

# The Influence of Capital Adequacy, Profitability, and Loan Growth on Non-Performing Loans a Case of Tanzanian Banking Sector

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## ABSTRACT

This study had two central objectives, compliance of capital adequacy and non-performing loan ratios prudential requirement and analysis on the influence posed by Capital Adequacy, Profitability, and Loan Growth on Non-Performing Loans. Banking sector ratios as reported by the supervisory authority (Bank of Tanzania) were used for the purpose of this study. The banking sector ratios show that commercial banks in Tanzania had strong Capital adequacy ratio greater the 10% required by the Bank of Tanzania. However, the banking sector failed to meet non-performing loans 5% threshold. On the hand, when regression analysis was used to study the influence, it was found that, capital adequacy, profitability posed insignificant influence on non-performing loans whereas loan to asset ratio and interest margin had a significant influence.

**Keywords:** Capital adequacy, Profitability, Loan growth, Non-performing loans, Tanzania.

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## 1. INTRODUCTION

### 1.1 Introduction to the problem

Banks play a vital role in economic development through financial intermediation which enhances investment and economic growth. This financial intermediation role is fulfilled by channelling surplus funds to their most productive uses (Bashir, 2000). Thus, they channel fund from surplus units (savers) to deficit units (borrowers). Due to this intermediation process, banking is a pivotal sector in the economic growth and stability of any country.

Since the growth and financial stability of the country depends on the financial soundness of its banking sector; it is important for central banks to make sure that banks have sound financial positions. When a bank fails, the whole of a nation's financial system is thrown into jeopardy (Ikhide, 2000) and the financial intermediation is disrupted. On the other side, studies also have shown that bank performance also is influenced by the economic performance (Demerguc-Kunt and Huizinga, 1999). Both ways of the argument justifies the close link of banks and the economy which infuses thirsty to understanding how banks should be managed and stabilized.

However, due to the nature of the business conducted in the banking sector, banks are subjected to many risks such as credit risks, liquidity risks to mention a few. These risks may result into bank failures damaging businesses, depositors and the economy as a whole (Lelisa, 2014). In the world where bank crises have resulted into financial catastrophe, the focus should be how financial risk of the banks are covered or even mitigated.

The general expectation is that banks are expected to absorb the losses from the earnings. But there may be some unanticipated losses which cannot be absorbed by operating profits or beyond the normal earnings coverage in which capital comes to cushion off the losses (Lelisa, 2014). This provides confidence to depositors that their money is safe; to the public that the bank is in a position to give genuine consideration to their credit and other banking needs in good as in bad times and to the regulatory authority that the bank will remain in continuous existence (Lelisa, 2014). Therefore, to enhance smooth functioning of banks it is required that banks should have risk management mechanism which will mitigate risks (BOT, 2010). One of the mechanisms is to meet capital adequacy and nonperforming loan requirements as often proposed by their supervisors.

### 1.2. Objectives of the Study

#### 1.2.1. General Objective

The general objective of this study is to determine the influence of capital adequacy and profitability on non-performing loans of banks in Tanzania.

#### 1.2.2. Specific Objectives

Achievement of the above general objective was guided by the following three specific objectives;

- a) To establish the compliance of capital adequacy requirement in Tanzania.
- b) To establish the compliance of nonperforming loans in Tanzania.
- c) To establish the impact of capital adequacy and non-performing loans on profitability of commercial banks in Tanzania.

### 1.3. Theories and Evidences

#### 1.3.1. Credit Risks and Non-Performing Loans

To improve banks' performance and financial positions, commercial banks carry out investment and asset activities of banking by provision of loans to various customers. Reports confirm that loans and advances constitute a major part of bank assets and loan income is the primary income of the banks (BOT, 2015). The process of creating credit works by transferring funds from savers to borrowers (Tchankova, 2002). However, commercial

lending is affected by various potential risks. These risks include interest rate risk, market risk, liquidity risk, politically connected risks, credit risk and risks that relate to foreign exchange to mention a few (BOT, 2010). Of all these risks, the principal risk that banks face is the credit risk (Tesfai, 2015).

