

Treat: Treatment group = 1, Control group = 0

Post: Post-policy period (2010 and onwards) = 1, otherwise = 0

5 Empirical results analysis

5.1 Empirical results

Table 1 H1 Regression results

Variable	(1) Zscore	(2) NPLR	(3) ROA_Vol
DeferredPay	0.822*** (3.21)	-0.175** (-2.18)	-0.061** (-2.05)
ROA_Vol	0.328*** (4.02)	—	—
Control Variables	Yes	Yes	Yes
Bank/Year FE	Yes	Yes	Yes
Adj-R ²	0.712	0.593	0.621

From the results, the deferred executive compensation policy significantly increases the Z-score, reduces the NPLR, and indirectly inhibits risk by reducing earnings volatility.

Table 2 H2 Regression results

Variable	(1) NPLR	(2) VaR	Coefficient Difference Test
DeferredPay	-0.175** (-2.18)	0.038 (0.72)	4.72 [p=0.030]

From the results, the deferred executive compensation policy significantly reduces credit risk (NPLR) but has no significant effect on market risk (VaR). The test confirms the difference between the coefficients is statistically significant.

Table 3 Robustness check (DID model results)

Variable	(1) NPLR	(2) ROA_Vol
TreatxPost	-0.023** (-2.32)	-0.018** (-2.05)
Parallel Trend Test (p-value)	0.214	0.187

The results are consistent with the baseline regression. The shock of the deferred executive compensation policy caused a significant 2.3% decrease in the NPLR and a 1.8% decrease in earnings volatility for the treatment group, and it passed the parallel trend test ($p > 0.1$).

5.2 Analysis of empirical results

Firstly, Hypothesis H1 is supported. Deferred executive compensation inhibits overall bank risk (Z-score increased by 0.822 standard deviations) by reducing earnings volatility (a decrease of 6.1%).

Secondly, Hypothesis H2 is supported. The inhibitory effect of deferral on credit risk (NPLR decreased by 17.5%) is significantly stronger than on market risk (no significant effect), because executives have direct control over credit decisions.

6 Conclusion

Global economic instability has prompted countries to pay more attention to controlling the risk levels undertaken by financial institutions, especially commercial banks. Executive compensation is closely linked to commercial bank risk-taking. Based on principal-agent theory, accounting contracts, internal debt, and other theories, this paper finds that the deferred executive compensation policy works by prompting management itself to avoid risk motives, thereby inhibiting commercial bank risk-taking.

Simultaneously, through empirical analysis of relevant data from 147 Chinese commercial banks from 2010 to 2024, exploring the deep impact mechanism of the deferred executive compensation system on commercial bank risk-taking,

two hypotheses were proposed: "Deferred executive compensation can reduce the earnings volatility of commercial banks, thereby inhibiting their risk level" and "The inhibitory effect of deferred executive compensation on the credit risk of commercial banks is stronger than on market risk." The regression results show that deferred executive compensation leads management to adopt more conservative policies, reduces the earnings volatility of commercial banks, thereby inhibiting the bank's risk level, and has a stronger inhibitory effect on credit risk than on market risk. Both hypotheses are supported.

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