Riskiness of the Banks: An Empirical Analysis of the Depositor's Sensitivity

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Abstract

This study focuses on checking for the existence and strength of market discipline in based on different ownership structures of the banks. First, this article determines if depositors react rationally to risk levels depending on the bank's ownership type, and the second, if the strength of this responsiveness differs depending on the bank's ownership type. This study is based on the 38 banks in the Indian banking sector. Empirical testing is carried out using panel data analysis and various proxies to assess the riskiness of the banks. The analysis shows that market discipline exists regardless of the kind of ownership. However, its strength varies across different ownership structures of the banks. These findings are crucial for the orderly functioning of the banking system so that the bank managers do not take advantage of the market perception based on their state ownership.

Keywords: Market discipline • Riskiness of the banks • Indian banking system • Ownership type of the banks • Deposit growth

JEL classification: G21, D81, G14

Introduction

The 2007-08 financial crisis exposed many weaknesses in corporate governance in developed and emerging markets, and in banking risk management practices. The global financial crisis demonstrated that banks failed due to two primary factors: insufficient capital to protect against asset risks and poor liquidity management [1,2]. The failure of a bank is linked to the worsening of the economy. Capital is wiped out due to a lack of asset quality. The rescue of these banks is critical because their failure might have a negative impact on the entire economy due to their prominence in the financial system. As a result, government involvement to make certain monetary changes becomes necessary. However, the government's intervention has implications in the form of weak market discipline, which will be discussed further in this paper. As a result, it is critical to strengthen banks' resilience to losses, as the cost of rescuing them in times of trouble is significantly higher, and must be borne by the government and, ultimately, taxpayers. Earlier studies have shown that ownership of bank has played its role in determining the NPA levels of the banks, profitability, depositor's base and many other aspects of the functioning of the bank. However, very few studies are there that studies the impact of depositor's responsiveness towards the risk-taking behavior of the banks. In the Basel norms II, a term has been introduced- "Market discipline". which emphasizes on the disciplinary actions taken by the stakeholders of the banks itself and thereby minimizing regulatory authorities' interference in the functioning of the banks.

With the state ownership comes the belief of government support in times of distress. Due to this implicit guarantee, these banks are indulging themselves to risky investment in order to earn higher returns. One of the many adverse effects of state ownership of these banks is undue trust of the

stakeholders in the bank. Due to the mere belief of implicit guarantee, the stakeholders assume that the government support would be provided to the bank in times of distress due to which the they take no action to discipline the actions of the bank managers. Hence the responsiveness of the depositors may vary with the ownership type of the bank. Depositors of private banks may charge a higher compensation for the increased risk and may reduce their stake in the bank while the depositors of the PSBs (Public sector banks) may not respond in the same manner or with the same magnitude.

This study aims at determining if the depositors respond in a rational way to the increased risk level of the banks and second, to check if the magnitude of response to the increased riskiness of the banks differs as per the ownership type of the bank.

Market discipline

Information disclosure, market influencing and market monitoring are the three components of market discipline as identified by Flannery (2001). The following section delves more into these elements:

Disclosure of information: Depositors must be aware of the bank's critical information, including riskiness and other factors that may affect their ownership in the bank, in order to exercise market discipline. The establishment of pillar 3 (Market Discipline) in Basel norms II, in which numerous rules have been set out to enable stakeholders to make a more informed decision, is one of the actions made by the Basel Committee to strengthen bank disclosures. Several studies have been conducted to assess the impact of improved disclosure norms, one of which was conducted by Iren, Reichert, and Gramlich (2014), who found that when more information is disclosed, bank returns first fall and then rise, indicating the importance of more information disclosure.

Market surveillance: This focuses on how stakeholders react to changes in the bank's riskiness. Depositors are likely to change their ownership in the bank or seek compensation for bank managers' actions if those actions enhance the bank's riskiness [3]. Evaluated yield spreads on subordinated debt to determine the risk sensitivity of investors, which is one of the studies in this area. The research examined at the European banking industry and found that investors are sensitive to a bank's riskiness level, and that this sensitivity has been increasing since 1990, particularly for TBTF banks, implying that government support in times of trouble has diminished since 1990.