Credit risk is represented by the existence of non-performing loans (bad loans), provision for losses of loans and loans for problems (Jimenez and Saurina, 2006). Credit risk is termed as that which occurs when a bank grants a loan, and, is not either in full or in partial terms repaid to the bank (Campbell, 2007). Since loans and advances are more profitable than any other assets, a bank is willing to lend as much of its funds as possible (Tesfai, 2015). But banks have to be careful about the safety of such advances (Radha and Vasudevan, 1980). Therefore, bank needs to be careful in advancing loans as there is a greater risk which follows it in a situation where the loan is defaulted. It is when such risks materialize that loans turn to be non-performing.

Non-performing loans are defined as defaulted loans which banks are unable to profit from (Petersson and Isac, 2004). According to the International Monetary Fund (IMF, 2009) a non-performing loan is any loan in which interest and principal payments are more than 90 days overdue (IMF, 2009). They generally refer to loans which for a relatively long period of time do not generate income; that is the principal and/or interest on these loans has been left unpaid for at least 90 days.

It is widely accepted that a big quantity or percentage of non-performing loans is often associated with bank failures and financial crises in both developing and developed countries (IMF, 2009). In fact, there is abundant evidence that the financial/banking crises are preceded by high non-performing loans (Tesfai, 2015). The global financial crisis in 2008 for instance, was attributed to the rapid default of sub-prime mortgages (IMF, 2009). This explains why much emphasis is placed on non-performing loans when examining financial vulnerabilities of the financial system of the economy (Sorge, 2004).

Because of the fear of nonperforming loans, commercial banks may become conservative in issuing loans. Thus, to minimize nonperforming loans banks may avoid issuing loan aggressively and ambitiously. Ultimately, banks may try to meet loan loss requirements at the expense of earnings from loan interest.

### 1.3.2. Measuring Non-Performing Loans

The BOT requires banks to express non-performing loan in terms of percentage ratios. The non-performing loans ratio as required by the Bank of Tanzania is given by gross non-performing Loans/Gross Loans. The threshold of the nonperforming loan is that Gross non-performing Loans/gross Loans ratio should not exceed 5% (BOT, 2015).

### 1.3.3. Capital Adequacy and its Trend in Tanzania

To be ready to deal with any imminent threat from various risks, banks are required by their regulators to maintain a certain level of capital called capital adequacy. Capital adequacy is the amount of capital a bank or other financial institution has to hold as required by its financial regulator in order to absorb the potential losses and protect the financial institution's debt holder (Dang, 2011). Eventually, this protects banks themselves, their customers, the government and the economy by establishing rules to make sure that these institutions hold enough capital to ensure continuation of a safe and efficient financial system that is able to withstand any foreseeable problems.

Capital adequacy requirement provides a cover against losses not covered by current bank earnings and to protect depositors and other creditors against loss in the event of liquidation (Tesfai, 2015). Functionally, adequate capital was regarded as the amount of capital that can effectively discharge the primary capital function of preventing bank failure by absorbing losses.

Since capital is a cushion against which to charge off losses, the riskier the asset composition, the more capital is required to maintain a given level of soundness and thus the greater the amount of capital adequacy required to maintain solvency. That said, capital adequacy ratio mirrors that the bank has risk loans, and as these risk assets grow, the bank should adjust its capital to keep pace with the loans.

#### 1.3.4. Capital Adequacy Ratio

There are two regimes used as sources of capital adequacy ratios and threshold requirements namely Bank of International Settlements (BIS) and the bank of Tanzania (BOT). The Bank of International Settlement (BIS) based Basel III framework gives three ratios to indicate capital adequacy namely, Common Equity Tier 1/RWAs, (Not less than 4.5%) Tier 1 Capital/RWAs (not less than 6%) and Total Capital/RWAs (not less than 8%) (BIS, 2010). On the other hand, the BOT through its Capital Adequacy Regulation of 2008 gives two statutory ratios. The first ratio is given by Core Capital/TRWA+OBSE (this is often referred as capital adequacy ratio) and the second ratio is given by Total Capital/TRWA+OBSE. The banking and financial institutions (Capital adequacy) regulation, 2008 among other things sets the percentage of capital adequacy. Section ten (S.10) of this regulation requires every bank or financial institution to maintain at all times a minimum core capital and total capital equivalent to ten percent (10%) and twelve percent (12%) respectively of its total risk-weighted assets and off balance sheet exposures (URT, 2008). This regulation was prepared in order to;

- a) ensure that banks and financial institutions maintain a level of capital which is adequate to protect them against the risk of loss that may arise out of their business activities;
- b) ensure that banks and financial institutions maintain capital adequacy standards in line with internationally accepted best practices; and
- c) Help promote and maintain public confidence in the Tanzanian banking sector.

