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Examining the determinants of financial stability of Indian small finance banks: An exploration of banking performance indicators

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Abstract
A recent development of the Indian Small Finance Banks aims on financial inclusion by offering essential banking services and credit facilities through a unique approach. The key challenge for these banks lies in achieving a cost-effective liability base and establishing accessible lending practices, all while leveraging strong technological infrastructure. Based on the importance of these financial institutions this study aims to examine the impact of banking performance indications on the financial stability and risk-adjusted performance matrices. Taking the CAMELS covariates as independent variables, this study has employed multiple linear regressions on 12 Indian Small Finance Banks covering a period from 2015 to 2024. The results suggested a positive impact of independent variables on the financial stability. However, outcomes partially supported that these factor could enhance the banking risk-adjusted performance matrices.

Keywords: Small Finance Bank, Financial Stability, Risk-adjusted Performance, CAMELS

Introduction

The financial stability has not been defined on a common ground if compared with the analysis of monetary and macroeconomic stability (Schinasi, 2004) [28]. It is often understood as the absence of financial fragility which arises from extreme market volatility or banking crisis and related financial shocks. Instability refers to the insolvency and liquidity problems and also provides a sequence of events of banks' failure. The recognition that a risk to financial stability in one location can pose a risk to financial stability globally necessitates a shift in treating financial stability from an implied factor to a clearly defined element in economic policy.

Mainly, the successful development of the economy depends on the effective and stable performance of its banking system. Banking stability assumes greater importance, particularly in context of the emerging market financial system where banks dominate more than 70 to 80 percent of the financial system. An evaluation of effective performance and reliable commercial banks is closely related to the stability of the financial system of an economy (Miletic, 2009) [19]. This stability raises the confidence of its depositors and investors in the financial system. A recent development in the Indian banking sector is the rise of Small Finance Banks (SFBs). These banks are tasked with advancing financial inclusion by offering essential banking services and credit facilities through a unique approach. The key challenge for these banks lies in achieving a cost-effective liability base and establishing accessible lending practices, all while leveraging strong technological infrastructure. Despite the literature has far discussed the stability in the Indian commercial banking sector, there is a profound gap that needs to be cover in the SFBs which are in working since the year of 2015.

Previous research has established a positive and significant correlation between financial stability and the banking system's performance. Earlier investigations, including those conducted by Schinasi (2004) [28] and Allen and Wood (2006) [3], highlighted the crucial importance of stabilizing the financial sector, emphasizing its beneficial impact on both the banking sector's performance and the overall development of the financial sector. Furthermore, studies have indicated the positive and substantial effects of factors such as human capital, economic growth, investment, and trade openness on the banking system's performance (Zeqiraj *et al*., 2021) [36]. In essence, these research findings confirm the central role played by these variables in influencing banking performance. The linkage of banking stability with the performance matrices banks further seeks to examine the risk-adjusted performance matrices also such as ROA and ROE.

Given the crucial role of financial sector, this study is going to explore the determinants of financial stability and risk-adjusted performance particularly in the Indian SFBs. Section 2 focused on the established literature surrounding the determinants of financial stability; whereas, section 3 covers the research methodology. Findings and discussion has been given in the section 4, and 5. Section 6 presented the conclusion of the study with its limitations and further scope.

Review of Literature and Hypothesis Development

In literature, there are various measures used for measuring the financial stability of the banking system. The assessment of banking sustainability is a well-established notion, with each bank employing its own internal strategies to uphold sustainability. A prominent example is the CAMELS rating method, which encompasses factors such as capital adequacy, asset quality, management effectiveness, earnings, liquidity, and market risk sensitivity. But there are also external influencing factors which used to measures sustainability and provide assistance regarding attaining it.

Abuzayad *et al*. (2018) categorize these measures in market-based and accounting-based stability measures while investigating the impact of diversification in Zavadska (2011) [35], highlighted equity, assets, liquidity, solvency,

profit efficiency, and risk as key financial indicators of stability and other organizational factors. Poghosyan and Cihak (2011) [25], analyses the determinants taken as CAMELS covariates and market discipline approximated by the ratio of total interest expenses to total deposits. They also take a dummy variable as a contagion dummy which values one for a bank if there was a failure in a similar bank (same size). And macro-variables were taken as concentration and stock market indicators.