Influence on the market: This shows how depositors have an impact on bank managers' decisions. It is a process by which variations in the price of a security affect a bank's response to adverse changes in its financial status.

Pillar III- Market discipline: To ensure bank stability, Basel II emphasizes the need to strengthen market discipline (Pillar 3), as well as capital requirements (Pillar 1) and official oversight (Pillar 2). The goal of introducing market discipline as Pillar 3 is to supplement the Basel rules' of minimum capital requirements in Pillar 1 and the supervisory review process in Pillar 2. In pillar 3, a set of disclosure rules have been developed that will allow stakeholders to assess crucial information such as capital application, risk exposure, and bank capital sufficiency. This is done to ensure that bank's information disclosure matches how senior management and the board of directors analyse and manage bank risks in order to determine capital requirements under Pillar 1. It is argued that giving out information based on a common framework is an effective way to alert the market to the risks that banks face, as well as to give a uniform and comprehensive information framework, enhancing comparability. It also contributes to the creation of a healthy and secure banking environment. If a bank fails to comply with the required disclosure standards, penalties are imposed. In order to secure market discipline, bank stakeholders might exert pressure on management by withdrawing funds or demanding a higher interest rate from riskier banks. Bank regulators, on the other hand, can impose direct restrictions on the bank's operations and recommend corrective action if the bank's stability is compromised in any manner. Only depositors are included in this analysis, out of all the stakeholders targeted by pillar 3, and so market discipline through depositors' response to bank riskiness is concentrated here, as indicated in later sections of the study.

Why weak market discipline is a problem

Weak market discipline would suggest lax disclosure standards, leaving stakeholders in the dark about the banks' riskiness. This would result in less transparency, and no efforts by stakeholders to monitor the actions of bank managers to curb excessive risk-taking would be taken. As a result, the riskier bank would not be penalised for taking too much risks, and it would continue to engage in riskier activities. Therefore, it can be concluded that market discipline, as well as RBI regulatory rules, are critical for the financial system's orderly operation.

WHY ownership and market discipline

Market discipline and bank ownership type are studied together in this study because public ownership may lead to poor market discipline due to the expectation that if the bank fails, the government will bail it out. As a result, the actions taken to monitor the bank's riskiness would be less, as compared to the private sector banks. Hence, it can be seen that state ownership leads to weak market discipline which is further examined in this study.

Literature Review

Prior research has shown that bank performance and risk-taking differ depending on the kind of ownership. State banks in 16 Asian nations have poorer profitability, equity capital, managerial efficiency, and credit losses than private banks, according to Cornett MM, et al. [4]. Furthermore, as the government's engagement in the banking sector grows, the gap between two types of ownership widens. The influence of non-interest income diversification on bank performance and solvency varies with bank ownership types [5]. The author discovers a link between governmental control and bank failure in Western Europe In comparison to foreign banks, state ownership has a significant negative influence on capitalization and liquidity, as well as a positive impact on credit losses, according to Zhu W and Yang J [6]. According to the authors, the difference is due to international banks' better regulation and market discipline, whereas implicit government assistance encourages state banks to take on more risks. Foreign banks in developing economies perform better and have a higher chance of survival [7,8]. Discover that state-owned banks in Europe have a larger maturity mismatch between assets and liabilities when it comes to funding stability. According to agency theory, a firm's risk-taking behaviour is influenced by the ownership structure. Although there is no agreement on the indicators of this connection, Laeven L and Levine R [9] and Saunders A, et al. [10] confirm the agency's theoretical prediction that significant owners with 65,987 cash flow rights have higher incentives