For the purpose of this paper, capital adequacy ratio will be used which expressed as;

$$\text{Capital adequacy ratio (CAR)} = \frac{(\text{Tier 1 capital} - \text{Goodwil}) + \text{Tier 2 Capital}}{\text{Risk weighted Assets} + \text{Off - balance sheet exposure}}$$

#### 1.4 Evidences From Previous Studies

Empirically, there is no consensus on the relation between capital adequacy, bank profitability and NPLs. On one hand, some studies have found a negative link between capital adequacy and non-performing loans. For instance, Sinkey and Greenawalt (1991) show that banks with adequate capital ratio experience lower rates of NPLs. Shrikes and Dahl (1992) in their study of US commercial banks confirmed that asset quality is associated with an increase in capital adequacy. According to this study, higher capital adequacy resulted to lower non-performing loans.

Santomero and Kim (1998) studied risk in banking and found that increase in capital ratios tend to lower banking risks and hence improve the asset quality and bank growth. Keeton (1989) pointed out that an increase in capital adequacy reflects the increase in asset quality. Mpuga (2002) investigated the link between assets quality and capital adequacy in Uganda and found a positive relationship between the asset quality and capital adequacy. Shrikes and Dahl (1992) in their study confirmed that there is a positive relationship between the asset quality as measured by risks and the capital requirements and that banks with the higher capital above the regulatory requirements are expected to reduce risks exposure hence accelerate banks growth in terms of asset quality while banks with minimum capital requirements are greatly exposed to the higher risk.

Basically, these studies were centered on the idea that capital adequacy ratio serves as a tool to control excessive risk taking by banks and to prevent them from being insolvent through recapitalization (Boudriga *et al.*,

2009). For instance, banks with CAR less than the regulatory minimum are forced to adjust their balance sheet to comply with the regulatory requirements either by raising more capital while holding assets constant or reducing risk-weighted assets while holding capital constant. These adjustments have a beneficial impact on the bank performance and soundness (Fries *et al.*, 2002).

On the other hand, some studies found positive relationship between capital adequacy and non-performing loans. These findings are based on the argument that banks with high levels of CARs might be encouraged to embark in riskier activities leading to riskier credit portfolios. This argument is supported by researchers like Rime (2001) who conducted a panel data of Swiss banks between the years 1989-1995 and observed a positive relationship between bank risk and capital ratio.

As regarding to profitability, studies also show conflicting findings. For instance Godlewski (2004) using the adjusted return on assets ratio (ROA) as a proxy for performance, shows that banks profitability negatively impacts the level of NPLs ratio. However, using a panel of 129 Spain banks during 1993-2000, Garcia-Marco and Robles-Fernandez (2007) find that higher levels of return on equity are followed by greater risk in the subsequent periods. They argue that profit-maximizing policies will be accompanied by higher levels of risk:

In Tanzania, the only published study was conducted by Dickson and Marobhe (2012). They employed Panel secondary data from 33 banks in the period (2006-2011) and found that capital adequacy has a great influence on the asset quality. According to this study, the increase in capital ratios sometimes reduced the levels of non-performing loans and increase in non-performing asset was accompanied by an increase in capital ratios.

## 2. METHODOLOGY

### 2.1. Types and Source of Data Required in the Model

Data used in this paper are secondary data as reported by the Bank of Tanzania. Specifically, this paper examines the influence of capital adequacy and profitability on non-performing loans using industrial ratio of the banking industry in Tanzania for 10 years from 2005 to 2014. Industrial ratios used in this study are return on Assets (ROA) as a proxy for profitability, Capital Adequacy Ratio (Core Capital/TRWA+OBSE), and Gross non-performing Loans/gross Loans as an indicator of the level of nonperforming loans.

