BANKING INCLUSION AND THE STABILITY OF COMMERCIAL BANKS IN TANZANIA

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Abstract
While the issue of bank stability is being given more emphasis by most of banks' stakeholders worldwide, many developing countries are busy promoting policies which aim at increasing the level of banking inclusion in their economies. The main objective of this study was therefore to investigate the influence of banking inclusion on bank stability using 30 commercial banks (CBs) in Tanzania for the period 2006-2015. Banking inclusion was measured using the Index of Financial Inclusion (IFI) and bank stability was measured using Z-score and the ratio of Non-Performing to total loans (NPL/TL). Six control variables namely size, capital, liquidity, mix, Gross Domestic Product (GDP) and inflation were included in order to increase the predictability and to reduce the model bias. Method of analysis applied was Random-effects GLS regression model. Findings revealed that the degree of banking inclusion was negative but statistically insignificant influencing Z-score of both small and large CBs. Findings also revealed that the degree of banking inclusion was positive but statistically insignificant influencing the ratio of NPL/TL of both small and large CBs. These findings contradict the financial intermediation theory which impliedly suggests that greater banking inclusion causes credit and insolvency risk to decrease, thus improve bank stability. Since the study has concluded that a degree of banking inclusion has no influence on stability of CBs in Tanzania; the study therefore recommends to banks' management to increase their outreach in order to reap the advantages of banking inclusion such as poverty alleviation as this will not endanger their stability provided that the increase in inclusion is well planned and does not aim to compromise their credit evaluation standard.

Keywords: *Banking Inclusion, Bank Stability, Bank Services, Z-score, NPL*

1. BACKGROUND AND CONTEXT OF THE STUDY
Bank stability is the primary goal to all central banks worldwide, particularly after the Global Financial Crisis (GFC) of 2007-2009 (Morgan and pontines, 2018; Čihák*et al.,* 2016; Ahmed, 2016). The concern for bank stability is based on the fact that bank instability may lead to deterioration of the economy as banks become unable to carry out their role of financial intermediation effectively (Ahmed, 2016). Bank stability is described by Nthambi (2015) as the distance of an individual bank from insolvency or actual failure. While the issue of bank stability is being given more emphasis by central banks worldwide, many countries especially developing ones are busy promoting banking inclusion in their countries (Musau, 2018; Siddik and Kabiraj, 2018). The promotion of banking inclusion in many countries is based on the belief that it alleviates poverty and improves bank stability (Mehrotra and Yetman, 2015; Han and Melecky, 2013). Banking inclusion is defined by Hameedu (2014) as a delivery of banking services at an affordable cost to the vast sections of disadvantaged and low-income groups. The fact that bank stability and banking inclusion are both promoted simultaneously in many

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countries, raise the question of whether greater banking inclusion leads to bank stability as the motive behind the promotion of banking inclusion advocates.

Several studies have investigated the influence of banking inclusion on bank stability and their findings are inconclusive. Ahmed (2016) using 2913 banks from 87 countries for the period 2004-2012 found that banking inclusion strongly leads to bank stability. Other researchers who came up with the similar findings as Ahmed (2016) include Siddik and Kabiraj (2018), Morgan and Pontines (2018), Nthambi (2015), and Han and Melecky (2013). Morgan and Pontines (2018) and Khan (2011) pointed out that greater banking inclusion leads to bank stability because retail deposits from low income clients mitigate deposit withdrawal risk. Han and Melecky (2013) argued that banking inclusion leads to bank stability because it brings in new borrowers from different agents of the economy thus more diversification of bank loans portfolio. Hanning and Jansen (2010) noted that banking inclusion can contribute to the overall stability of a banking system since it is used as a vehicle of better transmission of monetary policy.

Musau (2018) using the data covering the period of 2007-2015 from 43 CBs in Kenya found that banking inclusion was negatively causing bank instability. Ghosh (2008) who also documented a negative relationship between bank demographic inclusion and bank stability argued that bank demographic inclusion leads to bank instability because banks compromise their credit evaluation standards when trying to be more inclusive. In line with Ghosh's (2008) argument, authors such as Mehrotra and Yetman (2015) and Sahay *et al.* (2015), noted that banking inclusion leads to bank instability when banks are not well regulated and when expansion of credit is due to the relaxation of credit evaluation standards. Furthermore, Čihák *et al.* (2016) and Nthambi (2015) reported that banking inclusion strategies are the ones which triggered the recent GFC through subprime lending.

It should be noted that, all empirical studies discussed in the previous two paragraphs with exception of Musau (2018) and Nthambi (2015) focused on cross country, leaving specific sectors un-researched. This indicate that there is still a need to carry out more studies at a specific sector so as to have more empirical evidences in respect to the influence of banking inclusion on bank stability. Even the studies carried out by Musau (2018) and Nthambi (2015) which focused at the specific sector revealed conflicting results despite the fact that both used supply side data from CBs in Kenya and variables for banking inclusion and bank stability were measured in the same way. Knowledge of the relationship which exists between banking inclusion and bank stability is useful to banks' policy and bank managers to make informed decision when addressing the relationship between the two variables in future.

