



## Financial Stability and Economic Growth Nexus: Evidence from Sub-Saharan Africa using Panel Data

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### ABSTRACT

This paper examines the effect of financial stability on the economic growth of countries in Sub-Saharan Africa using the World Development Indicators Data. To select the appropriate model best fits for the data, the Hausman test was used to select Random Effect Estimator over Fixed Effect Estimator to assess the relationship between the variables. Panel data was collected on Sub-Saharan Africa countries from 2010 to 2019 to predict the effect of financial stability on economic growth. The paper revealed that financial stability accounted for 71.8% of the variation of a country's economic growth for the period other things being equal. It recommends that financial regulators within Sub-Saharan African should provide prudential policies aim at attaining higher economic growth should target both monetary and fiscal policies as well market discipline.

**Keywords:** Sub-Saharan African, Economic Growth, Financial Stability, Panel Data, Fixed Effects Estimator

**JEL Classifications:** E50, E58, F43, O47

### 1. INTRODUCTION

The recent global financial crisis which resulted in significant losses in several financial institutions was mainly due to an unstable financial system resulting from an increase in non-performing loans and excess liabilities over the market value of assets. There was a significant decline in the value of investments of most banks causing solvency and liquidity challenges. The financial crisis has also impacted negatively on macroeconomic stability and allocation of savings and investments and subsequently affected economic growth. These challenges resulted in significant disruption in the operations of the financial institutions and governments had to intervene to forestall their collapse. The crisis and interventions indicate the existence of a link between the performance of financial institutions and economic growth (Alsamara et al., 2018). A stable financial system enhances economic performance in many dimensions, whereas an unstable financial system detects economic performance (Schinasi, 2004). Financial instability implies that conditions in financial markets will harm, or threaten an economy's performance through their

impact on the working of the financial system. A stable financial system must necessarily take place as a precursor to the acceptance of money as a universally accepted medium of exchange utilizing payment for economic activities.

In recent times, the decline in commodity prices, tighter external financing conditions, and exchange rate depreciations have exerted further pressures on various dimensions of financial soundness, in particular in commodity-exporting countries (International Financial Statistics, 2016). This could be a harbinger of a slower pace of financial development in the medium term. Enforcement of prudential standards is quite weak in some cases, and the adoption of stricter financial standards in the future is likely to face implementation hurdles. The accelerated growth enjoyed by most countries in Sub-Saharan Africa over the decades (with significant interruptions) coupled with reforms to the financial sector has not resulted in any significant change to the banking sector but that cannot be compared with the advanced economies. This is because most countries in Sub-Saharan Africa (SSA) are developing and unlike the developed economies, the performance

of their financial institutions and systems remain underdeveloped thus reducing the contribution of this sector to economic growth (Sotiropoulou et al., 2019). However, economic benefits associated with financial sector reforms such as effective mobilization of domestic savings and allocation of resources and its subsequent positive effect of attracting foreign investment to boost economic growth is a motivation for SSA countries to revisit these reforms. Several studies have examined the relationship between financial development and growth in Africa leaving out the financial stability and economic growth nexus. Stability in the financial sector plays a key role in ensuring the sector attracts the much savings and investments required both internally and internationally sources. Stability in financial institutions will also reduce inefficiency in their operations, improve their level of public confidence and subsequently increase their ability to attract domestic savings and foreign investments needed to grow economies in SSA. By this, the private sector can also contribute significantly to achieving the sustainable growth required by economies in SSA.

Financial stability ensures that the financial institutions in a country are profitable and also possess sufficient liquidity that balanced their structured assets against liabilities (Klaas and Vagizova, 2014). Financial stability reduces the negative effect of insufficient quality of capital, assets and liabilities, associated with the aggression of their credit policy that increases credit risk, and as a result, probability of losses. Financial stability ensures there is sufficient capitalization characterized by the security level of risk assets and acted as the guarantor of bank reliability and liquidity, and also high profitability demonstrates the effectiveness of credit organizations resources use (Hodachnik, 2009).

