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Determinants of Banks' Profitability in a Developing Economy: Empirical Evidence from Tanzania

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Abstract
This study investigates the effects of bank specific and macroeconomic factors on banks' profitability in Tanzania. The fixed effects regression model was used on a panel data obtained from 23 banks from 2009 to 2013. The empirical results show that bank-specific factors (that are affected by bank-level management) significantly affect banks' profitability in Tanzania. However, macroeconomic factors do not seem to significantly affect banks' profitability. It can be argued that the profitability performance of banks in Tanzania is mainly influenced by management decisions, while macroeconomic factors have insignificant contribution. Thus Bank management must efficiently manage factors related to their management decisions in order to protect the long run interest of profit-making
Key Words: Bank profitability, ROA, Bank Specific Factors, Macroeconomic Variables

1. Introduction

During the last two decades the banking industry has experienced major transformations all over the world under the impact of technological advances, deregulation, and globalization. Both external and internal factors in one way or another have affected the structure and performance of banking industry in many countries. Despite the increased trend toward bank disintermediation observed in many countries around the world, the role of banking industry in a country remains crucial in financing economic activities in general and different segments of the market in particular. The efficient and profitable banking industry is better able to withstand negative shocks and contribute to the stability of the financial sector of a country. Hence, the determinants of bank financial performance have attracted the interest of academic research as well as regulators, policy makers, bankers and analyst. There is an extensive studies on banks financial performance (more detail see Bourke, 1989: Molyneux and Thornton, 1992: Demirguc-Kunt and Huizinga, 1999: and Goddard *et al.* 2004) employed linear models to estimate the effect of various factors that may be important in explaining profitability of banks.

The banking sector in Tanzania has undergone substantial structural change since the liberalization of the sector in 1991 by introducing a series of banking reforms measures. Although the monetary authorities have taken those measures to stabilize the banking system and build confidence in the banking industry, it is still germane to know what factors affect banks profitability in order to influence policy making in the banking industry in Tanzania.

Thus, the objective of this study is to investigate the effects of bank size, capital, asset quality, expenses management, liquidity and economic condition on banks' profitability in Tanzania by utilizing the data of 23 banks for the period 2009-2013. To achieve the study objective the panel data regression model was employed to determine the important factors in achieving high profitability. The study is relevant because it will invoke the

attention of the policy makers and the bank management to pursue policies that have long lasting positive implications on the entire banking system in Tanzania. The study provides additional knowledge for researchers and the general public about factors affecting banks' profitability in Tanzania

The remainder of the paper is organized as follows. A review of the relevant literature regarding the determinants of banking profitability is given in Section 2. Section 3 presents the data and methodology to be applied while Section 4 contains the empirical results. Lastly, the conclusion will be given in Section 5

2. Literature Review

In the literature, determinants of bank profitability can be split between those that are internal and those that are external. Internal determinants or bank specific factors can be defined as those factors that are influenced by the bank's management decisions and policy objectives. Management impacts are the results of differences in bank management objectives, strategies policies, decisions, and actions reflected in differences in bank operating results. The external factors are determinants that are not related to bank management but reflect the macroeconomic, political and legal factors that affect the operation and performance of banks. Various determinants have been proposed for both internal and external factors according to the nature and objective of each research. The determinants of banks' profitability have been empirically examined by many authors, especially in the developed countries.