This paper examines the influence of banking inclusion on the stability of CBs using CBs in Tanzania because for the past two decades the Bank of Tanzania (BoT) has been promoting banking inclusion and stability simultaneously. BoT has put in place several regulations with regards to statutory minimum reserve against deposit and borrowing, credit limit exposure, minimum liquidity requirement and minimum core capital requirement aiming to improve bank stability (BoT, 2014; BoT, 2010). In 2009, BoT established the Financial Sector Stability Department whose main responsibility is to deal with all matters relating to financial stability in the country (BoT, 2010). In 2013, BoT licensed two credit reference bureaus aiming to manage bank credit risk (BoT, 2010). Since 2010, BoT has been publishing the Financial Stability Reports aiming to build public confidence on the Tanzanian banking sector by communicating with the general public on issues pertaining to financial stability (BoT, 2010). Furthermore, the Tanzania Financial Stability Forum (TFSF) which is under the Chairmanship of BoT was established in March 2013 to provide for inter-agency coordination in handling financial system oversight and policy issues (BoT, 2013).

On the other hand, the government of Tanzania through BoT has been taking several initiatives to increase the degree of banking inclusion in the country. The Banking and Financial Institution Act (BFIA) which was enacted in 1991 (revised in 2006) aimed (among many other things) to increase the degree of banking inclusion in the country by making the environment in which banks are operating conducive for greater banking inclusion (BoT, 2011). In 2011, the government endorsed the Maya declaration committing itself to put in place policies that will increase the degree of banking inclusion in Tanzania (Tanzania National Council for Financial Inclusion (TNCFI), 2017). Due to enabling environment arising from these efforts, the degree of banking inclusion has been rising yearly. Statistics from Twaweza (2016) and Financial Sector Deepening Trust (FSDT) (2014) show that the percentage of adults owning a bank accounts grew from 9.1% in 2009 to 22% in 2016. Although the government of Tanzania has been promoting both bank stability and banking inclusion since the introduction of reforms in the banking sector which began in 1991, the relationship between the two is not known since to the best of the researchers' knowledge there is no documented empirical studies carried in this area.

2. THEORETICAL REVIEW

This paper is anchored on the financial intermediation theory which was proposed by Gurley and Shaw (1960). This theory suggests that the main role of banks in the economy is to channel funds from savers to borrowers. Proponents of this theory such as Allen and Santomero (1998), Diamond and Dybvig (1983), Benston and Smith (1976) and Guttentag and Lindsay (1968) claim that banks are able to perform the role of financial intermediation because they can deal effectively with the problem of information asymmetry, maturity transformation of financial assets, reduce transaction costs and perform the role of delegated monitoring effectively.

The theory of financial intermediation is relevant in this study because it is expected that as a bank increases its outreach, its stability improves as well. This is because banking inclusion brings in new clients including the previously excluded to participate in the banking system. As the number of savers and borrowers bank intermediates increases, the stability of the bank is expected to improve as well because the bank will be able to mobilize deposits from the general public and issue credits to borrowers from different agents of the economy. On one hand, retail deposits from the general public are said to cause bank stability because they mitigate withdrawal risk, unlike wholesale deposits which are said to be volatile (Morgan and Pontines, 2018; Khan, 2011). Similarly, the issuance of loans to different agents of the economy is also associated with bank stability because by doing so the bank diversifies its loan portfolios (Han and Melecky, 2013).

3. RESEARCH METHODOLOGY

3.1 Research design and target population

The study employed a longitudinal research design since panel data covering ten years (2006-15) were used. The target population of the study was 36 CBs operating in Tanzania as at December 2015. The year 2006 was used as a base year since in that year two important laws in the Tanzanian banking sector, which are BFIA and Bank of Tanzania Act (BoTA), were amended. The amendment of these Acts marked the new era for the Tanzanian banking sector.

3.2 Sampling procedures and sample size

Judgmental sampling technique was used in selecting banks to include in the study. Banks which were included in this study are only those which were operating in Tanzania not later than 2011. Banks which started their operations after 2011 were considered as new banks and were excluded from the study because their stability might be influenced by other factors apart from banking inclusion like being inexperienced in the industry. Furthermore, to have a detailed finding on the objectives of the study under scrutiny, banks were further categorized into two groups – large and small banks. The categorisation of these banks is as per the International Monetary Fund (IMF) (2016). IMF (2016) categorized banks with assets above Tanzanian

shillings (TZS) 711 259 million as large banks while banks with assets between TZS 711 259 and 75 591 million as medium banks. Lastly, banks with assets below TZS 75 591 million were categorized as small banks. As per IMF (2016), the category "small banks" was made by community banks which were not included in this study and only 2 CBs which were established after 2011, thus, were also not included in the study. Thus, banks which were included in the study fall into two categories – large and medium banks. For the sake of this study, the category medium banks were reclassified as small banks to have a meaningful categorisation. The category "large banks" was made by 10 banks while small banks was made by the rest 20 banks.

3.3 Operationalisation of study variables

3.3.1 Bank stability

The bank stability was measured using two variables which are Z-score and the ratio of NPL/TL. Both variables were used to provide information which would complement each since each variable provides different information with regards to the stability of banks. According to Lepetit and Strobel (2016), Z-score is the most popular measure of bank stability at the level of individual institutions because it is easily calculated and the data used in its calculation are easily accessed through the banks' financial statements. It measures the insolvency risk or bankruptcy risk a bank is facing. Lepetit and Strobel (2016) and Mare *et al.* (2015) reported that Z-score indicates the bank's probability of default, that is, to fail to honour its obligation from creditors partially or in full. Nthambi (2015) and Mare *et al*. (2015) noted that Z-score indicates the number of the standard deviation by which returns have to diminish to deplete the equity of bank or banking system. Worldwide, several researchers such as Morgan and Pontines (2014), Siddik and Kabiraj (2018), Anginer *et al.* (2014), Alharthi (2016), and Ahmed (2016) have used Z-score as the measure of banks stability in their studies. Moreover, Bouvatier and Nicolas (2017) claim that Z-score is among the most effective measures of bank stability recognized by the World Bank. The following is the formula used in the computation of Z-Score: -

$$Z - \text{score} = \frac{(k+\mu)}{\sigma} \quad \ldots\ldots (1)$$

Where; k is equity capital and reserves as a percent of total assets, μ is average net income as a percent of total assets and σ is the standard deviation of return on assets.