Depending on the theoretical framework employed, the effect of financial market performance on growth can be transient or long-term. In traditional growth theories, these effects are transient indicating their presence during the transition on an economy's steady-state growth path. In new theories of endogenous growth, the effects of financial market performance can be long-term and elevate an economy to a higher growth path permanently (Deabes, 2004). A long-term impact of the financial system on growth rate can be made in one of the following ways: (a) improving the average productivity of capital, (b) channeling investment funds to institutions in the process of financial intermediation, and (c) enhancing domestic savings (Deabes, 2004). On the empirical side, prior literature posits diverse views regarding the relationship between the financial stability and economic growth making the importance of the financial sector to economic growth a matter of great debate and study. Secondly, most of the studies conducted on the effect of the financial stability on economic growth were focused on the developed countries (Alsamara et al., 2018; Duprey et al., 2017; Aboura and Van-Roye, 2017; Klemkosky, 2013).

## 2. THEORETICAL REVIEW

This section reviews the theories and concepts underlying financial stability economic growth nexus. Two theories reviewed are Endogenous Growth Theory and Concept of Financial Stability and Economic Growth. It is very reasonable to argue that financial stability affects economic growth but this position has been

interrogated in the past produced mixed outcomes and it is very ambiguous and unclear.

### 2.1. Endogenous Growth Theory

The endogenous growth theory argues that there exist a two-way causal relationship exists between financial sector development and economic growth. The endogenous growth theory was propagated in the 1990s by Paul Romer. This theory was introduced against the criticism of the drawback of the Neoclassical growth model introduced by Solow in 1956. The theory holds the view that the rate of return on capital (i.e., physical capital and human capital) determines the growth rate of a country. Central to Endogenous growth theory is that economic growth is primarily the result of internal factors to the economy, and not because of external ones. The theory is built on the idea that improvements in innovation in the capital (i.e., physical capital and human capital) can lead to increased productivity and affect economic growth positively. For that matter, government policy should encourage entrepreneurship as a means of creating new businesses and ultimately as an important source of new jobs, investment, and further innovation. This means that government action of ensuring financial stability will create a congenial environment for businesses to thrive. Again, the theory argued that there capital reducer and capital enhancer. Inflation and excessive tax rate return on all capital and the economic growth rate (McCallum and Goodfriend, 1987). It is argued that the long-run growth rate of an economy depends on policy measures. Several empirical pieces of literature have indicated the existence of a financial stability and economic growth nexus (Eschenbach, 2004; Schinasi, 2004, Havi and Enu, 2014; Ibrahim and Sare, 2018). This financial sector-growth nexus is a result of trade facilitation, diversification, pooling of risks, saving mobilization, proper resource allocation as well as monitoring and controlling of agents and entities. One of the criticisms against the Endogenous Growth Theory is the issue of international trade. International and trade liberalisation are exogenous factors (i.e., external) that apparent affect economic growth (Fine, 2000). One major relationship unexamined in depth is the stability of the financial sector and its impact on economic development. The significant impacts of such literature on the economic development of Sub-Saharan Africa where a large number of countries are developing with low-income levels have prompted this study.

### 2.2. Concept of Financial Stability

Financial stability is soundness of financial institution, the stability of financial markets, the absence of turbulence, low volatility within sector (Schinasi, 2004). These are core requirement for well-functioning financial sector. After the 2008 financial crisis, has witnessed several reforms aimed at reinforcing financial stability. The financial crisis compelled policymakers and the Basel Committee to introduce legislation that ensures financial institutions should maintain sufficient capital buffers. The purpose of these reforms was to prevent the recurrence of the global financial crisis that occurred in 2008, the Basel Committee on Banking Supervision issued a paper in December, 2009 and titled "Strengthening the resilience of the banking sector" (BCBS, 2009). The paper was later referred to as "Basel III" by

the practitioners in the financial sectors. Basel III legislation was introduced after it was discovered that the global financial crisis in 2008 was partly triggered and aggravated by an insufficient level of quality capital.