Vasilyeva *et al*. (2016) [33] formalizes the factors that affect the stability in the Ukrainian banks and found the positive impact of interest margin to total income ratio, reserve to assets ratio, number of branches and ratio of NPL to total loans. On the other hand, liquidity and efficiency affect negatively to banks stability. Following the methodology of Lavrushin and Mamonova (2011) [16] that represent an economic model of financial stability of credit organization and banking sector, Daryakin and Klaas (2016), [9] with the help of correlational-regression analysis, detect the factors and define the financial instability of Russian banking system.

Based on the secondary data of Malaysian banks from the year 2002 to 2011, Sun *et al*. (2017) [30] identify the macroeconomic factors and categorize them as reserve, interest rate, exchange rate, and financial crisis. They resulted that all the factors were significantly impacting the financial stability of the banking system, measured by the extent of liquidity except the factor i.e. interest rate. Thus, in literature, various bank-specific, industry-specific and economic indicators have been studied to examine the significance of those in a particular economy. Meslier *et al*. (2014) [17] examined the consequence of banks income diversification on banking performance using 39 banks in the Philippines from 1999 to 2005.

Improving loan quality can enhance the returns on bank loans and decrease the likelihood of failure. However, achieving higher loan quality comes with associated costs that require careful management by banks (Khalid, 2012) [12]. One significant risk to the banking sector is the existence of Non-performing assets (NPAs), which represent loans that borrowers have failed to repay. Michael *et al*. (2006) [18] stressed that NPAs can negatively impact operational efficiency, subsequently affecting the profitability, liquidity, and stability of banking firms (Ombaba, 2013) [23]. Another measure, according to Koch (2015), for effective credit risk or asset quality is the ratio of loan loss reserves to gross loans.

Specifically focusing on the Indian small finance banks, the study of Ray and Shantnu (2021) [26] has studied the CAMEL components of 10 banks and provided that there was significant differences in the CAMELS components except the earnings ratio. While the other study (Kundu, 2022) [15] on this line indicated that SFBs face concentration risk both in their assets and liabilities. There are other studies as well that has concentrated on performance of small finance banking in India (Neelam and Tiwari, 2019 [21]; Ali and Kaveri, 2021 [4]; Anitha, 2024) [6]. However, the stability and risk-adjusted performance of these banks is not much focused in previous literature. Thus, the study aims to measure the stability and risk-adjusted performance of these banks and empirically examined the relationship with CAMELS components. To achieve this objective, this study has developed the following hypothesis to be analysed:

H1: There is significant and positive impact of banking performance indicators on the financial stability of Indian Small Finance Banks.

H2: There is significant and positive impact of banking performance indicators on the risk-adjusted financial performance of Indian Small Finance Banks.

Methodology

The study has followed the descriptive research design. Defining the various determinants of banking financial instability, impact of those determinants has been tested through empirical analysis.

1. Sample Design and Data Sources

The population for the study is the 11 Indian Small Finance Banks. Sample of all those banks that are in working atleast for the seven year of the study period have been taken for study. The selection of the sample is limited to only SFBs due to the similarity in their functioning and regulation. The main source for bank-specific data is the RBI Database on Indian Economy (DBIE) that published the financial data of banks' balance sheet, income statement and annual reports of SFBs of India. And, the other relevant data have been obtained through Prowess Database, a database of CMIE (Centre for Monitoring Indian Economy). For macroeconomic data of the Indian Economy, Statistical Year Book of Economy in India has been used as a source.

2. Period of the Study

The period for the research starts from the financial year 2015 to 2023. Thus, the study is trying to find out the position of financial stability or instability in the Indian SFBs by employing the cross-section analysis of this period. Thus, the study has overall taken the nine year time span to check the various related aspects of financial stability.

3. Empirical Model

There are various factors have been developed in literature that explain the financial stability of financial system such as Nkomo *et al.* (2013) [22], Poghosyan and Cihak (2011) [25] have used the CAMELS and GDP and Daryakin and Klaas (2016) [9], Pesola (2007), Sun *et al.* (2017) [30], Vasilyeva *et al*. (2016) have investigated diverse banking, industry, and economic indicators in their analyses of the determinants of financial stability. Based on the importance of CAMELS covariates, GDP growth and interest rate have been used.