Demirgüç-Kunt and Detragiache (1998) by employing a multivariate logic model the results find a significant contribution of external factors towards banking sector crises. Demirguc-Kunt and Huizinga (1999) employed linear regression on commercial bank data for 80 countries, the results find out a positive but insignificant impact of macroeconomic factors on banks' profitability. Naceur (2003) analyzed the determinants of banks' profitability in Tunisia using balanced panel data of ten major deposit banks, the results find or insignificant impact of annual growth rate and inflation rate on Tunisian banks. Mamatzakis and Remoundos (2003) analyzed 17 commercial banks in Greek from 1989 to 2000; they find no considerable link of CPI and Real interest rate with ROA and ROE of banks. Followed, Athanasoglou et al (2005) used GMM estimator approach find a significant positive effect of inflation and real interest rate on profitability of Greek banks. Khrawish (2011) finds significant and positive relationship between return on asset and the bank size, total liabilities/ total assets, total equity/ total assets, net interest margin and exchange rate of the commercial banks and that there is significant and negative relationship between ROA of the banks and annual growth rate for gross domestic product and inflation rate. Flamini et al (2009) find that apart from credit risk, higher returns on assets are associated with larger bank size, activity diversification, and private ownership. In addition the results indicate that bank returns are determined by macroeconomic variables. Pasiouras and Kosmidou (2007) find a positive and significant relationship between the size and the profitability of a bank. Goddard et al (2004) estimated the profitability of 583 European Union domestic banks employed cross sectional regression; the results find a significant positive effect of GDP on profits. Kosmidou et al (2005) analyzed the determinants of banks' profitability by focusing on profitability of domestic U.K commercial banks; the results find a strong positive Sharma and Mani (2012) analyzed the determinants of banks' profitability on Indian commercial banks from 2006 to 2011, the results find that the effect of GDP and inflation on banks' profitability are negligible. Zeitun (2012) investigated macroeconomic influential factors for banks of Gulf Cooperation Council countries. Cross

sectional time series panel data gave proof that GDP is positively related but inflation is negatively related with banks' profitability.

Although an extensive and sprawling literature on the determinants of banks' profitability exits for developed economies and other part of the world only scanty empirical research can be found in Tanzania. Therefore, the present study fills an important gap in the existing literature and improves the understanding of bank profitability in Tanzania. Second, we provide recent evidence by analyzing the years from 2009 to 2013. Due to the changes that occurred in the banking industry in Tanzania over the last two decades, an updated consideration of these issues is necessary and may provide additional insights

3. Research Methodology

3.1 Description of Variables

In the empirical study, in order to analyze the determinants of banks' profitability, the study used nine variables, one of them is the dependent and the others are independent variables. The independent variables are comprised of bank-specific and macroeconomic determinants of bank profitability.

3.1.1 Dependent Variable

In the literature, banks profitability, typically measured by return on asset (ROA), return on equity (ROE), net interest margin (NIM). ROA is defined as net profit divided by total assets and is expressed in percent. NIM reflects the difference between interest income and interest expense as a percentage of total assets. For example (Flamini *et al.,* 2009: Demirguc-Kunt & Huizinga, 1999: Khrawish, 2011: Athanasoglou *et al*., 2005: Dietrich & Wanzenrid, 2009: Qin & Pastory, 2012) employed return on asset (ROA), return on equity (ROE) and net interest margin (NIM) as measures of banks' profitability. In this study, we used return on assets (ROA) as a measure of bank's profitability. ROA is a general measure for bank profitability reflects bank ability to achieve return on its sources of fund to generate profits. In the literature ROA is regarded as the best and widely used indicator of earnings and profitability, because ROA assesses how efficiently a bank is managing its revenues and expenses, and also reflects the ability of the management of the bank to generate profits by using the available financial and real assets' (Obamuyi, 2013).

3.1.2 Independent Variables

3.1.2.1 Bank-Specific Variables

Bank specific determinants as internal factors are determined by bank's management decisions and policy objectives, such as asset size, capital adequacy, asset quality, liquidity, deposit etc. We use the following five bank-specific characteristics as internal determinants of bank profitability:

Bank size: In most finance literature, total assets of the banks are used as a proxy for bank size. Bank size is represented by natural logarithm of total asset (log A). The effect of bank size on profitability is generally expected to be positive (Smirlock, 1985). Bank size accounts for the existence of economies or diseconomies of scale (Naceur & Goaied, 2008). The banking theory asserts that a firm enjoys economies of scale up to a certain level, beyond which diseconomies of scale set in. This implies that profitability increases with increase in size, and decreases as soon as there are diseconomies of scale. Thus, literature has shown that the relationship between the bank size and profitability can be positive or negative (Staikouras and Wood, 2004; Athanasoglou *et al*., 2005; Flamini *et al*., 2009; Dietrich and Wanzenrid, 2009).