The member countries from International Monetary Fund (IMF), after the consultative meetings and surveys, endorsed a set of core indicators known as Financial Soundness Indicators (FSI) in 2001 which was later revised by IMF in 2015. The FSI provides the idea of financial system stability or soundness play a significant role in the economic development. The FSI indicators include capital adequacy ratio, asset quality (i.e., NPL) and liquidity. It is perceived that a robust financial sector is more resilient and less susceptible to cause a crisis that puts pressure on income levels had significantly caused economic activities in disarray. According to Schinasi (2004), financial crisis is likely to arise from an unstable financial sector, and a stable financial sector is more resilient and will significantly improve economic growth in various ways. A stable financial sector reflects a high capital adequacy ratio, an improved liquidity, a reduced risk associated with investments and increase capital accumulation. Financial stability will contribute significantly to economic growth.

The theoretical link between financial stability and economic growth has been divided into five dimensions of macroeconomics and finance challenges (García-Cicco and Kawamura, 2014). The five dimensions are: Information asymmetry and agency challenges in financial contracts; economic downturns arising from an unforeseen increase in market risk; credit supply changes that negatively impact market risk and makes it systemic; the disadvantage of making internal money creation a key factor in lending decisions; and long-term effect of central bank liquidity policy on bank liquidity preference changes which is a major cause of the financial crisis (García-Cicco and Kawamura, 2014). The significance of these five dimensions is that a developed financial sector that adopts appropriate technological innovation will attract foreign direct investment can distribute economic resources efficiently between entities that have a surplus and those that are in deficit entities at the same time pooling individual savings together to affect economic growth positively (Havi and Enu, 2014). Many of the banking sectors of the SSA have however remained underdeveloped as the result of government-controlled policies that have impeded financial growth negatively as compared to advanced economies. The advanced economies have well-developed and stable financial systems that contributes to their economic advancement. Rather, financial stability requires removal of controls, restructure of the distressed banks to make them solvent and formulating policies that will ensure their adequate supervision of the sector.

Several studies suggest that stable financial sector affects economic development and growth positively. A healthy financial system creates a medium that helped to channel household savings into value-creating investments, monitors borrowers to increase efficiency, helps agents pool, share and diversify risk, and facilitates trade. According to Levine (1997), Levine (2005), Demirgüç-Kunt and Levine (2008), Beck (2012) have provided literature on financial stability and economic growth nexus.

### 3. METHODOLOGY

This study is empirical research involving a quantitative research method to collect secondary data to measure phenomena and test research hypotheses. A quantitative method is used to assess data on the relationship between the financial stability on the economic growth in 33 Sub-Saharan African countries. Data is extracted from the World Development Indicators, published by the World Bank database from 2010 to 2019. This period was selected due to the lack of availability of published data before this period. The study employed descriptive statistics, correlational analysis, collinearity, and panel data regression as the data analytical tools for this study. The analysis is done using STATA as the data analysis software for this study. Panel dataset offers a very effective way to analyse the data, allows for variations in the constructing estimated parameter, and permits the use of relatively simple econometric techniques (Bond, 2002).

#### 3.1. Model Specification

To gain the maximum observations, a panel data is used. The advantage of having panel data is the ability to observe each country for more than once. Where the subscripts  $i$  and  $t$  represent the countries and periods of the selected SSA countries used for the regression. The model specified in equation (1) was adopted from Beck and Levine (2004) and modified slightly to incorporate other control variables previously as shown below:

$$\text{Growthit} = \beta_0 + \beta_1(\text{BCap})it + \beta_2(\text{NPL})it + \beta_3(\text{BLiquid})it + \beta_4(\text{Trade-open})it + \beta_5(\text{Inflation})it + \varepsilon it \quad (1)$$

Where:

Growthit is the dependent variable used in this study.

BCap, NPL, and BLiquid are both independent variables used in this study.

Open and Inflation are the control variable in this study.

$\beta_1, \beta_2, \beta_3, \beta_4,$  and  $\beta_5$  are regression coefficients of the equation to be estimated.

$\beta_0$  is the parameter of the equation.

$t =$  is the time series of the study ( $t=1, 2, 3, 4, 5, 6, 7, 8, 9$  and  $10$ ).

$i =$  is the cross-section (i.e., 31 firms selected from the GSE).

