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Bank Specific Determinants of Non-Performing Loans: Empirical Evidence from Commercial Banks in Tanzania

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Abstract:
This study examined bank specific determinants of non-performing loans using information from asymmetry theory, moral hazard theory and real business cycle theory. This study adopted causality research design, using panel data (2007 to 2015) of 16 commercial banks in Tanzania. Descriptive statistics and multiple regression analysis were the estimation methods employed, while Ordinary Least-Squares (OLS) regression technique was also used, and then Fixed Effects (FE) and Random Effects (RE) assumptions were considered.
The study found that asset growth, higher capital ratio and loan-to-asset ratio are negatively associated with the occurrence of non-performing loans, whereas cost inefficiency is positively associated with the occurrence of non-performing loans in Commercial Banks in Tanzania. The results extend further moral hazard theory, information asymmetry theory and Bad Management hypothesis. The study findings have both theoretical and managerial implications for practitioners and policy-makers.

Keywords: non-performing loans, credit risk, bank specific factors

1. Introduction

Ever since the transformation of the financial sector in the 1990s, the banking sector in Tanzania has fully grown to the level that it is currently dominating the financial sector. As at December 2016, the banking sector controlled over 20 trillion Tanzania shillings of financial assets, representing 70 percent of total financial assets, with loans and advances representing 50 percent of total banking financial assets. To ensure that commercial banks maintain good quality assets and operate within prudential requirements, the Bank of Tanzania (BOT) has increased on-site and offsite monitoring and passed Credit Reference Bureaux Regulations of 2012 and Management of Risk Assets Regulations of 2014 (MRAR), and Credit Concentration and Other Exposure Limits Regulations of 2014 (CCOL). However, despite all these efforts by the BOT, the quality of assets measured by non-performing loans (NPL) has been deteriorating over the years. Gross non-performing loans have increased steadily from 4.4 percent in 2005 to 9.6 percent in 2016.

Increase in the level of gross non-performing loans pause a great risk to the financial sector and the economy at large. Equally, failure to manage down non-performing loans over a long period gradually affects liquidity and solvency of banks and may thus negatively affect liquidity position of the financial sector (Kaaya and Pastory, 2013).Consequently, failures to prudently manage gross non-performing loans normally results in high loan provisioning, which leads to drop-in profits for many banks (Kithinji, 2010) and gradually minimizes the bank sector's ability to play its role in the development of the economy (Zaini et al, 2010). To the contrary, little is known as what are the determinants ofNPLs in Tanzania. It is, therefore, imperative to scientifically examine and understand factors that contribute to the increase in non-performing loans in Tanzania.

The objective of this paper is to examine and identify factors specific to commercial banks that contribute to the occurrence of non-performing loans in Tanzania. This paper is will review literature on NPL in other countries in Africa, Americas, Europe, South East Asia, and South Asia. The main question this paper is trying to answer is what are bank's specific determinants of non-performing loan in Tanzania? To respond to that question, this paper is organized into six sections. Section one introduce the topic of NPL, section two discusses review of literature on NPL, section three highlights the research methodology employed, section four discuss the findings of the research, section five provide recommendations for further research and section six provide the conclusion of the research.

2. Literature Review

2.1. Overview of the Banking Sector

The banking sector dominates the financial landscape and accounts for about 70 percent of the total financial assets (BOT, 2016). Loan advances and overdrafts of commercial banks in Tanzania have grown to over Tzs 14.9 trillion in 2015 from Tzs 1 trillion in 2004. As at 31 December 2015, the Tanzania banking sector had 56 banking institutions consisting of 36 commercial banks, 12 community banks, 3 financial institutions, 2 development financial institutions and 3 deposit-taking microfinance banks. Out of 56 banking institutions, 7 are state-owned and 49 are privately owned banking institutions, of which 27 were locally owned, while 29 were foreign-owned banking institutions.

2.2. Definition of Non-Performing Loans

There is no global standard to define non-performing loans; however, variations exist in terms of classification and content. Non-performing loans are usually defined by banks based on the best international practices (Rwegasira and Phunto, 2011). Different countries have different criteria for classifying loans as non-performing loans (Rajeev and Mahesh, 2010). Waweru and Kalani (2009) refer to non-performing loans as accounts whose principal and or interest remains unpaid for 90 days or more after the due date. Similarly, non-performing loans are loans which are past due for ninety days or more (Caprio and Klingebiel, 1996) and are no longer generating interest income for the bank (Tiwari and Sontakke, 2013).This paper adopted BOT definition of NPL, which states that a non-performing loan as any credit accommodation in which contractual repayment is ninety days or more past due, and has been classified as a substandard, doubtful or loss account by a bank.

