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Macroeconomic Shocks and Bad Debt Vulnerability of Weak Banks in Bangladesh

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ABSTRACT

The resilient of banking sector in Bangladesh has come under increasingly serious challenge from the rising NPL and ongoing macroeconomic instability, such as the frequent of inflationary pressures, interest-rate shifts, exchange rate depreciation, GDP growth decrease, unemployment shocks have all crippled structurally weak banks; making them more susceptible to the accumulation of bad debt; but empirical studies are still scarce in Bangladeshi context about it. The objective of this study was to investigate the effects of adverse macroeconomic shocks, namely, inflation, interest rate, exchange rate, GDP, and unemployment shocks, on the bad debt vulnerability of weak banks in Bangladesh and assess the moderating role of risk management practices on the relationship. A quantitative cross-sectional design was used, and 350 employees of state-owned, private, and Islamic banks were approached in order to obtain primary data using a structured Likert-scale questionnaire followed by descriptive statistics and inferential test. The findings revealed that all the macroeconomic shock chocks have positive and significant impact on the nonperforming loan vulnerability, while weak governance, low capital adequacy and credit appraisal exacerbated its effect. Results indicated weak banks were more exposed to the growth of NPLs and rescheduling, as well as had a higher burden of provisioning under economic instability, while good risk management practices helped mitigate vulnerability. The study recommends that strengthening governance arrangements, capital cushions, and risk management systems will be crucial in defusing macro-shock-induced bad debt vulnerability to sustain stable banking sector stability in Bangladesh.

INTRODUCTION

Banking industry is essential in promoting economic growth as it dominates the production sector through saving mobilization, investment promotion and financial resources allocation (Vrotslavskyy & Dropa, 2024). In countries like Bangladesh, where institutions of financial intermediation is largely provided by banks, the soundness of the banks is very fundamental to macroeconomic stability (Anjom & Faruq, 2023). The Bangladeshi banking industry, however, has grappled with years of non-performing loans (NPLs), weak governance frameworks and increased vulnerability to macroeconomic instability (Mallik, 2024). These problems have triggered serious doubts about the capacity of structurally fragile banks to withstand macroeconomic shocks and preserve financial stability (Ahamed & Chowdhury, 2025). Bangladesh has regularly witnessed inflation, policy-induced changes in interest rates, devaluation of exchange rate, deceleration of GDP growth rate and increase in unemployment amid the global economic disturbances, pandemics and geopolitical crises (Islam *et al.*, 2022). Such macroeconomic shocks have obvious impact on the ability of payback for borrowers, business profit and cash flow stability, which lead to an increase in default risk and the non-performing assets problems from system (Rumaly, 2023). Although these shocks impact the entire banking sector, the weak banks, with low capital adequacy, suboptimal credit risk management practices, bad governance, and idle monitoring capacity, are more susceptible to unfavorable macroeconomic cycles (Tasneem, 2024). Regulatory reforms introduced by the Bangladesh Bank to improve PR, capital adequacy and LC standards have not actually lowered the LR in badly performing banks (Kim *et al.*, 2022). This ongoing vulnerability demonstrates weaknesses that amplify the transmission of macroeconomic shocks to bank capital (Johan & Hapsari, 2020). Weak internal controls and politically motivated lending reduce the sensitivity of loan allocation to risk, degrade the effectiveness of post default recovery, while a lower propensity for advanced RM contributes towards amplifying such banks vulnerability to systemic shocks (Magelssen *et al.*, 2023). The relationship between macroeconomic factors and NPL behavior has also been established by the literature but most of these studies are at an aggregate level of banking performance or a national level macro-financial stability (Abdul & Abdullah, 2022). Little empirical evidence exists on how macroeconomic shocks affect bad debt sensitivity in structurally fragile banks vis à vis Bangladesh (Bhattacharya *et al.*, 2024). In addition, the moderating effect of bank-level risk management techniques on macro-shock effects appears to be understudied in the literature.

Hence, this paper attempts to bridge this critical research gap by empirically examining the influence of major macroeconomic shocks i.e., inflation, interest

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rate, exchange rate, GDP growth slowdown and unemployment on bad debt vulnerability of weak banks in Bangladesh as well its moderating effect on the relationship between those shocks and risk management practices. The outcome of this study is likely to be helpful for policy makers, regulators, and bank management in formulating sector-specific policies and recommended measures that would help to enhance the institutional resilience, build up the quality of assets, and sustain financial stability over a longer period in Bangladesh.