Capital adequacy: The ratio of equity to total assets (CA) is considered one of the basic ratios for capital strength. It is expected that the higher this ratio, the lower the need for external funding and the higher the profitability of the bank. It shows the ability of bank to absorb losses and handle risk exposure with shareholder. Equity to total assets ratio is expected to have positive relation with profitability that well-capitalized banks face lower costs of going bankrupt which reduces their costs of funding and risks (Berger, 1995; Bourke, 1989)

Asset Quality: The quality of assets held by a bank depends on exposure to specific risks, trends in nonperforming loans, and the health and profitability of bank borrowers. Poor asset quality and low levels of liquidity are the two major causes of bank failures. Poor asset quality led to many bank failures (Olweny and Shipo, 2011). The theory proposes that firm profitability will decrease if the firm is highly exposed by credit risk, hence we expect the inverse relationship between bank profitability and non-performing loan to total loan ratio (NPL) which is used to measure asset quality. For the purpose of this study, non-performing loan to total loan ratio (NPL) used to measure asset quality.

Expenses Management: The ratio of non-interest expenses to average assets is the ratio that more frequently used on studies of bank profitability in measuring the management quality (Kosmidou et al, 2006). It is expected a negative relationship between management quality (expenses management) and profitability, since improved management quality will increase efficiency and hence rise profits (Athanasoglou *et al*., 2005)

Liquidity: The ratio of loans to deposits is used in this study as a measure of liquidity. The higher this percentage the more liquid the bank is. Insufficient liquidity is one of the major reasons of bank failures. However, holding liquid assets has an opportunity cost of higher returns. Bourke (1989) finds a positive significant link between bank liquidity and profitability. However, in times of instability banks may chose to increase their cash holding to mitigate risk. Unlike Bourke (1989), Molyneux and Thorton (1992) come to a conclusion that there is a negative correlation between liquidity and profitability levels.

3.1.2.2 Macroeconomic Determinants

Banks profitability is expected to be sensitive to macroeconomic variables. In the literature in terms of external determinants, generally three macroeconomic variables are used: Annual real gross domestic product growth rate (GDP), annual inflation rate (INF) and real interest rate (RI). This study used GDP, INF and RI

GDP: It is a measure of the total economic activity and it is adjusted for inflation. It is expected to have an effect on many determinants related to the demand and supply for banks deposits and loans. In the literature GDP growth is expected to have a positive effect on bank profitability (Demirguc-Kunt and Huizinga, 1999). In this context, this study is expected a positive relationship between bank.

Annual inflation rate: This measures the overall percentage increase in Consumer Price Index (CPI) for all goods and services. Inflation affects the real value of costs and revenues. Inflation and profitability may have positive or negative relation depending on whether it is anticipated or unanticipated (Perry, 1992). In the literature most of studies observe a positive impact between inflation and profitability (Bourke, 1989; Molyneux and Thorton 1992; Kosmidou, 2006). This study is expected to have positive relationship between profitability and inflation.

Real interest rate: According to previous studies, the evidence has shown that, there is a positive relationship between interest rates and banks performance, bank profits increase with rising interest rates (Samuelson 1945).

Interest Rate is expected to have a positive impact on bank profitability. This is because interest rate directly affects bank interest income and expenses, and the net result that further affects profitability

Insert table 1

3.2 Data and Sample Size

The data for this study comprised of the panel secondary data (i.e. comprising cross-sectional and time-series data) which obtained from audited financial reports of 23 banks in existence as at the end of 2013. The cross-sectional element is reflected by the different banks in Tanzania and the time series element is reflected in the period of study (2009 – 2013). The main advantage of using panel data is that it allows overcoming of the unobservable, constant, and heterogeneous characteristics of each bank included in the sample (Saona, 2011). The sample is a panel dataset of 23 banks in Tanzania, consisting of 115 observations over the years from 2009 to 2013. Details related to the number of banks and observations by bank category are given in Table 2. It should be noted that the sample size includes all banks in the category of 8 large banks which consists CRDB bank, NMM, NBC, Standard Chartered bank, Exim Bank, Stanbic Bank, Citibank and Barclays, 10 Medium banks and 5 Regional & Small Banks, the institutions in the sample represent most of the banks and their assets

