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# The Relationship between Financial Development and Economic Growth in Africa

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**Abstract**

This study examines the relationship between financial development and economic growth. It presents evidence on a cross section of 50 African countries whose data is available for the period 1980-2008. Two proxies of financial development are employed: the ratio of credit to the private sector to total GDP and the ratio of broad money (M2) to total GDP. We establish a positive relationship between financial development and economic growth. However, we find that the relationship between private sector credit and economic growth is much stronger than the relationship between money supply and economic growth. In addition, we find that the relationship between financial sector development and economic growth is bi-directional. The results suggest that both the financial sector and the real sector are important in influencing Africa's current and future growth trajectory.

**Keywords:** Financial Development, Economic Growth, Africa

## 1. Background

Literature proposes that financial development through growth of private sector credit leads to improved economic growth (see section 3.0). However, an assessment of the historical picture does not seem to suggest that this is indeed the case in Africa. In the mid-1980's, economic deterioration contributed to bank failures in many countries. This led to financial reforms that were part of structural adjustment programs, which were supported by international financial institutions. Interest rates were liberalized, credit controls removed, and indirect monetary policy instruments introduced. While early results were mixed, a new round of reforms was implemented in the mid 1990s. This led to an increase in financial intermediation and credit growth in most of the African countries.

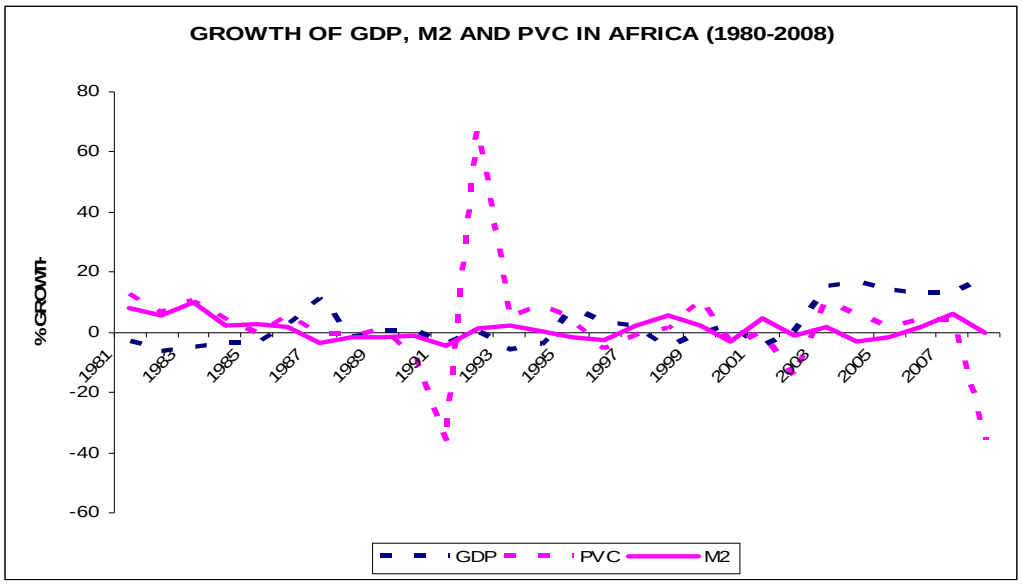
Section 2.0 shows that there was mixed economic performance in Africa between 1981 and 2008. GDP grew at -0.8 percent between 1981 and 1990, -0.3 percent between 1991 and 2000, and 8.6 percent between 2001 and 2008. However, private sector credit (PVC) grew at 3.2 percent between 1981 and 1990, 4.97 percent between 1991 and 2000, and -3.00 percent between 2001 and 2008). Although there is high credit growth witnessed during the period of study, economic growth is weak. Overall, data presented in figure 1 suggests that the growth of PVC, for instance, does not seem to be correlated with the growth of GDP and vice versa.

Various attempts have been made in the literature to unveil the link between economic growth and financial development. Some studies support the link between the two. These include Gurley and Shaw (1967), Shaw (1973) and Beck et al (2005). Other studies oppose the view that a link exists between financial development and economic growth. These include Ram (1999) and Favara (2003). In view of the controversy in the literature regarding the role of financial development on growth, this study seeks to contribute to the debate by investigating the relationship between financial development and economic growth in Africa.

## 2. Private sector credit, money supply and GDP growth in Africa

In figure 1, GDP growth maintains a near stable growth rate. On average, GDP grew by -0.84 percent for the period 1981-1990, -0.27 percent for the period 1991-2000 and 8.56 percent for the period 2001-2008. The average growth rate for the period 1980-2008 stood at 2.48 percent.

Private sector credit (PVC) grew at 3.2 percent during the period 1981-1990, 4.97 percent during the period 1991-2000 and -3.0 percent for the period 2001-2008. The average growth rate for the period 1980-2008 stood at 1.73 percent. From 1992 to 1993, there was a reversal in PVC growth from negative to positive. This could be attributed to financial liberalization measures that were being implemented in most of the countries. These measures were aimed at easing inflation, lowering the cost of financial intermediation and insulating credit markets from government interference. We note that PVC declines considerably in the year 2008. This could be attributed to the global financial crisis which adversely affected foreign capital inflows mainly from Europe and USA.