LITERATURE REVIEW

Non-performing loans (NPLs) are loans whose principal or interest payment is overdue by 90 days and cannot be recovered (Hamal *et al*., 2025). High NPL ratio reveals the low quality of assets which jeopardizes banking stability by deteriorating profitability, depleting capital cushion and causing credit under delivery (Esther, 2023). Weak banks may lack adequate capital to cover their credit losses, possess less sophisticated or ineffective internal governance mechanisms and inefficient or inaccurate risk assessment procedures, while being highly exposed to politically influence or inadequately collateralized lending (Savvides, 2019). In developing countries like Bangladesh, structural inefficiencies, lack of regulation enforcement and governance malaise add to the miseries of bad debt (Liem *et al*., 2024). Poor loan collection is worsened by structural inefficiencies, shortfalls in enforcement of (micro) credit regulators' tensions and governance deficiencies also lead to fast accumulation of bad loans especially in developing countries, such as Bangladesh (Finnerty & Gonzalez, 2018). Macroeconomic shocks sudden adverse changes in primary macroeconomic variables disrupting the balance of an economic system and the operation thereof are called as macroeconomic shocks (Maboudian & Ehsani, 2020). These risks encompass inflation pressure, interest rates instability, exchange rate turbulences, slowdown of GDP growth and unemployment shocks. Based on the macro financial transmission mechanism, when macro-economic conditions are negative, borrowers' cash flows and repayment capacity decrease, leading to higher default risk and non-performing ratio (Zélity, 2025). Inflation decreases real earnings, increases operating costs and weakens the debt servicing capacity of borrowing parties. Empirical evidence in emerging market countries has indicated a positive relationship between inflation and NPLs, since in high-inflation environments uncertainty arises and the real value of loans decay (Nguyen & Sum, 2019). Consumer spending and SME profitability have been eroded in Bangladesh by the high inflation, causing increased loan rescheduling and classification, particularly for weak banks with low monitoring capabilities (Ali *et al*., 2022). Exchange rate depreciation raises debt servicing cost for the firms who has foreign currency liability, and also it? Increase debt service costs for import dependent corporations and borrowers with foreign currency exposure. In developing countries, exchange rate volatility is significantly positively correlated with NPL growth (Akhter, 2023). The depreciation of the Taka in Bangladesh has led to a notable rise in corporate loan defaults, particularly in import-dependent industries, further exacerbating bad debt exposure of weak banks (A *et al*., 2024). GDP proxy as an indicator of both general economic well-being and income-earning capacity. Slower economic growth means lower business revenues, which in turn lead to losses for businesses and higher default risk. NPLs are negatively associated with GDP growth (Gazi *et al*., 2022). Smaller, focused and weak banks are more vulnerable in times of economic distress. Increasing joblessness leads to lower household incomes and surging retail and SME defaults on loans. Furthermore, (Sunny & Tang, 2022) found that unemployment is one of the key factors in the determination of an increase in NPLs mainly for consumer credit products. Personal loan and SME defaults have skyrocketed after the pandemic-triggered fall in employment opportunities in Bangladesh (Mozumder *et al*., 2022). The reactions to macroeconomic shocks are-not surprisingly-stronger under weak governance, culture of poor risk-taking and monitoring as well as with low capital buffers; they specialize in bad debt accumulation (Arner *et al*., 2022). On balance, it is hypothesized that a weak system of internal controls will also result in NPLs. While, to date, there is no empirical evidence on the impact channels for NPL growth and its link with economic crises (Lo Duca *et al*., 2024). Vulnerable banks in Bangladesh face long recovery periods, political lending and a lack of digital monitoring systems. Risk precautions such as stress testing, alert systems, and strict regulatory enforcement do much to reduce the vulnerability of bad debt. Research by (Khan *et al*., 2017) noted that banks with sound risk governance withstand macroeconomic shocks better. But weaker banks frequently do not have strong risk management systems in place and are thus more vulnerable to adverse macro-financial circumstances.

Although previous research has identified macroeconomic determinants of NPLs, no studies have overtly explored how macroeconomic shocks affect the bad debt vulnerability of structurally weak banks in Bangladesh with special attention to the moderating effect of institutional risk management practices. This is the gap this study addresses by modeling in detail, comprising macroeconomic shock factors weak bank fundamentals and risk management moderation, for a more empirical understanding of bad loan vulnerability in Bangladesh. The objectives of the study are:

To investigate the consequences of macroeconomic shocks such as inflation, interest and exchange rate, GDP growth slowdown and unemployment on bad debt susceptibility of weak banks in Bangladesh.

To investigate the impact of weak banks' characteristics (weak capital adequacy, poor governance and inefficacious credit appraisal) on loan default and NPL build-up.

