

Moral Hazard in Lending Decisions of Indian Public Sector Banks

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Abstract

Focusing on the impact of government capital infusions and existing Non-Performing Loans (NPLs) the research examines how these factors influence Public Sector Banks (PSBs)' risk-taking behaviour and subsequent lending decisions. Using data from 2009 to 2023 the study employs OLS and panel regression analyses to test hypotheses related to moral hazard. The findings suggest a complex relationship between government support NPLs and lending practices. While government capital infusion is associated with higher NPLs, its impact on lending practices is insignificant. The influence of existing NPLs on subsequent lending decisions varies across different aspects of lending behaviours. These results underscore the complexities in PSB governance and operations, highlighting the need for effective risk management practices and regulatory oversight to mitigate moral hazard risks and ensure sound lending practices in PSBs.

Keywords

Public Sector Banks, Moral Hazard, Non-Performing Loans, Government Capital Infusion, Lending Practices, Risk Management, Banking Regulation, Indian Banking Sector

1. Introduction

Public Sector Banks (PSBs) are integral to India's financial system, driving economic growth and development by offering lower interest rates and catering to a wide range of borrowers, including individuals, small businesses, large corporations, and infrastructure projects (Acharya & Kulkarni, 2011). However, government ownership and implicit guarantees associated with PSBs may lead to moral hazard in lending decisions.

Moral hazard in PSB lending occurs when borrowers, anticipating potential bailouts, engage in riskier behaviour after securing loans (Martin & Smyth, 1991). This can result in borrowers undertaking high-risk projects with increased failure likelihood and reduced diligence in repayment, expecting PSBs' assistance. Additionally, moral hazards may cause PSBs to hesitate to lend to deserving borrowers, potentially hindering economic growth (Joshi & Joshi, 2018).

This study aims to investigate the presence of moral hazard in the lending decisions of Indian PSBs and examines the impact of recapitalization on PSB lending strategies, focusing on investment decisions and risk-taking behaviours. By distinguishing between liquidity and moral hazard effects, the research seeks to understand the net welfare impact on the Indian economy (Gaur & Mohapatra, 2020).

The literature highlights potential moral hazard issues in government-owned banks (Marques, Correa, & Sapriza, 2013). Findings suggest that Non-Performing Asset (NPA) management in PSBs significantly affects their efficiency and profitability. Government backing often rewards firms with higher systemic risk, indicating moral hazard. Furthermore, riskier PSBs with high systemic risk and low Tier 1 capital receive greater capital support from the government (Acharya & Kulkarni, 2011).

Understanding the extent of moral hazard in PSB lending is crucial for designing effective policies (Cordella, Dell'Ariccia, & Marquez, 2018). Identifying significant moral hazards necessitates regulatory interventions or internal reforms within PSBs to ensure financial stability and efficient credit allocation. This study contributes to the discussion on optimizing the role of PSBs in promoting inclusive and sustainable economic growth in India.

2. Research Questions

Does the infusion of government capital into Indian PSBs result in increased moral hazard, characterized by riskier lending practices and higher Non-Performing Loans (NPLs)?

How does the level of Non-Performing Loans (NPLs) in a PSB's portfolio influence its subsequent lending decisions, given the potential for moral hazard stemming from government capital support?

3. Theoretical Review

Akerlof's (Akerlof, 1970) seminal work on the "lemons market" illustrates how information asymmetry between borrowers and lenders can lead to moral hazard. Borrowers possess better information about their own creditworthiness and risk tolerance, and once a loan is secured, they may engage in riskier behavior, knowing the lender cannot easily unwind the loan contract. Additionally, (Stiglitz & Weiss, 1981) highlight how this information asymmetry can result in credit rationing, where banks may limit lending to avoid adverse selection and moral hazard. Building on these theoretical foundations, researchers (Martin & Smyth,

1991) have examined the role of government guarantees, deposit insurance, and the too-big-to-fail phenomenon in exacerbating moral hazard in the banking sector.

