

Financial Development and the Economies of Sub-Sahara Africa: A Cointegration and Causality Approach

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Abstract: This paper examines the impact of financial development on the economic growth of Nigeria, Ghana and South Africa. With a model for each country, GDP proxied economic growth while four regressors were developed as proxies for financial development. Data was generated from the World Bank, IMF and Central Banks of the sample countries for the period 1980-2012. Applying the test for stationarity with the Ordinary Least Square (OLS), Cointegration and Causality procedures, the hypothesis that there is no significant relationship between financial development and the economies of the sample countries was tested. The results revealed a significant positive relationship between financial development and economic growth of the three Sub-Saharan countries studied. Remarkably, the proxies of Financial development exerted significant effect on the economic growth of South Africa but significantly weak in Ghana and Nigeria. Curiously, Bank Credit to the public and private sectors of the three economies had the wrong signs highlighting the high risks associated with lending in the developing economies which also agrees with the poor performance of these countries in the World Economic Forum's Financial Development Index (FDI) Fifth Pillar –Access.

Key words: Financial Development Index • Access • Economic growth • Growth trajectory • Risk diversification

INTRODUCTION

Empirical literature is replete with arguments concerning the relationship between Financial Development and Economic growth. For several decades economists and financial experts have amassed an avalanche of empirical, historical and theoretical analysis for and against the direction of this relationship. The first school of thought which classified the relationship in what may be regarded as supply-led theory of finance-growth nexus may have found its origin in the works of Bagehot [1] and actively supported by Schumpeter [2] who in his famous work contended that Technological innovation and implementation of innovative products requires a well-functioning banking system. This contention was supported by many other

researchers including Goldsmith [3], MacKinnon [4], Shaw [5], Galbis [6], Mathieson [7], Fry [8]; Kwan, Wu and Zhang [9] and King and Levine [10].

The schools of thought rightly argue (and there seems to be a kind of consensus too) that a well-functioning financial sector is a precondition for an economy to effectively exploit its growth potentials through greater efficiency in resource allocation. This is achieved through the intermediation function of the financial sector which identifies entrepreneurs with good growth prospects and ultimately reallocates financial resources to their most productive uses. The financial-growth nexus was sharply challenged by another group of scholars led by Robinson [11] who introduced a time-order relationship in the whole argument. According to Robinson [11], "Where enterprise leads,

finance follows". This is a radical challenge of the finance-growth nexus. It simply asserts that finance does not cause growth but rather reacts to improvements in demands in the real sector.

This suggests that it is economic development which gives rise to the demand for financial services. In other words, a positive change in income will warrant a demand for financial assets which also creates growth in financial services. Robinson has also found considerable support from a number of scholars including Gurley and Shaw [12], Demetridis and Husien [13]. Some other scholars are emphatic that financial development may not be beneficial for growth citing the inherent volatility and arbitrariness of the stock market pricing in developing countries among other factors as conditions that cripple the capacity of financial development to produce allocative efficiency. At the extreme in the support for this view which has culminated in the emergence of the demand-led theory school of thought is Lucas [14] who dismisses financial development as an over-stressed determinant of economic growth emphasizing that financial development and economic growth are not causally related.

Whatever view there is in this argument it is clear that recent developments in the global economy seem to lend support to the supply-led theory of finance-growth nexus and without any doubt, the global economic crises is a prima facie evidence that finance plays a leading and causal role in the development of the economies of nations.

Problem Statement: According to the World Economic Forum [15], the performance and long term economic growth and welfare of a country are related to its degree of financial development. Explaining the causality and time-ordered outcomes between financial development and economic growth and development, the World Economic Forum asserts that the higher the degree of financial development, the wider the availability of financial services that allow the diversification of risk. Such diversification in turn increases the long-term growth trajectory of a country and ultimately improves the welfare and prospects of producers and consumers that have access to financial services. This is indeed the supply-led theory of finance-growth nexus.

Perhaps, the pertinent questions in this paper are: given the reality of the differences in the circumstances and economic environments in which these researches were conducted, what relationship exists between financial development and the economies of Sub-Saharan Africa? , Does financial development cause economic

growth? Or is finance really a "badly overstressed" determinant of economic growth which rather follows where enterprise leads? Or indeed is there any causal relationship between them? If there is, how has it performed in the Sub-Saharan African economies? This paper therefore, investigates the impact of financial development on Sub-Saharan African economies. Our sample is Nigeria, Ghana and South Africa.