$\varepsilon =$  Unique Error or Error Term.

#### 3.2. Research Variables

To test the effect of the financial stability on the growth nexus, three variables were employed: Dependent variable, independent variables, and control variables.

##### 3.2.1. Dependent variable (i.e., GDP growth rate)

###### 3.2.1.1. Gross Domestic Products (GDP) growth rate

GDP growth rate is the annual percentage growth rate of GDP at market prices based on constant local currency. GDP growth rate measures how fast the economy is growing. Recent studies have shown that countries with better-developed financial systems have a faster economic growth rate. Empirical studies reveal that there a positive relationship between financial stability and economic growth (King and Levine, 1993; Nguena and Abimbola, 2013). GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.

**3.2.2. Independent variables (i.e., BCap, NPL, BLiquid,)**

The independent variables are Bank Capital (BB), Non-performing Loans (NPL), Bank Liquid (BL), and Bank Branches (BB) as financial stability variables.

**3.2.2.1. Bank capital (BCap)**

This is the ratio of bank capital and reserves to total assets. Bank capital is represented by BCap in this study. It is one of the measures of financial stability or soundness. BCap represents the net worth of the bank or its equity value to investors. The research conducted in 2011 by the Institute for International Finance (2011) on different regulatory zones of the United States of America, United Kingdom, Switzerland, and Japan established that bank capital affects economic growth negatively. This assertion has however being objected to by Admati (2011) and Martynova (2015) that bank capital affects economic growth positively. Despite the arguments raised by these scholars, very little empirical are available that supports the positive assertion.

**3.2.2.2. Non-performing loan (NPL)**

This is bank non-performing loans to total gross loans. NPL is calculated by dividing the value of nonperforming loans by the total value of the loan portfolio (including nonperforming loans before the deduction of specific loan-loss provisions). Non-performing Loan (NPL) occurs when payments of interest and/or principal are due payments by 90 days or more, or interest payments equal to 90 days or more have been capitalised (Bloem and Freeman, 2005). NPL is known as asset quality. The quality of loans and advances extended by the commercial banks is measured by the percentage of Non-Performing Loans (NPLs) to total loans. The outcome of studies into NPL shows a positive and significant relationship with economic growth (Jordan and Tucker, 2013; Morankinyo and Sibanda, 2016).

**3.2.2.3. Bank liquid (BLiquid)**

This is bank liquid reserves to bank assets ratio. It is the ratio of domestic currency holdings and deposits with the monetary authorities to claims on other governments, nonfinancial public enterprises, the private sector, and other banking institutions. The shows the banks’ can settle their liabilities or settle their liability positions as they become due. Holding enough liquid assets by the banks plays a key role in the financial stability as it is a well-known fact liquidity risk has the potential to create a bank failure in any country. A study conducted by Ojiegbe et al., (2016) concluded that there is a positive relationship between bank liquid and economic growth in Nigeria while Fidrmuc et al., (2015) established that bank liquid contributes to economic growth in Russia.

**3.2.3. Control variables (i.e., Inflation and Trade-openness)**

Apart from financial stability variables that were established that can influence economic growth, other external factors can also influence economic growth. These external factors are known as control variables. The control variables for this study are trade openness and inflation.

**3.2.3.1. Trade openness (Trade-open)**

Trade openness is used to measure the extent to which a country is engaged in the global trading system. This is represented as

Trade-open in this study. The proxy used to measure trade openness is a ratio of the sum of the total imports and exports divided by the total Gross Domestic Products (GDP). They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. Studies show a positive effect of trade openness on economic growth (Chang et al., 2009; Freund and Bolaky, 2008).

**3.2.3.2. Inflation**

Inflation is measured by the consumer price index. It reflects the potential risk of over-heating caused by increased credit granted to the private sector. Swarnapali (2014) asserted that the extent of the effect of inflation on banking performance depends on whether inflation is anticipated or unanticipated. Empirical studies show that inflation affects economic growth negatively (Boyd et al., 2001; Borio et al., 2003).