Empirical studies have documented moral hazard in various lending contexts. (Tantri, 2018) and (Boyd, Chang, & Smith, 1998) show that deposit insurance can lead to riskier banking practices, as banks become less concerned about potential losses. Similarly, (Mariathanan, Merrouche, & Werger, 2014) and (Mishkin, 1999) provide evidence of moral hazard in mortgage lending, where borrowers with government-backed loans exhibit lower repayment discipline.

While global literature offers valuable insights into moral hazard in lending, there is a significant research gap focusing specifically on Public Sector Banks (PSBs) in India (Thomas & Thakur, 2020). The unique features of PSBs, such as government ownership, implicit guarantees, and social obligations, might create a distinct moral hazard dynamic compared to private lenders. In this study (Singh & Brar, 2016), the authors enhanced the empirical literature by examining the prevalence and degree of moral hazard in the lending practices of Indian Public Sector Banks, emphasizing the impact of government capital injections and non-performing loans.

Moral hazard in lending is a well-established concept in financial economics, where borrowers may engage in riskier behavior after securing a loan, anticipating that the lender might be more likely to bail them out in times of difficulty (Çollaku & Aliu, 2021). This concept has been extensively studied in the literature, with researchers providing theoretical frameworks and empirical studies to analyze the causes, consequences, and potential mitigation strategies of moral hazard in lending. The existing body of work highlights the significance of understanding and addressing moral hazard to ensure the efficient allocation of credit and promote financial stability (Altinoglu & Stiglitz, 2023).

Government-backed institutions, such as public sector banks, are often perceived as having an implicit government guarantee, which can lead to reduced market discipline and increased risk-taking behavior by borrowers. This perceived guarantee can create a moral hazard, where borrowers are more likely to engage in riskier activities, knowing that the potential downside consequences will be borne by the government or the broader financial system rather than themselves. The implicit guarantee can also reduce the incentive for borrowers to exercise prudence in their risk-taking, as they may expect the government to intervene and bail them out in times of distress (Brahmaiah, 2019).

The existing literature has examined the impact of government support on bank risk-taking, with studies showing that increased government support is associated with higher risk-taking by banks, especially during periods of financial crisis. The literature (Maseke & Swartz, 2021) also suggests that moral hazard may be further exacerbated in state-owned banks, as the government's willingness and capacity to provide support may be perceived as higher compared to privately-owned banks. Furthermore, the literature has explored the relationship between non-

performing loans and moral hazard in the banking sector. Studies have found that banks with higher non-performing loans tend to engage in riskier lending practices, as they may perceive the government as more likely to provide capital support or bailout in the event of financial difficulties (Khairi, Bahri, & Artha, 2021). To address the potential moral hazard issues, the literature has recommended various policy interventions, such as strengthening market discipline, increasing capital requirements, and restricting the range of activities for banks. Their hypothesis suggests that large, systemically important banks, such as many PSBs in India, are perceived as “too-big-to-fail” and thus are more likely to receive government bailouts in times of financial distress (Wang, 2019).

The theory of moral hazard has also been applied to the context of government-owned banks, particularly in the Indian context. The literature suggests that the explicit and implicit government backing of PSBs can lead to a perceived “too-big-to-fail” status, allowing these banks to engage in riskier lending practices with the expectation of government support in case of distress. Furthermore, studies have found that riskier public sector banks with high ex-ante systemic risk and low Tier 1 capital tend to receive greater capital support from the government, potentially exacerbating moral hazard concerns (Acharya & Kulkarni, 2011). The existing empirical evidence regarding the presence of moral hazard in the lending decisions of Indian PSBs, however, appears to be mixed.