Source: World Bank: African development indicators

**Figure 1.** PVC, M2 and economic growth in Africa

Growth in M2 records a high of 10 percent in 1984 and a low of -4 percent in 1991. This can be attributed to appropriate monetary measures by most African countries' central banks to check inflationary tendencies. The average growth rate of M2 during the period 1981-1990 is 2.6 percent, -0.4 percent during 1991-2000 and 1.01 percent during 2001-2008. On average, the growth rate of M2 for the period 1980-2008 stood at 1.1 percent.

Figures 2 and 3 present the scatter plots of financial development indicators (M2 and PVC) and economic growth (YPC) in Africa.

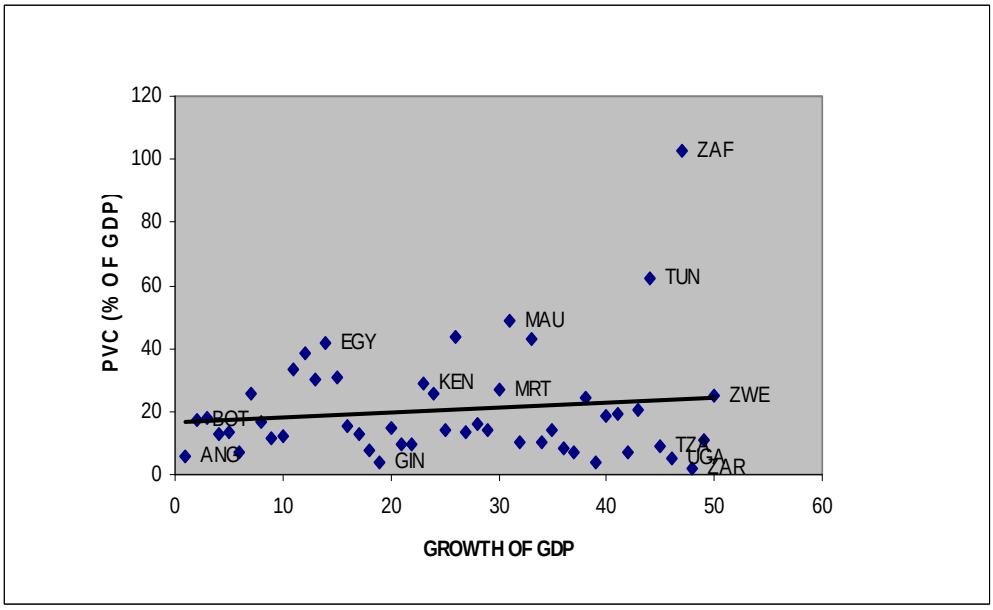



**Figure 2.** Growth of private sector credit and GDP

From figure 2, it appears that there is a positive relationship between credit to the private sector and economic growth. This result suggests that countries with high credit to the private sector tend to register higher growth performance. This is the first indication that financial development could be associated with economic growth. Country-level analysis suggests that growth of private sector credit is more strongly correlated with economic growth in South Africa, Botswana, Egypt, Kenya, Mauritius whereas there are weak correlations in Congo Democratic Republic, Uganda, Angola, and Guinea among other African countries.