The ratio of NPL/TL was also used to measure bank stability. This ratio shows the level of credit risk and the quality of loans the bank is having (Mare *et al*., 2015). According to Nthambi (2015), the loan is classified as a non-performing loan when the borrower is not honoring his debt in full and without recourse to collateral. Mataba (2016) claims that loans represent the largest portion of the total bank's assets and earn more income to a bank than all other assets. Therefore, it is apparent that the ratio of NPL/TL reflects the health of the whole banking system. Mare *et al.* (2015) noted that this ratio is used as a measure of bank stability because the levels of NPL affects negatively the profitability, liquidity and capital levels of the bank which can lead to bankruptcy risk or total closure. Researchers such as Musau (2018), Ouhibi*et al.* (2017), Ahmed (2016) and Klein (2013) used this ratio as a measure of bank stability in their studies.

3.3.2 Banking inclusion

Banking inclusion was a sole independent variable measured using the IFI proposed by Sarma (2008). This index was developed specifically to measure the degree of banking inclusion regardless of the name given to the index that is the Index of Financial Inclusion. In her paper, the term financial inclusion was used analogously to banking inclusion because banks are the gateway to the most basic forms of financial services. Therefore, it is also correct to call the index of financial inclusion as the index of banking inclusion. This study used the term banking inclusion instead of financial inclusion because the study focused only on the inclusiveness of

CBs in Tanzania. The use of the term financial inclusion might confuse the reader to think that the study was focusing on the inclusiveness of all financial institutions in Tanzania while it was not. The study adopted this index as a measure of banking inclusion instead of using individual dimensions of banking inclusion like the percentage of adults owning a bank account because the IFI measures the degree of banking inclusion in full unlike individual dimensions which are criticized to measure the degree of banking inclusion partially (Nthambi, 2015 and Sarma, 2012).

This index hypothesize that the degree of banking inclusion is the aggregation of three dimensions of banking inclusion which are penetration, availability and usage. The dimension penetration was measured using the number of deposit account per 1 000 adults. This variable indicates the number of clients out of 1 000 who are served by a specific bank. The dimension availability was measured using two variables viz. the number of bank branches per 100 000 people and the number of Automated Teller Machines (ATMs) per 100 000 people. This dimension shows the average number of people served by a network of bank branches and ATMs of a specific bank. Lastly, the dimension usage is measured using the ratio of credit (loans) plus deposit to GDP. This dimension indicates how credit and deposits facilities are used at a bank-specific level.

The IFI lays between 0 and 1. 0 Indicates full exclusion while 1 indicates full inclusion at the bank level. In order to calculate the index of financial inclusion; the index for each dimension must be computed first so as to have weighted dimensions that are used as inputs in the computation of the IFI. These indices were computed using the following formula: -

$$d_i = \frac{A_i - m_i}{M_i - m_i} \quad \text{……… (2)}$$

Where:
A_i = Actual value of dimension i
m_i = lower limit for dimension i
M_i = upper limit for dimension i.
The dimension for availability used two variables - one for bank branch and the second for ATMs. In the calculation of the indices for these variables, the weights of 2/3rd and 1/3rd were given for bank branch and ATMs index respectively because the study found that on average, there were 2 ATMs per bank branch for the period 2006-2015 in Tanzania.
After calculating the dimension index; the weight of 1, 0.5 and 0.5 were given for the index of penetration, availability and usage respectively. Less weight was given to the index of availability and usage due to lack of adequate data on some important indicators such as internet and mobile banking, payments, transfers and remittances. In the absence of such data, a complete characterisation of these dimensions is not possible.
After assigning weights to the dimensions, the following formula was used to calculate the IFI.

$$IFI = 1 - \sqrt{\frac{(1-p_i)^2 + (0.5-a_i)^2 + (0.5-u_i)^2}{1.5}} \quad \text{……… (3)}$$

Where p_i = weighted dimension index of penetration.
a_i = weighted dimension index of availability
u_i = weighted dimension index of usage

3.3.3 Control variables

To increase the predictability and reduce the bias of the model, the study included six control variables. These variables and their measurements were adopted from previous studies such as Siddik and Kabiraj (2018), Ahmed (2016), Cubillas and González (2014), Williams (2014), Rajhi and Hassairi (2013) and Nguyen *et al.* (2012) which concluded that these variables have significant influence on bank stability. The included variables are bank size which was measured using total bank asset, capital which was measured using the ratio of total equity to

total assets, liquidity which was measured using the ratio of liquid assets to customer's deposits, mix which was measured using the ratio of non-interest income to gross income, economic growth which was measured using GDP per capita and inflation which was measured using the Consumer Price Index (CPI).

3.4 Data and sources of data

This study employed unbalanced panel data. Bank's internal panel data were extracted from respective banks audited financial statements and other reports which were collected from BoT. Panel data in on macroeconomic data which are inflation and economic growth were collected from the World Bank's website.

