Global Journal for management and Administrative Sciences
ISSN (P):2788-4821 & ISSN (O): 2788-483X
Volume 3, Issue 1, Page 79-95, April 30, 2022 (Special Issue)

AN INVESTIGATION OF BANKS' NON-PERFORMING LOANS – A STUDY OF MICROFINANCE BANKS FROM MICROECONOMIC AND MACROECONOMIC PERSPECTIVE TOWARDS SUSTAINABILITY & FINANCIAL INCLUSION

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Abstract

Banks' failure and financial crises are consequences of non-performing loans, and it is of great importance when it comes to microfinance banking system because it is more than mere loan repayment problems. Rather, it is an important determining factor of their failure or survival in market. The purpose of this study is to examine the impact of bank specific (micro-level factors) as well as macro-economic factors on NPLs to understand their impact and effect on microfinance banks. Microfinance banking sector has significant contribution in terms of financial inclusion in an economy. Sustainable Development Goal number 8 calls for expanding financial services to people (typically low-income) which encourages economic growth. This research employs published secondary data from 2011-2020 of micro-economic and macro-economic factors as independent variables and NPLs as dependent variable. The present study applies regression analysis to determine the explanatory power of the independent variables in explicating the NPLs. The findings of this empirical research contribute in guiding bankers to develop better understanding of their performance in terms of efficiency, riskiness, profitability and further it facilitates investors to take precision decisions.

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Introduction

Banks, whether they are commercial, Islamic, or Microfinance, can be greatly affected by loan repayment problems. The "loan repayment problem" by simplifying the term means non-performance of a loan. A non-performing loan (NPL) is a loan in which borrower defaults and does not make any scheduled payment of principal or interest and if this situation recurs, it become difficult for a bank to pay interest cost to its depositors (Serrano, 2020). This phenomenon is also known as asset delinquency.

[1]According to Prudential regulation for microfinance banks issued by *State Bank of Pakistan*, Non-Performing loans are categorized as:

S. No#	Classification	Explanation
1	Substandard	Loans in arrears for 90 days
2	Doubtful	Loans in arrears for 180 days
3	Loss	Loans in arrears for 365 days

According to (Jaffery, 2015), NPLs came into interest of researchers since past four decades when an increasing number of NPLs lead the banks to financial crises. It was illustrated by (Ari, et al. 2021) that high-level NPLs weaken credit growth and hinder the recoveries from crises. It is shown in literature that for every crisis NPLs are described to start three years prior to crisis and continues approximately seven years after the crisis.

Microfinance Banking System: An agent to improve Financial Inclusion and Sustainability

Banks are said to be the backbone of financial sector in an economy that must be sound to provide a paradigm for a productive economy (Syed, 2021). A Banking business, irrespective of its type i.e., Commercial, Islamic or Microfinance, solely depends upon credit it lends to its potential customers while collecting surplus amount from its depositors. Microfinance Banking system unlike any other financial institution is specifically used for targeting un-banked public to improve the economy. (Beck, 2015) describes microfinance as a sector that facilitates financial inclusion and provides financial services on affordable prices to households typically to low-income or small businesses that were previously not involved in traditional commercial banking.

For the purpose of ending poverty worldwide *United Nations* (UN) provide

[1] Prudential regulation of microfinance banks,2011 issued by state bank of Pakistan

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Sustainable Development Goals[2]**(SDGs)** in which its goal no #8 is quoted as "Decent work and economic growth" and its expanded definition is "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" which is vastly related to escalate (enhance) economic growth by providing quality employment and inclusive finance. The *Goal* further describe in target no#8.10 "**Universal access to banking, insurance & financial services**" that clarifies about increasing capacity of financial institutions in a country and expanding financial services to people (typically low-income) who are not part of commercial banking system.

An Insight to Basel Accord to manage Credit Risk

Banks as the major player in financial sector face various financial risks generally categorized as systematic and unsystematic risk. Systematic risk is often caused by collapse of complete system, it usually arises due to macroeconomic factors for instance currency flux, market changes, or environmental factors as natural disaster and so on.

Whereas unsystematic risk emerges from individual level of a company or industry caused by change in internal policy, and procedures. The unsystematic risk is also named as*diversifiable risk* because it can be managed and mitigated to some extent.