### 2.2. Model Specification and Measurement of Variables

$$NL = f(C, E, I, LA, IE) + \varepsilon \quad (1)$$

$$NL_t = \alpha + \beta_1 C_t + \beta_2 ROA_t + \beta_3 IM_t + \beta_4 LA_t + \beta_5 NE_t + \varepsilon_t \quad (2)$$

Where;

$$ROA = \frac{\text{Profit Before Tax}}{\text{Bank Assets}}$$

$$NL_t = \text{Non performing loan ratio given by } NL_t = \frac{\text{Gross nonperforming Loans}}{\text{Gross Loans}}$$

$$C_t = \text{Capital adequacy ratio given by } C_t = \frac{\text{Core Capital}}{\text{TRWA+OBSE}}$$

$$LA = \text{Loans to assets ratio} = \frac{\text{Gross loans and advances}}{\text{Total Assets}}$$

IM = Interest Margin to Interest Income

LA= Loans to asset ratio, this is a proxy for loan growth

IE = Non-Interest expenses (Control factor for variables between earnings and net profit)

The betas are slopes in which;

$\beta_1$  = Non performing loan rate per change in capital adequacy ratio,  $\beta_2$  = Non performing Loan rate per every Return on Assets,  $\beta_3$  = Non-performing loans rate per Interest Margin,  $\beta_4$  = Non-performing loans rate per Loans to assets ratio,  $\beta_5$  = Non-performing loans to Non-interest expenses

$\alpha$  = Constant representing non-performing rate when capital adequacy and ROA are zero

$\varepsilon$  = Noise error term

If put in logalithimic form equation (1) will be;

$$nl_t = \alpha + \beta_1 c_t + \beta_2 roa_t + \beta_3 im_t + \beta_4 la_t + \beta_5 ne_t + \varepsilon_t \quad (3)$$

With lower cases indicating logalithimic form of the variables

### 2.3. Justification of Variables and Hypotheses

#### a) Capital Adequacy

Capital adequacy ratio stands for the capital available for default risks not adequately covered by bank earnings. The higher of this ratio indicates the extent banks perceives it may need risk funding other than that provided by bank earnings.

*H0: Capital adequacy does not influence non-performing loans.*

#### b) Profitability

Profitability is an important aspect in bank performance. It indicates how the bank generates revenue from its operations which can be made available to cover for immediate losses suffered by the bank. For the purpose of this study, profitability will be measured by return on assets (ROA) whereas non-interest expenses will be introduced as a control factor as they affect return on assets.

##### i. Return on Assets

Return on asset is an important indicator of profitability for banking institutions. Unlike return on equity, return on assets captures the movements of assets including loans and advances the growth of which may have implications on non-performing loan.

*H1: Return on assets does not influence non-performing loans*

##### ii. Non-Interest Expenses

Non-interest expenses stand as an important factor affecting the return on assets. It accounts to non-interest expenses which have influence on the net income which in turn affects return on assets. Technically, non-interest expenses are used as proxy of management quality in the banking institutions. Thus, non-interest expense rates are included as management quality proxy as well as a control variable.

*H2: Non-interest expenses have a negative influence non-performing loans*

#### c) Loan Growth

Loan growth is an important factor in commercial lending as it indicates the ambition and risk taking in generating more revenue from lending activities. In this study loan growth is measured by the loan to assets ratio and interest margin.

### **i. Loans to Total Assets**

Loans to total assets ratio indicates the extent to which assets are dominated by loans and advances. This ratio captures the growth of loans issued by the banking institutions and the growth of this ratio indicates the growth of loans and advances which might influence the growth of non-performing loans.

*H3: Loans to total assets ratio has a positive influence non-performing loans*

### **ii. Interest Margin**

Interest margin to total interest expenses account for the stability of income resulting from interest income. This is an important factor as it shows the growth of interest income over time. Interest margin also indicates the ambitions taken by banks in increasing earnings this might become an important factor in non-performing loans growth.