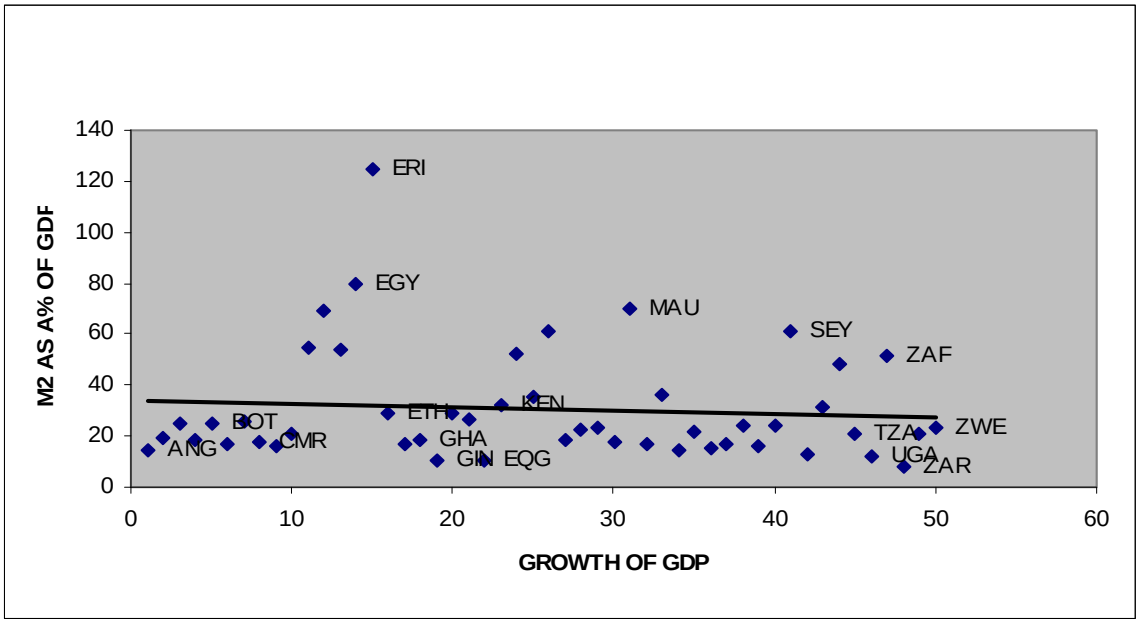



**Figure 3.** Growth of Broad Money supply and GDP

From figure 3, it appears that there is generally a weak negative relationship between the ratio of money supply (M2) and economic growth. This negative relationship could imply that most African countries have not harnessed the full potential of their financial sectors hence they remain undeveloped. In addition lack of sound monetary policies in these countries especially those that counter inflationary tendencies could be an indicator towards this weak negative relationship.

## 3. Literature Review

### *3.1 Theoretical literature*

Economists hold divergent views regarding the role of the financial system in promoting economic growth. John Hicks (1969) observed that it played an important industrialization role in England. The relationship between financial development and economic growth dates back to Schumpeter (1911) who underlined the central role of financial services in innovation and development. Financial institutions spur innovation and growth through identifying and funding productive investments.

Generally, there is consensus that the financial sector stimulates economic development

through the following channels: capital allocation; mobilization of savings; evaluation and monitoring of borrowers; transforming the maturity of portfolios of savers and investors while providing enough liquidity to the system; risk reduction through diversification, risk sharing, and pooling techniques; and reducing information asymmetries for efficient financial institutions through screening and monitoring investment projects among others. The financial sector plays a big role in deposits transfer to financial assets and channeling funds from surplus to deficit units. It therefore facilitates the creation of wealth, trade and the formation of capital (Ahmed 2006).

There are two dominant views on the nexus between financial development and economic growth. On one hand, the supply-leading view, postulates that financial development has a positive effect on economic growth (Schumpeter, 1911; King and Levine, 1993; and Calderon and Liu, 2003). According to this view, the causal effect runs from financial development to economic growth. This effect is caused by an improvement in the efficiency of capital accumulation, an increase in the rate of savings or an increase in the rate of investment.

On the other hand, the demand-following view postulates that financial development responds to changes in the real sector (Jung, 1986; and Ireland, 1994). Economic growth causes financial development according to this view. An increase in real economic growth causes a rise in the demand for financial services which results in the financial sector expansion. This means that financial development responds to economic growth.

Two other views exist that lie between the supply-leading and the demand-leading hypotheses (Apergis et al, 2007). The first one postulates that the relationship between the two is of mutual impact. This means that the relationship between financial development and economic growth is bi-directional. The second view postulates that there is no relationship between financial development and economic growth.

It is always assumed that the supply leading view dominates the demand-leading view which means financial development causes economic growth. Patrick (1966) introduces the stage of development view in this discussion by postulating that the causal relationship between financial development and economic growth depends on the stage of economic development. In the early stages of economic development, supply leading hypothesis dominates. This means financial sector development stimulates real capital formation vital for investment. The development of new financial services creates new opportunities for savers and investors which causes an increase in economic growth. With more financial and economic development, the supply-leading view becomes less and less dominant. It is soon gradually taken over by the demand-leading hypothesis which starts to dominate in the latter stages of financial and economic development.

### *3.2 Empirical literature*

Gurley and Shaw (1967), Goldsmith (1969), McKinnon (1973), Shaw (1973), and Beck et al(2005) all suggest that credit growth can foster economic growth by raising savings, improving allocative efficiency of loanable funds and promoting capital accumulation for investment. Choe and Moosa (1999) examine the relationship between financial development

and economic growth for Korea focusing on relative development of financial intermediaries and capital markets. Causality tests show that financial development leads to economic growth.

Ghali (1999) established a stable long-run relationship between financial development and economic growth in Tunisia. Causality runs from financial development to economic growth. In Botswana, Eita (2007) finds a stable long run relationship between financial development and economic growth implying that financial development causes economic growth. In addition, causality runs from financial development to economic growth as postulated by the supply leading view.

Cross country evidence on the direction of causality between financial development and economic growth is mixed. Jung (1986) tested causality between financial development and economic growth for 56 countries (19 developed and 37 developing). The results showed that developing countries have a supply-leading causality pattern more frequently than the demand leading pattern. Developed countries have a demand leading causality. The results provided support for Patrick's (1966) hypothesis of stage development. Habibullah and Eng (2006) tested causality on 13 Asian developing countries. The result is consistent with findings by Calderon & Liu (2003); Fase&Abma (2003) and Christopoulos & Tsionas (2003). They found that credit growth promotes economic growth, thus supporting the Schumpeterian hypothesis. Wadud (2005) established a stable relationship between financial development and economic growth for South Asian countries-India, Pakistan and Bangladesh. Granger causality tests establish a unidirectional causality that runs from financial development to economic growth.

The IMF report on Global Financial Stability of 2008, detected a significant impact of credit on GDP growth. It revealed that "a credit squeeze and a credit spread evenly over three quarters in the United States of America (USA) reduces GDP growth by about 0.8 per cent and 1.4 per cent points year-on-year respectively assuming no other supply shocks to the system."