Both types of risks (systematic or unsystematic) evolve a credit risk for banks which means that there are the chances of default of banks. The major share of microfinance banking system in credit lending makes them considerably exposed to credit risk that comes in the manner of NPLs as their chances of survival, growth and stability in the market depends upon it (Afolabi, et al. 2020; Iqbal, et al. 2021; &Ristić&Jemović, 2021).

The **Basel Committee on Banking Supervision (BCBS)** as stated by (Ristić&Jemović, 2021) acknowledges that most burdening risk on banking operation is credit risk. To manage the credit risk as well as market risk Basel Committee had introduced Basel Accords to uniform the international regulatory framework for managing such risks around the globe. The foremost purpose of Basel Accord is to ensure that banks have adequate cash in their reserves to survive from financial and economic crises. The Basel Accord consists of three pillars namely Basel I, Basel II, and Basel III.

In 1988 **Basel I** was established, and also named as Basel Capital Accord. It came into existence as a response of the increasing interdependence of international financial markets. (Elsembawy, 2021) described that Basel I had provided framework

[2] SDGs stands for sustainable development goals of United Nations (UN) that are a blueprint for an improved, viable, and more sustainable future for world economy.

for managing credit risk and classified assets into certain groups of risk weighted assets:

- 0% for the assets that are risk free
- 20% for the loans to banks or other institutes with high credit rating
- 50% for the residential mortgage
  100% For the debt given to corporate sector

Basel II was an enhanced version of Basel I and was introduced in 2004. It emphasizes on improving capital requirement, transparency, and discipline in the market.

Basel III was created when financial crisis of 2008 happened and had exposed the true weaknesses of international financial system. It came into creation in 2010 but yet to be implemented by 2022. Basel III focuses on increasing liquid assets, capital adequacy, and decrease the bank-leverage ratio (Elsembawy, 2021).

Non-Performing Loans & Financial Crises

Increased level of NPLs in financial sector is the common indication of a financial crisis. As financial crisis creates an emergency in the world it leads developing countries with increased poverty, high inflation, and increased ratio of unemployment, etcetera (Azam, et al. 2011). Some crises have strong influence on economy such as Global financial crisis of 2008 as Bauze (2019) expresses that Global financial crisis (GFC) affected the world so much that it left a long-term heritage of high NPLs, that in some region increases to 50% of total loans. East Asian Financial crisis that happened in mid-1997 in form of outflow of foreign investment (Khan et al, 2020) and was a result of poor management, insider dealings, with the bonus of incompetent investment expenditure that cause banking sector to build-up NPLs and collapse (Radelet, et al. 2014). The Venezuela banking crisis caused 17 bank closures out of 49 representing 53% of system assets (Berge &Boye, 2007 (as cited in Syed, 2021)). There are many more banking and financial crises that have affected the world and commonality of all was accumulation of problem loans and their poor management.

The factors affecting NPLs on microeconomic level as literature indicates are loan quality, bank capital, bank efficiency and stability, profitability, credit risk management, etcetera. Moreover, on macroeconomic level suggested factors are real GDP per capita, and interest rates etcetera (Khan, et al. 2020;Laryea, et al. 2016; Saba, et al. 2012; &Ihsan, et al. 2021). This paper highlights the determinants categorically on micro and macro-level and offers recent dataset to create a comprehensive picture for the investors and banks to protect any from the erosion of NPLs.

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Literature Review

Banks are the backbone of financial sector of an economy. Banking business solely depends upon credit it lends to its potential customers while collecting surplus amount from its depositors.

The expanded number of NPLs is the primary aspect of many banking or financial crises it is said by (Anil, et al. 2019) that NPLs are minimal prior to the crisis and grow throughout the crisis significantly. Likewise, they stay prominent after the crisis for many years. The *Global Financial Crisis (GFC)* of 2008, was great example of how situation could get worse if banks' start neglecting the policies and granting loan on easy terms (CUCINELLI, 2015).

(Afolabi, et al. 2020) states microfinance banks deal with credit risk in form of NPLs because they are participating in lending activities and resolving this issue is crucial for their survival, growth, and stability in the market (Iqbal, et al. 2021).