*H4: Interest margin have a positive influence non-performing loans*

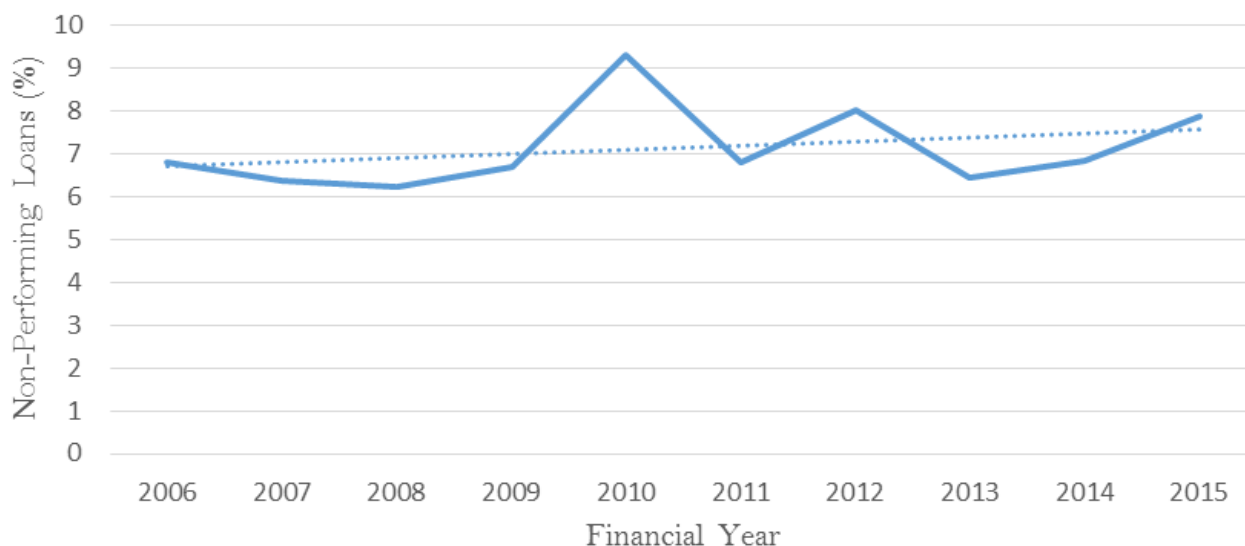
## **3. RESULTS**

This study was conducted at the time when the banking industry in Tanzanian economy is increasingly important. The banking sector is a leading player in the financial system as it accounts for about 70 percent of total assets of the financial system (BOT, 2015) and continues to grow. As at the close of the year 2015, the banking sector was composed of the Bank of Tanzania as a regulatory authority and 56 banking institutions consisting of 36 fully-fledged commercial banks, 12 community banks, 3 financial institutions, 2 development financial institutions and 3 deposit taking microfinance banks (BOT, 2015).

### **3.1. Bank Assets and Nonperforming Loans Situation and Trend in Tanzania**

Total assets of the commercial banks amounted to TZS 21,465.95 billion at the end of the year 2015. These assets were composed of cash, balance with banks and items for clearing (22.65 percent), investment in debt securities (13.67 percent) and loans advances and overdrafts (54.62 percent) and they continue to grow drastically. (BOT, 2015). It must be noticed that, the major part of the bank assets is loans and advances which account for 54.62 percent of the assets and the bank supervisor expects these assets to grow. It is from these assets where non-performing loans and eventually loan based losses are likely to originate.