Despite the above views, growth is at times seen as unrelated to financial institutions. Some studies postulate that economic growth drives credit growth. According to them, as the real sector grows, the increasing demand for financial services stimulates the financial sector (Gurley & Shaw, 1967). Robinson (1952) argues that economic activity propels banks to finance enterprises. In this case, more enterprises' development leads to increased finance. Other empirical studies support the demand-leading view between financial development and economic growth. Lucas (1988) believed that economists overemphasize the role of financial factors in economic growth. In essence, banks only respond passively to industrialization and economic growth. Muhsin & Eric (2000) work on Turkey further lends credence to this postulate by concluding that growth drives financial sector development.

Other studies have postulated that there exists a bi-directional causality relationship between financial development and economic growth. Demetriades & Hussein (1996) studied 16 less developed countries between 1960 and 1990 and established a long run relationship between indicators of financial development and per capita GDP in 13 countries. They however found

bi-directional causality in six countries and reverse causality in six countries while South Africa showed no evidence of causation between the variables. Akinboade (1998) tested the causal relationship between financial development and economic growth for Botswana for the period 1976 to 1995 and found that there was bi-directional causality between financial development and economic growth. Calderon and Liu (2003) using pooled data for 109 countries (developed and developing) for the period 1960 to 1964 concluded that financial development causes economic growth. The causality between financial development and economic growth was found to be bi-directional. Financial development contributed more to economic growth in developing countries than in developed countries.

Odhiambo (2005), Shan and Jianhong (2006) and Apergis et al. (2007) confirm bi-directional causality between financial development and economic growth for Tanzania, China and 15 OECD countries respectively. Oluitan (2012) conducted a dynamic panel on 31 African countries and established a bi-directional relationship between finance and growth. The study also concludes that the private sector is not allocated enough credit to spur economic growth. Our study differs from Oluitan (2012) since it increases the sample size from 31 to 50 countries and reports on the country specific information which is critical to providing country specific policy. We also incorporate more growth explanatory variables which include primary school enrolment and gross domestic investment.

Studies that have found no relationship between financial development and economic growth include Akinboade (2000) Ram (1999) and Favara (2003). Akinboade (2000) found the relationship between financial development and economic growth to be negative and significant during the period of liberalization but insignificant during financial repression. The causality tests indicate that financial development and economic growth are independent for Tanzania. Ram (1999) uses yearly data for 95 countries between 1960- 1989 to establish that the positive and significant relationship between the ratio of liquidity and the growth of GDP per capita appears only for nine among them. The relation is negative for 56 countries and 16 among them are significant at 5%. A re-examination by Favara (2003) of the analysis of Levine, Loayza & Beck (2000) reported that the relationship between credit growth and economic growth is weak. From this, there is no indication that finance spurs economic growth, rather for some specifications, the relationship is puzzlingly negative.

## 4. Methodology

### *4.1 The Model*

To establish the relationship between financial development and economic growth, this study estimates an augmented Barro growth regression of the form;

$$\text{GROWTH}_{i,t} = \alpha_i + \beta_i\ [\ \text{FINANCE}]_{i,t} + \gamma_i[\text{CONDITIONING SET}]_{i,t} + \varepsilon_{i,T} \qquad (1)$$

This may also be expressed as follows

$$G_{i,t} = y_{i,t} = \alpha_i + \beta_i F_{i,t} + \gamma_i C_{i,t} + \mu_i + \varepsilon_{i,t} \qquad (1')$$

Where y is Real GDP per capita, $G_{i,t}$ is the growth rate, $F_{i,t}$ is an indicator of financial development, $C_{i,t}$ is a set of conditioning variables, $\mu_i$ and $\varepsilon_{i,t}$ are error terms and i (i = 1,2,….N) the country, and t (t=1,2…..T) the time period, while ε is a white noise error with zero mean and μ is a country specific component of the error term that does not necessarily have a zero mean. The parameter $\alpha_i$ is the country –specific intercept which may vary across countries.

We use two indicators of financial development; the ratio of credit to the private sector to GDP (PVC) as a measure of financial depth and the ratio of broad money supply to GDP (M2) which is a monetization variable. In the model, we have included standard growth determinants including real per capita income (YPC), primary school enrolment (PRY) as a proxy for human capital formation, government final consumption (GC/GDP), trade of goods as a percentage of GDP (TRD) as a proxy for trade openness, gross domestic investment as a percentage of GDP (GDI) and inflation (INF).

The ratio of broad money to GDP (M2) is the most commonly used measure of financial development (see Calderon & Liu, 2003; King & Levine, 1993; Odhiambo, 2005). A higher ratio of M2 to GDP indicates a larger financial sector which means higher financial intermediation capacity. This ratio shows the real size of the financial sector of the country. If the financial sector grows faster than the real sector, this ratio increases over time. The ratio of broad money to GDP is expected to have positive relationship with economic growth. The ratio of credit extended to the private sector to GDP represents the actual amount of funds that are channeled to the private sector. This is directly more related to investment and economic growth. We expect a positive relationship between PVC and GDP growth.