to raise risk than those who do not. Shehzad CT, et al. [11] discovered that concentration of ownership decreases banking risk at lower levels of shareholder protection in a worldwide research. Oversight and rights. mix. Haw et al. (2010) also found that centralized management increases profitability, volatility and the risk of default for banks in Eastern and Western Europe. Found that concentration of ownership is associated with better loan quality, reduced capital risk and default risk at the same time. In a global study, also found that concentration of ownership reduces banking risk at lower levels of shareholder protection Rights and oversight. mix. found that state ownership of banks can be justified in terms of welfare debates and the need to address monopoly, externalities and distribution issues. Otchere (2005) further argues that 65, 987 government assets in the financial sector are advantageous in countries with 65,987 underdeveloped institutions. However, Haw et al. (2010) State administration was found to be affected by more government conflicts than in countries with weak legal and regulatory bodies. As a result, and Angkin and and Wihlborg (2010) found that public banks have higher credit risk than in Eastern Europe and Asia. In addition, Chou and Lin (2011) found that increased public participation is associated with increased delinquent loans and lower capital adequacy ratios of Taiwanese banks [12,13].

Hypothesis development

Among all the stakeholders, the reaction of depositors to the riskiness of banks is used to study market discipline. It is done in two ways: with a price approach and with a quantity approach. The responsiveness of interest rates on deposits to bank riskiness is observed in the Price method. Riskier banks, it is hypothesised, would pay more interest on their deposits and so face a higher cost to compensate for taking more risks. As a result, a positive relationship between deposit interest rates and bank riskiness would be proof of market discipline. The response of deposit growth to bank riskiness is shown in the Quantity method. Riskier banks, it is hypothesized, would attract less deposits, and so a negative relationship between deposit growth and bank riskiness would be evidence of market discipline. The existence of market discipline is examined in this study among banks of varying ownership structure. The following hypotheses are proposed based on the assumption that market discipline exists at both state and private ownership.

Hypothesis: Depositor's response to increased riskiness of the banks and ownership

H1: as the riskiness of the bank increases the deposit growth falls for both public and private sector banks.

H2: as the riskiness of the bank increases the cost of deposit rises for both public and private sector banks.

Hypothesis: Degree of responsiveness of depositors to increased riskiness of the banks and ownership

H3: Responsiveness of level of deposits to riskiness of the banks is less for Public Sector banks (PSBs).

H4: Responsiveness of cost of deposit to riskiness of the banks is less for Public Sector banks (PSBs).

In order to identify the type of relationship between riskiness and deposit growth, the sign of the coefficient will be observed for the first 2 hypotheses.

For the next two hypotheses, the coefficient value itself is observed. Since the coefficients values can't be compared as they are not dimension free. Hence, t ratio is compared which are nothing but the standardized coefficients. Higher the value of the t ratio, higher would be the response of the dependent variable (deposit growth and cost of deposit) w.r.t independent variables (riskiness of the babks). Depositors may behave rationally irrespective of the ownership type of the bank but the degree to which depositors respond riskiness of the banks may differ according to the ownership type of the bank. Hence, the final two hypotheses focus on the degree of responsiveness of the depositors to the riskiness which is checked through t statistics.

Data and variables

Data is taken for April, 1 2012-March, 31 2020. All public and private sec-

tor banks would be included in the study. Data about the bank's fundamentals was gathered from the RBI's "Database on Indian Economy (DBIE)" database.

Ownership (moderating variable)

Depositors have a tendency to react to the riskiness of banks in a certain way. It is expected that people act rationally and take required steps to mitigate the elevated risk level. However, due to differences in ownership, each bank's reaction to the higher amount of risk may differ. In comparison to private sector banks, PSBs may not face as much pushback. As a result, the bank's ownership type functions as a moderating variable, altering the strength of the relationship between bank's riskiness and depositors' reactions to it. Dummy banks are used in the process of splitting banks on the basis of ownership.

Risk variables

Following risk proxies are used:

Asset quality: For this ratio of gross non-performing loans to net advances (GNPA) is taken as a proxy. A higher GNPA indicates bad credit decision making process, which should have a negative relationship with deposit growth and a positive relationship with the cost of deposits.