Insert table 2

3.3 Method of Analysis

This study employed both descriptive and econometric analysis. The descriptive approach was used to analyze the sample and the observations that have been used in this study. A preliminary estimation of the correlation coefficients of the variables was carried out in order to determine the explanatory variables that would appear in the regression model. The econometric method was used in this study to evaluate the main determinants affecting profitability of banking sector in Tanzania. To investigate the factors affecting bank profitability, the study used panel data. In panel data models, the data set consists of n cross sectional units, denoted i = 1… N, observed at each of t time periods, t = 1… T. In data set, the total observation is n x t. The basic framework for the panel data is defined according to the following regression model (Brooks, 2008): In this study, the fixed effects model is used The fixed effects model is an appropriate specification if the study is focusing on a specific set of N firms and the inference of the study is restricted to the behavior of these sets of firms (Baltagi, 2005). The empirical model takes the following form:

$$Y_{it} = \alpha + \beta' X_{it} + \mu_{it}$$

Where y_{it} is the dependent variable, α is the intercept term, β is a kx1 vector of parameters to be estimated on the explanatory variables, and x_{it} is a 1 x k vector of observations on the explanatory variables, t = 1… T; i = 1… N. We can therefore extend the above equation, by including explanatory variables and ROA as dependent variables as follows

$$ROA_{it} = \alpha_0 + \beta 1\ (LogA_{it}) + \beta 2\ (CA_{it}) + \beta 3\ (NPL_{it}) + \beta 4\ (NIE_{it}) + \beta 5\ (LD_{it}) + \beta 6\ (GDP_{it}) + \beta 7\ (INF_{it}) + \beta 8\ (RI_{it}) + \mu_{it}$$

Where:

ROA_{it} = Return on Asset of Bank i at time t

α_0 = Intercept

$LogA_{it}$ = bank size of bank i at time t

CA_{it} =Capital Adequacy of bank i at time t

NPL_{it} = Asset Quality of bank i at time t

NIE_{it} = Expenses Management of Bank i at time t

LD_{it} =Liquidity Ratio of Bank i at time t

GDP_{it} = Gross Domestic Product (GDP) at time t

INF_{it} = Average Annual Inflation Rate at time t

RI_{it} = Annual Real Interest Rate at time t

μ_{it}= Error term where i is cross sectional and t time identifier

4.0 Empirical Results and Results

4.1 Results of the Descriptive Statistics

Descriptive statistical variables are summarized and presented in Table 3, which shows the mean value for each variable, as well as minimum and maximum values, and standard deviation. As shown by the results, on average, banking sector in Tanzania has a return on assets ROA of 1.67% over the entire time period from 2009 to 2013. Compared to other countries banks' profitability performance as expressed by ROA, the Tanzanian banks' performance is under the average of ROA in Sub-Saharan Africa, (SSA) which was about 2% (Flamini et al 2009). The average capital adequacy ratio is 13.7%, corresponding to the bank's requirements of 10%, minimum value is 7% and maximum value is 22%. This indicates that banks in Tanzania maintain capital than required amount. This could contribute in lower profits, because higher capital adequacy ratio could imply that banks prefer less risky investment. The average asset quality ratio and management quality are 4.4% and 12.8% with standard deviation of 5.7% and 6.2% respectively. The average asset quality which is measured by gross Non-performing Loans (NPLs) to Gross Loans is lower against the acceptable ratio of 5.0%. Liquidity ratio which is one of the important ratios for the banks amounts to 65.4% on average, while it varies between 20.3% and 86.4%. The average liquidity ratio is three times the regulatory minimum limit of 20.0%., high liquidity in the sector attributed to the structure of the asset portfolios, consisting of a substantial volume of government securities and placements abroad. On the other hand, Table 3 presents the mean of macroeconomic variables over the year 2009 through 2013. The average growth rate of real GDP is approximately 6.6% with minimum and maximum values of 6% and 7% respectively, while the mean of inflation rate and real interest rate are 10.9% and 15.16% respectively.