Research Hypotheses:

Ho1: There is a significant relationship between the selected financial development proxies and economic growth of the selected countries.

Review of Empirical Literature: By the year 2007, the world witnessed the global financial crises with its attendant consequences that once again brought to the front burner the debate on weak financial system policies. As such the attainment of financial stability has now become of paramount importance to the governments, civil societies and businesses alike such that even developed nations have begun to question the degree to which financial integration and innovation have brought exposure to the unabated financial crises [16]. Nor are the developing economies left out of this debate? The consensus is that emerging markets that have been primary drivers of global economic growth in the new millennium have yet to see the extent to which the financial crises will be resolved.

Growth-wise, the prediction has remained that the African continent is riding on a high fortune [17; 18; 19]. Lending support, Goldman Sachs, one of the authoritative world rating agencies has predicted that 8 of the top 11 growing economies in the next decade will come from Africa. This, no doubt, is premised on the perception that the development of local financial markets in the developing economies is central to the provision of the much-needed capital for the small and medium-sized companies that drive a large portion of economic growth in these countries, thus, underscoring the link between financial development and economic growth.

Over the years the debate on the relationship between financial development and economic growth as well as the question of causality between them has engaged researchers who have taken sides depending on the results of their studies. For example, Luintel and Khan [20] examined a sample of 10 less developed countries and concluded that causality between financial development and economic growth is bi-directional for all countries. Demetriades and Hussan [13] and Jung [21] used time

series analysis to conclude that causality for developing economies is also bi-directional. Wachtel and Rousseau [22] studied 5 industrialized economies and concluded that financial development mattered only at the early stages of economic development. Rajan and Zingales [23], Wurgler [24] as well as Beck and Livine [25] in separate studies found that financial development causes economic growth more in developed economies than developing economies.

Bagehot [1] and Schumpeter [2] seem to have kick-started this argument with their conclusion that efficient and effective financial system is a pre-condition for production and development of innovative products in an economy, supported by McKinnon [4] and Shaw [5], who emphasized that efficient utilization of resources via a highly organized, developed and liberal financial system enhances economic growth. This school of thought which is classified as supply-led theory of finance-growth nexus, has received further support from the empirical works of Gurley and Shaw, [12: 26], Hicks [27], Goldsmith [3], McKinnon [4], King and Levine [10], Galbis [6], Kwan, Wu and Zhand [9], Demeirguc-Kent and Detragiache [28], Demetriade and Andrianova [29], Nzotta and Okereke [30], Nwezeaku and Okpara [31] and Saibu and Agbeluyi I [32].

The conclusion of these proponents is that even with the perceived inherent fragility, the financial institutions underpin economic prosperity. They further contend that financial markets and institutions arise to mitigate the effects of information and transaction costs that hinder direct pooling and investment of savings. Amplifying, Levine, [33:34] succinctly posits that financial system helps to mobilize and pool savings, provide payment systems that facilitate the exchange of goods and services, produce and process information about investors and investment projects to enable efficient allocation of funds. This school of thought further contends that the financial system also provides the platform for monitoring investments while exerting corporate governance, with additional task of helping to diversify, transform and manage risk, even after funds allocation.

On the contrary, the opponents argued that the operation of the financial sector and by extension, financial development, merely responds to economic growth through adjustments in changing demands from the real sector. They maintained that where enterprise leads, finance simply follows, suggesting that it is economic growth which creates demand for financial services and by extension, financial development and not vice versa [11]. Lucas [14], was even more aggressive as

he argued that economists “badly over-stress” the importance of financial system on economic growth, maintaining that it is a “side show” for economic activity. Supporters of this school of thought are quick to point at the rapid growth of many Asian economies; a growth which has been steady and progressive despite the absence of a developed financial sector [35; 36].

According to Odeniran and Udoaja [37], not much has been done on Africa with regards to empirical studies on the relationship between financial development and economic growth. Nigeria one of the leading economies of the region has had a somewhat embarrassing nature of economic growth in what has variously been described as ‘jobless growth’ and a ‘paradox of plenty’. Although the economy has witnessed tremendous GDP growth (Nigeria’s GDP grew from \$36bn in 1999 to about \$559bn in under 10 years, which admitted the country into the global club of emerging middle income economies), key indicators of growth and development like unemployment, poverty, income distribution and access have assumed embarrassing proportions. Also Nigeria is a case of the extremely rich living side by side with the extremely poor, (a paradox of plenty).