Tier 1 capital ratio: This is also known as banks' fixed capital and includes equity, free reserve, innovative debt instruments and many more. This ratio shows the financial strength and feasibility of banks in difficult times. Therefore, the higher this ratio, the better it is for the bank. This variable would have a negative relationship with the cost of deposits and a positive relationship with the growth variables of deposits.

Management: It is computed by dividing the difference between the operating income and other income by interest income included to manage this. It covers a variety of operational costs, including salaries, worker allowances, and investment in training, reflecting a management policy perspective. These high levels of spending are not directly assigned to production activities and therefore reflect poor management. It should have a negative relationship with deposit growth and a positive relationship with deposit costs.

Dependent variables (measuring market discipline)

This paper looks at depositors' reactions to the level of risk facing the bank. The same was conducted taking into account the depositors by studying their sensitivity to the bank's risk profile. For this following proxy variables are being used:

Deposit growth: This is calculated by dividing difference between deposits of current year (CY) and deposits of previous year (PY) by deposits of PY. It is a quantitative variable that represents the responsiveness of the depositor. Under disciplined market conditions, the increased risk leads to a decrease in bank deposits and vice versa. Therefore, negative relationships should prevail, explaining the existence of market discipline that discourages depositors from trusting banks for deposits.

The cost of deposit: This is an implicit measure of the cost of interest on a deposit, measured by dividing the total cost of interest on the deposit by the total amount of deposits. As mentioned above, implicit indicators are used because the interest rates offered by the banks vary according to the nature, the maturity period of different deposits and also vary according to the monetary policy of the RBI. Under disciplined market conditions, increased risk increases the costs of bank deposits and vice versa. This variable should have a positive relation with the risk level of the bank (Tables 1 and 2).

Control variables

- Consumer Price Index (CPI) combined
- Gross Domestic Product Growth Rate (GDPR)

Research Methodology

The research is based on panel data from 38 banks, covering the years 2012 to 2020. Fixed effect has been used after conducting Hausman test. The deferred value is applied to all risk variables because it takes time for depositors to receive information about the bank's fundamentals and operations. Each model uses two control variables, the growth rate of Gross Domestic Product (GDPR) and the Consumer Price Index (CPI). A separate model is presented for each risk proxy to obtain depositors' sensitivity to bank's risk. To account for the fact that critical information is made public with a delay and hence takes time to reach depositors, lag values are used for all risk variables. Separate models (Model 1-Model 6) are created for each risk proxy in order to determine the depositors' sensitivity to the riskiness of the banks based on the ownership.

Model 1

Deposit growth $_{it}$ = α + $\beta 1$ (ownership type $_{it-1}$ *risk variables $_{it-1}$) + $\beta 2$ risk variable $_{it}$ + $\beta 3$ GDPR $_{it}$ + $\beta 4$ CPI + ε_{it}

Table 1. Descriptive statistics.

Variables	Observation	Mean	Standard Deviation	Minimum	Maximum
Tier 1 ratio	341	10.724	3.599	5.27	55.93
Gross NPA	342	5.820	5.665	0.200	27.954
Ratio of burden	342	9.189	5.547	-9.853	40.117
Deposit growth	340	111.932	13.696	46.291	232.074
Cost of deposit	340	5.757	2.179	0.043	8.738
GDPR	342	6.338	1.421	4.181	8.256
CPI	342	6.212	2.524	3.4	10.2
Ownership	342	0.526	0.500	0	1

Table 2. Correlation among variables.