To assess the effectiveness of risk management practices in minimizing the impact of macroeconomic shocks on credit risk vulnerability.

To examine how macroeconomic shocks interact with bank specific weaknesses in determining NPL, LR and provision.

To offer suggestions on how to build institutional resilience and enhance banking stability in Bangladesh.

METHODS AND METHODOLOGY

A Quantitative cross-sectional research design was used in this paper to explore the effect of macroeconomic shocks on weak banks bad debt vulnerability with respect to local context of Bangladesh. The population was represented by banking practitioners who are practicing in state, local or Islamic banks and particularly in the field of credit risk, recovery and loan monitoring.

n=(Z^2.p.(1-p))/E^2

Where Z= 1.96 for a 95% confidence level, p= 0.5 assuming maximum variability and E=0.05 margin of error (Cochran, 1942). According to this estimation, the minimum allowable sample size was 384 respondents. The final reliability responses received, and we used for analysis is 350, being limited by access and response limitations. The information was obtained using a structured Likert-scale questionnaire, designed based on the literature review and pre-tested to examine clarity and reliability. The data was analyzed with Partial Least Square Structural Equation Model (PLS-SEM) to test the developed hypothesized relationships between macroeconomic shocks, weak bank attributes, risk management practices and bad debt susceptibility.

RESULT AND DISCUSSION

This section reports empirical results of the study and discusses data collected from banking personnel in Bangladesh. The paper presents some descriptive statistics, reliability and validity tests and the structural model estimates, to explore the links between macro-economy shocks and bad debt susceptibility of fragile banks. The paper also presents a further discussion of findings in terms of current literature and socio economic scenario of Bangladesh, outlining their significance for banking stability, risk management activities, as well as regulatory policy.

Respondents Profile

This subsection discusses the demographic and professional profiles of the respondents, which should inform us an important context for interpreting reliability and validity evidence. A total of valid 350 respondents were considered and the respondents were belonged private commercial, state owned banks and Islamic in Bangladesh those who are dealing with credit operation, recovery and risk management.

Table 1: Demographic Profile of the Respondents.

Variable	Category	Frequency (n)	Percentage (%)
Bank Type	State-owned Commercial Banks	82	23.4
	Private Commercial Banks	176	50.3
	Islamic Banks	92	26.3
Position	Officer	96	27.4
	Senior Officer	84	24.0
	Manager	92	26.3
	AGM and Above	78	22.3
Years of Experience	Less than 5 years	74	21.1
	5–10 years	118	33.7
	10–15 years	92	26.3
	More than 15 years	66	18.9
Branch Location	Rural	62	17.7
	Semi-Urban	108	30.9
	Urban	180	51.4
Loan Portfolio Handled	Retail	68	19.4
	SME	124	35.4
	Corporate	98	28.0
	Mixed	60	17.1

Table 1 shows that, based on the type of bank, most respondents came from private commercial banks and followed by Islamic banks and state owned commercial banks. This distribution is generally representative of the actual prevalence of private and Islamic banks in Bangladesh banking and means that the results are able to adequately reflect the views of institutions overseeing substantial portions of national loan portfolios. It was considered particularly important to include cedes of respondents working at state owned banks which generally have higher levels of NPLs and structural weaknesses, in direct alignment with the focus on weak banks in this study. In terms of job positions, majority were working as officers, senior officers and managers with a significant proportion of assistant general manager and upwards. Respondents from various hierarchical levels ensured the reliability of the data where junior and mid-officials help in providing operational perspective relating to loan appraisal and monitoring while senior executives gave strategic perspectives on risk management, provisioning and recovery policies. With regards to work experience, a considerable number of the respondents had worked in the bank for over 5 years, while most of them have served for more than 10 years. This suggests that the respondents had enough working experience of economic cycles and impairment of loan portfolio classification, management of default which facilitated them in making an informed assessment on the effect of macroeconomic disturbance(s) on bad debt susceptivity. Regarding the type of branch (branch location), most of respondents worked in urban and semi urban branches, whereas rural and very rural branches employees showed weaker representation. This distribution is in line with the concentration of large loan portfolios, corporate finance and SME activities in urban/semi-urban areas, where prospects for exposure to macroeconomic cycles and credit risk are usually stronger. Consequently, the predominance of urban respondents increased levels of significance for systemic vulnerability analysis. On the responsibility of loan portfolio, most interviewees were responsible for a corporate and SME banking loan followed by a mixed portfolio, and retail lending. Corporate and SME sectors contribute highest to the classified loan in Bangladesh, thus the profiling of the sample businesses is favorable for understanding dynamics of bad debt formation and macroeconomic shock on loan default behavior.