**4. RESULTS AND DISCUSSION**

The goal of this section is to present the results obtained from the analysis using descriptive statistics, correlation matrix analysis and regression analysis as analytical tools for this study. Descriptive statistics are used to describe the variables used in this analysis.

**4.1. Descriptive Statistics**

Describes the central density of variables used for the analysis based on the mean, standard deviation, maximum and minimum of the variables used in the study. The outcome from the means of the dependents, independent and the control variables of this study is shown in the first column of Table 1. The mean, the maximum, and the minimum of the economic growth rate were 8.217, 9.897, and 7.118 respectively. The means for financial stability and the control variables are 2.296, 1.408, 3.118, 1.710, and 1.446 respectively. The mean is used instead of median because, in case that some of the variables exhibit extreme values from the central tendency, then the standard deviation can be used to check on the variation of the mean values. The standard deviations for Bcap, NPL, BLiquid, Trade-open, and Inflation were 0.397, 0.621, 0.939, 0.809 and 0.999 respectively. Greater emphasis is placed on the means and the standard deviation for the period between 2009 and 2019.

The means (averages) help to identify possible irregularities in the dataset before the regression analysis is done. The standard deviation discloses the dispersion from the mean or observation cluster around the mean, while the standard deviation for Growth was 0.971 and indicates how far it was from the mean. A low standard deviation means that most of the observation cluster around the mean, while a high standard deviation means that it is

**Table 1: Descriptive statistics**

Variable	Mean	Std. Dev.	Min	Max
Growth	8.217	0.971	7.118	9.897
Bcap	2.296	0.397	0.399	2.889
NPL	1.408	0.621	-0.879	2.642
BLiquid	3.118	0.939	0.865	4.98
Trade-open	1.710	0.809	0.265	3.112
Inflation	1.446	0.999	-0.902	2.958

Source: STATA version 15 Computation

far away from the mean but, a higher standard deviation implies that there was a lot of variation in the results. It is worthy to note that, despite that the mean showing the economic growth for the period under review; they are by no means absolute as the standard deviation seems to correlate their movements in tandem with the mean values, which there should be further probing for the period under review.

**4.2. Result from Correlation Matrix**

Pearson correlation matrix is used to test the degree of correlation among the variables. The correlation analysis is done to detect the correlation among the Growth BCap, NPL, BLiquid, Trade-open and inflation. Even though correlation dependent and independent variables is good but correlation among the independent variables may affect the efficacy of the estimated coefficients of the study. The correlation index (r) is used to describe the direction and the strength of the linear relationship between the variables used for the analysis. Table 2 shows that there is a significant and a positive correlation between the economic growth, BCap, and Trade-open, while the relationship between the growth and NPL, BLiquid and inflation is negative. The correlation between the dependent variable and the independent variables is very significant but it is not so much high among the independent variables so much that can cause multicollinearity problem. The correlation index (r) between Growth and BCap, NPL, BLiquid, Trade-open, and Inflation are: 0.477, -0.295, -0.314, 0.584, -0.442 are observed at the confidence levels of 1% and 5% respectively.

**4.3. Results from Multicollinearity Test**

Vector Inflation Factor (VIF) is used to check whether there is an existence of multicollinearity problem among the independent and control variables before carrying out regression. When a tolerance value is lower than 0.20 and a VIF value greater than 10 suggest a multicollinearity problem (Menard, 1995; Myers, 1990).

Table 3 shows that, the VIF values for the variables are less than 10 and this provides a clear indication that the variables are not suffering from multicollinearity problems. The highest VIF among the variable is BC which 2.591 with a tolerance value above 0.20. This indicates that, none of the variables were removed from the model because none of them has violated multicollinearity assumption for this study. The existence of multicollinearity would not affect the how the regression is performed but rather affect the interpretation of the result (Anderson et al., 2009). Therefore, since there is no independent variable that is strongly correlated, the study proceeds to run the regression model without the need to

**Table 2: Correlation matrix**

Variables	Growth	BCap	NPL	BLiquid	Trade-open	Inflation
Growth	1.000					
Bcap	0.477	1.000				
NPL	(0.295)	0.022	1.000			
BLiquid	(0.414)	0.310	(0.147)	1.000		
Trade-open	0.584	0.125	0.025	(0.724)	1.000	
Inflation	(0.242)	0.099	0.048	0.212	0.092	1.000

Source: STATA version 15 Computation. \*\*Correlation is significant at the 0.01 level (2-tailed). \*Correlation is significant at the 0.05 level (2-tailed)

eliminate any variable from the model for fear of multicollinearity challenge.

