FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM GHANA

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ABSTRACT

The paper employs cointegration, Fully-Modified Ordinary Least Squares (FMOLS), Error Correction and the Generalized Method of Moments (GMM) techniques to investigate the relationship between economic growth and financial development using annual time series data (1971-2010) from Ghana. Three measures of financial development are used: domestic credit as a share of GDP; domestic credit to private sector as a share of GDP and broad money supply as a share of GDP. Evidence from our data suggests that financial development undermines economic growth in Ghana. The paper, therefore, cautions against financial liberalization in Ghana.

INTRODUCTION

Theoretically, Schumpeterian authors as well as some neo-Keynesian authors have unequivocally trumpeted the banking system's ability to create money and channel it into productive and innovative uses (Graff, 2003). Schumpeter (1911), in particular, submits that a well-developed financial system has the potential of catalyzing technological innovation and economic growth through the provision of financial services and resources to those entrepreneurs who have the highest probability of successfully producing innovative products and processes. The predominant mantra reverberating in the arena of the finance- growth nexus is that a more developed financial sector provides a fertile ground for the allocation of resources, better monitoring, fewer information asymmetries, and economic growth (Shen and Lee, 2006).

Summary of the theoretical literature suggests that there are four possibilities regarding the causal relationship between financial development and economic growth (Apergis *et al*., 2007). The first hypothesis, called supply-leading response hypothesis, argues that financial development causes economic growth (Schumpeter, 1911, McKinnon, 1973; Shaw, 1973). The second hypothesis called demand-following response hypothesis posits that economic growth causes financial development. It argues that the development of the real sector stimulates demand for financial services that are passively met by the introduction of new financial institutions (Odhiambo, 2010). The third hypothesis is mutual impact which argues that there is a bi-directional causal relationship between finance and growth (Demetriades and Hussein, 1996; and Greenwood and Smith, 1997). The fourth hypothesis is no-causal relationship hypothesis which argues that there is no causal relationship between financial development and economic growth (Graff, 1999; Lucas 1988). In particular, Lucas (1988) rejects the existence of a finance-growth relationship, arguing that "economists badly overstress the role of finance in economic growth."

Most of the empirical studies on the finance-growth nexus have relied mainly on the cross-sectional and panel data (Saci, *et al.* 2009; Fernadez and Galetovic, 1994; King and Levine, 1993). However, there is a budding notion that conditions are a significant factor in the determination of the finance-growth nexus. Arestis and Demetriades (1997) assert that cross-section regressions do not reflect individual country

conditions such as financial institutions, policy regime and effectiveness of governance. In support of this notion, Rousseau and Wachtel (2001) report that in countries with high inflation, the effects of finance on growth weaken. This has been confirmed by Rioja and Valev (2004) who, after studying 74 countries at different stages of development, employing generalized method of moments (GMM) estimation, conclude that evidence of an influence of financial development upon economic growth is highly dependent on the level of development of the financial sector of a particular country or group of countries. Bittencourt (2012) emphasizes the importance of a more open, competitive financial sector in transmitting financial resources to entrepreneurs as well as the relevance of macroeconomic stability (in terms of low inflation rates) and all the institutional framework that it encompasses (central bank independence and fiscal responsibility laws), as a necessary prerequisite for financial development and consequently for continued growth and prosperity in Latin America. This presupposes that there should be a paradigm shift from cross-sectional and panel studies to country-specific studies which will permit consideration of country-specific conditions.

The current study derives its motivation from the budding notion that the finance-growth discourse should be narrowed down to individual countries. It seeks to answer two main questions: (1) Does financial development promote economic growth in the long run? (2) Does financial development promote economic growth in the short run?

The rest of the paper is structured as follows. The next section provides the review of the extant literature. This is followed by data and methodology section. The penultimate section presents the results. The concluding comments section ends the paper.

LITERATURE REVIEW

The debate on the finance-growth nexus will see no finality insofar as results are conflicting. Using a panel dataset covering ninety-three countries from 1970-90, Graff (2003) reports that financial activity has generally supported economic growth. Tran (2008) obtains a finding in Vietnam that suggests that financial development has a positive impact on economic growth. Jalil and Ma (2008) employ bound testing (ARDL) approach to cointegration with deposit liability ratio (DLR) and credit to private sector (CPS) as proxies for financial development and report that both DLR and CPS have significant impact on economic growth in Pakistan but not in China. King and Levine (1993a and 1993b) and Levine *et al.* (2000) have also reported a positive relationship between financial development and economic growth. However, there are studies that have found a negative relationship between finance and growth (Adusei, 2012; Loayza and Rancie`re, 2006; Demirguc-Kunt and Degatriache, 1998, 2000; Gourinchas et al. 2001, Kaminsky and Reinhart, 1999)