Insert 3

Table 4 below presents the summary results of the correlation analysis for the study in order to determine the level of association among the variables. As seen in table 4, there are fairly low data correlations among the independent variables. As per statistics in table 4 most of the variables are weakly correlated with coefficients of correlation less than 0.40: Kennedy (2008), state that correlation is high when its value is above 0.80 or 0.90. Bryman and Cramer (2001) view that multi collinearity is when correlation exceeds 0.80 whereas, Anderson, Sweeney and Williams (1990) use 0.70 as standard point indicating multi collinearity. Hence due to these low correlation coefficients the results show that there is no multi collinearity problem for the independent variables.

Insert table 4

Table 5 presents the summary results of Variance Inflation Factor of Variables (VIF). As a rule of thumb, if VIF of a variable exceeds 10, then there is indication of the existence of multicollinearity (Guajarati, 2007). As can be seen from table 5 that presents the VIF of the variables, none of them is above 10. This indicates that there is no problem of multicollinearity in this analysis.

Insert table 5

4.2 Empirical Results from Panel Data Analysis

Tables 6 show the estimated parameters and t-statistics obtained from the application of fixed effects model, using ROA as a profitability measure which represents as dependent variable. The fixed effects coefficients of the regressors indicate how much profitability changes which is measured in term of ROA when there is a change in the bank size, capital adequacy, assets quality, expenses management, liquidity management as internal factors and Gross Domestic Product, inflation rate and real interest rate as banks external factors. The sample is comprised of 115 observations. The overall regression is statistically significant, $F = 12.80$, $p = .001$, thus supporting the fact that the internal and external determinants used in the model are important factors in explaining banks' profitability in Tanzania. The explanatory power of the model, the R-squared and adjusted R-squared are at the satisfactory level of 68.9% and 63.3% respectively. The standard error of the regression is 0.7169. The result of the Durbin Watson Statistics of 1.86 indicates that there is no autocorrelation among the variables included in the model, making the model more reliable. All the variables are significant at the 5% level in the regression with the expected sign. Bank size which is represented by natural logarithm of total asset is highly significant and positively related to banks' profitability. This positive relationship shows that the size of the banks have significant positive impact on banks' profitability. It suggests that larger banks achieve a higher profitability, the positive and significant coefficients of asset size variable provide evidence for the economies of scale theory. The coefficient of capital adequacy is positive and highly significant, reflecting the sound financial condition of banks in Tanzania. A bank with a sound capital adequacy is in the better to use high technology such as establishing ATM, using on-line computer systems, opening new branches and using mobile banking which results high efficiency and thus achieving high profitability. As Athanasoglou et al. (2005) argue that, a bank with a sound capital position is able to pursue business opportunities more effectively and has more time and flexibility to deal with problems arising from unexpected losses, thus achieving increased profitability. This result stands in line with the empirical evidence of Dietrich and Wanzenrid (2009), Bourke (1989), Demirguc-Kunt and Huizinga (1999), Goddard et al. (2004), and Pasiouras and Kosmidou (2007). The assets quality which is measured by non-performing loan to total loan ratio (NPL) is found to have a significant negative impact on banks' profitability. Higher level of nonperforming loans means higher credit risk and poor asset quality management in the banks. It reduces interest income and increases provisioning costs, thus decreasing profits of a bank. Banks tend to be more profitable when they are able to undertake more lending activities, yet due to the credit quality of lending portfolios and the general practice in Tanzania a higher level of provision is needed. Such a high level of provision for non-performing loans against total loans in fact affects adversely banks' profitability significantly. This result is consistent with the empirical evidence of Athanasoglou et al. (2008) observed that the loan-loss provisions to loans ratio (credit risk) is negatively and significantly related to banks' profitability. Expenses Management which is measured by the ratio of non-interest expenses to average assets appear to be an important determinant of banks' profitability in Tanzania. This factor has negative relationship