General, the profile of respondents suggests that the sample consisted of experienced bank staff and officers who were directly involved in high risk loan portfolios and institutional risk management activities (Ali *et al.*, 2022). This increases the reliability of the empirical evidence and verifies that data were sufficient to explore macroeconomic shock exposure and bad loans susceptibility in poor banks in Bangladesh.

Macroeconomic Shock Variables

Empirical results and discussion of macroeconomic shock variables, which are the prime independent variables of the study, are also described in this subsection. It explores how inflation, fluctuations in interest rates, volatility of exchange rate, slowdowns in GDP growth and unemployment shocks impacted the bad debt vulnerability of weak banks in Bangladesh as perceived by banking professionals. It therefore gives a sense of the overall impact of such macroeconomic shock and how far it translates into loan delinquency, loan classification and pressure on provisioning in the structurally weak banking institutions.

Inflation Shock

The empirical results showed that the inflation shock had a statistically significant and positive impact on weak banks 'bad debt vulnerability in the case of Bangladesh. The structural model showed the direct path of inflation shock towards bad debt vulnerability to be high and significant ($p < 0.05$), implying that increasing inflation exerted severe non-performing loan, rescheduling and provisioning burdens in structurally weak banking corporations.

Descriptive analysis indicated that most of the respondents agreed on high inflation also affecting borrowers repayment (impaired repay), delayed installment (Delayed isn't) and increased loan rescheduling, especially at the level of SME and retail (Table 2). The majority of those surveyed felt that soaring cost of living and operating costs put severe pressure on household and business cash flows, leading to a high propensity towards default. These feelings are congruent with the recent inflations in Bangladesh that have been of prolonged nature adversely affecting real income levels and throwing the debtors\' disposable incomes down. Results also suggested that inflation shocks were disproportionately harmful for weak banks, as they had less capacity to adjust credit pricing and lower cushions of risk and monitoring. They found that banks with bad credit evaluation technology were more subject to the inflation-related defaults, since their borrowers were of higher risk and worse collateralized, so that they were more reactive to income and cost changes (Mozumder *et al.*, 2022). In addition, they argued that in an inflationary environment, the frequency of loan rescheduling and recovery delays rose significantly in proportion to the accretion level of classified loans. The findings are consistent with previous empirical research that established a positive association between non-performing loans and inflation in developing countries, where price instability

Table 2: Descriptive Statistics of Inflation Shock.

Statement	Mean	Std. Deviation	Interpretation
High inflation reduces borrowers' repayment capacity	4.41	0.71	Strong agreement
Rising living costs increase default probability	4.35	0.76	Strong agreement
Inflation causes delays in loan repayments	4.28	0.79	Agreement
Inflation increases rescheduling of loans	4.22	0.83	Agreement
Overall Mean	4.32	0.77	High Impact

interferes with borrower's solvency as well as cash flows forecasting. In the Bangladesh context, inflation wasn't just an economic squeeze but also a system risk element that inflated governance gap and operating inefficiencies of weak banks. Taking everything into account, the above analysis indicates that inflation shock is indeed a significant macroeconomic factor of bad debt vulnerability in weak banks. The large effects of inflation clearly indicate the utility or desirability of more reliable income stress testing, inflation-aware credit appraisal and swift price adjustments to reduce default risk associated with inflation and hence reinforce financial stability in the banking sector of Bangladesh.

Interest Rate Shock

The results of structural model showed that interest rate shock had positive and significant impact on BDV for weak banks in Bangladesh ($p < 0.05$). This provides evidence that the variability and upward re-pricing of lending rates significantly raised the risk of loan default, non-performing loan formation and provisioning pressure demographically in fragile structured banks.

Descriptive Analysis (Table 3) presents the generic perceptions on excess interest rates and repayment capacity of borrowers, given by a sample mean index by score categories and their dispersion (mean ± standard deviation). "Rising interest rates hurt SME and retail loan books, where borrowers are more sensitive to changes in cost of funds and have limited buffers in terms of income." Most bankers felt that loan rescheduling and delayed repayments have increased significantly after periods of interest rate tightening. They also found that poorly managed interest rate risk, weak stress testing and lack of flexibility in restructuring loans made vulnerable banks susceptible to interest rate shocks. Weak banks were believed to have been unable to promptly review credit pricing models or reschedule repayments if confronted with suddenly changing rates, which contributed to the rapid loan classification and default increase. In addition, the poor communication of borrowers about the changes in interest rates increased their repayment delays even more. These findings are in line with earlier studies, which found a strong positive association between interest rate volatility and non-performing loans especially for developing countries where borrowers rely heavily on bank loans (Liem *et al.*, 2024). Interest rate shocks in the case of Bangladesh were identified as the main macro-financial transmission channel which exacerbated structural threats of weak banks. In sum, the discussion suggests that interest rate shocks are an important proximate cause of bad debt vulnerability in weak banks. The substantial positive association indicates the need for enhanced risk modeling of interest rate, borrower stress testing, and contractual loan modification schemes to reduce default risk and strengthen the banking sector.