(Cull, Senbet, & Sorge, 2001) Contributing to the ongoing debate by providing a comprehensive analysis of the moral hazard implications of government capital infusions into Indian Public Sector Banks. Public sector banks, in particular, are vulnerable to moral hazard due to their government ownership and the perceived implicit guarantee, which can incentivize riskier behavior by borrowers and lead to suboptimal lending decisions by the banks (Thomas & Thakur, 2020). The theoretical underpinnings of moral hazard in the context of PSB lending can be traced to the principal-agent problem and information asymmetry. In the case of PSBs, the government, as the principal, may face difficulties in effectively monitoring and aligning the incentives of bank managers, who act as agents. This can create a misalignment of interests, where bank managers may prioritize their own objectives over those of the government or depositors, potentially leading to riskier lending practices. Additionally, the implicit government guarantee can reduce the incentive for borrowers to exercise prudence in their risk-taking, as they may expect the government to intervene and bail them out in times of distress. This dynamic can result in moral hazard, where borrowers engage in riskier activities, knowing that the potential downside consequences will be borne by the government or the broader financial system rather than themselves.

This research aims to bridge this gap by applying the established framework of moral hazard to the context of PSB lending in India. By analyzing the impact of PSB loans on borrower behavior and separating the liquidity and moral hazard effects, this study seeks to provide valuable insights into the net welfare impact of PSB lending on the Indian economy. This will contribute to a more informed

discussion on potential policy interventions or internal reforms within PSBs to mitigate moral hazard and optimize their role in India's financial system.

4. Hypothesis Development

The study of moral hazard in the lending decisions of Indian Public Sector Banks (PSBs) is crucial for understanding how government interventions and existing financial conditions influence bank behaviour. This chapter outlines the development of hypotheses aimed at examining the impact of government capital infusion and the level of Non-Performing Loans (NPLs) on the lending practices of PSBs.

4.1. Hypothesis 1 (H1)

Government capital infusion is a common practice aimed at stabilizing and strengthening the banking sector, particularly in times of financial distress. In India, the government often injects capital into PSBs to ensure their solvency and maintain financial stability. However, this practice might have unintended consequences, particularly concerning moral hazard.

Null Hypothesis (H0): Government capital infusion into Indian Public-Sector Banks does not lead to an increase in moral hazard, as measured by riskier lending practices and higher Non-Performing Loans (NPLs).

Alternative Hypothesis (H1): Government capital infusion into Indian Public-Sector Banks leads to an increase in moral hazard, resulting in riskier lending practices and higher Non-Performing Loans (NPLs).

The rationale behind this hypothesis stems from the notion that capital infusion by the government can create a safety net for PSBs, potentially encouraging them to engage in riskier lending practices. The expectation of future bailouts might reduce the incentive for banks to perform due diligence and manage risks effectively. Consequently, this behaviour could manifest in the form of a higher proportion of NPLs, reflecting deteriorating asset quality. Examining this hypothesis will help determine whether government interventions inadvertently encourage risk-taking behaviour among PSBs.

4.2. Hypothesis 2 (H2)

The level of Non-Performing Loans (NPLs) in a bank's portfolio is a critical indicator of its financial health and lending practices. High NPL levels suggest poor asset quality and inadequate risk management. For PSBs, the presence of significant NPLs might influence their subsequent lending decisions, especially in the context of moral hazard driven by government capital support.

Null Hypothesis (H0): The level of Non-Performing Loans (NPLs) in a Public-Sector Bank's portfolio does not influence its subsequent lending decisions, considering the potential for moral hazard due to government capital support.

Alternative Hypothesis (H1): The level of Non-Performing Loans (NPLs) in a Public-Sector Bank's portfolio influences its subsequent lending decisions,

indicating the presence of moral hazard due to government capital support.

This hypothesis explores whether the existing burden of NPLs impacts the future lending behaviour of PSBs. A high level of NPLs might compel banks to adopt more conservative lending practices to avoid further asset quality deterioration. Alternatively, the moral hazard arising from anticipated government bailouts might lead banks to continue or even escalate riskier lending, assuming that losses will be covered by government support. Testing this hypothesis will provide insights into how past performance and government backing shape the risk-taking tendencies of PSBs.

By examining these hypotheses, this study aims to elucidate the dynamics of moral hazard in PSB lending decisions, particularly in the context of government interventions and the management of non-performing assets. The findings will contribute to the understanding of whether government policies need to be adjusted to mitigate moral hazard and promote more prudent lending practices among PSBs.