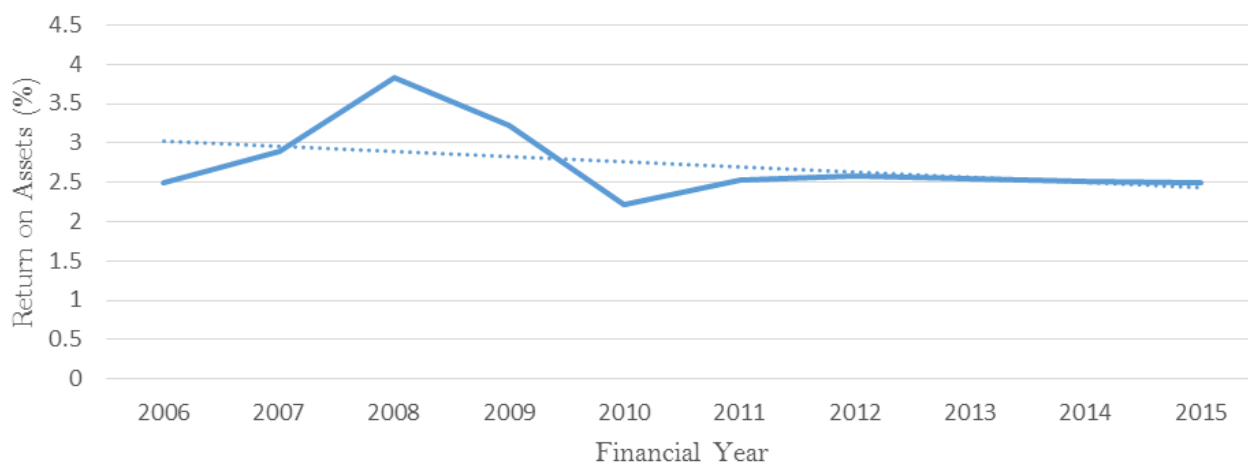
As presented in figure 1 below, nonperforming loans have generally increased and stand at a ratio bigger than the 5% limit required by the Bank of Tanzania as the supervisor. This means, banks have generally failed to meet the nonperforming ratio requirements of not more than 5.0% as directed by the BOT. This ratio also presents the default rate posed by bank borrowers. Unless this ratio is adequately covered by the by earnings or capital (as indicated by capital adequacy ratio) it represents the risk of bank failure.



**Figure-1.** Nonperforming loans (ratio) trend in Tanzania for the past ten year  
 Source: BOT Financial Stability Reports (2006-2015)

**3.2. Profitability of Commercial Banks**

During the year ended 31st December 2015, the banking sector recorded net interest income of TZS 2,464.85 billion. The return on Assets has registered a falling trend (see figure 2 below). This trend presents financial worries to commercial banks because, while nonperforming loans have risen over the past ten years, the profitability have fallen. Left unchecked, this trend may lead to banking crises especially when capital adequacy is insufficient.



**Figure-2.** Return on Assets Trend in Tanzania for the past ten years  
 Source: BOT Financial Stability Reports (2006-2015)

**3.3. Banks Capital and Capital Adequacy Trend in Tanzania for the Past Ten Years**

As at the end of financial year 2015 total capital of the banking sector amounted to TZS 3,801.72 billion. Core capital and other capital represented 39.08 percent and 60.92 percent of the total capital respectively (BOT, 2015). As per this report, other capital items comprised of share premium, capital grants, general reserves, retained earnings, profits for the year and fixed assets revaluation reserves.

During the ten years period under review banks were adequately capitalized as indicated by capital adequacy ratios presented in figure 3 below. The capital adequacy trend illustrates that banks registered capital adequacy ratios that are greater than the 10% statutory ratio required by the BOT and the ratio as shown by the dotted line



has generally increased. This represents good performance of banking sector in Tanzania because it suggests that banks have enough capital to use during financial stress especially when earnings are have been exhausted or are not enough to cover the loan losses. Therefore, with the falling trend of bank profitability, capital adequacy represents financial cushion to the rising rates of non-performing loans.

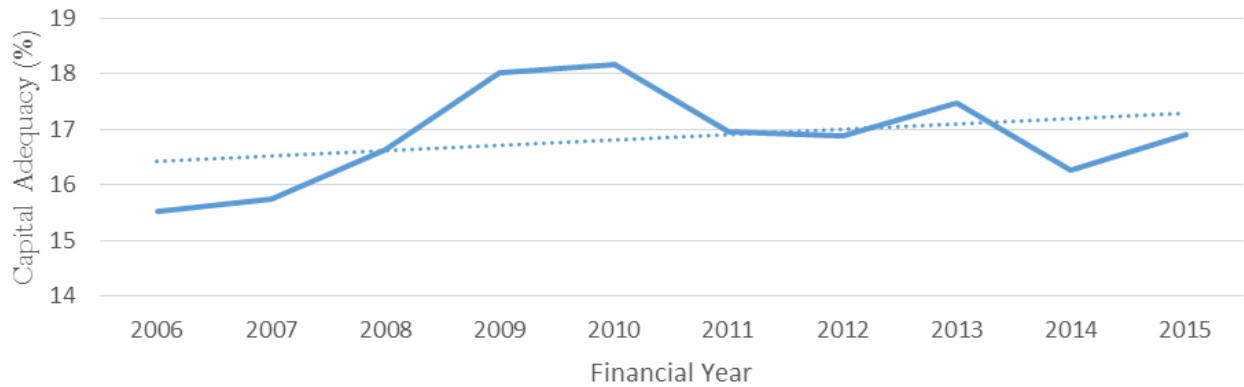


Figure-3. Capital Adequacy Ratio Trend in Tanzania for the Past Ten Years

Source: BOT Financial Stability Reports (2006-2015)