3.5 Model specification

The model of analysis used is regression analysis. This model is the most commonly used in all studies which investigated the influence of banking inclusion on bank stability and those which investigated the determinants of bank stability. This might be due to the fact that most of these studies employed time series or panel data, thus the sole method suitable for analysing such data is regression analysis. Studies carried out in this area that applied this model include Kohler (2015), Williams (2014) and Mirzaei *et al.* (2013). Regression model and variables used are specified hereunder:

$$Stability_{it} = \beta_1 IFI_{it} + \beta_2 Capital_{it} + \beta_3 Size_{it} + \beta_4 Liquidity_{it} + \beta_5 Mix_{it} + +\beta_6 GDP_t + \beta_7 Inflation_t + \mathrm{E}_{it} \quad \ldots\ldots (4)$$

Where: $Stability_{it}$ is the stability for bank i in year t, $IFI_{it}$is the index of financial inclusion for bank i in year t, $Capital_{it}$ is capital adequacy for bank i in year t, $Size_{it}$ is bank size for bank i in year t, $Liquidity_{it}$ is liquidity for bank i in year t, Mix_{it} is diversification for bank i in year t, GDP_t is GDP per capita in year t, $Inflation_{it}$ is inflation in year t. β_1-β_7 are coefficients of respective variables. Table 1 Summarizes the variable's symbol, definition and measurement used in this study.

Table 1: Symbol, Definition and Measurement of variables

Variable symbol	Definition	Measurement
	Dependent variables	
Z-score	Z-score	Measured as the sum of return on assets and capital to asset ratio divided by the standard deviation of return on assets.
NPL/TA	The ratio of Non-performing loans	The ratio of Non-Performing loans to total gross loans
	Independent variable	
IFI	Index of financial inclusion	The index which incorporates three dimension of banking inclusion namely penetration, availability and usage of banking services.
	Control variables	
Capital	Capital adequacy	Bank equity as a percentage of total assets.
Size	Bank size	Accounting value of the total assets.
Liquidity	Liquidity	The ratio of liquid assets to customers' deposits
Mix	Activity mix/ diversification	A ratio of non-interest income to total bank's income.
GDP	Economic growth	GDP per capita.
Inflation	Inflation	The Consumer Price Index.

The study checked whether the data satisfied important assumptions of normality, stationarity, multicollinearity, homogeneity, heteroskedasticity and autocorrelation because these assumptions must be met for the findings to be accurate and generalizable to the entire population when regression analysis is used (Pallant, 2010). The assumption of normality requires sampling distribution and errors in the model to be normally distributed (Field, 2013).

The study employed Kolmogorov-Smirnov test to check for this assumption. According to Field (2013), this assumption is met when the significant level is ≥ 0.05. Table 2 presents the results in details.

Table 2: Tests of Normality on Original Data

	Kolmogorov-Smirnov		
	Statistic	**Df**	**Sig.**
Z-score	0.186	263	0.000
NPL	0.148	264	0.000
IFI	0.245	264	0.000
Capital	0.214	264	0.000
Size	0.237	264	0.000
Liquidity	0.224	264	0.000
Mix	0.057	263	0.011
GDP	0.113	264	0.000
Inflation	0.234	264	0.000

Source: Author's computation

Findings show that the data did not meet the assumption of normality. Field (2013) suggested that when data violate this assumption they can be transformed using available transformation options to make them normally distributed. This study used the log transformation option to transform the data. Table 3 presents findings with respect to normality on transformed data.

Table 3: Tests of Normality on Transformed Data

	Kolmogorov-Smirnov		
	Statistic	**Df**	**Sig.**
Z-score	0.174	263	0.352
NPL	0.193	264	0. 162
IFI	0.238	264	0.187
Capital	0.196	264	0.082
Size	0.041	264	0.198
Liquidity	0.144	264	0.168
Mix	0.052	263	0.441
GDP	0.121	264	0.483
Inflation	0.198	264	0.194
IFI	0.238	264	0.187

Findings show that the assumption of normality was met after the transformation of the data. Further tests and analysis employed transformed data. Fisher-type unit-root test which is based on Augmented Dickey-Fuller (ADF) was employed to test for the assumption of stationarity. Biorn (2017) noted that this assumption is met when the P value are ≤ less than 0.05. Table 4 presents findings in regard to Fisher-type unit-root test.

Table 4. Fisher-type unit-root test.

	Inverse chi-squared		**Modified inv. chi-squared**		**Lag length**
Variable	**Statistics**	**P. Value**	**Statistics**	**P. Value**	
Z-score	124.6090	0.0000	7.1199	0.0000	1
NPL	174.183	0.0000	9.3189	0.0000	1
IFI	217.266	0.0000	3.2385	0.0000	1
Capital	222.8916	0.0000	15.7698	0.0000	1
Size	180.3861	0.0000	11.7534	0.0000	1
Liquidity	176.4191	0.0000	11.3785	0.0000	1
Mix	100.6797	0.0002	4.2218	0.0000	1
GDP	207.3372	0.0012	-19.0425	0.0004	1
Inflation	117.1936	0.0000	5.7823	0.0000	1

Findings indicate that the data met the assumption of stationary, therefore, all variables were retained for further analysis.

The study also tested for the assumption of multicollinearity using the correlation matrix. Field (2013) claimed that this assumption is met when the correlation coefficients between independent variables are ≤ +0.9 or ≥ -0.9. When this assumption is violated, one variable among the two variables that are highly correlated must be dropped since they are both measuring the same effect in the model. Table 5 presents the correlation matrix of variables.