Primary school enrolment proxies human capital formation. The higher the percentage of children going to school, the higher the human capital formation which is expected to impact positively on economic growth. Primary school enrollment is expected to positively influence growth through its effect on productivity (see Barro, 1989).

Government final consumption represents total government expenditure (Barro, 1989). Under normal circumstances, increased government consumption impacts negatively on economic growth as it crowds out private investment. In such circumstances government consumption is expected to have a negative effect on economic growth. However, government spending on infrastructure promotes economic growth which then makes the theoretical relationship ambiguous since it can impact economic growth positively or negatively.

Trade of goods and services represents the exchange of goods and services outside the country as a percentage of GDP (Caporale, et al, 2009). It shows the level of interaction with the rest of the world. Following the traditional theories of growth, trade allows goods, services and technology to flow freely therefore helping the countries to grow. Trade of goods and services proxies international trade openness and is expected to impact positively on economic growth. Gross domestic investment represents investment in the economy as a percentage of GDP (Caporale et al, 2009). Increased investment enhances economic growth and the expected relationship between the two is positive.

Inflation measures the degree of uncertainty about the future market environment. When inflation is high, firms become more reluctant to make long-run commitments. We expect a negative relationship between inflation and GDP growth (Caporale et al, 2009).

In view of the above, the model to be estimated is stated as:

$$YPC_{i,t} = \alpha_i + \beta_1 M2_{i,t} + \beta_2 PVC_{i,t} + \beta_3 GDI_{i,t} + \beta_4 INF_{i,t} + \beta_5 TRD_{i,t} + \beta_6 GC_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

Where;

YPC-Real per capita GDP growth
M2- Ratio of broad money supply to GDP
PVC- Ratio of domestic credit to the private sector to GDP.
GDI- Gross domestic investment as a percentage of GDP
INF- Inflation, average consumer prices
GC- Government consumption/GDP

TRD- Trade of goods and services as a percentage of GDP

*4.2 Panel unit root tests*

Before estimation, we performed stationarity tests. Recommended tests include Levin, Liu & Chu (LLC) test, Breitung test, Im, Pesaran & Shin test, the Fisher type tests and the Hadri test. This study uses the Im, Peseran & Shin (IPS) test. This test is popular and it allows for the persistence parameter (ρ) to vary across cross sections. The general panel unit root test takes the following process;

$$y_{it} = \rho_i y_{it-1} + \Phi_i \sum_{i=1}^{m} \Delta y_{it-1} + \varepsilon_{it} \quad (3)$$

Where i= 1, 2, N cross-section units or series that are observed over period's t= 1, 2…..T. $\rho_i$ are the autoregressive co-efficient, and the errors $\varepsilon_{it}$ are assumed to be mutually independent idiosyncratic disturbance.

If $|\rho_i| < 1$, $y_i$ is said to weakly (trend) stationary on the other hand, if $|\rho_i| = 1$ then $y_i$ contains a unit root.

4.2.1 Im, Pesaran and Shin test (IPS)

IPS begins by specifying a separate Augmented Dickey Fuller (ADF) regression for each cross section.

$$\Delta y_{it} = \alpha_i y_{it-1} + \sum_{j=1}^{\rho i} \beta_{ij} \Delta y_{it-j} + \varepsilon_{it} \quad (4)$$

The null and alternative hypotheses may be written as;

$H_O$: $\alpha_i = 0$ for all i

$H_1$: $\alpha_i$=0 for i= 1, 2 …..$N_1$

$\alpha_i$< 0 for i= N+1, N+2, ……..N

Under the null hypothesis, there is a unit root, while under the alternative hypothesis there is no unit root.

*4.3 Causality Tests*

In this study, we test whether financial development causes economic growth and vice versa. We use the following models.

$$LM2_{it} = \beta_0 + \sum_{t-1}^{t-j} \beta LM2_{t-1-j} + \sum_{t-1}^{t-1-j} \Phi LYPC_{t-1-j} + \lambda_i + \varepsilon_{it} \quad (5)$$

Or

$$LPVC_{it} = \beta_0 + \sum_{t-1}^{t-j} \beta LPVC_{t-1-j} + \sum_{t-1}^{t-1-j} \Phi LYPC_{t-1-j} + \lambda_i + \varepsilon_{it} \quad (5')$$

And

$$LYPC_{it} = \alpha_0 + \sum_{t-1}^{t-1-j} \alpha LYPC_{t-1-j} + \sum_{t-1}^{t-1-j} \gamma LM2_{t-1-j} + \psi_i + \nu_{it} \quad (6)$$

Or

$$LYPC_{it} = \alpha_0 + \sum_{t-1}^{t-1-j} \alpha LYPC_{t-1-j} + \sum_{t-1}^{t-1-j} \gamma LPVC_{t-1-j} + \psi_i + \nu_{it} \quad (6')$$

Where LM2 is the log of the ratio of money supply to GDP, LPVC is the log of the ratio of the private sector credit to GDP and LYPC is the log of the real per capita GDP. In equation 5, M2 is a function of its own lags and the lags of YPC are used to test whether or not M2 causes YPC. A similar treatment is applied to PVC in equation 5′where PVC is a function of its own lags and YPC lags. Causality is established by conducting individual and joint significance of YPC lags. Equation 6 is used to test whether YPC causes M2 analyzing the individual and joint significance of the M2 lags. Equation 6′tests whether YPC causes PVC and also tests the individual and joint significance of the PVC lags. Therefore if the respective lags are either individually or jointly significant then causality is proved and vice versa.

