

Influence of bank-specific and macroeconomic factors in determining nonperforming loans in Africa

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Abstract

This study aims to understand the various bank-specific and macroeconomic factors which might lead to loan default in Africa: Botswana, South Africa, Namibia, Nigeria, and Tanzania. Panel data techniques are used to analyze and quantify the impact of macroeconomic and bank-specific variables on NPLs. The proposed hypothesis has been tested using the correlation coefficient and multiple linear regression. It is suggested that banks consider the macroeconomic conditions, this practice can help the management of the banks to estimate the overall performance of their loans and avoid increasing the risk of default.

Keywords – Nonperforming loans, loan size, repayment period, lending interest rate, employment rate, GDP growth rate, inflation rate

1. Introduction

The banking system plays a major role in contributing to the economic growth of a nation. It is known that bank facilitates, and loans are considered to be mutually beneficial, but it is also known that banks bear a major risk of loans becoming non-performing. For developing countries, the role of banks becomes even more important as it would help in the growth and sustainability of the country (Ikram *et al.*, 2016). A banks financial stability can be best described through its ability to overcome non-performing loans since it shows that the bank can overcome credit risk, resources allocation efficiency and operational skill. If the payment of the interest due haven't been made in 90 days or more, it is considered to be a non-performing loan. Financial distress refers to a point when a borrower is incapable to meet a payment obligation to lenders and other creditors (Zakiet *al.*, 2011). When the economy is showing an upward trend then the asset prices increase, loan recovery rates increase, and overall NPLs decrease (Bardhan and Marjit, 2016). Different banks in the same economy handle their NPLs differently, as it appears that bank-specific factors play a significantly larger role in the creation of non-performing assets (NPAs) over time, as these factors directly influence a bank's health. (Bardhan and Mukherjee, 2016). Loan characteristics like loan decision making process, loan default management, loan recovery processes, risk exposure and most importantly the performance depends on different

banks. All of these elements have varying effects on NPAs. In light of the foregoing, this work has two objectives. Firstly, we will investigate how loan characteristics affect loan default in Africa. To do this we will study the impact that loan amount, loan term and interest rate will have on loan default. Secondly, we will determine the effect of macroeconomic factors on loan default and to do so we will study the impact of employment rate, inflation rate and GDP growth rate on loan default (Climent-Serrano, 2017). To do this we will construct a multiple linear regression model with a sample period from 2011-2020. In this regard, this study attempts to answer the following unanswered questions:

RQ1) Would bank specific factors influence loan default?

RQ2) Would macroeconomic factors determine loan default?

2. Literature Review

2.1 NPAs and Inflation | NPLs and GDP growth rate

Bardhan and Mukherjee (2016) examines the duty of the bank-specific variables for describing the complexities of NPAs banks in a panel data approach. The mentioned results have been obtained by managing the factors of macroeconomic like inflation and real GDP. Using Generalized Method of Moments (GMM) approach in dynamic models, it was found that there is considerable time resilience of NPAs in the existing banking system. The conclusion reached signifies those bigger banks have more defaults than smaller banks. Abusharbeh (2020) has examined the impact of the bank-specific variables as well as macroeconomics on the credit quality on Palestine since the last decade. The impact of macroeconomic and financial variables is analyzed and quantified using panel data techniques. Housing prices, bad debt coverage, interest rates, and solvency have been proved to be the variables that have the biggest impact on NPLs, according to the research. This leads to the hypotheses:

H₁ Inflation has a significant influence on Loan default

H₂ GDP growth rate has a significant influence on loan default

2.2 NPLs and Loan Size | NPLs and Employment

Using variables reflecting loan and borrower characteristics, industry and macroeconomic conditions, and many recovery process variables, Khieu et al. (2012) generated a model for bank loan recoveries. Following Acharya et al. (2007), the paper used the ordinary least squares method using Huber White (1980) heteroskedasticity-consistent standard errors, taking into account a linear relationship between recovery rates and explanatory variables. Loan features are more important drivers of recovery rates than borrower characteristics prior to default, according to the findings.. Mota et al. (2018) used a sample of 752 microcredit loans granted in Portugal by the National Association for the Right to Credit, which used individual lending mechanisms and granted loans in collaboration with several credit institutions, to investigate the determinants of microcredit loan repayment. An ordered logistic regression was used in this investigation, with a dependent variable consisting of four discrete meaningful sequentially ordered categories. Loan size, on the other hand, had a statistically minor impact on borrowers' ability to repay their loans. This leads to the following hypotheses:

H₃ Loan size has a significant influence on loan default

H₄ Employment rate has a significant influence on loan default

2.3 NPLs and Lending Interest Rate | NPLs and Repayment period

Olarewaju (2020) sought to investigate the factors firm specific and macroeconomic factors accountable for non-performing loans. From 2010 to 2017, a total of 880 data sets were analysed using the dynamic panel regression analysis on 110 commercial banks from nine countries. Louzis et al. (2010) investigated the factors of nonperforming loans in the Greek banking system, looking at each loan category separately (consumer loans, business loans and mortgages). Ahmed et al. (2021) investigated the macroeconomic and bank-specific determinants of NPLs for commercial banks from 2008-2018. Ikram et al. (2016) empirically explored the determinants of NPLs, small and medium enterprises (SMEs) held by the commercial banks. Zhang et al. (2017) did an empirical study to evaluate the factors that influence the likelihood of acquiring a loan in online peer-to-peer lending. Kiros (2020) looked at the elements that influence loan settlement for MSEs sponsored by Somali Microfinance Institutions, taking lender characteristics into account. Kurniawan and Wijaya (2020) investigated whether the loan granted factor influences

lending in Indonesia. According to the findings of binary logistic regression, the loan repayment period, grace period, and loan release timeliness all have a statistically significant impact on loan repayment. This leads to the following hypotheses:

H₅ Lending interest rate has a significant influence on loan default

H₆ Repayment period has a significant influence on loan default

3. Research Methodology

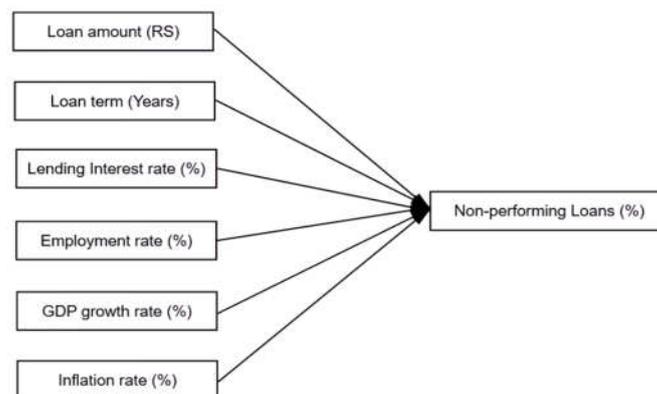
3.1 Data Source

The purpose of this paper is to identify the signification of macroeconomic and loan determinants of NPLs in Africa. In this regard, to enhance the generalizability of the findings, Africa is divided into three clusters, namely: underdeveloped, developing, and developed nations using the Human Development Index (HDI). The result from this paper will help us in understanding the causes of credit risk in Africa (Abusharbeh, 2020). Countries with an HDI score greater than 0.800 are categorised as very high, those with a value between 0.700 and 0.799 are classified as high, those with a value between 0.550 and 0.699 are classified as medium, and those with a value less than 0.550 are defined as low. In this backdrop, South Africa and Botswana were selected as the developed country, Namibia was selected as developing country, and Nigeria and Tanzania were selected as underdeveloped country. Time series panel data were gathered from the World Bank for a period of 10 years, from 2011 to 2020. The data regarding loan size and repayment period is created hypothetically.

3.3 Model Construction

Most previous studies that addressed the factors causing NPLs have used the multiple linear regression model, considering macroeconomic and bank specific characteristics acknowledging the findings of previous studies, this paper employs a balanced panel data analysis to pool the cross-sectional data over a certain period in order to identify the determinants of credit risk (Abusharbeh, 2020). Further this paper uses correlation and multiple linear regressions with the help of its dependent variable and independent variable.