Table 5: Correlation Matrix

	Z-score	NPL/TL	IFI	Capital	Size	Liquidity	Mix	GDP	Inflation
Z-score	1.000								
NPL/TL	0.620	1.000							
IFI	-0.582	0.276	1.000						
Capital	0.282	-0.198	-0.117	1.000					
Size	0.422	-0.249	0.389	-0.523	1.000				
Liquidity	-0.330	0.491	0.002	0.522	-0.165	1.000			
Mix	0.281	-0.681	0.015	-0.063	0.257	0.347	1.000		
GDP	-0.739	0.319	-0.166	0.017	0.290	-0.110	-0.051	1.000	
Inflation	-0.290	-0.591	-0.065	0.141	-0.035	0.002	0.050	0.076	1.000

Findings indicate that there was no problem with regards to the assumption of multicollinearity among independent variables because the correlation coefficients between variables were ≤ +0.9 or ≥ -0.9. Therefore, all variables were retained for further analysis.

Furthermore, the study tested for the assumption of homogeneity of variance which required the variance to be the same throughout the data (Biorn, 2017). Impliedly, every bank included in the analysis was supposed to have the same variance as other banks in the population. The study employed Levine's test to validate the assumption. According to this test, the assumption is met when P≥0.05. Table 6 presents the findings in detail.

Table 6: Test of Homogeneity of variance

		Levine Statistics	df1	df2	Sig
Z-score	Based on mean	3.892	1	263	0.271
NPLs	Based on mean	6.291	1	264	0.651
IFI	Based on mean	1.902	1	264	0.248
Capital	Based on mean	2.893	1	264	0.562
Size	Based on mean	8.903	1	264	0.371
Liquidity	Based on mean	6.594	1	264	0.164
Mix	Based on mean	4.872	1	263	0.219
GDP	Based on mean	7.741	1	264	0.891
Inflation	Based on mean	5.914	1	264	0.485

The assumption of homogeneity of variance was met since the results indicate that the P values were ≥0.05. Another assumption that was tested is heteroskedasticity. This assumption was tested to be sure whether there is a constant variance within the residual. The modified Wald test was used to validate this assumption. According to this test, the assumption of heteroskedasticity is met when the P≤0.05 (Biorn, 2017). Findings indicated that this assumption was not violated because the Prob>chi2 = 0.0000. This is to say, the P values was less than 0.05. Further, the study tested for the assumption of autocorrelation. This assumption is met when there are no similarities among values of the same variable over consecutive time intervals. This is to say, the person should not be able to predict future values of the variable using past values. The Wooldridge (2002) test was used to validate this assumption. This assumption is met when the P≥0.05. Findings revealed that this assumption was met because the F statistics was 0.471 with the P value of 0.621. Finally, the study used the Hausman Specification test to check whether Fixed Effect (FE) or Random Effect (RE) model should be used in the analysis. The FE model assumes that the average scores of the group are fixed while

RE model assumes that the average scores of the group are random sample from a population. When using the Hausman specification test, researchers should employ RE model when Prob>chi2 is less than 0.05 (Musau, 2018). Table 7 presents result with respect to the Hausman Specification test.

Table 7: Hausman Specification Test

Variables	**Coefficients**			
	(b) FE	**(B) RE**	**(b-B) Difference**	**Sqrt (diag(V_b-V_B)) S.E.**
Z-score	2.610432	1.630123	0.980309	0.49015
NPLs	-0.6952101	-0.5019543	-0.1932558	0.096627
IFI	-9.636017	-5.432917	-4.2031	2.198035
Capital	7.316003	6.968407	0.3475964	0.4408795
Size	0.1807179	0.0447017	0.1360162	0.1058454
Liquidity	-0.0503358	-0.2852958	0.23496	0.1414891
Mix	1.61354	0.6589482	0.9545918	0.3570236
GDP	-0.895946	-0.702964	-0.192982	0.172478
Inflation	-0.0699407	-0.0654185	-0.0045222	0.0107174
Notes:				
Number of observations			262	
Number of groups			30	
Group variable			Id	
Observations per group:				
Min			5	
Average			8.7	
Max			10	
R-sq: within			0.6282	
Between			0.8793	
Overall			0.6923	
Wald chi2(8)			471.71	
Prob > chi2			0.0428	

Findings indicates that the RE was the appropriate model to use because the Prob > chi2 was 0.0428. Thus, the study used RE as the main model to analyse the influence of banking inclusion on bank stability.

4. FINDINGS AND DISCUSSION

Random-effects GLS regression analysis was used to test the influence of banking inclusion on the stability of CBs in Tanzania. The coefficients for independent and control variables were considered to be statistically significant influencing bank stability when the P values were ≤ 0.05 as Field (2013) suggested. Findings concerning the influence of banking inclusion on Z-score of CBs in Tanzania is presented on Table 8.

Table 8: Random-effects GLS regression (Dependent Variable = Z-score)

	Large Banks			**Small Banks**		
Dependent variable = Z-score	**Coefficients**	**Std. Error**	**P. Value**	**Coefficients**	**Std. Error**	**P. Value**
IFI	-5.301848	7.823938	0.498	-56.34868	104.5099	0.590
Capital	8.957822	1.796826	0.000	6.346987	0.8351923	0.000
Size	0.1664454	0.0989261	0.092	0.3317605	0.1646035	0.044
Liquidity	-0.7583028	0.3962363	0.056	-0.283295	0.2557126	0.268
Mix	0.709709	0.1644333	0.260	-0.6016667	0.5799484	0.300
GDP	-0.8287421	0.1644333	0.000	-1.383953	0.2485939	0.000
Inflation	-0.0757469	0.1223135	0.536	-0.1391708	0.1273073	0.274
Constant	3.450478	0.9115786	0.000	5.293663	0.96583	0.000