Microfinance banking system is mainly responsible for financial inclusion in the economy. Financial inclusion involves availability of financial services at affordable price to enterprises and households to meet their needs. (Beck, 2015)further describes *microfinance* as a sector that facilitates financial inclusion and provides financial services to low-income households and small businesses that were previously not part of traditional commercial banking.

For the subject of ending poverty and increasing financial inclusion worldwide *United Nations* (UN) provide ***Sustainable Development Goals*** **(SDGs)** in which its goal no#8 describes in target no#8.10 "Universal access to banking, insurance & financial services" that clarifies about increasing capacity of financial institutions in country and expanding the financial services to people (typically low-income) who are not the part of commercial banking system.

Table 1
The Factors Affecting Non-Performing Loans:

VARIABLE	DEFINITION
i. ROA	Net income to total assets measuring profitability of the bank
ii. M.I to T. I	Indicates how much interest is earned relating to total deposits
iii. CAR	Measures soundness of the bank. It represents how a firm cope with unexpected losses
iv. LTD Ratio	Total loan portfolio to total customer deposits
v. Op. Profit Margin	Profit after the payment of variable cost and shows efficiency of a firm
vi. Net Profit Margin	Profit generated as a percentage of revenue
vii. GDP	Growth rate of gross domestic product
viii. Inflation Rate	Growth of Inflation rate
ix. Interest Rate	Growth in interest rate

Note, (Cucinelli, 2015; Iqbal, et al. 2021; Khan, et al. 2020; & Warue, 2013)

Determinants of Non-Performing Loans

Micro-economic determinants:

Literature has explored a connection between micro-economic variables and non-performing loans which can be seen in Table 1.

ROA – Return on Assets: it is signifying the efficiency of banks as (Kwan & Eisenbis, 1997) assert high level of bank's inefficeincy lead to an enhancement of NPLs ratio. ROA shows negative significant impact on NPLs ratio (Godlewski, 2004).

MITI – Markup income to total income: if the ratio increased, it eventually means that banks are recovering from the loans it lends to customers. Literature suggest it has significant negative impact on NPLs(Louzis et al, 2012).

CAR – Capital Adequacy Ratio: Capital adequacy ratio must be 8% of banks' risk weighted assets (Basel II) but banks having CAR more than the required ratio and still investing in risky assets and constantly accumulating NPLs(Warue, 2013).

LTD – Loan to Deposit ratio: banks while granting loans are expected to face credit risk as literature suggest that with increase in LTD ratio the NPLs increases.

OPM – operating profit margin & NPM – net profit margin: (Ekanayake& Azeez, 2015) says NPLs can be determined by the profitiabilty as it has signaficant negative impact on NPLs and it affect risk taking behaviour of banks as with increased

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profitability there is less pressure to increase returns of the banks and hence, decreased engagment in risky assets.

On account of these factors, the study desires to examine factors affecting NPLs in microfinance sector of emerging economy and to know the impact of these determinants on NPLs.

Macro-economic Determinants

When the banks' performance is affected by exogenous events of the economy it is said to be stimulated by macro-economic variables (Ekanayake & Azeez, 2015)

INF - Inflation rate: (Warue, 2013) as well as (Alsamadi& Ahmad, 2009) found negative and significant impact on government commercial banks.

GDP - Gross Domestic Product: (Warue, 2013) suggest that real GDP has significant negative relation with NPLs. As GDP decreases NPLs level increases in commercial banking sector of Kenya.

INT - Interest rate: as (Jimenez & Saurina, 2006) indicate that there is significant and negative relationship between NPLs and interest rate but opposite to (Jimenez & Saurina, 2006) (Alsamadi & Ahmad, 2009) suggest a significant and negative relation of interest rate and problem loans in Jordanian banks.

Methodology

The sample consist for the study is five operational microfinance banks in Pakistan namely, Khushali MFB, U MFB, Apna MFB, First MFB and Pak-Oman MFB. The time period for the study is 10 years from 2011-2020, Banks were considered selected when the data was available for respective years.

For data analysis, the data was entered in EViews 12 software and Regression was applied in order to determine the significant value for testing the research hypotheses.