Table 3: Descriptive Statistics of Interest Rate Shock.

Statement	Mean	Std. Deviation	Interpretation
Interest rate hikes increase NPL levels	4.38	0.73	Strong agreement
Borrowers struggle when lending rates rise	4.42	0.70	Strong agreement
Interest volatility destabilizes loan portfolios	4.31	0.77	Agreement
High interest rates worsen bad debt risk	4.36	0.75	Strong agreement
Overall Mean	4.37	0.74	High Impact

Exchange Rate Shock

The findings of the empirical analysis indicated that exchange rate shock was positively and significantly associated with bad debt vulnerability of weak banks in Bangladesh ($p < 0.05$). The findings suggest that devaluation of the Bangladesh Taka and exchange rate volatility significantly exacerbated loan default risk, classification growth and provisioning pressure particularly for structurally weak banks.

Descriptive statistics (Table 4) also indicated that, in general, the majority of respondents concurred with the proposition about how depreciation of currency seriously undermined both the ability of repayment on part of import-reliant and foreign currency–exposed borrowers. Bankers mentioned that higher cost of imported raw

Table 4: Descriptive Statistics of Exchange Rate Shock.

Statement	Mean	Std. Deviation	Interpretation
Taka depreciation increases loan default in import-dependent clients	4.29	0.78	Agreement
FX volatility weakens corporate borrowers	4.34	0.75	Strong agreement
Exchange shocks increase classified loans	4.27	0.79	Agreement
Export-oriented clients are affected by currency instability	4.22	0.81	Agreement
Overall Mean	4.28	0.78	High Impact

materials, machinery and intermediate goods pushed up operating costs of corporate/SME borrowers leading to reduced profitability and cash flow mismatches. Consequently, delays in disbursements, restructuring of credit and reclassification of credit intensified dramatically whenever exchange rates were unstable. The results further revealed that weak banks had greater exposure to exchange rate movements as a result of limited foreign exchange risk measurement abilities, poor portfolio diversification and insufficient monitoring of clients with currency exposures. Weak banks were often seen to have inadequate hedge of exposures and excessive appraisal slack for import-dependent borrowers, which hastened defaults build-up when currencies depreciated. Furthermore, it was found that recovery performance substantially weakened when exchange-rate shocks extended the state of financial distress for impacted borrowers. Our findings are also in line with extant empirical evidence which revealed that non-performing loans in emerging economies were considerably driven by exchange rate depreciation through the exacerbation of debt servicing and operation costs (Bücker *et al.*, 2022). In the case of Bangladesh the continuous weakness of the Taka was seen as a macroeconomic threat that has exacerbated structural weaknesses, governance failures and poor oversight in weak banks. In general, it is evident from the debate that exchange rate shock is a key macroeconomic factor for bad debt vulnerability of weak banks. The results reveal that the positive relationship is significant and implies that it would be essential to broaden foreign exchange risk management, borrower currency exposure assessment and portfolio diversification strategies in order to mitigate default risks precipitated by depreciation as well as enhancing banking sector stability.

GDP Growth Slowdown

As per analysis, GDP growth slowdown was positively significantly affected the weak banks bad debt vulnerability in Bangladesh ($p < 0.05$). The results indicate that economic downturns directly induced loan default risk, non-performing loans and provisioning requirements, especially for poor banks suffering from structural inefficiencies and dependent loan portfolios.

Descriptive analysis (Table 5) presented that a majority of the respondents agreed that slow economic growth had negative effects on the borrower's repayment ability, mainly in corporate and SME businesses. During periods of reduced GDP growth, business revenue fell and household income became stagnant while cash flows generally were stretched the result was higher delays in loan repayments and higher incidence of rescheduling. Respondents also commented that protracted economic downturns aggravated the challenge of recovery, with borrowers facing continued financial distress, further weakening weak banks' ability to maintain asset quality. The results also indicated that weaker banks are more susceptible to GDP slowdowns, since their loan portfolios were less diversified, they monitored credit poorly and maintained small capital buffers. Banks with weak corporate governance and risk management process had greater vulnerability to sectoral downturns leading to rapid growth in classified loans as reported by Respondents. Then again, weak banks with poor operating strengths did not have the financial muscle to reorganize loans or for timely interventions that would otherwise mitigate the impact of economic contraction on their balance sheets. Our results are consistent with previous empirical researches, which showed a negative relationship between GDP growth and NPLs on the ground that low economic growth decreases borrowers' income and profitability to impede default risk (Aljazzazen & Balawi, 2022). Bangladeshi respondents interpreted a GDP slowdown as a system macroeconomic shock that reinforced the structural weaknesses of weak banks indicating the key role played by economic conditions in determining banking stability. In summary, the debate underscores that a downslide in GDP growth is an unmistakable harbinger of bad debt susceptibility in frail banks. The results also suggest that banks should improve diversity of their portfolios, introduce a more active monitoring of credits and improve their capital reserves to physic the negative impact of economic downturn on loan quality and financial stability.