Not so with South Africa the largest economy in the region which has been experiencing improvements in both the banking and non-banking financial services and stability in its financial institutions. Improvements which are attributed to greater currency stability and more robust IPO and securitisation activity as well as a tax environment that is investment-friendly. Perhaps, South African business environment and underdeveloped infrastructure are the economies weakest points.

Ghana, a smaller economy in the region has a very strong financial institutional stability but a very weak financial intermediation in both the banking and non-banking financial services. Nevertheless, Ghana benefits from a very high commercial access, a high degree of foreign direct investment, a relatively well-functioning local equity market.

MATERIALS AND METHODS

Three representative sub-Saharan economies have been selected for this study; Nigeria with the largest population (about 160.3 million people) in sub-Saharan Africa, South Africa the largest economy in sub-Saharan Africa and Ghana one of the fastest growing economies of the region. These economies were among the countries selected by the World Economic Forum and measured by the Financial Development Index [15].

We adopted the traditional co-integration procedures of Johansen and Juselius [38] to establish the co-integrating relationship between the variables (proxies) of financial development and Granger causality tests to establish causality among them.

The Model: The avalanche of theoretical literature predicts economic growth as a positive function of financial development and this can be deduced by the Mackinnon-Shaw type of models on which Mackinnon [4] showed that a positive relationship exists between financial development and the level of output and Shaw [5] empirically showed that financial markets through debt intermediation promotes investment which increases the level of output. Therefore, we can specify a functional model of financial development and economic growth as;

$$EG = f(FD) \tag{1}$$

$$EG = \alpha_0 + \alpha_1 FD + E \tag{2}$$

$$\ln EG = \alpha_0 + \alpha_1 \ln FD + E \tag{3}$$

Where;

- GDP = Gross Domestic Product
- FD = Financial Development
- E = Error Term.

In recent works, the role of private sector credit as a measure of GDP has received attention and much of the empirical literature has used this variable as a proxy for financial development given that it depicts not only the financial sector's contribution towards the facilitation of transactions, investment and output but also defines access or the ease with which the citizens are able to obtain the capital they require for investment. Also, theoretical literature has espoused the role of interest rate in financial development. The endogenous growth literature indeed predicts a positive relationship between financial development and interest rate (king and Levine, 1993). We can therefore, extend models 2 and 3 with these variables as follows;

$$EG = \alpha_0 + \alpha_1 TBCR + \alpha_2 INTR + E \tag{4}$$

Where;

- TBCR = Bank credit to the economy
- INTR = Interest rate.

As a measure of financial deepening, M₂/GDP has found acceptance in theoretical literature. In addition, this ratio measures the degree of monetization of the economy. We also employ the gross domestic product (GDP) the traditional proxy for economic growth as our dependent variable and finally

There is a consensus on the relationship between the size and depth of the financial system as a determinant of savings and investment. According to the World Economic Forum [16], the size of the financial system also matters because the larger the size of the financial system, the greater its ability to benefit from economies of scale given the significant fixed costs prevailing in the financial intermediation process. Therefore, market capitalization is employed in the study to complement the rest of the variables that are selected as proxies for financial development. Our final model is hereby represented as follows;

$$GDP_t = \alpha_0 + \alpha_1 TCAP_t + \alpha_2 INTR_t + \alpha_3 M2_t + \alpha_4 TBCR_t + \mu \tag{5}$$

Where;

- GDP_t = Gross Domestic Product at year t,
- CAP_t = Market Capitalization at year t,
- INTR_t = Interest Rate at year t,
- M2_t = Money Supply at year t,
- TBCR_t = Total Bank Credit to the Economy at year t,

μ = Stochastic Term and $\alpha_1, \alpha_2, \alpha_3, \alpha_4 \in [0, 1]$

The Unit Root Test: The Augmented Dickey Fuller (ADF) statistic was used to test the stationarity of the variables the model is given by the form;

$$\Delta y_t = \delta_0 + \alpha_1 T + \delta Y_{t-1} + \sum_{i=1}^p \alpha_i \Delta Y_{t-i} + E_t \tag{6}$$

Where;

- Y_t = The variable under test
- T = The time trend and,
- E_t = A random error term.

The Cointegration Test: A Cointegration test is a test that measures the long-term relationship between the variables, the existence of which guarantees that the variables demonstrate an order of integration. A well known and accepted test is Johansson's procedure. In this study we employ the Johansson and Juselius[38] procedure as follows;

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^p \Delta Y_t + \Gamma X_t + E_t, \dots \dots \dots \quad (7)$$

$$\Pi = + \sum_{i=1}^p \Delta A_i - 1, \Gamma = - \sum_{i=1}^p + 1 A_j, \dots \dots \quad (8)$$

Where;

- Y_t = a k –vector of the 1(1) variables;
- X_t = a vector of the deterministic variables;
- Γ = number of the cointegrating relations and
- E_t = identically and independently distributed error term.