4. Empirical Estimation

Taking the abovementioned indicators and following the suggestions of Poghosyan and Cihak (2011) [25], Gunsel (2012), this study has used the following empirical model:

$$Risk_{it} = C + \alpha CAMELS_{it} + \beta\, CONTROL_{it} + u_{jt}$$

here 'i' and 't' represent the bank and time, respectively, and C is the constant. RISK is the stability/fragility measures such as Z-score, RAROA and RAROE. Based on accounting measurements, the Z-score is a commonly utilized risk exposure indicator in widespread use. The Z-score can be understood as the measure of how many numbers of standard deviations a bank's returns would need to decrease from the mean to exhaust all its equity. RAROA, a financial stability measure, captures the risk-adjusted financial performance of a banking firm, which has been measured as return on assets. Another dependent variable, i.e., RAROE, is the risk-based return on equity, utilized as another financial stability measure. Study has not

used the market-based measurement of financial stability due to a very less SFBs were listed on any stock exchange during the study period. All the above-mentioned dependent variables used in the study were calculated as follows:

$$Z_{it} = \frac{ROA_{it} + \left(\frac{E}{TA}\right)_{it}}{\sigma ROA_{it}}$$

Where, Z_{it} is the Z-score for a bank for a particular time period; $\text{ROA} = \frac{\text{Total Assets}}{\text{Net Income}}$ and, Capital to Assets (CTA) = Total Equity capital ⁄ Total Assets

$$RAROA_{it} = \frac{ROA_{it}}{\sigma ROA_{it}} \text{ ; and } RAROE_{it} = \frac{ROE_{it}}{\sigma ROE_{it}}$$

CAMELS are bank-specific micro variables, an acronym that stands for the above-mentioned six key components, i.e., CAR, AQ, MQ, EQ, LIQ, and NIM. CONTROL is a vector of control variables that includes bank size (SIZE), Growth of GDP (GDPG), and Real rate of Interest (RIR) and Covid to control the impact of Covid-19. Thus, there are thirteen independent variables and four control variables (Table 1) used in the regression analysis to check the impact of determinants on the financial stability of Indian Small Finance Banks.

Table 1: Variables Formation and Description

Variable Name	Nature of Variables	Description
Risk	Dependent Variables	Z-score, RAROA, RAROE (representing financial stability)
Capitalisation (CAR)	Independent Variables	Total equity/ Total assets or CAR
Assets Quality (AQ)		Total Advances to Total Assets Ratio (LTA)
		loan-loss provision/total loans (LLPs)
		Net Non-Performing Assets / Net Advances (NPLs)
		ROA
Managerial Quality (MQ)		Total cost/Total Income (TCTI)
		Profit Per Employee (PPE)
		Business Per Employee (BPE)
Earnings Quality (EQ)		Net Income / Average Shareholder's Equity (ROE)
		Interest Income /Total Income (IITI)
Liquidity (LIQ)		Cash/Deposit (CD)
		Total Investment to Total Deposit Ratio (ID)
Sensitivity (Net Interest Margin= NIM)		(Interest Income - Interest Expense) / Interest Earning Assets
SIZE	Controlling Variables	Natural logarithm of the total assets
GDPG		GDPG as growth rate of GDP
RIR		Real rate of interest
COVID		A binary variable, value is "1" for the financial year of 2021 to 2022, otherwise "0"

Source: Authors' Compilation

The study has employed panel regression to account for both cross-sectional and longitudinal data features. Panel data considering a total of 12 Indian SFBs and the impact of banking performance determinants on the Indian banks' financial stability has been measured using Multiple Linear Regression analysis.