## 5. Empirical Results

### *5.1 Panel unit roots*

**Table 1.** Panel unit root results: IPS test

| Variable | Intercept | Intercept with trend |
|---|---|---|
| M2 | -0.510 | -1.930* |
| | (0.3051) | (0.0268) |
| ΔM2 | -21.148*** | -16.766*** |
| | (0.0000) | (0.0000) |
| PVC | -0.181 | -0.236 |
| | (0.4281) | (0.4067) |
| ΔPVC | -25.273*** | -21.350 |
| | (0.0000) | (0.0000) |
| GC | -0.819 | -2.291*** |
| | (0.2063) | (0.0110) |
| ΔGC | -19.474*** | -14.853*** |
| | (0.0000) | (0.0000) |
| PRY | 2.630 | -2.581*** |
| | (0.9957) | (0.0049) |
| TRD | -2.386*** | -3.701*** |
| | (0.0085) | (0.0001) |
| YPC | 5.379 | 2.085 |
| | (1.0000) | (0.9814) |
| ΔYPC | -18.646*** | -21.113*** |
| | (0.0000) | (0.0000) |
| GDI | -6.961*** | -4.872*** |
| | (0.0000) | (0.0000) |

*** Significant at 1% level; ** Significant at 5% level and * Significant at 10% level. ρ-statistics in parentheses.

The study uses panel unit roots tests to test for stationarity of the variables. In table 1, we report the results when the test includes an intercept only and also when it includes an intercept with a trend. The panel unit root tests for M2 show that the data is not stationary (has unit root). After differencing the data once, stationarity (no unit root) is attained at 1% level. PVC, GC and YPC are not stationary. However, after differencing once, they become stationary at 1% level. PRY, TRD and GDI are stationary. PRY is stationary at 1% level when the test includes an intercept and trend. In conclusion, we accept the null hypothesis of unit root for M2, PVC, GC and YPC before differencing while we reject the null hypothesis for PRY, TRD and GDI.

*5.2 Causality Tests*

**Table 2.** Causality test results

| Lagged Variables | Growth of YPC | | Financial development | |
|---|---|---|---|---|
| | YPC | YPC | M2 | PVC |
| M2(-1) | 0.034*** | | 1.037*** | |
| | (2.855) | | (36.966) | |
| M2(-2) | -0.036*** | | -.060** | |
| | (-3.099) | | (-2.150) | |
| PVC(-1) | | -0.012 | | 1.081*** |
| | | (-1.419) | | (39.510) |
| PVC(-2) | | 0.009 | | -0.121*** |
| | | (1.131) | | (-4.446) |
| YPC(-1) | 1.281*** | 1.293*** | 0.249*** | 0.020 |
| | (46.472) | (47.846) | (3.814) | (0.230) |
| YPC(-2) | -0.276*** | -0.287*** | -0.243*** | 0.002 |
| | (-9.890) | (-10.485) | (-3.668) | (0.017) |
| C | -0.017 | -0.022* | 0.038 | -0.0305 |
| | (-.480) | (-1.931) | (1.363) | (-0.833) |
| $R^2$ | 0.996 | 0.996 | 0.947 | 0.948 |
| Wald coefficient restrictions | | | | |
| Lagged variables | YPC | YPC | M2 | PVC |
| M2(-1)=M2(-2)=0 | 13.054 | - | - | - |
| | (0.0012) | - | - | - |
| PVC(-1)=PVC(-2)=0 | - | 3.894 | - | - |
| | - | (0.1427) | - | - |
| YPC(-1)=YPC(-2)=0 | - | - | 17.620 | 10.367 |
| | - | - | (0.0001) | (0.0056) |

*** Significant at 1% level; ** Significant at 5% level and * Significant at 10% level. t-statistics in parentheses before introducing the Wald restrictions. After introducing the Wald restrictions ρ-statistics in parentheses.

Table 2 reports the causality tests. We establish bi-directional causality between M2 and YPC. After introducing the Wald coefficient restrictions, we accept the null hypothesis of causality when M2 is regressed against YPC and vice versa. When PVC is regressed against YPC, there is no causality detected. However, after imposing restrictions causality is detected running from PVC to YPC. We accept the null hypothesis of causality.

In general, we establish bi-directional causality between financial development (M2 and PVC) and economic growth (YPC). In all the tests, Chi-square results are significant at conventional levels of testing. This is consistent with findings by Calderon and Liu (2003) for 109 countries, Odhiambo (2005) for Tanzania, Shan &Jianhong (2006) for China and Apergis et al (2007) for 15 OECD countries. However, our findings contrast with those of Ram (1999).