with banks' profitability and statistically highly significant which meets the expectation of this study. In bank operations cost control is a prerequisite for an efficient and higher profitability of a bank. Thus cost control management is very crucial for improved profitability of banks in Tanzania. This result, which stands in line with the results of Dietrich and Wanzenrid (2009) clearly show that, the more efficient a bank, the higher is its profitability. Athanasoglou et al. (2008), clearly shows that efficient cost management is a prerequisite for improved profitability of a bank. Turning to Liquidity management which is measured by the ratio of loans to deposits is found to be positive and statistically highly significant effects on banks' profitability. High liquidity less would be the need for costly borrowings in case the need arises. The result found to be consistent with that of Bourke (1989) who found positive and significant relationship between bank liquidity and profitability. The external variables used in this study are growth rate in GDP, inflation rate and real interest rate. The coefficient of growth in GDP variable is positive and insignificant. This finding agrees with theory and empirical evidence that; the relationship between GDP trend growth and banks' profitability could be pro-cyclical. This would imply that when GDP trend growth is positive, the effect to bank profitability is positive and when GDP trend growth is negative, the effect on profitability is negative. An important finding from this study is that, in recent years Tanzania economy experienced positive economic growth that could have impacted positively on banks' profitability. The positive impact in GDP to banks' profitability could be due the following reasons. Bank credit could increase during boom period since such periods are normally associated with lower risk. Insignificant positive effect of GDP is supported by researches of (Athanasoglou and Staikouras, 2006; Demirguc-Kunt and Huizinga, 1999, Flamini, et al 2009; Naceur, 2003). Inflation variable, the coefficient is negative but insignificant on bank profitability. A negative relationship between inflation and banks' profitability would suggest that banks in Tanzania are not able to project the effect of inflation expectations in their operational costs to increase profits. From this conclusion, incorrect forecast of inflation could result negative on bank's profitability. The result of negative relationship of inflation with profitability found to be consistent with that of (Khrawish, 2011; Saksonova and Solovjova, 2011) and insignificance of inflation is found to be consistent with that of (Demirguc-Kunt and Huizinga, 1999; Naceur, 2003: Sharma and Mani, 2012) For real interest rate variable, the coefficient is positive but insignificant on bank profitability. The insignificant positive relationship of interest rate with banks' profitability is in line with previous studies such as (Aburime, 2008; Athanasoglou, Brissimis and Delis, 2005: Demirgüç-Kunt & Detragiache, 1998; Demirguc-Kunt and Huizinga, 1999; Staikouras and Wood, 2004).

.insert table 6

5. Conclusion:

It is generally agreed that a strong and efficiency of banking system is important for sustainable economic growth. Banking industry in Tanzania has experienced drastic and comprehensive reforms for more than two decades. The reform has achieved phased success, while challenges remain. In order to with stand negative shocks and maintain financial stability, apparently, there is a need for an in-depth and comprehensive financial performance study to be carried out in Tanzanian banking sector. There are numerous internal and external factors which influence banks' profitability. Thus, this study investigates the effect of bank specific and macroeconomic factors on banks' profitability in Tanzania. The determinants of banks' profitability used in this study were bank size, capital adequacy, assets quality, expenses management and liquidity management as bank

specific factors and GDP, Inflation rate and real interest rate as macroeconomic factors. Some theoretical and empirical reviews were employed to support the relationship between banks' profitability and determinants of banks' profitability. The econometric model of fixed effects regression method was used in this study, using a panel data of 23 banks in Tanzania for period from 2009 to 2013. The results of the study found consistent with some previous findings that the bank size, capital adequacy, assets quality, expenses management and liquidity management have statistically significant impact on banks' profitability in Tanzania. The results suggest that larger banks achieve higher profits and improved bank capital, assets quality, efficient management of banks' expenses as well as liquidity management contribute to higher banks' profitability and growth of Tanzanian banks. However macroeconomic factors (real GDP growth rate, inflation rate and real interest rate) have not important effect on bank profitability. Overall, results of this study show that, the profitability of banks in Tanzania is mostly affected by bank specific factors (that are internal factors determined by bank's management decisions and policy objectives). Yet, macroeconomic factors do not seem to significantly affect profitability. These results have important implications for banks' survival and growth. It is expected that this study will guide the policy makers and bank management in the formulation and implementation of better policies and strategies which may results better performance of banks in Tanzania.