2.3. Theoretical Literature Review and Hypothesis Development

Over the years, researchers (Akerlof, 1970; Berger and De Young, 1997) have developed a variety of theories and hypotheses to explain factors that are associated with the occurrence and accumulation of non-performing loans in commercial banks. The growth of literature examining non-performing loans is attributed to the fact that non-performing loans play a critical role in the financial losses of commercial banks. This has been evidenced by the strong association between NPLs and banking crises in Argentina, East Asia and sub-Saharan Africa in the 1990s, and most recently in the US and Europe (Allen and Carlett, 2009).The theoretical perspectives that informed this research that have led to the development of the hypothesesin analysing the relationship between bank specific factors and the occurrence of NPL are moral hazards theory, information asymmetry theory, adverse selection theory and bad management hypothesis.

Moral hazard in the banking sector is a concept with a variety of principal-agent problems. Accordingly, bank managers have the incentives to undertake risky decisions because they stand to gain a large portion of upside risk (profits, bonuses, market share) and a small portion of downside risk on their part, but high downside risk to depositors and shareholders (Jensen and Mickling, 1976). Equally, bank managers facing capital pressure (undercapitalized banks) tend to react to moral hazard incentives by underwriting high-risk loans at a high interest rate with the assumption that high interest rate will boost profits and capital base. To the contrary, high-risk loans result in higher levels of NPLs, as high interest rates may have similar adverse incentive to borrowers. Moral hazard is normally linked to bank management behaviour through balance sheet items such as bank size, loan growth, asset growth, deposit growth and capital adequacy ratio as, changes in all these items is associated with decisions made bank management. Based on the argument on moral hazard theory, it is hypothesized that:

- ➢ H1:   The higher the size of the bank in the market, the lower the non-performing loans
- ➢ H2A: The more rapid the growth of the loans, the higher the non-performing loans.
- ➢ H2B: The more rapid the growth of total assets, the higher the non-performing loans.
- ➢ H3:   The higher the deposit growth rate, the higher the non-performing loans.
- ➢ H4:   The higher the capital adequacy ratio, the lower the level of non-performing loans.
- ➢ H5:   The higher the net interest margin, the lower the non-performing loans.
- ➢ H6:   The higher the ratio of loan to assets, the higher the non-performing loans.

Information Asymmetry Theory argues that asymmetric information occurs when one party in a transactional relationship is more informed about the transaction than the other party. In the financial decision space, asymmetric information literature looks at the impact of decisions based on the difference in the information available to both parties (Mishkin, 1992).Lenders offering credit facilities to borrower's face uncertainty of loan repayment, as they cannot observe the characteristics and actions of the borrower, thus making it difficult to assess the creditworthiness of the borrower (Ariccia, 1998). Consequently, informational asymmetries cause adverse selection, also known as the "lemon Principle" and moral hazard problems first described by Akerlof (1970).

When lenders cannot distinguish good from iniquitous borrowers, all borrowers are charged a normal interest rate that reflects their pooled experience (Evans et al., 2000; Catro, 2013). However, if this rate is higher than good borrowers can afford, it will push some good borrowers out of the borrowing market, forcing banks to charge higher rates to the remaining unqualified borrowers (Barron and Staten, 2008). Consequently, adverse selection leads to a situation whereby high-quality

borrowers are displaced by low-quality borrowers, which in the long run cause deterioration in the overall quality of bank loan portfolios and lead to accumulation of non-performing loans (Bofondi and Gobbi, 2003; Bofondi and Ropele, 2011; Makri et al., 2014;).

In line with adverse selection, bank managers also may lack the ability to ability to underwrite, manage credit risk and manage operating costs, this phenomenon is linked to Bad Management Hypothesis. Bad management hypothesis, first introduced by Berger and De Young (1997) points out that in responding to the increase in non-performing loans resulting from adverse selection, bank management tends to inject more resources into managing and monitoring bad loans, which in the long run results in an increase in operating expenses over the interest income. Accordingly, higher cost-to-income ratio is a sign of weak bank management in underwriting, monitoring, and control of the loan portfolio (Louzis et al., 2010; Vardar and Özgüler, 2015; Muratbek, 2017). Based on the argument on cost inefficiency, it is hypothesized that:

> ➢ H7:   The higher the cost-to-income ratio, the higher the level of non-performing loans.