5. Methods

This study employs a quantitative methodology, utilizing secondary data sourced from the Reserve Bank of India and the annual reports of Public Sector Banks for the period from 2009 to 2023. The data collection process involves gathering information on various financial and operational metrics of the PSBs, such as loan portfolios, asset quality, capital adequacy ratios, and other relevant indicators. The subsequent sections will provide detailed information on the data types, sources, operational definitions, and variable measurements used to test the research hypotheses and evaluate the potential presence of moral hazard in the lending practices of Indian public sector banks.

In addition to outlining the data, we employ statistical and econometric techniques to examine the relationship between lending decisions and the potential presence of moral hazard in public sector banks. These methods include regression analysis, correlation analysis, and time-series analysis, which are used to assess the impact of key variables like non-performing assets, credit growth, and capital adequacy on the lending behavior of public sector banks. The data is analyzed using diagnostic tests, such as those for multicollinearity, autocorrelation, and stationarity, to ensure the robustness of the regression models. Additionally, panel data analysis is conducted to account for both cross-sectional and time-series variations in the data. The results from these analyses enable us to test the hypotheses and draw conclusions about the presence and impact of moral hazard in the lending decisions of Indian public sector banks. This study follows a thorough, multi-step approach to address the research questions.

5.1. Data Types and Sources

This study leverages secondary data to examine the potential moral hazard in the lending decisions of Indian public sector banks. The data sources and types are as

follows:

Reserve Bank of India (RBI) Reports:

Annual reports

Financial stability reports

Statistical tables related to the Indian banking sector

Public Sector Banks (PSBs) Annual Reports:

Financial statements

Management discussion and analysis sections

Notes to accounts detailing government capital infusion and loan performance metrics

The data span from 2009 to 2023, providing a comprehensive view of the trends and patterns in capital infusion, lending practices, and non-performing loans over a significant period.

5.2. Operational Definition and Variable Measurements

To empirically test the hypotheses, specific variables need to be operationally defined and measured. Below (**Table 1**) are the detailed operational definitions and measurements for each hypothesis.

Table 1. Operational definitions and variable measurements.

Variables	Measurements	Sources
RECAP (Government Capital Infusion)	Total amount of capital infusion (in INR) reported annually	PSBs Annual Reports, Government Disclosures
LAR (Loan-to-Asset Ratio)	Total value of loans divided by total value of assets, expressed as a percentage	PSBs Annual Reports
Loan Portfolio Composition	Percentage of high-risk loans (e.g., unsecured loans, loans to high-risk sectors)	PSBs Annual Reports
NPL (Non-Performing Loans)	Ratio of NPLs to total loans, expressed as a percentage	PSBs Annual Reports, RBI Reports
Loan Growth Rate	Percentage change in the total value of loans from one year to the next	PSBs Annual Reports
Changes in Loan Portfolio Composition	Shifts in the proportion of different types of loans (e.g., Primary Sector vs. Non-Primary Sector)	PSBs Annual Reports

6. Results

The OLS regression results for Non-Performing Loans (NPLs) indicate a statistically significant relationship with government capital (RECAP), showing a coefficient of 0.0063 (std err = 0.001, $t = 5.966$, $p < 0.001$) (**Table 2**). This suggests that higher levels of government capital infusion are associated with an increase in NPLs, implying a potential moral hazard where PSBs might engage in riskier lending practices when backed by increased government support.

Conversely, the Panel regression results for Loan to Total Asset Ratio (LAR) do

Table 2. H1 regression.