Results

1. Descriptive Outcomes

A higher Z-score advocates lower susceptibility to insolvency because it indicates a sufficient level of capital to withstand potential risks or shocks in a bank's earnings. Numerous studies have supported this interpretation (Hasan and Risfandy, 2021 [11]; Saha and Dutta, 2021 [27]; Abedin, 2023) [1]. Descriptive outcomes of the variables used in the study are presented in Table 2. The Z-score has a mean value of 2.238 with a standard deviation of 3.235, while the corresponding values for the RAROA are 2.219 and 3.221, respectively and, for RAROE it is 1.529 and 2.475 respectively. Regarding the independent variables of the study, firms have a CAR of 16.342. For LTA, the ratio is 0.631, and the NPLs ratio has a value of 3.534. Total cost represents an average score of 6.912 to total income, with a deviation of 0.441. In terms of earnings quality, the outcomes reveal that the average ROA of 0.496, with a deviation value of 3.569. The ratio of interest income to total income (IITI) has an average value of 0.885, also with a deviation of 0.441 throughout the period. Additionally, liquidity, measured by the investment-to-deposits ratio (ID), has a mean value of 16.089, while the value of cash-to-deposits ratio (CD) stands at 0.208, which is lower than the investment deposit ratio. Banks exhibit a net interest margin (NIM) of 7.831, with a value of SD of 3.108. The maximum size of the banks has a score of 13.713, with an average value of 11.043, which has been standardized using the natural logarithm.

Table 2: Descriptive Statistics

Variables	Mean	Std. Dev.	Min.	Max.
Z-score	2.238	3.235	0.026	19.500
RAROA	2.219	3.221	-1.862	19.489
RAROE	1.529	2.475	-1.951	15.041
CAR	16.342	15.738	0	63.71
LTA	0.631	0.182	0	0.918
LLP	0.036	0.071	0	0.441

NPL	3.534	15.625	0	63.71
ROA	0.496	3.569	-20.52	8.403
TCTI	6.912	0.441	0.333	8.142
PPE	0.123	0.343	-1.676	0.965
BPE	16.630	17.720	0	65
ROE	0.118	9.415	-63.726	37.104
IITI	0.885	0.061	0.609	1
CD	0.208	1.840	0	17.177
ID	16.089	40.449	0	123.822
NIM	7.831	3.108	0.026	16.293
SIZE	11.043	1.351	5.434	13.713
GDPG	5.585	4.352	-5.8	9.1
RIR	3.649	2.763	0.100	7.600
COVID	2.132	4.234	0	1

Notes: Mean is the average, Std. Dev. is the standard deviation, Min. is the minimum value and Max. is the maximum value of each of the variable used in the study.

Source: Authors' Compilation

The correlation between different variables has been displayed in Table 3. The bivariate correlations are generally low, indicating no significant multicollinearity issue. Pearson's correlation is used, and the pairwise correlation matrix shows that no correlation between dependent and independent variables. The mean VIF of 4.18 confirms the negligible correlation among all the variables.

2. Empirical Outcomes and Discussion

Table 4 illustrates the significance of each independent variable in relation to the dependent variable i.e., Z-score (Model 1), RAROA (Model 2) and RAROE (Model 3). As per the Model 1, the results of the multiple linear regressions reveal that several variables, namely Capital (CAR), ROA, ROE, IITI and ID are positively correlated with the Z-score. These variables make a significant contribution to maintain the stability of the Indian small finance banking system. For the control variables, Size of the firm, RIR, and GDPG also presents a positive association with the Z-score. While LTA, NPL and TCTI gives a negative and significant association with the Z-score. A negative and insignificant impact of LLP has shown that till now, SFBs are not much focused in provisioning for non-performing assets or there is very less need to maintain loan loss provisions in these banks. Another reason might be the managerial efficiency wile selection the loan disbursement area. While talking about the Model 2 and Model 3, CAR has shown a positive and significant influence on the dependent variables. For the assets quality variables, not any positive association have been found with the LTA and signifying that NPL is adversely related with the stability (RAROA).

ROA gives a positive impact on ROAROA which is statistically significant at 0.10 level. TCTI does not provide any positive impact on the RAROA and RAROE. ID ratio has contributed positively and significantly in enhancing the risk based profitability (RAROA and RAROE). NIM found to be positively related with the RAROE as shown in Model 1. Whereas, Covid has shown a negative impact on RAROA alongwith the Z-score. Adequate capital buffers act as a safety net during times of financial stress, enabling banks to absorb losses and maintain their operations. A robust ROA and ROE reflects efficient utilization of resources and effective management of risks, bolstering a bank's overall stability. ID impact has also depicts that banks are able to manage its liquidity efficiently. The findings of this study support the conclusions drawn in previous Indian studies conducted by Gunsel (2012), Swamy (2014) [32], and Sinha and Sharma (2016) [29]. These studies have also established a positive relationship between variables related to capital adequacy, assets quality, and the managerial efficiency component of CAMELS with financial stability of banks.