2.4. Empirical Literature Review

In recent years, empirical literature on determinants of non-performing loans (Louzis et al., (2010); Makri et al (2014); Vardar and Özgüler (2015); Gila-Gourgoura and Nikolaidou (2017)) have emerged with varying conclusions on the causes of NPL. However, determinants of non-performing loans vary from country to country and across regions depending on economic conditions and the maturity of the banking and the financial sector (Eichengreen and Rose, 1998).

A study by Ahmad and Ariff (2007) on determinants of non-performing loans in emerging countries (India, Korea, Malaysia, Mexico and Thailand) revealed that the increase in non-performing loans is associated with bank-specific factors, specifically; incapable bank management and bank regulatory capital. Similarly, Ozili (2017) study on determinants of NPLs using a sample of banks from 134 countries concluded that more efficient banks (low cost to income ratio) tend to have less NPLs compare to inefficient banks.

From an African perspective, Warue's (2013) study on Kenyan banks (1995 to 2009) found that increase in the levels of non-performing loans was associated with bank-specific factors; in particular, weak credit risk management, poor organizational and operating structure.Warue's (2013) findings support Geletta's (2012) study on Ethiopian banks, which suggested that non-performing loans are associated with bank-specific factors such as aggressive lending, poor credit risk assessment and weak monitoring of loans.

From a Middle East and North Africa (MENA) perspective, a study by Abid et al. (2013) on Tunisian banks (2003 to 2012) suggested that bank specific variables – in particular, bad management quality — influence the occurrence of NPL. Similarly, the Espinoza and Prasad (2010) study on determinants of non-performing loans in the Gulf Cooperative Council countries (GCCC) (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE) concluded that the increase in NPL in the GCCC was associated with bank specific factors (asset growth, operating efficiency, and ownership structure).

From the perspective of the Americas and the Caribbean, a report by Fein (2009) on the causes of the 2007 to 2009 financial crisis in the US concluded that bad management, flawed credit underwriting standards, inappropriate credit analysis, poor credit documentation, unrealistic repayment assumptions and rising home values were the causes of the increase in defaults on mortgage repayment in the US. Similarly, the Haughwout et al. (2008) study (2001 to 2007) on causes of delinquency of mortgages in the US concluded that both bank-specific factors such as relaxation of underwriting criteria at origination were critical factors in the increase in default rates. Furthermore, Ghosh (2015) study (1984-2013) on bank specific of non-performing loans revealed that higher capitalization, liquidity risks, poor credit quality, high cost inefficiency significantly increase NPLs significantly influence the increase in NPLs.

From a European perspective, the Louzis et al. (2010) study on the determinants of non-performing loans in Greece (2003 to 2009) revealed that bank-specific factors such as poor performance and cost inefficiency have a significant effect on the level of NPL. Makri et al (2014) study (2000 to 2008) on determinants of non-performing loans in the Eurozone concluded that bank capital adequacy and Return on Equity are negatively associated with NPLs.

From the perspective of the East Asia Pacific countries, Suhartono's (2012) study (2004 to 2011) on the determinants of loan loss provision in Indonesian banking revealed that bank specific factors influence non-performing loans. The Suhartono (2012) study concluded that lower capitalized banks tended to have higher non-performing loans. The Setiawan and Putri (2013) study (2007 to 2012) on the determinants of non-performing loans on Islamic banks in Indonesia found that the increase in the level of non-performing financing was associated with poor bank management. On the other hand, the Xu (2005) study on causes of non-performing loans in China indicated that non-performing loans were largely a result of sustained losses at state-owned enterprises and lack of a commercial credit culture. Similarly, a study by Li (2003) from 1996 to 1999 on non-performing loans in Taiwan commercial banks and the Asia Financial crisis, found that both loan growth and bank size were positively related to the occurrence of non-performing loans. Furthermore, a study by Hajja (2017) on determinants of credit risk in Malaysian banks concluded that inefficient banks (higher cost to income ratio) tend to have higher NPLs.

From a South-East Asia perspective, the Rwegasira and Phuntsho (2009) study on the major causes of non-performing loans in Bhutan found that non-performing loans were associated with bank-related factors, specifically, insider lending, a weak credit management system and control mechanism, and poor corporate governance. The Rwegasira and Phuntsho

(2009) study supports the Haneef et al. (2012) study on the impact of risk management on non-performing loans in Pakistan, which concluded that the increase in non-performing loans was related to lack of effective credit risk management controls and monitoring tools. Similarly, a study (2007 to 2014) by Muratbek (2017) on determinants of non-performing loans in Kazakhstan banking sector revealed that non-performing loans are negatively associated with the capital-to-asset ratio.