Results presented on Table 8 indicate that banking inclusion was negative but statistically insignificant influencing Z-score of both large and small banks. Impliedly, this inform that the study did not find any statistically significant relationship between the bank's degree of banking inclusion and its Z-score. The findings of this study are not in line with the findings of Musau (2018), Čihák *et al.* (2016), and Sahay *et al.* (2015) who found that banking inclusion and Z-score was negative and statistically significant related. Furthermore, these findings are also contradicting the findings of Siddik and Kabiraj (2018), Ahmed (2016), and Han and Melecky (2013) who found that banking inclusion was positive and statistically significant influencing Z-score. The difference in the findings of the current study and the mentioned study is possibly due to the fact that most of these studies with exception to Musau (2018) used cross country data. The difference with regards to the findings of Musau (2018) who focused on Kenya might be caused by financial sector setup, cultural, economic and social differences existing between Tanzania and Kenya. The findings of this study did not confirm with the theory of financial intermediation which hypotheses that greater banking inclusion leads to bank stability.

Findings with respect to control variables indicate that out of six control variables included in the study, two variables which are capital and GDP were found to influence Z-score of both large and small CBs. Capital was found to influence Z-score positively while the GDP was found to influence Z-score negatively. These findings tell that the bank with higher capital levels is also stable as far as Z-score is concerned. That is, the bank with higher capital levels is far away from going bankrupt. These findings are in line with the findings of Cubillas and González (2014), Williams (2014) and Nguyen *et al*. (2012) while they are disagreeing with the findings of Tabak *et al.* (2013), Srairi (2013) and Barry *et al.* (2011). On the other hand, GDP per capita is negative related to Z-score. These findings are in line with the findings of Cubillas and González (2014) and Agoraki *et al.* (2011) but are contradicting the findings of Kohler (2015), Williams (2014) and Rajhi and Hassairi (2013). Table 9 presents findings on the influence of banking inclusion on the ratio of NPL/TL.

Table 9: Random-effects GLS regression (Dependent Variable = NPL/TL)

	Model 1 – Large Banks			**Model 2 – Small Banks**		
Dependent variable = NPL/TL	**Coefficients**	**Std. Error**	**P. Value**	**Coefficients**	**Std. Error**	**P. Value**
IFI	0.9149705	5.520367	0.868	25.05078	146.2172	0.864
Capital	-1.329683	0.7676928	0.083	-2.298922	1.015395	0.024
Size	-0.0442385	0.089789	0.622	-0.2644988	0.2191921	0.228
Liquidity	0.2043786	0.1836292	0.266	0.4559378	0.3082703	0.139
Mix	-0.0652419	0.2645334	0.805	-0.028205	0.7216651	0.969
GDP	-0.0921695	0.0841441	0.003	-0.7895379	0.3426876	0.000
Inflation	-0.0173267	0.0478878	0.717	-0.0157435	0.1385677	0.910
Constant	0.0862588	0.7086947	0.903	-1.555387	1.194244	0.193

Results revealed that banking inclusion was positive but statistically insignificant relating to the ratio of NPL/TL of both small and large banks in Tanzania. This implies that the ratio of NPL/TL of CBs in Tanzania are not influenced by the degree of banking inclusion. This is possibly caused by the fact that initiatives taken by CBs in Tanzania of increasing their inclusion do not compromise their credit evaluation standards. In other words, CBs in Tanzania do not compromise their credit evaluation standards as one of the measures of increasing their inclusion. These findings contradict with the findings of Nthambi (2015) who documented a negative and statistically significant relationship between financial inclusion and the ratio of NPL/TL in Kenya. Also, these findings disagree with the findings of Ghosh (2008) who found a positive relationship between banking inclusion and NPL/TL of banks in India. The findings of the current study and Nthambi's (2015) findings are possibly caused by the difference in the

setup of financial systems between Tanzania and Kenya. In Kenya, banking inclusion has been promoted mainly by relaxing Know Your Client (KYC) regulations thus reaching to more people including the low-income earners and rural dwellers. This tendency has caused the loans portfolios of CBs in Kenya to be diversified. The diversification of loans portfolios of CBs in Kenya is possibly the main reason that caused the degree of banking inclusion to be negatively related with the ratio of NPL/TL of CBs in Kenya. Moreover, the findings of the current study differ with the findings of Ghosh (2008) who found a positive relationship between banking inclusion and NPL/TL of banks in India because banks in India were promoting the degree of banking inclusion by compromising their credit evaluation standards. Additionally, the findings of the current study contradict with the financial intermediation theory which impliedly suggest that greater banking inclusion cause the ratio of NPL/TL or credit risk to decrease thus, improving banks stability. The contradiction between the findings of these study and the financial intermediation theory is possibly caused by the fact that CBs in Tanzania have not been increasing their inclusion to all types of individuals in the community like rural dwellers and low-income people since most of banks are found in cities and other major urban areas. The implication of this, is that the loan portfolios of CBs in Tanzania are not well diversified. If these segments are included in the banking sector, then banking inclusion is more likely to reduce the ratio of NPL/TA or credit risk.