It must be noted that the finance-growth discourse has many dimensions. One dimension is the effect of the stock market on economic growth. Studies that have been done on this dimension have produced mixed results. One set of studies finds a positive impact of stock market on economic growth because stock market encourages the liquidity of capital and transmits capital to companies (Saci *et al.,* 2009; Bencivenga *et al.*, 1995; Greenwood and Smith, 1997; Holmstrom and Tirole, 1993). Another group of studies argues that there is an inverse relationship between stock market and economic growth, submitting that stock market promotes asymmetric information on companies and contributes to the reduction in savings (Devereux and Smith, 1994; Mayer, 1988; Morch *et al.*, 1990a, 1990b; Shleifer and Summers, 1988; Stiglitz, 1985).

Another dimension of the finance-growth discourse is the relationship among financial market development, stock market development and economic growth (Saci *et al.* 2009. Findings on this dimension can be categorized into three groups. One group finds a positive financial and stock markets on

economic growth (Beck and Levine, 2004; Levine and Zervos, 1996, 1998; Rousseau and Wachtel, 1998, 2000; Wachtel and Rousseau, 1995). Another group reports that only the stock market has a positive effect on economic growth (Saci *et al,* 2009; Tang, 2006). The other group shows that financial market has a negative effect on economic growth (Neceur and Ghazouani, 2007; Saci *et al.*, 2009). *Saci et al.* (2009) provide evidence, based on a panel of annual data for 30 developing countries, that whereas stock market is positively and significantly related to growth, its presence in the model causes banking sector variables, credit to the private sector and liquid liabilities, having negative effects on growth.

One of the issues that have become pronounced in the finance-growth discussions is the direction of causality between financial development and economic growth. Three categories of findings are identifiable: *supply-leading response group* which argues that financial development leads to economic growth underpinned by notable studies such as Bittencourt (2012); Levine *et al.*(2000); and Choe and Moosa (1999); *demand-following group* supported by studies such as Odhiambo (2004, 2010); Zang and Kim(2007); Liang and Teng (2006); and Demetriades and Hussein (1996) which argues that growth leads to financial development; and *bidirectional group* grounded by the studies of Apergis *et al.*(2007); Rousseau and Vuthipadadorn (2005); Luintel and Khan (1999); Akinboade (1998); and Wood (1993) which submits that there is a bidirectional causality between financial development and economic growth.

Whereas there is some considerable measure of evidence on the finance-growth nexus in other parts of the world especially the developed world, the same cannot be said about Africa. Interestingly, the few studies that have been done in Africa have produced mixed results. Esso (2010) investigates the relationship between financial development and economic growth in Burkina Faso, Cape Verde, Cote d'Ivoire, Ghana, Liberia and Sierra Leone and establishes a long run relationship between the two variables. The study shows that financial development precedes economic growth in Ghana and Mali, growth leads finance in Burkina Faso, Cote d'Ivoire and Sierra Leone, and finance and growth cause each other in Cape Verde and Liberia. In Ghana, Quartey and Prah (2008) report that whereas there is some evidence in support of demand-following hypothesis when growth in broad money to GDP ratio is used as a measure of financial development, there is no significant evidence to support either the supply-leading hypothesis or demand-following hypothesis when growth in domestic credit to GDP ratio, private credit to GDP ratio and private credit to domestic credit ratio are used as proxies for financial development. Odhiambo (2010) investigates the dynamic causal relationship between financial development, investment and economic growth in South Africa employing ARDL-Bounds testing procedure and reports that economic growth has a formidable influence on the financial sector development. In Nigeria, Ndako (2010) investigates the causal relationship between financial development and economic growth and reports that there is a unidirectional causality from financial development to economic growth when bank credit to the private sector (LBCP) is used as a measure of financial development. However, when domestic credit to the private sector (LDCP) and bank deposit liabilities (LBDL) are used to proxy financial development there is a bidirectional relationship between financial development and economic growth (Ndako,2010). Ghali (1999) reports from Tunisia that the persistence of high information and transaction costs coupled with lack of a competitive financial sector casts doubts on the existence of a positive impact of finance on economic growth in developing economies.

DATA AND METHODOLOGY

Annual time-series data covering the period 1971-2010 gathered from the World Development Indicators (WDI) of the World Bank (http://www.worldbank.org) have been used. The use of time series is tenable because, as Jalil and Ma (2008) observe, time series analyses provide an opportunity to study the causality pattern.

Fully Modified Ordinary Least Squares (FMOLS) has been employed to investigate the long-run relationship between financial intermediation and economic growth whilst Error Correction Method (ECM) has been adopted to investigate the short-run dynamics of the finance-growth nexus. To check the robustness of our findings, Generalized Method of Moments (GMM) estimation technique has been employed. Developed by Arellano and Bond (1991), GMM techniques control for unobserved country-specific effects, first-difference non-stationary variables, overcome the endogeneity of the explanatory variables by using instruments and test for the presence of autocorrelation (Saci *et al*.2009).