The Granger Causality Model: The Granger causality test is a procedure to determine whether a specific variable or group of variables play any role in determination of other variables in the Vector Error Correction Model (VEC) process.. It can be used to test whether an endogenous variable can be treated as exogenous by examining the statistical significance of the lagged error correction terms by applying separate t-tests on the adjustment coefficients as follows;

$$Y_t = \sum_{i=1}^n \Phi_i FD_{t-1} + \sum_{i=1}^n \Phi_i GDP_{t-1} + N3_t \quad (9)$$

$$FD_t = \sum_{i=1}^n \Phi_i FD_{t-0} + \sum_{i=0}^n \Phi_i GDP_{t-1} + N4_t \quad (10)$$

Where;
 i and j are lag periods;
 a, b, δ, Ø, δ, Øy and p are parameters t= time period.

Finally, the data for the study was collected from the central banks of the selected countries as well as the various World Bank publications for the period, 1980-2010.

RESULTS AND DISCUSSIONS

Unit Root and Co- Integration Tests: The unit root test is carried out using the Augmented Dickey Fuller test in order to determine whether the data set is stationary and the order of integration. Evidently, from Tables 4.1 through 4.3, all the variables in all cases of Nigeria, Ghana and South Africa were stationary at first difference or 1(1). We then applied the Johansson co-integration test which adopts no exogenous variables as it is based on the vector auto regression (VAR) modeling. This helped us in establishing that a strong long-run equilibrium exists between the financial development indicators and the gross domestic product.

While in the cases of Nigeria and South Africa, there is only one co integrating equation, none exists for Ghana. However, in all cases the ordinary least square (OLS) results equally support the existence of a short run relationship in all the countries (Table 4.4).

The Granger Causality Results: Here, we estimate the direction of the effect of the variables taken together and the analyses are presented according to the countries.

The Granger Causality Results for Nigeria: Under the Nigerian economy, while gross domestic product (GDP) granger causes both the total market capitalization and total bank credit (NTBCR) at 5%, no significant causal effect was noticed between any pair of the variables, both at 1% and 5% alpha levels ,within the period of the study, 1980 -2010 (See results in appendix).

The Granger Causality Results for Ghana: For the Ghana results, while market capitalization granger causes gross domestic product (GDP) at 9%, total bank credit (GTBCR) granger causes money supply (GM2) at 7%.However, no significant causal relationship was observed between any other pairs of the variables(see results in appendix).

The Granger Causality Results for South Africa: For South Africa, whereas the market capitalization (GCAP) granger causes gross domestic product (GDP) at 5%, gross domestic product (GDP) also granger causes money supply (SM2) at 5.5%. However, no other significant causal effect was observed between any other pair of the variables both at 1% and 5 % significant level.

The Influence of Financial Development on Economic Growth of Nigeria

Table 4.5 above shows the results of the global statistics as produced under the three models namely the Ordinary least square (OLS) without the lagged value of the gross domestic product, Ordinary least square (OLS) with the lagged value of the real gross domestic product and the VAR form of the estimate.

Because model 2, with a one-year lagged variable of the GDP, parades better statistics (R-square of 98.2.0%, Adjusted R-square 97.8%, Standard Error 135826, Log Likelihood -462.7744, Akaike information criterion 31.25 , Schwarz criterion of 31.53, Hannan-Quinn of 31.34 and Durbin-Watson of 2.28) ,than others, it is therefore selected for the estimation.

Therefore, from model 2 of table 4.5, since the F – ratio calculated (265.1798) > F – ratio critical (3.86,2.60), at both 1% and 5% levels of significance

Table 4.1: Unit Root Test for Nigeria

Augmented Dickey-Fuller Unit Root Test				
Variable	T-statistic.	Critical value	p-value	Order of Integration
NCAP	-6.952107	-3.679322**	0.0000	1(1)
NINTR	-8.546383	-3.679322**	0.0008	1(1)
NM2	-4.695026	-3.679322**	0.0000	1(1)
NTBCR	-3.394733	-3.679322**	0.0195	1(1)

Source: E-views 7.0 Statistical Package.