For future research, this study can be extended to cover longer time periods. Unbalanced panel data can be used to incorporate the banks which are recently established. Other econometric techniques can be applied to verify the relationship. More macroeconomic factors such as exchange rate, imports, exports, tax rates and income level can be focused on.

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Table 1: Definition of variables

Variables	**Description**	
Dependent variable	Bank profitability	
ROA	Net profits over total assets (in %).	
Independent variables		Expected
Bank-specific characteristics		Result
Bank size	natural logarithm of total asset	+
Capital adequacy	The ratio of equity to total assets	+/-
Asset Quality	non-performing loan to total loan	-
Expenses Management	The ratio of non-interest expenses to average assets	-
Liquidity	The ratio of loans to deposits	+
Macroeconomic Determinants		
GDP	Annual Real GDP Growth rate	+
Inflation rate	Annual Inflation Rate	+/-
Interest rate	Real Interest Rate	+

Source: Authors

Table 2: Number of banks and observations by bank category

	Large Bank	Medium Bank	Regional Bank	All
No. of banks	8	10	5	23
No. of observations	40	50	25	115

This table reports the number of banks as well as observations by bank category, as defined BOT

Table 3: Results of Descriptive Statistics for Variables

Variables	Mean	Std. Dev.	Min.	Max.
ROA	1.6757	2.2680	-10.30	6.60
Log A	5.3101	0.5420	3.81	6.43
CAR	13.7391	10.0630	7.00	22.00
NPL	4.4039	5.7395	0.00	32.20
NIE	12.8174	6.2233	4.00	49.00
LQD	65.4455	25.2705	20.30	86.4
GDP	6.6600	0.3997	6.00	7.00
INF	10.9800	3.5296	6.20	16.00
RI	15.1600	0.4519	14.50	15.80

Source; Authors

Table 4: Results of Correlations between Independent Variables

	Log A	CAR	NPL	NIE	LQD	GDP	INF	RI
Log A	1.00							
CAR	-0.4565*	1.00						
NPL	0.3387*	-0.14	1.00					
NIE	-0.3423*	0.2467*	-0.06	1.00				
LQD	-0.2468*	0.4594*	0.02	0.2259*	1.00			
GDP	0.1918*	-0.10	0.06	0.03	-0.02	1.00		
INF	0.03	-0.03	0.05	-0.05	-0.13	-0.3795*	1.00	
RI	0.2215*	-0.11	0.2318*	-0.08	-0.03	0.2480*	0.3082*	1.00

Source: Authors

Table 5: Results of Multi Co linearity (VIF)

Variables	VIF	1/VIF
Log A	1.58	0.634378
CAR	1.52	0.658999
NPL	1.19	0.84333
NIE	1.18	0.845405
LQD	1.34	0.74636
GDP	1.47	0.681423
INF	1.5	0.664889
RI	1.42	0.703981
Mean VIF	1.4	

Source: Authors

Table 6: Determinants of Return on Assets (ROA)

Variables	Coef.	Std. Err.	t	P>t	[95% Conf.]	[Interval]
Log A	1.0832	0.4314	2.5100	0.0140	0.2279	1.9384
CAR	0.3271	0.0194	3.4000	0.0060	0.0855	0.0114
NPL	-0.0611	0.0175	-3.5000	0.0010	-0.0958	-0.0265
NIE	-0.1477	0.0369	-4.0000	0.0000	-0.2209	-0.0744
LQD	0.0177	0.0060	2.9300	0.0040	0.0297	0.0057
GDP	0.6396	0.5775	1.1100	0.2710	1.7846	0.5055
INF	-0.0215	0.0373	-0.5800	0.5660	-0.0953	0.0524
RI	0.2607	0.2866	0.9100	0.3650	0.8290	0.3075
Cons	8.0637	5.1276	1.5700	0.1190	-2.1022	18.2297

Source: Authors

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