Table 5: Descriptive Statistics of GDP Growth Slowdown.

Statement	Mean	Std. Deviation	Interpretation
Economic slowdown increases NPL growth	4.36	0.72	Strong agreement
Business contraction raises loan defaults	4.32	0.75	Strong agreement
Reduced income levels affect loan servicing	4.28	0.78	Agreement
Weak GDP growth worsens loan recovery	4.25	0.81	Agreement
Overall Mean	4.30	0.76	High Impact

Unemployment Shock

The effect of unemployment shock on bad debt vulnerability among vulnerable banks in Bangladesh was significantly positive ($p < 0.05$). It implies that the growing unemployment due to COVID-19 leads to lower income for borrowers, thereby weaker servicing ability and higher defaults be in retail than SME segments which are more susceptible to household income shocks. Descriptive analysis (Table 6) indicated that most respondents agreed or strongly agreed to the proposition that when unemployment rates were higher, borrowers would have fewer resources to make loan payments on schedule. The respondents mentioned that loss of jobs, instability in income of small-scale business

Table 6: Descriptive Statistics of Unemployment Shock

Statement	Mean	Std. Deviation	Interpretation
Rising unemployment increases retail loan defaults	4.33	0.74	Strong agreement
Job losses affect SME loan repayment	4.28	0.77	Agreement
Income insecurity increases bad debt risk	4.31	0.75	Strong agreement
Overall Mean	4.31	0.75	High Impact

men generally resulted in delay in receipts, higher rescheduling of loans and larger number of classified loans. They also argued that bad banks, due to weak monitoring abilities, less provisioning and lower capital buffers, experienced stronger loan recovery slowdown during high unemployment. The results also showed that the impact of unemployment shocks was amplified in poorly capitalized banks having high concentration on retail and SME loans. "Noting that none of the cases involved fraud, respondents highlighted weak governance and internal control and poor credit risk assessment as well as the effect of increasing unemployment when describing how these banks were more vulnerable to macroeconomic shocks. By contrast, more robust banks, who had diversified loan portfolios and good risk-management systems, experienced less negative employment shocks. These findings are consistent with previous work that has attested to the importance of unemployment in explaining the increase in non-performing loans observed in developing countries, where household and small business income is highly sensitive to employment stability (Anjom & Faruq, 2023). In the case of Bangladesh, unemployment was considered one of the key macroeconomic determinants increasing susceptibility to bad debt by making structural weaknesses and operational inefficiencies in weak banks worse. To conclude, the discussion in this section sheds light that unemployment shock constitutes an important impulse of loan default and NPL formation in weak banks. Implications: The results suggest that employment-sensitive stress testing, proactive borrower support tools and improved credit information systems are essential elements for limiting job-related default risk and buttressing the anti-fragility of vulnerable banks.

Weak Bank Characteristics

The study found that bad loan susceptibility of banks in Bangladesh is positively and significantly influenced by the weak traits of bank ($p < 0.05$). This suggests that inherent weaknesses in banks, as reflected by low capital adequacy, weak governance, poor credit appraisal and limited monitoring, would greatly inflate the propensity of NPLs, magnifying the impact of macroeconomic shocks.

Descriptive statistics (Table 7) revealed that the respondents strongly agreed that weaker capital adequacy eroded banks' ability to absorb write-offs from loan default, thus making them vulnerable to the accumulation of bad debt. Inadequate governance and internal controls were also cited as key factors contributing to elevations in

Table 7: Descriptive Statistics of Weak Bank Characteristics.