	Tier 1 Ratio	Gross NPA	Ratio of Burden	Deposit Growth	Cost of Deposit	GDPR	CPI	Ownership
Tier 1 Ratio	1	-	-	-	-	-	-	-
Gross NPA	-0.310	1	-	-	-	-	-	-
Ratio of Burden	0.272	-0.007	1	-	-	-	-	-
Deposit Growth	0.616	-0.447	-0.184	1	-	-	-	-
Cost of Deposit	-0.025	0.472	0.091	0.271	1	-	-	-
GDPR	-0.105	-0.416	-0.145	0.092	0.6115	1	-	-
CPI	0.026	-0.503	0.017	0.326	0.418	0.186	1	-
Ownership	-0.554	0.446	-0.132	-0.316	-0.068	0.008	0.003	1

Where,

Deposit Growth= (deposits of CY-PY) *100/deposits of PY

Risk variables include ratios as mentioned earlier which are asset quality management and tier 1 capital ratio.

Control variables- GDP growth rate and consumer price index

Model 2

Cost of deposit $_{it}$ = α+ β1 (ownership type $_{it-1}$ *risk variables $_{it-1}$) + β2 risk variable $_{it}$ + β3 GDPR $_{it}$ +β4 CPI $_{it}$ +ε $_{it}$

Where,

Cost of Deposit- interest expense on deposits/deposits

Risk variables include ratios as mentioned earlier which are asset quality, management, tier 1 capital ratio.

Control variables- GDP growth rate and consumer price index.

Market discipline can be traced with the nature of the relationship between the dependent variable (deposit growth and cost of deposit ratio) and the interaction terms as independent variables. This is indicated with the sign of the coefficients in both of these models. However, for the strength of market discipline, t statistics would be considered. Linear combination of the variables are made and tested for significance due to the presence of interation terms in the regression models. Based on these results, a new column of adjusted t statistics (adj t stats) has been presented in the tables. It is being hypothesised that the strength of this response would be lower for PSBs than the private sector banks. The significance of the linear combination of these factors has been evaluated and given in the column of adjusted t values since all of the models include interaction terms with dummy variables.

Results and Discussion

Empirical results

This section examines whether depositors punish riskier banks by withdrawing funds or demanding a higher interest rate on their deposits, based on the ownership of the banks. This section also looks at differences in depositors' reactivity to the riskiness of banks based on their ownership type. In other words, proof of the presence depositor's rationality and strength is examined in this section.

Following the Hausman test, fixed effect is applied. Because all of the models incorporate interaction variables, each t statistic is generated and reported under the adjusted t statistic column. The following findings are drawn solely on the basis of these corrected t statics. The appendix contains all of the results (Table 3).

Gross non-performing assets: The existence of market discipline can be seen in the negative association between deposit growth and the interest rate on deposits ratio, as well as the positive relationship between deposit growth and the interest rate on deposits ratio. The magnitude of coefficient strength varies as well. In both models of deposit growth and interest rate on deposits, the adjusted t data for private sector banks are higher than for PSBs. As a result, this validates the theory that depositor sensitivity to bank risk varies depending on the bank's ownership structure.

Burden to interest income: (Operating Expenses - Other Income)*100/interest earned. This ratio has a positive relationship with deposit growth, which is contrary to expectations. This could be because a lower non-interest expense ratio is associated with reduced overhead costs (wage bill, printing and advertisement cost, etc.). As a result, the bank's prospects of acquiring

Table 3. Regression results cost of deposit- Dependent Variable.

Explanatory variables	Model 1				Model 2				Model 3			
	Coefficient	SE	t stats	Adj t stats	Coefficient	SE	t stats	Adj t stats	Coefficient	SE	t stats	Adjusted t statistic
Constant	0.524	0.952	0.55		-0.287	0.542	-0.53		0.078	0.738	0.11	
Tier 1 ratio	-0.003	0.036	-0.10	-2.35***								
Tier 1 ratio*PSBs	-0.348***	0.155	-2.25	-2.25***								
Ratio of burden					-0.069***	0.035	-1.97	1.56				
Ratio of burden*PSBs					-0.028	0.056	-0.51	1.25				
Gross NPA									0.175**	0.072	2.42	2.42***
Gross NPA*PSBs									-0.133*	0.067	-1.99	2.49***
GDPR	0.801***	0.064	12.51		0.797***	0.062	12.74		0.753***	0.072	10.33	
CPI	0.276***	0.033	8.13		-0.279***	0.033	8.28		0.213***	0.043	4.89	
No. of observation	340				340				340			
R^2	0.52				0.49				0.39			