Findings with regard to control variables indicate that GDP per capita is negative and statistically significant influencing the ratio of NPL/TL of both small and large banks. This informs that favourable economic growth and condition reduces the rate of borrowers who default to repay their loans. Thus, during economic recession, the ratio of NPL/TL of CBs in Tanzania increases. The remaining control variables were found to be statistically significant influencing the ratio of NPL/TL.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The objective of the study was to examine the influence of banking inclusion on the stability of 30 CBs in Tanzania. Findings revealed that banking inclusion was negative but statistically insignificant influencing Z-score of CBs in Tanzania. These findings contradict with the theory of financial intermediation which impliedly hypotheses that greater banking inclusion leads to bank stability. Findings also indicate that the ratio of capital to total assets was positively influencing Z-score of CBs in Tanzania while GDP per capita was found to influence Z-score negatively. Lastly, findings showed that banking inclusion was positive but statistically insignificant influencing the ratio of NPL/ TL of both small and large banks in Tanzania. These findings contradict with the financial intermediation theory which impliedly suggests that greater banking inclusion cause the ratio of NPL/ TL or credit risk to decrease thus, improving banks stability. This is possibly caused by the fact that initiatives taken by CBs in Tanzania of increasing their inclusion do not compromise their credit evaluation standards.

5.2 Recommendations

It is the political will of the government of Tanzania to see every citizen participating in the formal banking sector because the participation of individuals in the formal banking sector is linked with poverty alleviation and economic growth. The findings of the study revealed that a high or low degree of banking inclusion does not improve or threaten the stability of CBs in Tanzania. Therefore, the study recommends to banks' management to increase their outreach as this will not endanger their stability provided that the increase in inclusion is well planned and does not aim to compromise their credit evaluation standards. Furthermore, the study recommends to banks to continue to adhere to all regulations stipulated by BoT such as credit limit exposure and capital adequacy since the compliance with these regulations are likely to maintain the stability in the sector.

REFERENCES

Ahmed, M. (2016). Essays on bank profitability, stability and efficiency: the impact of financial inclusion and bank competition. Thesis for award of PhD Degree at Queen Mary University of London, United Kingdom.

Agoraki, M., Delis, M., and Pasiouras, F. (2011). Regulations, competition and bank risk-taking in transition countries, *Journal of Financial Stability*, 7(1): 38-48.

Alharthi, M. (2016). The Determinants of Efficiency, Profitability, and Stability in the Banking Sector: A Comparative Study of Islamic, Conventional and Socially Responsible Banks. Thesis for award of PhD Degree at Plymouth University.

Allen, F., and Santomero, M. (1998). The theory of financial intermediation, *Journal of Banking and Finance*, (21): 1461–1485.

Anginer, D., Demirguc-Kunt, A., and Zhu, M. (2014). How does deposit insurance affect bank risk? Evidence from the recent crisis, *Journal of Banking and Finance*, (48): 1–26.

BoT. (2011). Tanzania Mainland's 50 Years of Independence; A Review of the Role and Functions of the Bank of Tanzania (1961—2011). BoT.

BoT. (2013). Financial Stability Report. [https://www.bot.go.tz/Publications/Fin-stability/FSR%20March%202014.pdf], accessed on 6/5/2020.

BoT. (2010). Financial Stability Report. [https://www.bot.go.tz/Publications/Fin-stability/financial%20Stability%20Report.pdf], accessed on 7/5/2020.

BoT. (2014). Financial Stability Report. [https://www.bot.go.tz/Publications/Fin-stability/Financial%20Stability%20MARCH%202017.pdf], accessed on 7/5/2020.

Barry, T., Lepetit, L., and Tarazi, A. (2011). Ownership structure and risk in publicly held and privately-owned banks, *Journal of Banking & Finance*, 35(5): 1327-1340.

Benston, W., and Smith, C. (1976). A transaction cost approach to the theory of financial intermediation, *The Journal of Finance*, 31(2): 2215-2231.

Biorn, E. (2017). Economics of Panel Data; Methods and Applications. Oxford University Press

Boyd, J., De Nicoló, G., and Jalal, A. (2006). Bank risk-taking and competition revisited: new theory and new evidence, IMF Working Paper No. 06 Vol. 297, Washington DC.

Bouvatier, V., and Nicolas, P. (2017). Bank insolvency risk and Z-score measures: caveats and best practice, Social Science Research Network.

Čihák, M., Mare, D., and Melecky, M. (2016). The Nexus of Financial Inclusion and Financial Stability: A Study of Trade-Offs and Synergies", Policy Research Working Paper 7722, World Bank Group.

Cubillas, E. & González, F. (2014). Financial liberalization and bank risk-taking: International evidence, *Journal of Financial Stability*, (11): 32-8.

Demirgüç-Kunt, A., and Huizinga, H. (2013). Are banks too big to fail or too big to save? International evidence from equity prices and CDS spreads, *Journal of Banking and Finance*, 37(3): 875-894

Diamond, D., and Dybvig, P. (1983). Bank runs, deposit insurance, and liquidity, *Journal of Political Economy*, 91(3): 401-419.

Field, A. (2013). Discovering Statistics using IBM SPSS (4rd Edition). SAGE publications Ltd. London.

FII. (2015). Tanzania Quick sights Report. Applied Research for Digital Financial Inclusion.

FSDT. (2017). Finscope Tanzania. FSDT. [https://www.fsdt.or.tz/wp-content/uploads/2017/09/FinScope-Tanzania-2017-Insights-that-Drive-Innovation.pdf], accessed on 7/5/2020.

FSDT. (2014). Finscope Tanzania. FSDT. [https://www.fsdt.or.tz/finscope/], accessed on 7/5/2020.

FSDT. (2009). Finscope Tanzania. FSDT. [https://www.fsdt.or.tz/finscope/], accessed on 7/5/2020.

Fiordelisi, F., and Mare, S. (2014). Review: Competition and financial stability in European cooperative banks, *Journal of International Money and Finance, Elsevier*, 45(C): 1-16.