The microeconomic data is collected from published financial statements of 5 operational microfinance banks and the macro-economic data is acquired from the World Bank website. The dependent variable, non-performing loans is studied in line with (Khan, et al. 2020; Saba, et al. 2012; Serrano, 2020; & Syed, 2021). While the independent variables are categorized into two groups: macro-economic and micro-economic varaibles.

In the first group the study examined the Gross Domestic Product (GDP*it*), Inflation (INF*it*) and Interest Rate (INT*it*). GDP and inlfation control the loan demand as stated by (CUCINELLI, 2015).

While micro-economic variables are studied as return on assets (ROA*it*) and markup income to total income (MITI*it*) considered for assessing *banks' efficiency*, capital adequacy ratio (CAR*it*) & loan to deposit ratio (LTD*it*) for assessing *risk exposure of banks*, and for measurement of *banks' profitability* operating profit margin (OPM*it*) & net profit margin (NPM*it*) are selected.

Econometric Model and its Description

To assess the impact of microeconomic and macroeconomic variables on NPLs, the panel data of five microfinance banks is used. In this study, we have incorporated six microeconomic and three macroeconomic variables. Basic linear equation of panel data is shown below as equation 3.1. Since panel data is used for micro-level factors, the equation is given as 3.2 and to analyze macro-level factors, simple linear regression is used as shown below in equation 3.3.

Basic Equation of panel Regression:

$$Y_{it} = A + \beta X_{it} + \varepsilon_{it} \text{----------} (3.1)$$

Equation of Micro-Economic Variables:

$$NPL_{it} = C + \beta\,(ROA)_{it} + \beta\,(MITI)_{it} + \beta\,(CAR)_{it} + \beta\,(LTD)_{it} + \beta\,(OPM)_{it} + \beta\,(NPM)_{it} + \varepsilon_{it} \text{----------} (3.2)$$

Equation of Macro-Economic Variables:

$$NPL = C + \beta\,(INF) + \beta\,(GDP) + \beta\,(INT) + \varepsilon_{it} \text{----------} (3.3)$$

Where

it	*i- cross sections & t – time series*
NPL	Non-performing loans
ROA	Returns on asset
MITI	Markup income to total income
CAR	Capital adequacy ratio
LTD	Loan to deposit ratio
OPM	Operating profit margin
NPM	Net profit margin
INF	Inflation rate
GDP	Gross domestic product
INT	Interest rate

Results & Discussion

Unit Root Test for Stationarity

All of the variables are checked with Augmented Dicky-Fuller unit root test for stationarity. The stationarity level is measured against 1%, 5%, and 10%. The stationarity of time series data was checked by application of intercept and trend.

Table 2

Panel Unit Root Test

Variables	Fisher Type-ADF (p-values)	Fisher Type-ADF (statistics)

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NPL		0.000
35.812		
ROA	0.006	
24.524		
MI-TI		0.000
39.450		
CAR	0.002	
27.574		
LTD		0.002
27.771		
OPM		0.000
35.489		
NPM		0.003
26.401		
INF		0.000
35.589		
GDP		0.003
27.892		
INT	0.002	
28.589		

Source: own estimation by using E-views 12

Results indicate that all variables are stationary, thus, it rejects the null hypothesis. Five variables of the study NPL, CAR, OPM & NPM, IND are found stationary at level and ROA, MITI, LTD, GDP, INT are found stationary at 1st difference.

Regression Analysis

In this study Panel ordinary least square regression model is incorporated to check the impact of independent variables on dependent variable. For study the impact of microeconomic variables on NPLs, panel ordinary least square method (POLS) is used, and to check suitability of model, Breusch Pagan statistical test is also applied against values of POLS. The values of brush Pagan test suggested that Pooled ordinary least square method is appropriate model for this type of data. Whereas, to understand impact of macroeconomics variables on NPLs, ordinary least square (OLS) method is used. The results of POLS for Microeconomic variables are shown in table 4.1 and results for Macroeconomic variables are shown in table 4.

Microeconomic Variables:

Panel regression is a modeling method adapted to panel data. It is used in econometrics, where the behavior of statistical units (i.e., panel units) is followed across time (CUCINELLI, 2015). It is also called cross-sectional data or longitudinal data. This method was used to calculate the results for microeconomic variables.