Deposit Growth- Dependent Variable												
Explanatory variables	Model 4				Model 5				Model 6			
	Coefficient	SE	t stats	Adj t stats	Coefficient	SE	t stats	Adj t stats	Coefficient	SE	t stats	Adjusted t statistics
Constant	-23.708***	5.730	-4.14		-9.553***	3.673	-2.60		10.007	5.077	1.97	
Tier 1 ratio	2.145***	0.216	9.89	9.89***								
Tier 1 ratio*PSBs	-0.594***	0.932	-0.64	9.25***								
Ratio of burden					1.035***	0.239	4.32	4.32				
Ratio of burden*PSBs					-0.723**	0.382	-1.89	2.43				
Gross NPA									-1.322***	0.496	-2.66	-2.66
Gross NPA*PSBs									0.982***	0.461	2.13	-0.53
GDPR	0.857***	0.395	2.22		0.7664**	0.423	1.81		-0.407	0.501	-0.81	
CPI	1.595***	0.204	7.81		1.667***	0.228	-7.29		1.277***	0.300	4.25	
No. of observation	340				340				340			
R^2	0.63				0.35				0.42			

new clients are reduced, and existing customers are frequently lost as a result of poor service. The interest rate on deposits, on the other hand, has no significant correlation with this ratio. However, when comparing private sector banks to public sector banks, the coefficients of this regression are larger, indicating a lack of market discipline, which validates the theory. This suggests that, in comparison to private sector banks, depositors of PSBs are not as affected by the bank's services.

Tier 1 capital ratio: The existence of market discipline in the deposit growth model is clear due to the positive link between deposit growth and tier 1 capital. This means that as tier 1 capital is depleted (risk increases), the bank is penalised by having its deposits reduced. The interest rate on deposits ratio and the tier 1 ratio has a negative relationship, suggesting that as the tier 1 ratio falls, the banks' interest rate on deposits rises. The degree to which market discipline exists varies as well. In both models, the value of the t statistics is higher for private sector banks. As a result, the prediction that depositor sensitivity to bank risk varies depending on the bank's ownership structure is supported.

Conclusion

This analysis is based on 38 banks in the Indian banking industry, both public and private, from 2012 to 2020, to examine the existence of market discipline, and to see if the strength of market discipline varies by ownership type. To this goal, several risk proxies are used as independent variables, with their interaction with ownership as a dependent variable. This study shows that depositors respond to a bank's riskiness regardless of the bank's ownership structure. Depositors can either lower their stake in banks by withdrawing deposits (quantity method) or by receiving a higher interest rate for their deposits as compensation for increased risk from the banks. As a result, depositors punish riskier banks irrespective of the ownership. However, risk sensitivity differs depending on the bank's ownership structure. Depositor responsiveness is found to be lower for PSBs (public sector banks) than private sector banks in terms of deposit growth and cost of deposit. As previously indicated, this could be owing to the expectation that as a PSB, the bank would be bailed out in times of trouble. As a result, depositors have a higher level of trust in these institutions than in other banks. Hence, they do not penalise PSBs for taking more risks. Thus, it is clear that the ownership types of banks play a role in the strength of depositors' reactivity to the riskiness of the banks. These findings are empirical in the context of orderly functioning of the banks. If like the depositors, other stakeholders continue to trust the banks merely on the basis of their state ownership, then the managers of such banks may indulge into riskier activities without considering their tolerance level. Moreover, this type of

implicit guarantee available with the banks hampers the competitive strength of the other banks. Hence, the regulatory authorities must take into account if their actions are somehow providing an implicit guarantee to these banks and take actions accordingly.

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