3. Research Methodology

This research used secondary data from published audited financial statements of 16 licensed and registered commercial banks in Tanzania commercial banks that have been in existence from 2007 to 2015 and various reports from the Bank of Tanzania. All commercial banks that had been operating for less than three years during the period under the study were excluded. A sample of 16 out of a population of 36 banks was purposefully selected based on the availability of financial data and was categorized based on assets size, loans size, liabilities positions, capital, and earnings. The selected banks represent approximately 75 percent of all banks' assets size, loans size, liabilities positions, and capital and earnings, therefore making this sample sufficiently representative of the population

This research adopted causality research design and deductive research strategy.The causality research design has been chosen because: i) the study attempted to test and analyse the relationship among hypothesized variables, ii) the design helps to find empirical association between the independent variables and dependent variable.

This research used descriptive analysis and multiple regression analysis methods to analyze data. To ensure that the sample conform to multiple regression analysis methods,the data was tested for normality, linearity, multicollinearity, and heteroscedasticity. No significant violations were found. Similarly, to ensure that the sampleis large enough to guarantee stable coefficients, provide adequate power for statistical significance, and generalizability, the research applied Hair, et al. (2009) rule of Thumb methods. Hair, et al. (2009) rule of thumb method argue that the ratio of observations to independent variables should not fall below 5:1, with desired levels between 15 to 20 observations for each independent variable. This research has 8 independent variables; hence, minimum observations are 40 (5*8), preferred observations are 120 (15*8) or 160 (20*8). The research used the Hair et al. (2009) rule of thumb and applied a ratio of 9:1 observations per one independent variable to estimate sample size. Therefore, this study used 128 observations that are above the minimum of 40 observations recommended by Hair et al. (2009). Therefore, this sample size is sufficient to provide adequate power for statistical significance and generalization of results.

3.1. Measurement of Variables

Dependent Variable for this research is *Non-Performing Loans* (NPL) ratio, which is calculated by dividing non-performing loans to total loans and advances; it is used as an indicator of credit risk. The higher the NPL ratio, the poorer the credit quality and, therefore, the higher the risk that more loan loss will be charged against income. Higher levels of NPLs reduce profitability of the bank.

Bank size (BNKSZ) is measured by dividing total assets of an individual bank over the sum-total of assets of all sampled commercial banks. It is an indicator of the size of individual banks against the size of all sampled banks. *Loan Growth (LNGR)* rate is measured by dividing net change in current year loans and advances balance, over the preceding year loans and advances balance of an individual bank. It is an indicator of year-over-year growth in loans and advances balance. *Asset Growth (AGR)* rate is measured by dividing net change in current year total assets balance, over the preceding year total assets balance of an individual bank. It is an indicator of year- over-year growth in total assets. Banks' assets are comprised of cash, balance with banks and items for clearing, investment in debt securities, loans advances and overdrafts, property and equipment, and other assets. *Deposit Growth (DPGR)* rate is measured by dividing the change in current year deposits balance over the preceding year deposits balance of an individual bank. It is an indicator of year-over-year growth in deposits.

Capital Adequacy (SLVT) is measured by dividing an individual bank's total capital over total risk weighted assets and off-balance-sheet exposure. It reflects the strength of a bank's capital. Bank total capital is comprised of equity shares and other capital items including share premium, capital grants and general reserves, retained earnings, profits for the year, and fixed assets revaluation reserves. Equally, off-balance-sheet items include letters of credit, guarantees and indemnities, bills for collection, forward exchange, and undrawn loans and overdrafts. *Cost-to-income ratio (CIGRT)* is calculated by dividing non-interest expenses to gross income. This ratio reflects management efficiency in managing assets. Existing literature provides evidence that a high cost-to-income ratio reflects serious weaknesses on management capacity, while a low cost-to-income ratio indicates management's strength in managing assets. *The net interest margin (NIMEA)* is the difference between the average interest rate earned on assets and the average interest rate paid on deposits. Mathematically, it is usually defined as net interest income over average earning assets, with net interest income being the difference between interest income and interest expense (Salas and Surina, 2002; Das and Gosh, 2007). *Loan-to-Asset ratio (LNTA)* is measured by dividing the total outstanding loans to total assets of an individual bank. This ratio is an indicator of bank risk-taking behaviour or risk appetite.