NB:*=Stationary @ Level, **= Stationary @ First Difference,***= Stationary @ Second Difference.

Table 4.2: Unit Root Test for Ghana

Augmented Dickey-Fuller Unit Root Test				
Variable	T-statistic.	Critical value	p-value	Significance
GCAP	-6.952107	-3.679322	0.0000	1(1)
GINTR	-8.546125	-3.679322	0.0000	1(1)
GM2	-4.695026	-3.679322	0.0009	1(1)
GTBCR	-3.394717	-3.679322	0.0011	1(1)

Source: E-views 7.0 Statistical Package.

NB:*=Stationary @ Level, **= Stationary @ First Difference,***= Stationary @ Second Difference

Table 4.3: Unit Root Test for South Africa

Augmented Dickey-Fuller Unit Root Test				
Variable	T-statistic.	Critical value	Order of Integration	Significance
SCAP	-5.827895	-3.679322	0.0000	1(1)
SINTR	-8.305495	-3.679322	0.0000	1(1)
SM2	-4.626417	-3.679322	0.0019	1(1)
STBCR	-3.362370	-3.679322	0.0009	1(1)

Source: E-views 7.0 Statistical Package.

NB:*=Stationary @ Level, **= Stationary @ First Difference,***= Stationary @ Second Difference

Table 4.4: Summary of Co integration Results for all selected Countries

Country	No. of Co integrating Equations	Evidence of Long-run relationship	Evidence of Short-run relationship
NIGERIA	1	Yes	Yes
GHANA	Nil	No	Yes
SOUTH AFRICA	1	Yes	Yes

Source: E-views 7.0 Statistical Package.

Table 4.5: Global Statistics for Nigeria

Test-statistic	Model1 Least square,	Model2 Least Square, with Lag	Model3, VAR
R-square	0.860142	0.982221	0.990492
Adjusted R-square	0.838626	0.978517	0.987899
S.E of Regression	3676144	1353826	10254813
Sum of squared residual	3.51E+14	4.40E+13	2.31E+13
Log likelihood	-509.8994	-462.7744	-438.5231
Durbin-Watson stat	1.363711	2.277121	NA
Mean depend. var	6125186	6327704	6544259
S.D. depend. Var	9151138	9236653	9322319
Akaike info criterion	33.21932	31.25162	30.72573
Schwarz criterion	33.45061	31.53186	31.05576
Hannan-Quinn criterion	33.29471	31.34128	NA
F-statistic	39.97576	265.1798	381.9884
Prob(F-statistic)	0.000000	0.000000	NA

Source: E-views 7.0 Statistical Package

respectively, we reject Ho and conclude that financial development has a significant relationship with the level of economic growth in Nigeria (Tables 4.5 and 4.6).

Having tested the significance of the model, we go a step further to test the significance of the financial development indicators in contributing to the total variation in the level of economic growth in Nigeria, using model 2. This is achieved through the student t – test.

We refer to the regression result in Table 4.6. From Table 4.6, only the one-year lagged value of GDP (GDP_{t-1}) proved to exert significant contribution to economic growth in Nigeria.

The Influence of Financial Development on Economic Growth of Ghana: Here, one lead equation is to be estimated to test the hypothesis that there is no significant relationship between the selected financial development indicators and the level of economic growth.

Table 4.7 above shows the results of the global statistics as produced under the three models namely the Ordinary least square (OLS) without the lagged value of the gross domestic product, Ordinary least square (OLS) with the lagged value of the real gross domestic product and the VAR form of the estimate.

Here, also, because model 2, with a one-year lagged variable of the GDP, parades better statistics (R-square of 94.8%, Adjusted R-square 93.7%, Standard Error 1001.653, Log Likelihood -246.5032, Akaike information criterion 16.83, Schwarz criterion of 17.11, Hannan-Quinn of 16.92 and Durbin-Watson of 2.02), than others, model 2 is therefore selected for the estimation.

In order to confirm the specification status of our model, we employ the analysis of variance or ANOVA.

Therefore, from model 2 of table 4.7, we reject Ho and conclude that financial development has a significant relationship with the level of economic growth in Ghana (Tables 4.7 and 4.8).

Here, also, having tested the significance of the model, we go a step further to test the significance of the financial development indicators in contributing to the total variation in the level of economic growth in Ghana, using model 2. This is achieved through the student t – test.

We refer to the regression result in Table 4.8. From Table 4.8, only the one-year lagged value of GDP proved to exert significant contribution to economic growth in Ghana.