**4.4. Testing of Regression Assumptions**

One of the basic methods to assess the effect of the independent variables on the dependent variable is the use of pooled Ordinary Least Squares (OLS) regression. This method assumes that the composite error terms are not correlated with the independent variables (Gujurati, 2003; Wooldridge, 2006) but most times this assumption of pooled OLS regression is unrealistic. Anytime this assumption is abused, the result from pooled OLS regression does not yield inconsistent results to violation of heterogeneity assumption. To avoid violations of the regression assumption, the following assumptions of normality, autocorrelation, endogeneity, and heteroscedasticity were tested and the result is presented in Table 4.

In reality, assumption tests are the precursor to successful regression except for endogeneity and heterogeneity test, because they are only possible after the regression is done. According to Hamilton and Nickerson (2003), the problem of endogeneity is a very serious issue in regression but most often ignored by researchers when conducting non-experimental research. Endogeneity is a situation where an independent variable is correlated with the error term. Table 4 showed that, the parameters are not misspecified and passed the normality, endogeneity, and autocorrelation and heteroskedasticity tests.

**4.5. Regression Results**

The main purpose of this study was to estimate the effect of financial stability on the economic growth for the SSA countries. There are two types of panel data estimator to decide between

**Table 3: Variance inflation factor (VIF) and tolerance value**

Variables	VIF	Tolerance value
BCAP	2.237	0.447
NPL	2.304	0.434
BLiquid	2.591	0.386
Trade-open	2.101	0.476
Inflation	2.674	0.374
Mean VIF	2.381	

Source: STATA version 15 Computation

**Table 4: Model diagnostic checks and stability test**

Test	Assumption tested	Chi-square(5)	P-value	Status
1.	Residua Normality: Smirnov-Kolmogorov (Sk Test)	15.45	0.143	Evidence of normality
2.	Endogeneity: Wu-Hausman test	4.260	0.372	No evidence of endogeneity
3.	Autocorrelation: Cumby-Huizinga Test	1.471	0.227	No autocorrelation
4.	Heteroskedasticity: Breusch-Pagan (Hetest Test)	12.83	0.421	No heteroscedasticity

Source: Compiled by the author (2020)

for the regression, Fixed Effects Estimator and Random Effects Estimator. The next critical issue is the determination of the suitable estimator to be used to estimate the effect of financial stability on economic growth. The difference between these two models lies in the treatment of the unobserved heterogeneity. Hausman has developed a model specification test that can decide between Fixed Effects Estimator and Random Effects Estimator (Greene, 2003).

The null hypothesis for the Hausman test assumes a Random Effects estimator and the alternate hypothesis is the Fixed Effects estimator (Green, 2012). The decision criteria are to reject the null hypothesis of the Fixed Effects Estimator, when the P-value is less than or equal to 5% and use a Random Effects Estimator, when the p-value is statistically significant (i.e., when  $P > 0.05$ ). The result from the Hausman test shows that (Chi-square = 5.73,  $P = 0.3330$ ). The result is presented in Table 5 and suggests that the Random Effects model is the most suitable to estimate the relationship between the variables.

Table 6 shows the result from the Random Effect Estimator on the relationship between the financial stability and economic growth. Running a regression analysis provides an opportunity to discover whether the coefficients on the independent variables are different from zero (i.e., having a genuine effect on the dependent variable).