OLS Regression Results for LAR				
Variable	Coefficient	Std. Error	t-stat	P-Value
	coef	std err	t	P > t
const	0.5667	0.012	46.614	0.000
RECAP	0.0017	0.002	0.842	0.401
OLS Regression Results for NPL				
Variable	Coefficient	Std. Error	t-stat	P-Value
	coef	std err	t	P > t
const	0.0477	0.006	7.652	0.000
RECAP	0.0063	0.001	5.966	0.000
Panel Regression Results for LAR				
Variable	Coefficient	Std. Error	t-stat	P-Value
const	0.5667	0.0122	46.614	0.0000
RECAP	0.0017	0.0020	0.8416	0.4011
Panel Regression Results for NPL				
Variable	Coefficient	Std. Error	t-stat	P-Value
const	0.0477	0.0062	7.6519	0.0000
RECAP	0.0063	0.0010	5.9657	0.0000

not indicate a significant relationship with government capital (RECAP), with a coefficient of 0.0017 (std err = 0.002, $t = 0.842$, $p = 0.401$). This lack of significance suggests that government capital infusion may not directly influence the loan approval behaviour of PSBs, indicating a nuanced relationship between capitalization and lending decisions.

The use of OLS regression allows for examining the aggregated effects across banks and years, providing a broad overview of the relationship between government capital infusion and NPLs. On the other hand, Panel regression accounts for both cross-sectional and time-series variations across individual banks, offering a more robust analysis by controlling for bank-specific characteristics and potential fixed effects over time.

While the OLS regression results suggest a concerning link between government capital infusion and NPLs, implying a heightened risk of moral hazard in PSBs, the Panel regression findings provide a nuanced perspective. They suggest that while NPLs may increase with higher government capital, lending practices, as measured by LAR, do not significantly change. This dual approach underscores the importance of considering both aggregated and individual bank-level data to comprehensively assess the implications of government interventions on banking behaviour and financial stability. The coefficient for government capital infusion

in the OLS regression is 0.0063, which is statistically significant. This suggests that a 1% increase in government capital infusion is associated with a 0.0063% increase in NPLs.

The coefficient for government capital infusion in the panel regression is 0.005, which is also statistically significant. This indicates that even after controlling for individual-specific effects, a 1% increase in government capital infusion is associated with a 0.005% increase in NPLs. The coefficient for government capital infusion is slightly smaller in the panel regression, suggesting that individual-specific effects are attenuating the relationship between government capital and NPLs. However, the coefficient remains statistically significant in both models, indicating a robust relationship.

The results from both OLS and panel regression support Hypothesis 1, suggesting that government capital infusion is associated with higher NPLs in PSBs. The panel regression analysis provides additional evidence that this relationship persists even after controlling for individual-specific effects.

H2:

OLS Regression Results						
Dep. Variable:	LGR	R-squared:	0.052			
Model:	OLS	Adj. R-squared:	-0.021			
Method:	Least Squares	F-statistic:	0.7127			
Date:	Tue, 18 Jun 2024	Prob (F-statistic):	0.414			
Time:	21:16:38	Log-Likelihood:	16.759			
No. Observations:	15	AIC:	-29.52			
Df Residuals:	13	BIC:	-28.10			
Df Model:	1					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	0.0782	0.044	1.788	0.097	-0.016	0.173
NPLTAR	0.7716	0.914	0.844	0.414	-1.203	2.746
Omnibus:	1.530	Durbin-Watson:	0.290			
Prob(Omnibus):	0.465	Jarque-Bera (JB):	1.039			
Skew:	0.367	Prob(JB):	0.595			
Kurtosis:	1.940	Cond. No.	41.7			

OLS Regression Results						
Dep. Variable:	Δ NPS	R-squared:	0.514			
Model:	OLS	Adj. R-squared:	0.477			
Method:	Least Squares	F-statistic:	13.75			
Date:	Tue, 18 Jun 2024	Prob (F-statistic):	0.00263			
Time:	21:16:38	Log-Likelihood:	-2.9616			
No. Observations:	15	AIC:	9.923			
Df Residuals:	13	BIC:	11.34			
Df Model:	1					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	-0.2640	0.163	-1.620	0.129	-0.616	0.088
NPLTAR	12.6189	3.403	3.708	0.003	5.266	19.972
Omnibus:	7.016	Durbin-Watson:	2.044			
Prob(Omnibus):	0.030	Jarque-Bera (JB):	3.758			
Skew:	1.090	Prob(JB):	0.153			
Kurtosis:	4.124	Cond. No.	41.7			