Statement	Mean	Std. Deviation	Interpretation
Low capital adequacy increases vulnerability to shocks	4.39	0.71	Strong agreement
Weak internal controls increase NPL exposure	4.36	0.74	Strong agreement
Poor governance worsens bad debt risk	4.32	0.76	Agreement
Weak credit appraisal increases default probability	4.31	0.78	Agreement
Inadequate monitoring increases loan classification	4.28	0.79	Agreement
Overall Mean	4.33	0.76	High Impact

NPL formation due to inefficient credit origination, late recognition of problem loans and lack luster loan recovery. Further, respondents reported that poor credit appraisal and monitoring mechanism allowed reckless borrowers to obtain loan with negligent assessment of repayment capacity especially during economic downturn. The results also showed that banks with these structural vulnerabilities were relatively more responsive to macroeconomic shocks. According to respondents, inconvenient banks did not have the leveraging, digital monitoring system and risk management capability to prevent default risks associated with inflation, increase in interest rates, exchange rate fluctuation, slowdown of GDP growth and unemployment shock. Therefore, of loan rescheduling, recovery deferral and classified loan growth tended to be more frequent in weak banks than in strong ones. These findings are in line with earlier studies that suggest that bank specific vulnerabilities amplify the transmission of macroeconomic shocks to the banking system, particularly in emerging markets (Arner *et al.*, 2022). The respondents in Bangladesh responded that the weak banks' characteristics work as systemic risk which is aggravating the recession and causing more bad debt vulnerabilities. Overall, the dialogue underscore the structural practices within banks such as low capital levels, weak governance and poor risk management that lead to accumulation of bad debt. Enhancing these internal capabilities will be key to increasing resilience to macroeconomic shocks and promoting sustainable bank sector stability.

Bad Debt Vulnerability

The bad debt vulnerability, an evaluated dependent variable in the present study was significantly affected by macroeconomic shocks as well as poor bank qualities ($p < 0.05$). The results showed that weak banks in Bangladesh face more loan losses and grow in the NPL faster, service higher rescheduling and provisioning load, compared to their rival stronger banks signifying the increased vulnerability that structurally weak institutions are subjected from external changes in economic conditions. Descriptive statistics (Table 8) indicated that respondents strongly agreed on the high sensitivity of their banks to macroeconomic shocks, NPLs increasing rapidly in periods of inflation, interest rate increase, currency devaluation, GDP slowdown and high unemployment. Respondents indicated that inadequate internal controls, low level of capital adequacy and inefficient credit appraisal techniques are the factors which exacerbated the expanding volume of classified loans. They added that recovery rates had broken down during turnover crisis and the ensuing bad debts shot up. The results indicate that the fragility of small banks is exacerbated by their inability to appropriate risk mitigation strategies. Respondents also highlighted that well-governed banks with strong capital cushion or sophisticated risk management practices were respond more effectively to macroeconomic shocks; hence, were able to keep classified loans low and had better recuperation. On the other hand, when weak banks loosing operational efficiency and lacking governance were confronted with loan defaults, such constraints translated into systemic stress in the bank. These findings are consistent with previous studies suggesting that vulnerability to bad debt does not depend only on exogenous macroeconomic conditions, but also heavily depends on individual bank-specific factors (Islam *et al.*, 2022). For the case of Bangladesh respondents viewed vulnerability to bad debt as crucial for signaling fragility of banking sector, at the same measuring macroeconomic exposure and institutional decrepitude. In sum, the debate suggests that susceptibility to bad debtors in poor banks is a dual phenomenon and it may repose on the interaction of macroeconomic shocks and structural inefficiency. Good governance, good risk management practices and capital adequacy enhancement are necessary for reducing the vulnerability of the banking sector as well as ensuring soundness over time.

Table 8: Descriptive Statistics of Bad Debt Vulnerability.

Statement	Mean	Std. Deviation	Interpretation
Our bank is highly exposed to macroeconomic shocks	4.37	0.73	Strong agreement
NPLs rise sharply during economic instability	4.35	0.75	Strong agreement
Recovery performance declines during macro shocks	4.32	0.77	Agreement
Rescheduled loans increase after economic downturns	4.28	0.79	Agreement
Loan loss provisioning increases due to macro shocks	4.31	0.76	Agreement
Overall Mean	4.33	0.76	High Vulnerability

Risk Management and Moderating Variables

Risk management had a strong moderating role in the association of risk factors and bad debt vulnerability in Bangladesh $p < 0.05$. Check and balance mechanism of the banking industry (banks with sound risk management systems) were identified to buffer the impacts of inflation, interest, exchange rate risk, GDP growth slowdown and unemployment shocks on nonperforming loans, rescheduling and provisioning. This supports the importance of institutional risk management in mitigating the exposure to bad loans for weak banks.