3.2. Econometric Methodology

Based on the theoretical relationship among variables, multiple regression models were developed as per the objectives of the study. The study employed a modified version of the econometric model of Salas and Saurina (2002), Das and

Ghosh (2007), Messai and Jouini (2013), Louzis et al. (2010), and Bucur and Dragomirescu (2014).The regression model is estimated to examine both bank-specific determinants and macroeconomic determinants of NPL. The model is expressed as:

$$NPL_{it} = \alpha + \beta_1 BNKSZ_t + \beta_2 LNGR_t + \beta_3 SLVTt + \beta_4 DPGR_t + \beta_5 AGR_t +$$
$$+ \beta_6 CICRT_t + \beta_7 NIMEA_t + \beta_8 LNTA_t + e_{it} \text{--------- (1)}$$

Whereas: -

α is a constant term,

't' to represent the year

'β' is a coefficient of independent variables

'e' represents the unexplained residual

Where NPL=Non-performing loans and total gross loans ratio, BNKSZ=Bank Total Assets/Sum (Banks Total Assets), LNGR=Annual loan growth rate, SLVT=Shareholders Funds/Total Assets, DPGR=Year-on-year deposit growth rate, AGR=Year-on-year asset growth rate, CICRT=Non-Interest Expenses/Gross Income, NIMEA=Net Interest margin to average earning assets, LNTA=Loan to Asset ratio, ROA=Return on Assets, ROE=Return on Equity.

This research used three panel estimation methods: 1) Pooled Regression Model (OLS), 2) Fixed Effects (FE), 3)Model and Random Effects (RE) Model. OLS assumes that all subjects are homogeneous which discounts the heterogeneity (individuality or uniqueness) that might exist among different subjects under study in the regression model (Woodridge, 2010). The Fixed Effects (FE) model takes into account heterogeneity or individuality among cross-section units by letting each entity have its own intercept value that captures the differences across entities (Gujarati and Porter, 2009). On the other hand, Random effects (RE) Model is used on assumptions that the unobserved individual heterogeneity is uncorrelated with the independent variables included in the model. The RE estimator assumes that the intercept of an individual unit is a random component that is drawn from a larger population with a constant mean value. The Hausman test shows the Chi Square of 18.86 with the p value of 0.17. Given this, the results and discussion are focused on the outcome provided by the Random Effects model.

4. Results and Discussion of Findings

4.1. Descriptive Statistics

As it can be seen from Table 1, the mean value of NPL is 7 percent, which range widely from a low of 0.1 percent to a high of 36.5 percent. The average value of bank size is 6 percent with the largest bank holding 25 percent of market share, which occurred in 2015. The mean value of loan growth is 16 percent, widely ranging from a low of -133 percent to a high of 81 percent. The maximum loan growth is almost five times the mean value. The maximum loan growth value is a result of a significant increase in loans issued by banks following an increase in demand that is attributable to consistent economic growth from 2008 to 2015. The mean value of operating costs to income ratio is 63 percent, which ranged from a low of 22 percent to a high of 185 percent. The highest value of cost-to-income ratio is a result of loan write-offs.

Deposits have been growing at an average of 16 percent, ranging from a low of -20 percent to a maximum of 134 percent. Similarly, bank assets growth recorded a mean value of 17 percent with a maximum value of 122 percent, from a minimum of -23 percent. Both growth in deposits and assets are largely driven by growth in demand for credit from the private sector, and banks' need to fund their loan books and growth of banks' business base respectively.

The mean value of capital ratio is 12 percent, ranging from a low of 6 percent to a high of 24 percent. The average capital ratio of 12 percent is consistent with the BOT's minimum capital adequacy ratio of 12 percent. The mean value of net interest margin is 9 percent, which ranges from a minimum 1 percent to a maximum 71 percent. The low rate is because some banks pay higher costs for deposits to fund their loan books. The mean value of loan-to-asset ratio is 13 percent, which ranged from a minimum of 18 percent to a maximum of 87 percent.

Variable	Obvs	Mean	Median	Max	Min	Std. Dev.
NPL	128	0.07	0.05	0.36	0	0.07
BNKSZ	128	0.06	0.03	0.25	0	0.07
LNGR	128	0.16	0.2	0.81	-1.33	0.24
CIGRT	128	0.63	0.6	1.85	0.18	0.22
DPGR	128	0.16	0.15	1.34	-0.2	0.19
AGR	128	0.17	0.17	1.22	-0.23	0.18
SLVT	128	0.12	0.12	0.24	0.06	0.03
NIMEA	128	0.09	0.07	0.71	0.01	0.08
LNTA	128	0.5	0.52	0.87	0.18	0.13

Table 1: Descriptive Statistics of Bank Specific Variables

4.2. Correlation Results

Pearson r was calculated to determine whether a statistically significant correlation was present between bank-specific variables with the NPLs. In the observations, the findings indicated that among bank-specific variables, loan growth, cost-to-income, asset growth and net interest margin are significantly negatively correlated with NPLs, whereas other remaining variables are not significantly correlated with NPLs.