Table 4.6: Results of Model 2 for Nigeria

Dependent Variable: NGDP
Method: Least Squares
Date: 07/11/13 Time: 22:33
Sample (adjusted): 1981 2010
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1144463.	3744032.	0.305677	0.7625
NGDP1	1.207936	0.105356	11.46532	0.0000
NINTR	-24692.07	77884.64	-0.317034	0.7540
NM2	-2367.600	87675.24	-0.027004	0.9787
NTBCR	-4727036.	8960811.	-0.527523	0.6027
NCAP	3672475.	20668373	0.177686	0.08605
R-squared	0.982221	Mean dependent var		6327704.
Adjusted R-squared	0.978517	S.D. dependent var		9236653.
S.E. of regression	1353826.	Akaike info criterion		31.25162
Sum squared resid	4.40E+13	Schwarz criterion		31.53186
Log likelihood	-462.7744	Hannan-Quinn criter.		31.34128
F-statistic	265.1798	Durbin-Watson stat		2.277121
Prob(F-statistic)	0.000000			

Table 4.7: Results of the Global Statistics for Ghana.

	Model1 Least square,	Model2 Least Square, with Lag	Model3, VAR
Test-statistic			
R-square	0.811351	0.947775	0.945766
Adjusted R-square	0.782328	0.936894	0.930975
S.E. of Regression	1863.728	1001.653	1045.918
Sum of squared residual	90310522	24079391	24066781
Log likelihood	-274.7011	-246.5032	-238.7704
Durbin-Watson stat	1.183461	2.020416	NA
Mean depend. var	7386.484	7524.267	7665.310
S.D. depend. Var	3994.676	3987.341	3981.029
Akaike info criterion	18.04524	16.83355	16.94968
Schwarz criterion	18.27652	17.11379	17.27972
Hannan-Quinn criterion	18.12063	16.92320	NA
F-statistic	27.95556	87.10954	63.94198
Prob(F-statistic)	0.000000	0.000000	NA

Source: E-views 7.0 Statistical Package

Table 4.8: Results of Model 2 for Ghana

Dependent Variable: GGDP
Method: Least Squares
Date: 07/11/13 Time: 22:54
Sample (adjusted): 1981 2010
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1433.505	2053.424	-0.698105	0.4918
GGDP1	0.862378	0.112484	7.666684	0.0000
GCAP	20271.07	13041.74	1.554322	0.1332
GINTR	49.27595	47.73218	1.032342	0.3122
GM2	-25.36318	63.24103	-0.401056	0.6919
GTBCR	2424.648	7020.469	0.345368	0.7328
R-squared	0.947775	Mean dependent var		7524.267
Adjusted R-squared	0.936894	S.D. dependent var		3987.341
S.E. of regression	1001.653	Akaike info criterion		16.83355
Sum squared resid	24079391	Schwarz criterion		17.11379
Log likelihood	-246.5032	Hannan-Quinn criter.		16.92320
F-statistic	87.10954	Durbin-Watson stat		2.020416
Prob(F-statistic)	0.000000			

Source: E-views 7.0 Statistical Package

Table 4.9: Results of the Global Statistics for South Africa

Test-statistic	Model1	Model2	Model3, VAR
	Least square,	Least Square, with Lag	
R-square	0.580766	0.734682	0.750180
Adjusted R-square	0.516268	0.679407	0.682047
S.E of Regression	59014.23	48428.37	48638.95
Sum of squared residual	9.05E+10	5.63+10	5.05E+10
Log likelihood	-381.8123	-362.8562	-350.1168
Durbin-Watson stat	1.152980	2.352308	NA
Mean depend. var	141485.0	143516.4	145610.4
S.D. depend. Var	84850.49	85530.92	86258.67
Akaike info criterion	24.95563	24.59042	24.62874
Schwarz criterion	25.18692	24.87066	24.95878
Hannan-Quinn criterion	25.03103	24.68007	NA
F-statistic	9.004455	13.29150	11.01055
Prob(F-statistic)	0.000346	0.000003	NA