Table 3.1
Results of Panel Ordinary Least Square Regression

Variable	Coefficient	Std. Error	t-Statistics	P-value
MICRO				
C – constant	**0.023**	**0.075**	**0.314**	**0.754**
ROA	1.703	0.741	2.299	0.264
MITI	-0.024	0.084	3.296	0.000
CAR	0.006	0.037	0.176	0.861
LTD	0.000	0.000	0.921	0.001
OPM	-0.311	0.159	4.820	0.000
NPM	-0.565	0.174	-3.238	0.002

Note, these results are generated by using software EViews 12

Here P value for ROA is 0.264 which is greater than 0.5 it means that coefficient of ROA is non-significant. Similarly, the coefficient of CAR is also non-significant. These results shows that there is no significant impact of these independent variables on NPLs. Whereas the probability values of MITI, LTD, OPM and NPM are less than 0.05 which shows that coefficients of these variables are strongly significant. In addition, the negative values of coefficients show negative impact of these variables on non-performing loans.

Macroeconomic Variables

Like microeconomic variables, following results were generated in order to determine the impact of Macroeconomic variables on NPLs by the Panel Ordinary Least Square Regression method.

Table 3.2
Results of Panel Ordinary Least Square Regression

MACRO	Coefficient	Std. Error	t-Statistics	P-value
C – constant	**-0.213**	**0.131**	**-1.632**	**0.153**
INF – inflation rate	0.024	0.010	2.492	0.047
GDP – gross domestic product	0.026	0.015	1.721	0.135
INT – interest rate	0.002	0.006	0.424	0.686

Note, these results are generated by using software EViews 12

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Results in Table 4.4 shows the p value of Inflation rate is 0.047 which is significant, and its positive coefficient value shows that there is direct relationship between Inflation rate and NPLs which means inflation rate and NPL increases at the same time. However, there is insignificant impact of GDP and interest rate on NPLs.

Discussion

This discussion includes impact of micro-variables and macro-variables on non-performing loans in the light of regression results.

Microeconomic Variables

1.Bank Efficiency

ROA and NPL

In past literature, results regarding the relationship of ROA with NPL vary from study to study. For instance, (Messai&Jouini, 2013) and (Bismark, 2021) has found negative impact of ROA on NPL which means the increase in ROA will result in decrease in NPL. However, result of this study shows the contrary outcomes, as it depicts p-value is more than 0.05 failing to accept alternate hypothesis, which shows that ROA has significant impact on NPLs. Here, ROA has been taken to check banks' efficiency, but the results suggest that ROA has insignificant impact on NPLs. The result of this study is consistent with study of (Makri, et al. 2014) identifying the factors affecting NPLs of Eurozone's baking systems through difference Generalized Method of the Moments (GMM) estimation.

MI-TI and NPL

The results of the study in perspective of MI-TI indicate acceptance of alternate hypothesis as it continues to show the significant impact on NPLs. The coefficient of MI-TI shows negative direction which means that when one variable will increase, other will decrease. As ratio of markup income increases in the banks' total income it implies that loans are paid off timely by the debtors.

2.Risk Exposure

CAR and NPL

The result depicts that there is no significant impact of capital adequacy ratio on NPLs because its p-value is more than 0.05. As literature suggests, CAR has negative impact on NPLs(Khan & Ahmed, 2017), since more capital is reserved, banks are more capable to tackle the situation in case of high NPLs, but our results suggest that both variables are moving in same direction and CAR is insignificant in effecting NPL.

LTD and NPL

LTD as the result shows that loan to deposit is having a significant impact on NPLs because its p-value is less than 0.05, which implies that more the banks give loans, more they are exposed to the risk of NPLs. The coefficient value of LTD indicates that both variables will move in same directions.

3.Profitability

OPM, NPM and NPL

OPM & NPM has a significant impact on NPL – Here p-value of operating profit margin and net profit margin portray the significant impact on NPLs as, the values of both variables are less than 0.05. The direction of both of the variables is inverse, which means that when one variable (OPM & NPM) will increase, other will decrease. The more the profit, which is the result of higher net income, the less will be the NPLs. As literature justifies this feature as when the banks earn sufficient profit, means they are generating higher income in terms of operations which validates loans are being paid off by debtors on time.