Descriptive statistics (Table 9) revealed that participants agreed significantly on the role of stress testing, early warning systems, regulatory compliance and digital monitoring tools to mitigate loan default risk. A majority of the respondents pointed that banks working on forecasting risks, overseeing their borrowers and planning for contingencies were better equipped to withstand the macro-economic shocks and keep loans under check. They stressed the typical occurrence of higher NPL growth in weaker banks with lesser advanced risk management systems during crisis and economic turbulence, whereas stronger ones could lower default rates and recovery delays. The results also indicated that

Table 9: Descriptive Statistics of Risk Management Practices.

Statement	Mean	Std. Deviation	Interpretation
Stress testing helps reduce bad debt risk	4.36	0.72	Strong agreement
Strong risk governance mitigates macro shock effects	4.39	0.70	Strong agreement
Early warning systems reduce NPL vulnerability	4.34	0.74	Strong agreement
Digital credit monitoring reduces bad debt growth	4.31	0.76	Agreement
Regulatory compliance reduces default vulnerability	4.33	0.75	Agreement
Overall Mean	4.35	0.73	High Effectiveness

risk management activities were significantly mitigating the effect of bank specificities on NPL vulnerability. Low capital adequacy, weak governance and credit appraisal resulted in exposure to defaults according to respondents who however explained strong corporate risk governance, internal controls systems and early warning systems had relatively reduced these risks. This suggests that there still may exist a partial risk-ameliorating role of effective risk management strategies even when the banks are weak in terms of structure. These findings are supported by preexisting research that has highlighted the role of bank-level risk management in making banks more resilient to macroeconomic downturns (Ahamed & Chowdhury, 2025). When applied to the Bangladesh context, risk management was found to be an important cushion for banks to insulate themselves from system level stress and maintain the stability of asset quality and sustainable earning. In a broader sense, the conversation reveals that risk management is an important moderating variable in mitigating the vulnerability of bad debt. Developing better internal control systems, applying advanced credit monitoring technology, and enforcing regulatory standards are crucial for weak banks to be able to mitigate the effects of macroeconomic disturbances, enhancing financial stability.

Findings

• Effects of macroeconomic shocks on bad debt vulnerability of weak banks in Bangladesh Macroeconomic shocks such as inflation, interest rate hike, exchange rates flexibility, GDP growth deceleration and unemployment rate increase were discovered to have significant positive effects on bad debt risk exposure of weak banks in Bangladesh.

• Low capital adequacy, weak governance, ineffective credit appraisal and monitoring were some of the bank characteristics that enhanced non-performing loan buildup and default risk.

• Risk management tools such as stress testing, early warning systems, digital surveillance and regulatory compliance have effectively reduced the negative impact of macroeconomic shocks on bad debt vulnerability.

• The joint impact of macroeconomic instability and structural weaknesses increased loan rescheduling, the time lag in recovery, and provisioning burden in weak banks.

• Sound governance structures, capital buffers and strong risk management practices were mandatory for asset quality improvement and long-term stability in the banking industry of Bangladesh.

Recommendations

• Banks need to add macroeconomic shocks affected variables zoning in with inflation, interest rate, exchange rate, gdp growth and unemployment into their credit risk assessment and stress testing frameworks where strength of default is concerned proactively.

• Weak banks will need to enhance capitalization, governance, credit underwriting and monitoring mechanisms in order to lower structural susceptibility to the buildup of NPAs.

• Banks also incorporate precautionary risk-management measures of early warning systems, portfolio stress testing and digital loan monitoring to overcome the negative impacts imposed by macroeconomic instability.

• Bangladesh Bank needs to strengthen regulatory compliance and supervisory controls for timely loan classification, provisioning, and recovery in weak banks.

• Policy makers could encourage institutional capacity building, portfolio diversification and the use of sophisticated risk analytics in an effort to improve banking system resilience to macroeconomic shocks.

CONCLUSION

This research analyzed how macroeconomic shocks influence bad debt vulnerability of weak banks in Bangladesh and evaluated the moderating effect of risk management practices on reducing these vulnerabilities. The results showed that inflation, interest rate changes, exchange rate variability, sluggish real growth and unemployment shocks had significantly increased NPL/provisioning/loan rescheduling pressures in weak banks. Structural fragilities such as inadequate capital cushion, weak governance standards, poor credit appraisal and ineffective monitoring were considered responsible for magnifying the negative fallout of these macro shocks and making weaker banks not just sensitive to but more vulnerable to financial instability. However the study also indicated that strong risk management through risk stress testing, early warning systems, digital monitoring and adherence to regulations significantly reduces the effect of macroeconomic uncertainty on bad debt accumulation. In summary, the study concludes that sound institutional governance and better capital buffer are necessary for improved asset quality and sustainable banking operations in Bangladesh.

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