*5.3 Estimation Results*

**Table 3.** Pooled and fixed effects estimation results

Dependant variable is income per capita, YPC

| Variable | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| M2 | 0.339*** | 0.043 | 0.335*** | -0.086** |
| | (5.610) | (1.541) | (3.632) | (-2.180) |
| PVC | 0.339*** | 0.032** | 0.322*** | 0.322*** |
| | (8.263) | (2.111) | (5.239) | (5.239) |
| GDI | - | - | 0.102 | 0.044* |
| | - | - | (0.994) | (1.662) |
| INF | - | - | -0.120*** | -0.009* |
| | - | - | (-4.530) | (-1.300) |
| PRY | - | - | 0.734*** | 0.084** |
| | - | - | (5.824) | (2.011) |
| TRD | - | - | 0.439*** | 0.016 |
| | - | - | (5.273) | (0.505) |
| GC | - | - | 0.079*** | 0.262*** |
| | - | - | (7.206) | (10.330) |
| C | 4.239*** | - | -2.421*** | - |
| | (31.209) | - | (-4.682) | - |
| T | 29 | 29 | 18 | 18 |
| N | 50 | 50 | 40 | 40 |
| $R^2$ | 0.220 | 0.954 | 0.585 | 0.987 |
| Adjusted $R^2$ | 0.219 | 0.952 | 0.578 | 0.986 |

*** Significant at 1% level; ** Significant at 5% level and * Significant at 10% level. t-statistics in parentheses.

Equation 1 and 2 provides us with results for both the pooled and the fixed effects models from the baseline model. Equation 3 and 4 provides us with results for both the pooled and fixed effects models respectively after introducing other variables that influence economic growth. From equation 1 and 3, the relationship between M2 and YPC is positive and significant at 1% level. Equation 2 shows that the relationship between M2 is positive though weak and insignificant. Controlling for growth variables and regressing through the fixed effects model, changes the sign to negative and weak though significant at the conventional level of testing. This result is surprising since theory says that a higher ratio of M2 to GDP indicates a larger financial sector implying bigger financial intermediation (Calderon & Liu (2003), Odhiambo (2005) and Eita (2007)).

Private sector credit reports a positive and significant relationship to economic growth in the baseline model (equation 1 and 2). The same results persist in equation 3 and 4 after controlling for growth variables at the conventional levels of testing. We conclude that M2 and PVC impact positively on economic growth. This is consistent with the findings of Calderon and Liu (2003), Odhiambo (2005) and Eita (2007).

Gross domestic investment (GDI) impacts positively on economic growth (equation 3 and 4) though the relationship is insignificant in equation 3 and significant in equation 4. Primary school enrolment (PRY) is positively related to economic growth from equation 3 and this relationship persists in equation 4. Trade in goods and services (TRD) have a positive and significant relationship to economic growth in equation 3. The relationship persists in equation 4 though it's insignificant. Government consumption has a positive relationship with economic growth in both equations 3 and 4. Government consumption seems to crowd in contrary to the conventional crowding out effect of increased government consumption. Inflation as expected has a negative impact on economic growth as shown in both equations 3 and 4, where the relationship is negative and significant in both equations. This means that a higher rate of inflation will slow down economic growth while a low rate of inflation is good for economic performance since it minimizes potential risks and uncertainty.

In addition, there are other countries specific fixed effects reported in the fixed effects model. Some countries experience positive fixed effects while others record negative fixed effects during the period of study. Negative fixed effects imply that there are some factors that derail economic growth in these countries. Rwanda records a negative fixed effect of -0.192 during the period of study. This can be attributed to the genocide that faced the country in the 1990's which led to the loss of millions of lives and impacted negatively on the economic growth of the country. A lot of resources and time were used in rebuilding the country, little effort if any was channeled towards investment and growing the economy during this time.

A negative fixed effect of -0.147 is also reported for Kenya during the period of study. This can be attributed to the aid embargo that was imposed on the country in the 1990's by the World Bank, International Monetary Fund and other donors due to lack of transparency and accountability in the use of public funds, official corruption, human rights abuse, multiparty democracy agitation among others. This led to an adverse effect on economic growth as indicated by the negative fixed effect.

Sudan also records a negative fixed effect of -0.003 during the period of study. This can be attributed to the political instability that has engulfed the country for many years including the period of study. Political instability in Sudan especially the Southern Sudan has led to deterioration in economic growth. Uganda records a negative fixed effect of -0.393. Uganda experienced political instability including Coups especially in the 1980's and dictatorial regimes such as that of Idi Amin. In addition unsound economic policies led to hyper inflation which impacted negatively on economic growth.

### *5.4 Controlling for Endogeneity*

The study recognizes that there exists reverse causality between financial development and economic growth. To address this problem, we employ the two stage least square method (2SLS).