Source: E-views 7.0 Statistical Package

Table 4.11: Results of Model 2 for South Africa

Dependent Variable: SGDP

Method: Least Squares

Date: 07/11/13 Time: 23:11

Sample (adjusted): 1981 2010

Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-109487.1	93793.45	-1.167321	0.2545
SCAP	1070386.	460177.4	2.326029	0.0288
SGDP1	0.606885	0.172522	3.517724	0.0018
SINTR	1705.985	1979.734	0.861724	0.3974
SM2	2012.327	2919.203	0.689341	0.4972
STBCR	-202530.9	324098.7	-0.624905	0.5379
R-squared	0.734682	Mean dependent var		143516.4
Adjusted R-squared	0.679407	S.D. dependent var		85530.92
S.E. of regression	48428.37	Akaike info criterion		24.59042
Sum squared resid	5.63E+10	Schwarz criterion		24.87066
Log likelihood	-362.8562	Hannan-Quinn criter.		24.68007
F-statistic	13.29150	Durbin-Watson stat		2.352308
Prob(F-statistic)	0.000003			

Source: E-views 7.0 Statistical Package

Table 4.12: T- Comparative Analysis of selected Statistics

Statistic	Nigeria	Ghana	South Africa
1 Durbin-Watson	2.28	2.02	2.351
2 R ²	98%	94%	73%
3 F-Ratio	265.18	87	13.29
4 No. of Variables			
Statistically Significant	1	1	2
5 No. of Variables That met a priori expectation	2	4	4
6 Short-run relationship	Yes	Yes	Yes
7 Long-run relationship	Yes	No	Yes
8 No. of Co integrating Equations	1	Nil	1

Source: Eviews 7.0 Statistical Package.

The Influence of Financial Development on Economic Growth of South Africa:

Table 4.9 above shows the results of the global statistics as produced under the three models namely the Ordinary least square (OLS) without the lagged value of the gross domestic product, Ordinary least square (OLS) with the lagged value of the gross domestic product and the VAR form of the estimate.

Because model 2, with a one-year lagged variable of the GDP, parades better statistics, the Durbin-Watson is 2.35,

In order to confirm the specification status of our model, we employ the analysis of variance or (ANOVA).

Therefore, from model 2 of Table 4.9, using the F – ratio as our guide (calculated (13.29150) > F – ratio critical (3.86, 2.60)) at both 1% and 5% levels of significance respectively, we conclude that financial development has a significant relationship with the level of economic growth in South Africa (Tables 4.9 and 4.11). However, the resulting estimated models are given as follows;

Having tested the significance of the model, we go a step further to test the significance of the financial development indicators in contributing to the total variation in the level of economic growth in South Africa, using model 4.2. This is achieved through the student t – test.

We refer to the regression result in Table 4.11. From Table 4.11, two of the explanatory variables (total market capitalization, SCAP_i and one-year lagged value of gross domestic product, GDP_{t-1}) proved to exert significant contributions to economic growth in South Africa.

It is instructive to note that estimation was carried out under three conditions; multiple regression with OLS properties, the OLS with one-year lagged variable of GDP as well as the vector auto regression estimation models (VAR). In so far as each of these estimation conditions yielded a model, the actual hypotheses testing was based on the model with the “best fit” statistics as reflected under the tables for global statistics (Tables 4.5, 4.7 and 4.9).

Given these yard sticks, the model 2 (the OLS with one-year lagged variable of GDP), in each case was selected for the hypotheses evaluation. Hence, the results are discussed along these lines for the countries, Nigeria, Ghana and South Africa.

The Nigerian Model: As presented in model 2 of tables 4.5 and 4.6, the Nigerian model indicates that there is a significant relationship between financial development and economic growth of Nigeria. This model was

statistically significant at 1%. Also, the study, with an R^2 of about 98%, is indicative of the fact that the variations in the financial development indicators have been able to explain about 98% of the total variation in the level of economic growth and also about 97% after adjusting for the errors within the study period, 1980-2010. The resulting estimated model is given as follows;

$$NGDP_t = 1144463 + 3672475NCAP_t - 24692.07NINTR_t - 2367.6NM2_t - 4727036NTBCR_t + 1.207936NGDP_{t-1} \dots 4.2$$

From this model 2, whereas the one-year lagged value of the dependent variable (GDP_{t-1}), as well as market capitalization (NCAP) with their positive coefficients, appear to have met the a priori expectation, bank total credit to the economy (NTBCR), interest rate (NINTR) and money supply (NM2), with their negative coefficients and hence, contribution to the level of economic growth in Nigeria, failed to meet the a priori expectation.

Furthermore, one (GDP_{t-1}) out of the five explanatory variables was statistically significant in terms of its contribution to economic growth. With this result one can infer that financial development in Nigeria has not been quite encouraging and must be looked into by the monetary authorities. Whereas the highest contribution to the level of economic growth comes from the one-year lagged value of the dependent variable (GDP_{t-1}), the least contribution, however, comes from money supply (NM2).