Table 4: Results for the Multiple Regression Analysis

Variables	Z-score (Model 1)	RAROA (Model 2)	RAROE (Model 3)
	Coeff. (Sign)	Coeff. (Sign)	Coeff. (Sign)
CAR	0.021**	0.032**	0.028**
LTA	-2.355**	-2.829***	-2.145***
LLP	-3.41	0.708*	-3.367
NPL	-0.055***	-0.080***	0.030
ROA	0.174	0.318*	0.270*
TCTI	-4.685***	-6.655*	-3.046*
PPE	-0.507	-2.044***	-0.035***
BPE	0.003	0.005	-0.006
ROE	0.174**	-0.169**	0.133**
IITI	3.878***	4.245	5.279
CD	-1.090**	-2.448	-10.163
ID	0.085***	0.087***	0.045***
NIM	0.264***	-0.218***	0.015***
SIZE	0.816	0.955***	0.367***
RIR	0.254**	0.260	0.086
GDPG	0.022***	0.023	-0.001
COVID	-0.323**	-2.001***	0.091***
Cons.	-3.010*	-2.862	-2.658
R Sq.	51.18***	50.17***	56.97***

Notes:
***, **, * denote the level of significance at 0.01 level, 0.05 level and at 0.10 level, respectively.
Results are based on STATA Outcomes

Source: Authors' Compilation

Overall, the study emphasizes the significance of capital adequacy, assets quality, earnings quality, liquidity and sensitivity (as represented by net interest margin) in maintaining stability and reducing the risk of banking defaults in the Indian context. The results are in line with earlier studies that have focused on examining the impact of various determinants on the firm's solvency and instability such as Poghosyan and Cihak (2011) [25], Swamy (2012), Arrawatia *et al*. (2019) [7] and Ali and Kaveri (2021) [4]. However, managerial quality does not plays any significant

role in banking stability. Thus, the study highlights that there is less efficiency in effective resource deployment by managers, which leads to economic deficiency for banking firms.

Based on the regression analysis results, the study concludes that strengthening the CAMELS components can enhance stability in small finance banks. This supports H1 that banking performance indicators have a positive and statistically significant effect on stability of Indian SFBs. However, it partially supported the H2, stating that banking performance indicators have a positive and statistically significant relationship with risk-adjusted performance indicators of SFBs. SFBs encounter numerous challenges including elevated transformation costs, managing non-performing assets, adhering to prudential norms, adapting to technological advancements, facing intensified pressure on profitability, and competing with other banks in the economy. Consequently, this current research assesses the overall profitability and performance of specific SFBs in India. Specifically, the present study confirms that CAR, ROA, IITI, ID and NIM contribute to enhancing the financial stability as well as the risk-adjusted performance of SFBs. This aligns with the findings of Swamy (2014) [32], Sinha and Sharma (2016) [29] and Kundu (2022) [15]. By corroborating these previous studies, the current research further strengthens the understanding of the factors concerning CAMELS rating which play a vital role in promoting financial stability within the banks. Thus, the study has widened the area of CAMELS rating with a view that apart from providing a financial performance, it might be used to define the stability and risk-adjusted performance of the SFBs.

Conclusion and Implication of the Study

This study tends to analyse the impact of bank-specific performance factors on the stability and risk-adjusted performance matrices of Indian SFBs. The aim is to examine the impact of the CAMELS components on financial stability, particularly using accounting-based measures. The research output provides positive insights into the importance of capital adequacy, asset quality measures, earnings quality, liquidity and sensitivity elements of the CAMELS model in measuring financial stability in the Indian SFBs. This reinforces the significance of these components in assessing and maintaining stability in Indian banks. Thus, the first hypothesis (H1) of the study has been validated, which states there is a positive and significant effect of bank-specific performance determinants on the financial stability of Indian SFBs. Further, the study provided partial validity to H2 of the study which measure the impact of banking performance indicators on the risk-adjusted performance of the Indian SFBs. The study has practical implication for the stakeholders and managerial executive of the SFBs in order to assess the risk-based performance and financial stability of these banks. Along with this, the policymakers and regulator might focus to enhance the managerial efficiency related policies. The study has provided novel evidences on this area in Indian SFBs which could be further extended by employing a comparative analysis with other types of banks or taking other independent variables.

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