**Table 4.** Endogeneity test results

Dependent variable is YPC

| Variable | (5) | (6) | (7) | (8) |
|---|---|---|---|---|
| M2 | 0.354*** | 0.050*** | 0.282*** | 0.037 |
| | (5.307) | (3.479) | (2.417) | (0.574) |
| PVC | 0.339*** | 0.062*** | 0.402*** | 0.142*** |
| | (7.449) | (7.579) | (4.881) | (2.622) |
| GDI | - | - | 0.223 | 0.039 |
| | - | - | (1.434) | (0.535) |
| INF | - | - | -0.215*** | -0.093* |
| | - | - | (-4.420) | (-1.869) |
| PRY | - | - | 0.787*** | 0.029 |
| | - | - | (3.860) | (0.415) |
| TRD | - | - | 0.587*** | 0.200*** |
| | - | - | (5.345) | (3.107) |
| GC | - | - | 0.096*** | 0.117* |
| | - | - | (6.524) | (2.121) |
| C | 4.196*** | 5.894*** | -3.912*** | 2.643*** |
| | (29.083) | (142.042) | (-4.554) | (2.750) |
| T | 28 | 28 | 10 | 10 |
| N | 50 | 50 | 37 | 37 |
| $R^2$ | 0.220 | 0.987 | 0.613 | 0.995 |

*** Significant at 1% level; ** Significant at 5% level and * Significant at 10% level. t-statistics in parentheses.

Table 4 provides the results presented in equations 5-8. Equations 5 and 6 provide us with results for 2SLS in the baseline model from both the pooled and fixed effects models respectively. Equations 7 and 8 show results after controlling for growth variables in both the pooled and fixed effects models respectively.

The coefficients on M2 are positive and significant in all equations except in equation 8 where it is positive and insignificant. PVC has a positive and significant relationship with economic growth (see all equations). GDI records a positive but insignificant relationship with economic growth (in equation 7) and a positive but insignificant relationship (in equation 8). The coefficient on INF is negative and significant in equations 7 and 8, suggesting that inflation adversely affects economic growth. The relationship between PRY and YPC is positive and significant in equation 7 but positive and insignificant in equation 8. The coefficients on TRD and GC are both positive and significant in equations 7 and 8.

## 6. Conclusion and Recommendations

### *6.1 Conclusion*

The main objective of this study is to establish whether there exists a relationship between financial development and economic growth in Africa. We use a cross section of 50 African countries whose data is available for the period 1980-2008. We apply both panel regression and causality testing frameworks to establish the link between financial development and economic growth. We used two proxies of financial development: the ratio of credit to the private sector to total GDP and the ratio of broad money (M2) to total GDP. From the regression analysis, we establish a positive relationship between financial development and economic growth. From causality testing, we find a bi-directional relationship between financial development and economic growth in Africa. In general, there is a strong positive link between private sector credit and economic growth in Africa meaning that private sector credit stimulates growth in Africa.

We also find a positive but weak link between growth of money supply and economic growth. This could be attributed to problems associated with uncontrolled money supply which leads to excessive inflationary tendencies. In addition, undeveloped financial sectors could also be an indicator of this weak relationship.

### *6.2 Policy Recommendations*

From our findings, private sector credit stimulates economic growth in Africa. This implies that Africa's current and future growth trajectory will be dependent on how deep the financial sectors are. Governments in Africa should therefore put appropriate measures in place to stimulate and sustain the growth of private sector credit. Governments should endeavor to maintain peace which is a recipe for attracting and retaining local and international investors, unlike the political turmoil and war related activities that have been experienced in most African countries. In addition, the UN and international organizations such as the World Bank and IMF should provide resources to build up more financial institutions to increase private sector credit in most African countries.

Money supply stimulates economic growth even though the relationship is weak in most African countries. This could be attributed to inflationary tendencies that influence increased money supply. Central banks should stimulate economic growth through the monetary policy but also on the other hand check inflation to prevent its adverse effects. Governments should also encourage the increase in commercial bank deposits, loans and advances to stimulate economic growth. Finally, financial institutions such as the stock and bond firms should be developed in most countries in order to increase the size of the financial sectors. Through increased activities in their markets, the level of intermediation will increase which will impact positively on economic growth.

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## Appendix

Appendix 1.Table of selected African countries in the sample

| List of countries | | |
|---|---|---|
| Algeria (ALG) | Ethiopia (ETH) | Niger (NER) |
| Angola (ANG) | Gabon (GAB) | Nigeria (NGA) |
| Burundi (BUR) | Ghana (GHA) | Rwanda (RWA) |
| Benin (BEN) | Guinea (GIN) | Sudan (SDN) |
| Burkina Faso (BFA) | Gambia (GMB) | Senegal (SEN) |
| Botswana (BOT) | GuineaBissau (GNB) | Sierra Leone (SLE) |
| CentralAfricaRepublic (CAF) | Equatorial Guinea (EQB) | Swaziland (SWZ) |
| Cote D'Ivoire (CIV) | Kenya (KEN) | Seychelles (SYC) |
| Cameroun (CMR) | Liberia (LBR) | Togo (TOG) |
| Congo republic (COG) | Lesotho (LSO) | Tunisia (TUN) |
| Cape Verde (CPV) | Morocco (MAR) | Tanzania (TZA) |
| Chad (CHA) | Madagascar (MDG) | Uganda (UGA) |
| Comoros (COM) | Mali (MLI) | South Africa (ZAF) |
| Djibouti (DJI) | Mauritania (MRT) | Congo Democratic |
| Egypt (EGY) | Mauritius (MAU) | Republic (ZAR) |
| Eritrea (ERI) | Malawi (LWI) | Zambia (ZMB) |
| | Namibia (NAM) | Zimbabwe (ZWE) |