**Table 5: Hausman test**

Variable	Coefficients			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fe	Re	Difference	S.E
BCap	0.0387333	0.0219242	0.0168091	0.0116656
NPL	-0.0708048	-0.0633334	-0.0074715	0.0113070
BLiquid	0.0195113	0.0186742	0.0008372	0.0018774
Trade-open	0.1053051	0.1023549	0.0029501	0.0042545
Inflation	-0.0394655	-0.0369757	-0.0024898	0.0051243

Source: STATA version 15 Computation

**Table 6: Random effects estimator**

Model summary:						
(R <sup>2</sup> )						
Within: 0.76	Number of obs.: 330					
Between: 0.46	Number of groups: 10					
Overall: 0.718	Average: 33					
P-value: 0.000	Wald Chi-square(5) = 124.82					
Corr (ε <sub>it</sub> , X) = 0.00						
Growth	Coefficients	Std. Err.	t-statistics	P> z	95% Conf. interval	
BCap	0.0662	0.0243	2.724	0.003	-0.025	0.069
NPL	-0.0668	0.0183	-3.643	0.001	-0.100	-0.027
BLiquid	0.0189	0.0037	5.064	0.000	0.011	0.026
Trade-open	0.1026	0.0135	7.629	0.000	0.076	0.128
Inflation	-0.0352	0.0135	-2.393	0.012	-0.066	-0.008
Constant	7.1597	0.4999	14.322	0.000	6.362	7.717
sigma_u	0					
sigma_e	0.554					
rho	0					

Source: Researcher's Stata version 15 Computation

The R<sup>2</sup> of the model summary explains the fraction of the variation in the dependent variable that is explained or accounted for by the independent variables.

The within of the model summary, that is, R<sup>2</sup> is 0.76 or 76% while the overall of the model summary, R<sup>2</sup> is 71.8 or 71.8%, which is closer to 100%. This implies that the model or the financial stability can explain about 71.8% of the variation or changes in economic growths. This implies that the financial stability and other control variables can only explain 71.8 of the relationship with economic growth. This leaves about 28.2% unexplained by this regressive model. Therefore, 28.2% of the total changes in the economic growth are explained by factors outside the model. The Rho is known as the interclass correlation. The “rho” gives the proportion of the variation in the dependent variable that can be explained by the ε<sub>it</sub>. The error ε<sub>it</sub> is correlated with the regressors in Random Effects Estimator (corr (ε<sub>it</sub>, X) = 0.00).

The signs and the size of the coefficients of the independent variables explain the direction and effect on the dependent variable. Table 6 shows that the P-values for the independent variables are below 0.05 or 5% (i.e.,  $P < 0.05$ ), implying that there is a significant relationship with the dependent variable. The P-value tells you how confident you can be that each variable has some correlation with the dependent variable, which is the important thing. The coefficients of the independent variables show Bank Capital, Bank Liquid, and Trade-open have a significant positive relationship with economic growth, while NPL and Inflation have a negative significant relationship with economic growth. Table 6 shows that financial stability represented by BCap, BLiquid and Trade-open show a positive and significant relationship with economic growth while NPL and Inflation have a negative and significant relationship with economic growth at a  $P < 5\%$ . Also, the t-statistics are all above the standard value of 1.96. This implies that the model is good and that, any increases or decreases in the financial stability variables will affect economic growth.

The outcome from Table 6 is used to produce an equation model that can predict the relationship between economic growth and financial stability. The result of equation is presented in the regression model forms below as equation (2):

$$Growth_{it} = 7.039 + 0.066BCap - 0.063NPL + 0.019BLiquid + 0.102Trade-open - 0.037inflation \quad (2)$$

This implies that, the economic growth is predicted to increase one percentage (i.e., 1%) when the BCap, Trade-open, Trade-open increase by 0.066, 0.019, and 0.102 respectively while NPL and inflation decreased by (0.063) and (0.037) respectively. This positive outcome of BCap is consistent with Basel III’s argument that a higher bank capital promotes financial stability and other researchers. This is because it provides the bank with enough liquid reserve ratio needed as the bank assets to channel enough loans to support economic expansion. The bank capital is a very important variable for financial stability as it affects the bank performance directly (Financial stability is essential for a well-performing economy since financial fragility can cause financial crises that enhances financial stability by reducing bank risk-taking incentives and while increasing

the banks' buffer against losses of depositors funds, which will eventually influence economic growth positively (Alsamara et al., 2018). Bank credit has a positive influence on economic growth and is consistent with Abusharbeh (2017). Again, the positive relationship between trade-openness and economic growth is supported by several pieces of literature (Chang et al., 2009; Dollar and Kraay, 2004; Freund and Bolaky, 2008). This implies that trade-openness creates an opportunity for the SSA to integrate their markets to the global markets that will end up in economic growth for the economies.