The correlation matrix shows that cost-to-income is significantly positively correlated with NPLs, while asset growth and net interest margin are significantly negatively correlated with NPLs. The study found that other variables such as bank size, loan growth, deposit growth, capital adequacy ratio, and loan-to-assets ratio are negatively correlated with NPLs, but the relationship is not statistically significant.

The results show that cost-to-income is significantly negatively correlated with bank size. However, there is no significant correlation between bank size and the rest of the variables. The results show that deposit growth and asset growth are significantly positively correlated with loan growth, whereas capital adequacy is significantly negatively correlated with loan growth. Other variables such as cost-to-income, net interest margin, and loan-to-asset are not statistically significantly correlated with loan growth.

It is also found that net interest margin is significantly negatively correlated with cost-to-income, whereas other variables are not significantly correlated with cost-to-income. Consequently, asset growth is statistically positively correlated with deposit growth, whereas other variables are not significantly correlated with deposit growth. Capital adequacy is statistically negatively correlated with asset growth, while, other variables are insignificantly correlated with asset growth. Loan-to-asset is negatively and significantly correlated with capital adequacy; however, net interest margin is not significantly correlated with capital adequacy. The correlation matrix of bank-specific variables is presented in Table 2 below.

	NPL	BNKSZ	LNGR	CICRT	DPGR	AGR	SLVT	NIMEA	LNTA
NPL	1								
BNKSZ	-0.0709	1							
LNGR	-0.1432	-0.0352	1						
CICRT	0.5091*	-0.2390*	-0.0281	1					
DPGR	-0.1349	-0.1105	0.2196*	0.1039	1				
AGR	-0.2094*	-0.1408	0.2760*	0.1066	0.8514*	1			
SLVT	-0.1138	-0.0011	-0.2484*	-0.0992	-0.1645	-0.2356*	1		
NIMEA	-0.1817*	0.0137	0.1353	-0.2142*	-0.0345	-0.0124	0.0059	1	
LNTA	-0.1518	0.0128	0.1592	0.0848	-0.062	0.0200	-0.2488*	0.0713	1

Table 2

4.3. Regression Results

This thesis presents results from the Random Effects (RE) of bank-specific determinants of NPLs.

The coefficient estimate of **Bank Size (BNKSZ)** is positive but statistically not significant, indicating that the larger the bank, the higher the level of non-performing loans. The results do not indicate bank size to be a significant determinant of NPLs in Tanzania. Consequently, these results are inconsistent with the claim that large banks have enough human and technological resources to effectively management credit risk and maintain a high-quality loan portfolio. Therefore, the result fails to support Hypothesis 1, that the higher the market shares of the bank, the lower the non-performing loans. This result supports the findings of Khemraj and Pasha (2009) and Abud et al. (2014), which showed a positive relationship between NPLs and size of the bank. This indicates that large banks are not necessarily more effective in the credit management cycle when compared to their smaller counterparts. This study is inconsistent with the findings of Swamy (2012), Salas and Saurina (2002) and Das and Ghosh (2007) which showed a negative relationship; indicating that large banks have experienced management with the necessary skills to effectively manage credit risk.

The estimated coefficient of **Loan Growth(LNGR)** is negative but the result is not statistically significant. The results indicate loan growth moves in the opposite direction to non-performing loans, which is contrary to what this study had hypothesized. However, since the results were insignificant, the study failed to support Hypothesis 2A. The result probably reflects the dominance of a few large banks extending credit to existing clients with a good record of managing their loans. This result is consistent with previous findings of Vogiazas and Nikolaidou (2011), Khemraj, and Pasha (2009); indicating that rapid loan growth may not necessarily transform into high NPLs in the future. The findings of this study do not support the moral hazards theory, which suggest; under pressure to meet growth targets, bank managers lower the borrower eligibility criteria and extend credit unqualified borrowers who later defaults on their loans and lead to an increase in NPLs. To the contrary, the results are inconsistent with the findings of Kraft and Jankov (2005) and Salas and Saurina (2002) who found a positive relationship between rapid loan growth and increase in the probability of credit quality deterioration.