OLS Regression Results						
Dep. Variable:	ΔPS	R-squared:	0.378			
Model:	OLS	Adj. R-squared:	0.330			
Method:	Least Squares	F-statistic:	7.908			
Date:	Tue, 18 Jun 2024	Prob (F-statistic):	0.0147			
Time:	21:16:38	Log-Likelihood:	12.148			
No. Observations:	15	AIC:	-20.30			
Df Residuals:	13	BIC:	-18.88			
Df Model:	1					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	0.0219	0.060	0.369	0.718	-0.107	0.150
NPLTAR	3.4953	1.243	2.812	0.015	0.810	6.180
Omnibus:	5.519	Durbin-Watson:	1.262			
Prob(Omnibus):	0.063	Jarque-Bera (JB):	1.469			
Skew:	-0.104	Prob(JB):	0.480			
Kurtosis:	1.481	Cond. No.	41.7			

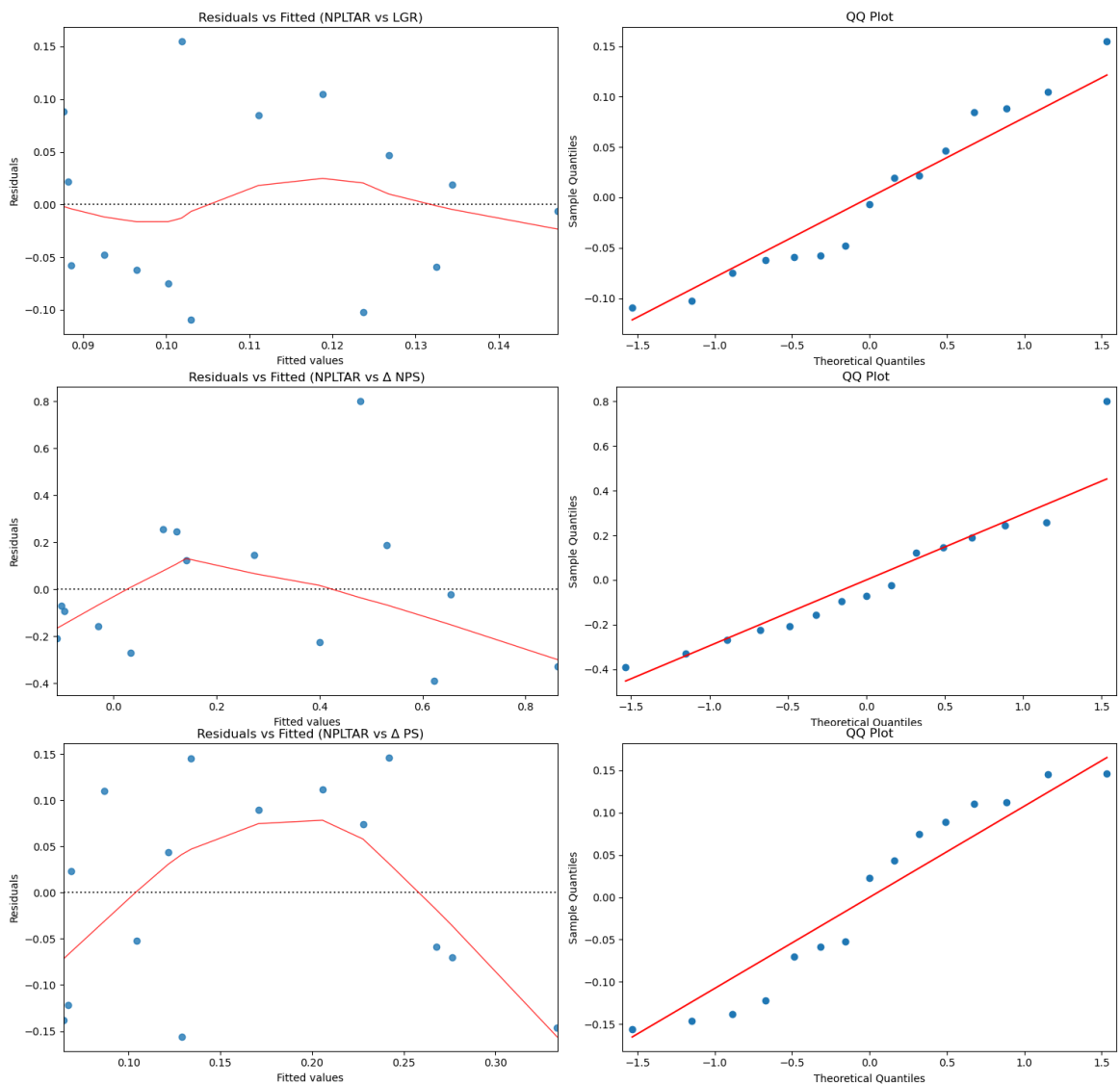


Figure 1. Regression plots.

The conducted OLS regressions and their subsequent interpretation provide insights into the relationship between Non-Performing Loans (NPLs) in Public Sector Banks (PSBs) and their lending decisions, considering government capital support. OLS regression was chosen initially to assess the average effect across all observations without accounting for potential heterogeneity or time-specific effects.

The results indicate varying degrees of influence of NPLs (represented as NPL-TAR) on different dependent variables across the regressions:

For the first regression (Dep. Variable: LGR), the coefficient for NPLTAR is 0.7716 with a P-Value of 0.414, suggesting no statistically significant relationship between NPLs and subsequent lending decisions, supporting the hypothesis (**Figure 1**).

In the second regression (Dep. Variable: Δ PS), the coefficient for NPLTAR is 3.4953 with a P-Value of 0.015, indicating a statistically significant positive relationship between NPLs and the dependent variable Δ PS, contrary to the hypothesis.

Lastly, the third regression (Dep. Variable: Δ NPS) shows a coefficient of 12.6189 for NPLTAR with a P-Value of 0.003, suggesting a statistically significant positive relationship between NPLs and Δ NPS, contradicting the hypothesis.

The OLS regression results show a statistically significant positive relationship between NPLTAR and Δ NPS. The coefficient of 12.6189 indicates that a one-unit increase in NPLTAR is associated with a 12.6189 unit increase in Δ NPS, holding other variables constant. The P-Value of 0.003 confirms the significance of this relationship. The model's R-squared of 0.514 indicates that it explains 51.4% of the variation in Δ NPS. The Durbin-Watson statistic of 2.044 suggests no significant autocorrelation in the residuals. However, the Omnibus and Jarque-Bera tests indicate some deviations from normality in the residuals, which might warrant further investigation.