The Ghanaian Model: The model for Ghanaian analysis is also as presented in model 2 but of tables 4.7 and 4.8. Here, too, the study revealed that a significant relationship exists between financial development and economic growth in Ghana, even at 1% level of significance. However, the study, with an R^2 of about 94%, is indicative of the fact that the variations in the financial development indicators have been able to explain about 94% of the total variation in the level of economic growth, thus, leaving only about 6% to chance occurrence. The resulting estimated model is given as follows;

The model 2 for Ghana seemingly replicates the model 2 under Nigeria in a number of remarkable ways. For instance, in both models only one (GDP_{t-1}), out of the five explanatory variables was statistically significant in terms of its contribution to economic growth and again, it is positively correlated with economic growth in both countries, for the period under investigation, 1980-2010.

However, from the model 2 under the Ghanaian experience, whereas the one-year lagged value of the dependent variable (GDP_{t-1}), market capitalization (GCAP), interest rate (GINTR) and total bank credit to the economy (GTBCR) with their positive coefficients, appear to have met the a priori expectation, only money supply (GM2) with its negative coefficient and hence, contribution to the level of economic growth in Nigeria, failed to meet the a priori expectation.

Furthermore, as only (GDP_{t-1}) out of the five explanatory variables was statistically significant in terms of its contribution to economic growth. It is again, evident that financial development in Ghana has little influence on economic growth. Whereas the highest contribution to the level of economic growth comes from the one-year lagged value of the dependent variable (GDP_{t-1}), the least contribution, however, comes from bank credit to the economy (TBCR).

The South African Model: As presented in model 2 of tables 4.9 and 4.11. the South African model indicates that there is a significant relationship between financial development and economic growth in South Africa. This model was also statistically significant at 1%. Also, the study, with an R^2 of about 73%, is indicative of the fact that the variations in the financial development indicators have been able to explain about 73% of the total variation in the level of economic growth and also about 67% after adjusting for the errors within the study period, 1980-2010.

The model 2 of South Africa as presented in table 4.9.2, posits a remarkable departure from those for Nigeria and Ghana. From this model 2, both the one-year lagged value of the dependent variable (GDP_{t-1}) and the market capitalization (SCAP), exert significant effects on the level of economic growth in South Africa whereas it was only the one –year lagged values of the gross domestic product (GDP_{t-1}) for both cases of Nigeria and Ghana.

Here, too, only one (STBCR) out of the five explanatory variables failed to meet the a priori expectation with its negative contribution to the level of economic growth in South Africa. Stated differently, the one-year-lagged value of the gross domestic product (GDP_{t-1}), market capitalization (SCAP), interest rate (SINTR) and money supply (SM2), all with their positive coefficients, exert positive effects on economic growth in South Africa.

With this result one can conclude that financial development causes economic growth in South Africa much better than in Nigeria and Ghana whereas the highest contribution to the level of economic growth comes from the one-year lagged value of the gross domestic product (GDP_{t-1}), the least contribution, however, comes from the interest rate (SINTR).

Comparative Analysis Of The Models: Comparatively, analysis of the Global Statistics shows that the South African model parades better statistics than that of Nigeria and Nigeria better than Ghana, in that order.

This is evidenced, in particular by the results of the Durbin-Watson statistic. For instance, whereas the South Africa model posits a Durbin-Watson statistic of 2.35, the comparable figures for Nigeria and Ghana are 2.28 and 2.02 respectively. Hence, South Africa possesses a stronger predictive power than the cases of Nigeria and Ghana (Hill, Griffiths and Lim [39] and Gujarati and Porter [40]).

Also, in terms of the contribution of the explanatory variables to economic growth, the South African model indicates that two explanatory variables were statistically significant as opposed to only one under Nigeria and Ghana.

CONCLUSION

The results of this study agrees with the performance of these three countries in the recent World Economic Forum [15] report. In the Financial Development Index (FDI) of that report, South Africa ranked highest above the five Sub-Saharan African countries included in the report and was 28th out of the 62 countries. However the exception is that Ghana performed better than Nigeria in the report coming 56th while Nigeria was 61st. From the results of this study, we conclude that financial development causes economic growth in South Africa but only to a lesser degree in Ghana and Nigeria. Indeed, this may be part of the causes of high unemployment, low growth and rising debt that has characterised Nigeria's economy and to some varying degrees, the rest of the Sub-Saharan African economies. These economies may be advised to institute a comprehensive reform of their financial system to avert the looming crisis.

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