### 3.4. Regression Analysis

This study commenced under the null hypothesis that there is no influence posed by capital adequacy ratio, profitability and loan growth on non-performing loans. As shown by table 1 below, the analysis of variance (ANOVA) shows that the significance level is less than 0.05. These results suggest that we reject the null hypothesis. Therefore, there is a statistical influence posed by capital adequacy ratio, profitability, and loan growth (as indicated by interest margin, and non-interest expenses) on non-performing loans of the banks. Nonetheless, as suggested by the model summary in table 2 below, the relation is very weak as this model accounts for a roughly 26% of the variability in non-performing loans.

Table-1. The ANOVA Table

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.145	5	.029	2.804	.043 <sup>b</sup>
	Residual	.217	21	.010		
	Total	.362	26			

a. Dependent Variable: LogNPL  
 b. Predictors: (Constant), LogNE, LogROA, LogC, LogLA, LogIM

Sources: Author's SPSS Results (2017)

Table-2. Model Summary Table

Model Summary <sup>b</sup>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.633 <sup>a</sup>	.400	.258	.10170	1.473

a. Predictors: (Constant), LogNE, LogROA, LogC, LogLA, LogIM  
 b. Dependent Variable: LogNL

Sources: Author's SPSS Results (2017)

Furthermore, the case by case diagnosis of variables show that capital adequacy ratio and return on assets shows that significance level higher than 0.05 and thus their influence on non-performing loans as measured by the coefficient of correlation (B) are insignificant (see table 3 below). On the other hand, proxies of loan growth namely;

interest margin and loans to assets ratios have significant coefficients of correlation and significance level of less than 0.05 therefore their influence is statistically significant. These correlation results were obtained when the multicollinearity as measured by Variance Inflation Factor (VIF) were significantly lower than 10. This means there was no serious multicollinearity among variables.

**Table-3.** Correlations Table

Coefficients <sup>a</sup>								
Model	Unstandardized Coefficients		t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error			Lower Bound	Upper Bound	Tolerance	VIF <sup>1</sup>
<b>(Constant)</b>	-3.808	.5317	-.716	.482	-14.866	7.250		
<b>LogC</b>	-.202	.527	-.384	.705	-1.298	.894	.446	2.244
<b>LogROA</b>	.031	.225	.138	.891	-.437	.499	.669	1.495
<b>LogIM</b>	1.512	.587	2.578	.018	.292	2.732	.265	3.770
<b>LogLA</b>	-.693	.571	-1.213	.023	-1.881	.495	.292	3.420
<b>LogNE</b>	.647	.354	1.830	.082	-.088	1.382	.187	5.341
<b>a. Dependent Variable: LogNPL</b>								

Sources: Author's SPSS Results (2017)

#### 4. CONCLUSION

Bank profits and capital are the most easily available instruments used in dealing with financial stress caused by various risks such as default by bank borrowers. In Tanzania, commercial banks are required to maintain core capital of not less than 10% of its risk-weighted assets. Under the period of 10 financial years (2006-2015) covered in this study, commercial banks in Tanzania have complied with capital adequacy ratio requirement by maintaining capital adequacy ratio higher than the 10% required by the Bank of Tanzania. Nonetheless, commercial banks failed to meet the non-performing loan 5% limits over the past ten years and maintained a ratio worse than that required by the Bank of Tanzania. If not properly addressed, this increasing trend in non-performing loans may hinder the performance of banks leading into financial stress and possible bank failure.

Furthermore, regression analysis presented in this paper show that capital adequacy ratio and profitability do not provide significant influence on the level of non-performing loans. However, the paper found significant influence posed by loan growth (as indicated by loans to assets ratio and interest margin) to non-performing loans.

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<sup>1</sup> Variance Inflation Factor

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