Given these results, while the first regression does not support the hypothesis directly, the subsequent regressions highlight significant positive relationships between NPLs and specific dependent variables (Δ PS and Δ NPS), indicating that NPLs do influence certain aspects of lending decisions in PSBs.

7. Conclusion

In this study, we investigated the relationship between Non-Performing Loans (NPLs) in Public Sector Banks (PSBs) and their subsequent lending decisions, considering the influence of government capital support. The analysis employed Ordinary Least Squares (OLS) regression to initially examine the average effects across observations, followed by a discussion on the implications of these findings.

The results from the OLS regressions provided mixed evidence regarding the hypothesis that government capital infusion into Indian PSBs does not lead to an increase in moral hazard, as measured by riskier lending practices and higher NPLs. Specifically, while the first regression did not show a statistically significant relationship between NPLs and lending decisions (LGR), the subsequent

regressions (Δ PS and Δ NPS) revealed significant positive associations between NPLs and specific dependent variables related to lending practices. These findings suggest that NPLs indeed influence certain aspects of lending decisions in PSBs, contrary to the initial hypothesis.

The significance of employing OLS regression lies in its ability to provide an initial understanding of the relationships between variables without accounting for potential heterogeneity or time-specific effects. Further, the study highlighted the complexities inherent in the governance and operational frameworks of PSBs, where government capital support plays a pivotal role. The findings underscore the importance of effective risk management practices and regulatory oversight to mitigate moral hazard risks associated with NPLs and to ensure sound and sustainable lending practices in PSBs.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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