Ghosh, S. (2008). Financial inclusion and Financial Fragility: - An Empirical Note, Munich Personal Repec Archive No 24252.

Guttentag, J, and Lindsay, R. (1968). The uniqueness of Commercial banks, *Journal of Political Economy* (71): 991-1014.

Hameedu, M. (2014). Financial Inclusion - Issues in Measurement and Analysis, *International Journal of Current Research and Academic View*, 2 (2): 116-124.

Han, R., and Melecky, M. (2013). Financial Inclusion for Stability; Access to Bank Deposits and the Deposit Growth during the Global Financial Crisis, Personal Repec Archive Paper No. 45157, University Library of Munich, Germany.

Hanning, A., and Jansen, S. (2010). Financial Inclusion and Financial Stability: Current Policy Issues, Asian Development Bank Institute working paper series.

IMF. (2018). Financial System Stability Assessment— Press Release; Staff Report; and Statement by the Executive Director for the United Republic of Tanzania. IMF.

IMF. (2016). United Republic of Tanzania Selected Issues—Macro financial Issues. IMF Country Report No. 16/255, Washington, D.C.

Khan, S. (2011). Financial inclusion and financial stability: are they two sides of the same coin? Indian Bankers Association & Indian Overseas Bank, Chennai.

Klein, N. (2013). Non-Performing Loans in CSEE: Determinants and Impact on Macroeconomic Performance, IMF Working Paper No. 13/72.

Kohler, M. (2015). Which banks are riskier? The impact of business models on bank stability, *Journal of Financial Stability* (16): 195-212.

Lepetit, L., and Strobel, F. (2016). Bank insolvency risk and Z-score measures, a refinement. Finance Research Letters, University of Birmingham.

Mataba, L. (2016). Efficiency and Non-Performing Loans in Community Banks in Tanzania. Thesis for award of PhD Degree at Sokoine University of Agriculture.

Mare, S., Fernando, M., and Roverto, R. (2015). Nonstationary Z-Score Measures. World Bank Group.

Mehrotra, A., & Yetman, J. (2015). Financial inclusion – issues for central banks, Bank for International Settlement, Quarterly Review.

Mirzaei, A., Moore, T., and Liu, G. (2013). Does market structure matter on banks profitability and stability? Emerging vs. advanced economies, *Journal of Banking and Finance*, 37(8): 2920-2937.

Morgan, J., and Pontines, V. (2018). Financial Stability and Financial Inclusion: The Case of SME Lending, *The Singapore Economic Review*, 63(1): 1-14.

Musau, S. (2018). Financial Inclusion and Stability of CBs in Kenya. Thesis for the award of PhD Degree at Kenyatta University, Kenya.

Nguyen, M. Skully, M. and Perera, S. (2012). Market power, revenue diversification and bank stability: Evidence from selected South Asian countries, *Journal of International Financial Markets, Institutions and Money,* Elsevier, 22(4): 897-912.

Nthambi, E. (2015). Financial Inclusion, Bank Stability, Bank Ownership and Financial Performance of CBs in Kenya. Thesis for award of PhD Degree at University of Nairobi, Kenya.

Ouhibi, S., Ezzeddine, S., and Hammami, A. (2017). Non-Performing Loans and Sytematic Risk: Empirical Evidence to Tunisia and Morocco, *Arabian J Bus Manag Review*, 7(2): 1-6.

Pallant, J. (2010). SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS. Allen and Unwin.

Rajhi, W. & Hassairi, S. (2013). Islamic banks and financial stability: a comparative empirical analysis between MENA and Southeast Asia countries, *Region et Development*, (37): 149-177.

Sahay, R., N'Diaye. P., Barajas. A., Mitra, S., Kyobe, A., Mooi Y., and Yousefi. S. (2015). Financial inclusion: can it meet multiple macroeconomic goals? IMF's Discussion note, International Monetary Fund, Washington, DC

Siddik, N., and Kabiraj, S. (2018). Does Financial Inclusion Induce Financial Stability? Evidence from Cross-country Analysis, *Australasian Accounting, Business and Finance Journal*, 12(1): 34-46.

Sarma, M. (2008). Index of Financial Inclusion, Indian Council for Research on International Economic Relations working Paper No. 215.

Sarma, M. (2012). Index of Financial Inclusion – A measure of financial sector inclusiveness, Berlin Working Papers on Money, Finance, Trade and Development: Working Paper No. 07/2012.

Srairi, S. (2013). Ownership structure and risk-taking behaviour in conventional and Islamic banks: Evidence for MENA countries, *Borsa Istanbul Review* (13): 115-127.

Tabak, M., Fazio, M., and Cajueiro, D. (2013). Systemically important banks and financial stability: The case of Latin America, *Journal of Banking & Finance* (37): 3855-3866.

TNCFI. (2017). Financial Inclusion Framework; A Public-Private Stakeholders' initiative (2018-2022). TNCFI.

Twaweza. (2016). Money Matters; Citizens and financial inclusion, *Twaweza*, Brief No. 38

Williams, B. (2014). Bank risk and national governance in Asia, *Journal of Banking and Finance, Elsevier*, (49): 10-26.

Wooldridge, J. (2002). Econometric Analysis of Cross Section and Panel Data. Cambridge, MA: MIT Press, Cambridge.

World Bank Group. (2017). Money Within Reach Extending Financial Inclusion in Tanzania Public. The World Bank Group Macroeconomics and Fiscal Management Global Practice, Africa Region.