Also, the relationship between GDP growth rate, NPL, and inflation in equation (2) implies that whenever there is an increase of 0.063% and 0.037% increase in NPL and inflation respectively, it will cause a reduction in economic growth by one percentage vice versa as shown by the coefficients for (0.063) and (0.037) in Table 6. The negative relationship between NPL and economic growth is strongly supported by many literatures (Prochniak and Wasiak, 2017; Ahmad et al., 2016; Muthami, 2016). Furthermore, inflation and economic growth rate shows a negative relationship and which implies that inflation has adverse effects on economic growth. Many studies on effects on economic growth suggest that inflation affects financial stability negatively. Since inflation may cause market friction leading to credit rationing. Fisher (1993) argued that inflation distorts the price mechanism, and this will affect the efficiency of resource allocation and hence influence economic growth negatively. Inflation erodes business confidence and may cause both local and international to shy away from countries with high inflation vice versa. This at the end affects economic growth negatively. This outcome is supported by (Idris and Baker, 2017; Mamo, 2012).

#### 4.6. Robustness Test

Robust testing is a process of verifying the robustness of the analytical software adopted for the analysis in this study. It is done to check the variables of the coefficient estimates for the regression specification when modified by the addition or removal of variables in the model. It provides the medium through which the results obtained from panel regression results and the testing of the underlying assumptions of the model, especially heteroscedasticity and endogeneity problems. Two different estimation techniques were employed: Ordinary Least Square (OLS) regression and Robust Standard Error regression to ensure the robustness of the outcome against the heteroscedasticity and endogeneity problems. The coefficients of the variables and the  $R^2$  in the second outcome are consistent with the coefficients of the variables and the  $R^2$  obtained in Table 6. This implies, the results obtained in testing of heteroscedasticity and endogeneity in Table 4 are consistent with the outcome of the Random Effects Estimator in Table 6. In summary, the robust testing supported the theories and the results presented in Table 4.

## 5. CONCLUSIONS

The purpose of this paper is to establish the existence of a relationship between financial stability and other microeconomic variables with economic growth in SSA. The analyses are performed using 33 SSA countries recent data taken from WDI from 2010 to 2019. The result from the panel data regression reveals positive relationships between economic growth and Bank capital, Bank credit, and Trade-openness, this outcome is supported by the school of thought

that financial stability is relevant to the economic growth for the countries selected from the SSA. While the relationship between economic growth, NPL, and inflation is negative. This outcome is supported by the endogenous growth theory that inflation is a capital reducer (Jones and Manuelli, 1991; Ploeg and Alogoskoufis, 1994). Therefore, financial stability provides good responses to economic growth and can promote economic growth.

The outcome from this study has provided the necessary impetuses needed by the financial sector regulators of the SSA to adopt the Basel 3 regulatory requirements in the near future, future researches can be based on the impact that complying with Basel 3 capital and liquidity requirements will have on the banking sector's ability to support economic growth. The study also revealed that, not only do financial stability variables are important to attaining economic growth but inflation must be contained if meaning economic growth should be achieved. The negative relationship between inflation and economic growth and economic growth implies that inflation is a detriment to economic growth. Therefore, prudential policies aim at attaining higher economic growth requires both monetary and fiscal policies as well market discipline. The positive relationship between bank credit and economic growth is an interesting revelation to policymakers for the SSA economies. This paper recommends that the regulators of the SSA should lower their cost of credits to provide more domestic funding that improves their credits policy to reinforce local fundraising capacity and investments.

The study recommends the need for the governments of SSA to play an active but non-distortionary role in the financial stability. The government should provide policy aim at creating a better operating environment for the financial sector to develop. This requires a need to develop financial control systems that will reduce operational risks and achieve a high level for the SSA countries.

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