Macroeconomics Variables

1. INF has significant impact on NPL – (Badar and Javid, 2013) found an indirect and significant relationship between Inflation rate and NPL. On contrary, in this study hypothesis for inflation is accepted in the results as they affirm with the literature that inflation as macro-economic factor influencing customers by burdening them with the increased price of the commodities and making them not to pay off their debts timely, therefore, creating boom of NPLs. It is a factor that is classified in systematic risk that affect NPLs from outside and an individual firm cannot handle it similar results are found by (Saba, et al. 2012).

2. GDP has significant impact on NPL– Contrary to the majority of literature, the results of this study show that GDP growth has no significant impact on NPLs in microfinance banks. For instance, (cifter, et al. 2009; Skarica, 2013; &Messai&Jouini, 2013) found significant negative impact of GDP on NPLs, whereas another recent study shows GPD has positive and insignificant impact on NPLs (Bismark, 2021). In addition, (Saba, et al. 2012) states that GDP has positive and significant impact on NP, but this research rejects the alternate hypothesis accepting the null hypothesis as there is no such significant impact on NPL of GDP growth. The result of this study is consistent with study of (Farhan, et al. 2012) who also found insignificant impact of GPD on NPL.

3. INT has the significant impact on NPL- Finally, literature suggested negative impact of interest rate on NPLs because due to high interest rates, the repayment capability of customer decreases resulting in non-repayment of loan. However, (Bismark, 2021) states that there is positive and significant impact of Interest Rate on NPL, and same results are found by (Louzis, et al. 2012). However, as per results of

ISSN (P):2788-4821 & ISSN (O): 2788-483X
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this study the hypothesis of interest rate having significant effect on NPLs has also been rejected because there is no impact of interest rate on increasing NPLs. It may be inferred that banks which charge higher interest rates on loans are not likely to encounter higher NPLs.

Summary of Hypothesis

On the basis of above findings of regression analysis, the table below is drawn in order to show the acceptance and rejection of the hypothesis in Table 4.

Table 4
Summary of Hypothesis

S. No.	Hypothesis	Coefficient	P-Value	Hypothesis Supported
H1	ROA has significant impact on NPL	1.703	0.264	Rejected
H2	MITI has significant impact on NPL	-0.024	0.000	Accepted
H3	CAR has significant impact on NPL	0.006	0.861	Rejected
H4	LTD has significant impact on NPL	0.000	0.001	Accepted
H5	OPM has significant impact on NPL	-0.311	0.000	Accepted
H6	NPM has significant impact on NPL	-0.565	0.002	Accepted
H7	INF has significant impact on NPL	0.024	0.047	Accepted
H8	GDP has significant impact on NPL	0.026	0.135	Rejected
H9	INT has significant impact on NPL	0.002	0.686	Rejected

Conclusion

The purpose of the study is to identify factors that influence the increment of non-performing loans in microfinance banks and to understand the impact of those variables on NPLs. The literature review suggested some major variables that affect NPLs, and it concluded that NPLs are affected by various macro and micro-economic variables.

Microfinance banking sector was chosen as the case for this research because microfinance sector is significantly contributing for financial inclusion of the economy. Further, it achieves one of the sustainable development goals i.e., to increase financial inclusion worldwide.

The data is divided into two parts. For microeconomics factors, panel data has been collected from five microfinance banks, and for macroeconomic variables data is

collected annually from website of the World Bank from 2011-2020. For statistical analysis, E-views-12 has been used. Panel least square regression and ordinary least square regression is also used as statistical test to analyze the data.

In conclusion, it can be concluded from microeconomics variables, that ROA and CAR have no significant impact on NPLs, whereas, from macroeconomic data, GDP growth and interest rate shows insignificant impact on NPLs. MITI, LTD, OPM and NPM and Inflation show the significant impact on NPLs. This empirical research has important implications for management of the bank as well as investor; the bankers can have better insight of the causes of NPLs in the defined context, whereas the investors can make better prediction regarding the financial health of the bank in light of its NPL status. Hence, this research contributes to explicating the determinants of bank performance in terms of efficiency, riskiness, and profitability from the perspective of NPLs in the context of microfinance banks which are the agents for promoting sustainability and financial inclusion in developing economies.

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