Figure 1: Conceptual Framework



4. Analysis and Discussion

The statistical test has been done for five different countries that are Botswana, South Africa, Namibia, Nigeria and Tanzania. Table 1 shows the correlation result for 6 countries between the dependent variable (NPLs) and independent variable (GDP growth rate, Inflation rate, Employment rate, Lending Interest rate, Loan size and Repayment period).

4.1 Botswana

In case of Botswana, loan amount has a significant influence on NPLs as the significance value is 0.035 which is less than 0.05. Thus, we can accept H₃. Chaudhary and Ishfaq(2003) argue that the higher loan amounts are, the stricter the terms and conditions attached to loan contracts need to be (e.g., higher interest rates). The p-value is positive thus

suggest a positive relationship between Loan size and NPLs, thus increase in loan size leads to increase in NPLs and vice versa. Loan term has a significant influence on NPLs as the significance value is 0.007 which is less than 0.05. Thus, we can accept H₆. The reason for the same can be if the repayment period is longer the borrower might use the funds for other purposes hoping to repay the loan from later cash flows (Roslan&Mohd, 2009). Thus, it can lead to loan default. Employment rate has a significant influence on NPLs as the significance value is 0.003 which is less than 0.05. Thus, we can accept H₄.

4.2 South Africa & Namibia

Loan size, lending interest rate, and employment rate all have a substantial impact on NPLs in South Africa, with a significance of less than 0.05. Thus, we will accept H₃, H₄, and H₅. Also there exist a positive correlation between loan size, lending interest rate and employment rate and the NPLs. On the other hand, repayment period, GDP growth rate and inflation rate does not have a significant influence on NPLs as the significance is more than 0.05. Thus, we will reject H₁, H₂, and H₆. The situation in Namibia is like that in South Africa, in that loan size, lending interest rate, and employment rate all have a substantial impact on NPLs, with a significance of less than 0.05. As a result, H₃, H₄, and H₅ will be accepted. A positive association exists between loan size, lending interest rate, and employment rate, as well as NPLs. On the other hand repayment period, GDP growth rate and inflation rate does not have a significant influence on NPLs as the significance is more than 0.05. Thus, we will reject H₁, H₂, and H₆. Also there exist a negative correlation between inflation rate and NPLs. Both GDP growth rate and repayment period has a positive correlation with NPLs.

Table 1 – Correlation Coefficient

African Nations		Loan amount (RS)	Loan term (Years)	Lending Interest rate (%)	Employment rate (%)	GDP growth rate (%)	Inflation rate (%)
NPL (%) Botswana ^a	Pearson Correlation	.666*	.789**	-.874**	.829**	-0.221	-.858**
	Sig. (2-tailed)	0.035	0.007	0.001	0.003	0.539	0.002
	N	10	10	10	10	10	10
NPL (%) South Africa	Pearson Correlation	.835**	-0.424	.666*	.789**	0.561	0.174
	Sig. (2-tailed)	0.003	0.222	0.035	0.007	0.092	0.63
	N	10	10	10	10	10	10
NPL (%) Namibia	Pearson Correlation	.835**	0.475	.666*	.789**	0.606	-0.302
	Sig. (2-tailed)	0.003	0.166	0.035	0.007	0.063	0.397
	N	10	10	10	10	10	10
NPL (%) Nigeria	Pearson Correlation	.653*	.740*	0.337	-0.533	-.655*	.843**
	Sig. (2-tailed)	0.04	0.014	0.342	0.113	0.04	0.002
	N	10	10	10	10	10	10
NPL (%) Tanzania ^a	Pearson Correlation	0.434	0.584	.835**	-.632*	-0.159	-.672*
	Sig. (2-tailed)	0.21	0.076	0.003	0.05	0.662	0.033
	N	10	10	10	10	10	10