The coefficient of **Asset Growth(AGR)** is negative and statistically significantly is associated with the growth in NPLs; indicating growth in bank's assets is associated with the decrease in NPLs. The result is the opposite of what was hypothesized and shows a negative but significant relationship. Therefore, the study failed to support Hypothesis 2B. A possible explanation is that as banks grow their loans, they implement robust risk management procedures and technology, which allows them to

end up with lower levels of NPLs. The result does not support the moral hazard theory and is inconsistent with the claim that an increase in total assets is associated with increase in NPLs. A possible explanation for this result is that loans form a major part of bank assets, and growth in the banking sector assets is driven mainly by asset growth of the four largest banks in Tanzania. A significant portion of the loan book of large banks is made up of loans to large corporations. These four large banks are more likely to lend under renewal at an enhanced level, or offer new term loans to existing corporate clients with a good repayment record. Equally, these banks tend to exert greater managerial efficiency in screening large loans and post-loan monitoring, leading to lower defaults. To the researcher's knowledge, asset growth has not been widely considered as a determinant of NPLs on studies done by other researchers; therefore, this forms a part of new knowledge for future researchers.

The coefficient of **Deposit Growth(DPGR)** is positive but the relationship is not statistically significant. Therefore, the study failed to support Hypothesis 3. These results indicate increase in deposits associated with increase in NPLs, but deposit growth does not have explanatory power over the occurrence of NPLs. The results, thus lending support to the moral hazard theory. A possible explanation for this is that deposits being the main source of funding for loans, they tend to move in the same direction as NPLs. To the researcher's knowledge, deposit growth has not been considered as a determinant of NPLs in other studies.

The estimated coefficient of **Capital Adequacy (SLVT)** or solvency ratio, a measure of banks' risk-taking attitude, is negative and statistically significantly associated with the occurrence of NPLs. The results indicate that the higher the capital ratio the lower the NPLs and vice versa. Therefore, the study supports Hypothesis 4.These results support the moral hazard theory, which argues that highly capitalized banks tend to have lower NPLs, while under capitalized banks tend to have higher NPLs. The results are consistent with the findings of Salas and Saurina (2002), Berger and DeYoung (2007), Makri et al. (2014) and Abid et al. (2014). A possible explanation for this in the Tanzanian context is that the four largest banks are also well capitalized. They hold 50 percent of total banking assets and use their strong expertise to manage loans more effectively than their smaller counterparts. On the contrary, these results are inconsistent with the findings of Louzis et al. (2010) and Swamy (2012), who found a positive relationship between capital adequacy of solvency ratio and NPLs.

The results found **Net Interest Margin(NIMEA)** measured by 'net interest margin to average earning assets' to be statistically insignificant but positively associated with NPLs. This result is the opposite of the hypothesis that higher net interest margin is associated with lower non-performing loans. Therefore, the study failed to support Hypothesis 5. The result explains that increases in bank earnings are associated with the increase in NPLs. These results suggest that when bank managers are driven to grow their earnings, they tend to attract riskier borrowers and charge high interest rates. High interest rates adversely affect a borrower's ability to meet monthly principal and interest expenses, thus causing them to default on their loans and increasing the number of non-performing loans. These results are consistent with the findings of De Lis et al. (2000) in Spain, but inconsistent with the findings of Salas and Saurina (2002), and Das and Ghosh (2007), with evidence in Spain and India respectively.

The coefficient estimate of the **Loan-to-Asset ratio (LNTA),** which represents the risk appetite of commercial banks, is negative and statistically significant. Therefore, the study fails to support Hypothesis 6. These results suggest that increase in banks' risk appetite is associated with the decrease in NPLs. The results fail to support the moral hazard theory, which argues that, under pressure to meet profitability targets and bonuses, bank managers respond to moral hazard behaviours by taking more risks in the form of excessive lending. They lower their lending standards and extend credit to unqualified borrowers, who later default on their loans. A possible explanation to this is that due to the small nature of the banking market, coupled with a highly competitive landscape made up of few borrowers, banks tend to extend large credit to a few existing borrowers; corporate customers. They have good track records, and hence reduce the possible increase in the default rate. On the contrary, these results are inconsistent with the findings of Klein (2013) and Sheefeni (2015), who found loan-to-asset ratio to be positively associated with the occurrence of NPLs.