4.3 Nigeria & Tanzania

In the case of Nigeria loan size, loan term, GDP growth rate and inflation rate has a significant influence on NPLs as the significance is less than 0.05. Thus, we will accept H₁, H₂, H₃, and H₆. Also there exist a positive correlation between loan size, loan term, and inflation rate and NPLs. The pace of GDP growth and the number of nonperforming loans (NPLs) have a negative relationship. However, neither the lending interest rate nor the employment rate have a major impact on NPLs. As a result, we will rule out H₄ and H₅. There is also a negative relationship between unemployment and NPLs. Furthermore, there is a positive relationship between lending interest rates and nonperforming loans. Because the significance is smaller than 0.05, the lending interest rate, employment rate, and inflation rate all have a substantial impact on NPLs in Tanzania. Thus, we will accept H₁, H₄, and H₅. Also there exist

a positive correlation between lending interest rate and NPLs. Employment rate and Inflation have negative correlation with NPLs. On the other hand, loan size, repayment period, and GDP growth rate do not have significant influence on NPLs. Thus, we will reject H_2 , H_3 , and H_6 . Loan size and repayment period have a positive correlation with NPL, and GDP growth rate has a negative correlation with NPLs. From table 1, we can say that GDP growth rate is the least significant variable that has an influence on NPLs as it has significant influence on NPL only in Nigeria. Out of the five African countries studied, lending interest and employment rate had a substantial impact on NPLs in four of them.

5. Discussion and Conclusion

5.1 Theoretical & Practical Implications

The current study evaluates a variety of categories, including macroeconomic and bank-specific characteristics, to determine the best leading indicators for NPLs in Africa (Botswana, South Africa, Namibia, Nigeria, and Tanzania). The study hypothesizes about these types of variables' comparative and predictive performance are established and empirically tested. The study concluded that relying just on macroeconomic variables to forecast the progression of NPLs is ineffective. Therefore, researchers should also consider widening the scope of variables used. Most of the studies done in this area have taken one country but this paper has taken not only 5 countries but also taken high developed, medium developed and low developed countries based on their HDI. This study examined various bank specific and macroeconomic factors that can affect NPLs. The main contribution of this paper is the econometric analysis results, which may help in a better understanding of the variables that influence NPLs. We underline that both bank management at the micro level and indicator management at the macro level are equally crucial for controlling NPLs in banks. Banking regulations play a major effect. It should focus on bank-specific parameters like loan size and lending interest rate.. The accumulation of nonperforming assets (NPAs) might be greatly reduced if bank-specific issues were managed more effectively. The most significant components of credit management have been identified as risk identification and measurement; consequently, more time and effort should be spent assessing how much risk borrowers bring to bank loans. As a result, managers must accurately assess the ability to repay the loan. Furthermore, it is critical to stress the importance of risk management while also attempting to strike a balance between customer acquisition, which comes at the cost of the risk of default and the loss of any interest income the customer could have brought, and the loss of any interest income the customer could have brought. When managing the credit risk of their loans to avoid the possibility of increasing defaults, bank management can refer to the performance of macroeconomic conditions to predict the performance of their bad loans. To maintain stability in banking sector it is important that regulatory authorities establish more effective monitoring process. To detect banks with potential NPLs, regulatory authorities should focus on managerial performance. In order to avert future financial instability, authorities should focus on banks' risk management systems and procedures. In terms of lending policy, banks are advised to apply a strict credit policy to all borrowers. When banks loosen their policies, they lose bargaining power with borrowers. Banks with low capitalization ratios must reassure their managers that they are not taking too many risks.

5.2 Conclusion, Limitations, and future scope

Bad loans are an important indicator of a bank's asset quality, financial health, and thus liquidity and solvency. In Botswana, South Africa, Namibia, Nigeria, and Tanzania, this study looks at some of the important macroeconomic and bank-specific factors affecting non-performing loans. The results of this study indicate that loan amount, repayment period, lending interest rate, employment rate, GDP growth rate, and inflation rate have a significant impact on NPLs. We found out that lending interest rate and employment rate are the most significant factor influencing NPLs in Africa. On the other hand, GDP growth have been the least significant factor influencing NPLs as it was only in the case of Nigeria where GDP growth rate significantly influenced NPLs. The limitations in the paper provide opportunity for further research. The data was collected only for 10 years' time period, as more the time period more reliable the result will be. Loan amount and repayment period data were created hypothetically. The study only examined bank specific and macroeconomic factors influencing NPLs. Future researchers may consider the microeconomic factors in the emerging financial markets. As this paper has studied limited banking indicators as contributing factor of NPLs, future investigators should contemplate more attributes as determinants of the NPLs to perform more in-depth analysis. Moreover, cross-cultural impacts on NPLs can also be examined.

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