The coefficient of operating cost to gross income **(Cost to Income Ratio- CICRT)** is positive and statistically significant. Therefore, this study supports Hypothesis 7A. The results provide support for information asymmetry theory, adverse selection theory, and bad management hypothesis. Bad management hypothesis states that low cost efficiency is a signal that senior bank management is not sufficiently monitoring and controlling their expenses and they are neither efficient nor effective in underwriting, monitoring and controlling their loan portfolio.Additionally, these managers find it difficult to monitor and control borrowers after the issuance of loans, which in the long run leads to a high number of non-performing loans in the future. Possible explanations for this in the Tanzanian context is that bank managers in Tanzania have limited skills in managing credit risk and henceforth limit their ability to manage their credit portfolio. The results of the study are consistent with the findings of Louzis et al. (2010) and Abid et al. (2014) who found a positive and significant relationship between cost inefficiency and NPLs. This result is inconsistent with the findings of Ross et al. (2005) and Ganić (2014), who found a negative correlation between cost efficiency and NPLs. The latter findings supported the skimping hypothesis argument by Berger and De-Young (1997), which argued that high cost efficiency may reflect few resources being allocated to manage lending activities, and in the end, results in a high level of NPLs.

Independent Variables	Dependent variable	NPL	
	Pooled OLS	Fixed Effects (FE)	Random Effects (RE)
	Coefficients	Coefficients	Coefficients
BNKSZ	0.018	0.379	0.023
	(0.245)	(0.979)	(0.171)
LNGR	-0.016	0.000	-0.005
	(-0.716)	(-0.019)	(-0.270)
CICRT	0.164*	0.081*	0.107*
	(6.917)	(3.112)	(4.584)
DPGR	0.033	0.012	0.015
	(0.645)	(0.293)	(0.375)
AGR	-0.128**	-0.089**	-0.094**
	(-2.390)	(-1.986)	(-2.153)
SLVT	-0.524*	-0.338	-0.446**
	(-2.688)	(-1.548)	(-2.265)
NIMEA	-0.036	0.114***	0.076
	(-0.551)	(1.715)	(1.222)
LNTA	-0.125*	-0.243*	-0.173*
	(-3.005)	(-3.902)	(-3.510)

Table 3: Regression Results
Source: Researcher's own construct using data from 2007-2015.
*Note: Significant levels are reported with *, **and *** corresponding to 1%, 5% and 10% significant values.*
t-statistics are reported in parenthesis.

Independent Variables	Hypothesis number	Theory	Hypothesis sign	Actual sign of result	P Value	Statistical significance of results	Conclusion (Hypothesis)
Bank Size	1	Moral Hazard	-	+	0.86	Insignificant	Not Supported
Loan growth	2A	Moral Hazard	+	-	0.79	Insignificant	Not Supported
Asset Growth	2B	Moral Hazard	+	-	0.03	Significant	Not Supported
Deposit Growth	3	Moral Hazard	+	+	0.71	Insignificant	Not Supported
Solvency	4	Moral Hazard	-	-	0.03	Significant	Supported
Net Interest Margin	5	Moral Hazard	-	+	0.22	Insignificant	Not Supported
Loan to Asset	6	Moral Hazard	+	-	0.00	Significant	Not Supported
Operating Cost to Income	7A	Information Asymmetry/ Adverse selection	+	+	0.00	Significant	Supported
Operating Cost to Income	7B	Information Asymmetry/ Adverse selection	-	+	0.00	Insignificant	Not Supported

Table 4: Summary of Regression Results and Hypothesis Test

5. Conclusion

In this study, we used panel data methods to examine bank specific determinants of NPLs in the Tanzanian banking sector. The study found that growth in total assets, higher loan-to-asset ratio are associated with the decrease in NPL thus refuting to the moral hazard theory while higher capital ratio is also associated with the decrease in NPLs thus supporting the moral hazard theory. On the other hand, higher cost to income ratio is associated with the increase in NPLs in Tanzania thus lending support to Asymmetry Theory, Adverse selection theory and bad management hypothesis linking this variable with the quality of bank management.

The results of this study leave several implications for practitioners and regulators. For practitioners, as evidenced in this analysis, the accumulation of NPLs is associated with information asymmetry and management's moral hazards incentives. Though it is not clear to what extent managers pay attention to client data and information during the credit analysis stage, bank management will need to invest in robust credit information systems; thus to reduce informational gaps

and increase access to complete, accurate and reliable information concerning borrowers' payment histories including the installation of a statistical credit scoring model, and a relationship management system that will allow banks to better monitor and manage borrowers.

Bank regulators need to increase the frequency of monitoring banks, offsite and onsite monitoring of commercial banks. Specifically, regulators need to closely monitor bank operating efficiency and capital adequacy by paying more attention to cost-to-income ratio trends and bank's capital position. Specifically, regulators should work closely with undercapitalized banks and seek to implement measures designed to ensure these banks have effective strategies to grow their capital base, and maintain prudent credit standards when underwriting credit during different economic cycles.

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