Credited to Phillips and Hansen (1990), FMOLS uses kernel estimators of the nuisance parameters that affect the asymptotic distribution of the OLS estimator (Shahbaz, 2009). It achieves asymptotic efficiency by modifying the least squares to account for serial correlation effects and tests for the endogeneity in the regressors that results from the existence of cointegrating relationships (Phillip and Hansen, 1990; and Shahbaz, 2009). To utilize this technique in estimating long-run parameters, the analyst must satisfy the condition that there exists a cointegration relation between a set of I (1) variables. Thus, we have to establish the presence of unit root in our data and then test the cointegrating relationship. To establish the presence of unit root in our data, the study employs Augmented Dickey Fuller (ADF) and Phillips-Perron tests that are used to investigate the degree of integration among variables. According to Engle and Granger (1987), when all the variables under investigation are non-stationary at level, but stationary at 1st difference, this permits the use of Johansen cointegration technique. In economics, two variables are cointegrated if they have a long-term relationship between them (Shahbaz, 2009).

Two log-linear equations with autoregressive term accounting for serial correlation to be estimated are:

$$LGDPPC = \delta_1 + \delta_2 LDC + \delta_3 LOSFIS + \delta_4 LCPS + \delta_5 LOPEN + \delta_6 LGS + \delta_7 LRATE + \eta_t \quad (1)$$

$$LGDPPC = \delta_1 + \delta_2 LDC + \delta_3 LOSFIS + \delta_4 LCPS + \delta_5 LOPEN + \delta_6 LGS + \delta_7 LRATE + \delta_8 FR + \eta_t$$
$$(2)$$

$$\eta t = \rho \eta_{t-1} + \varepsilon_t \quad (3)$$

Where
LGDPPC = Log of per capita GDP
LDC= Log of domestic credit as a share of GDP
LOFIS= log of size of the financial intermediary sector
LCPS= Log of credit to the private sector as a share of GDP
LGS= Log of Government Final Consumption Expenditure as a Share of GDP
LRATE= Log of interest rate
LOPEN = Log of openness of the economy of Ghana
FR= Dummy for financial reforms. D=1 from 1988 onwards; otherwise D=0
$\eta_{t=}$ *stochastic* error term
$\eta_{t=}\rho\eta_t$ -₁+ε_t = *Autoregressive AR (1) term applicable to (1) and (2)*

According to Pesaran et al. (2001), the Johansen (1991 and 1995)'s approach can also be applied to a set of variables containing possibly a mixture of I (0) and I (1) variables. The model to achieve this is called Error Correction Model (ECM) which is generally given as:

$$Z_t = \sum \varphi_1 \Delta_{i=1}^{p-1} Z_{t-1} + \alpha_0 + \eta_t$$

$$(4)$$

This can also be standardized as follows:

$$\Delta Z_t = \sum \varphi_1 \Pi_i \Delta_{i=1}^{p-1} Z_{t-k} - \partial_1 Z_{t-k} + \alpha_1 + \varepsilon_t \quad (5)$$

Where:

$\Pi_{i=} -I + \partial_1 + \partial_2 ..... + \partial_t$

$I = 1, 2, 3, ... k$-1 and $\partial = I - \partial_1 - \partial_2 .... \partial_k$

and p represents total number of variables considered in the model. The matrix Π captures the long-run relationship between the p variables (Shahbaz, 2009).

Substituting equation 5 with our chosen variables we have:

$$\Delta LGDPPC = \alpha_0 + \sum_{j=0}^{n} \beta_1 \Delta LDC + \sum_{j=0}^{n} \beta_2 \Delta LOSFIS + \sum_{j=0}^{n} \beta_3 \Delta LCPS + \sum_{j=0}^{n} \beta_4 \Delta LOPEN + \sum_{j=0}^{n} \beta_5 \Delta LGS$$

$$+ \sum_{j=0}^{n} \beta_6 \Delta LRATE + \eta CE_{t-1} + \varepsilon_t$$

(6)

In line with the work of Odhiambo (2010), we use log of real per capita GDP as proxy for economic growth. Two strands of the literature on the effects of financial intermediation on economic activity exist. One strand of literature finds a positive effect of measures of private domestic credit and liquid liabilities on per capita GDP growth (e.g., King and Levine, 1993a and 1993b, Levine, *et al.* 2000). The other strand of literature, called the banking and currency crisis literature, finds that monetary aggregates such as domestic credit, are among the best predictors for crises (e.g., Demirguc-Kunt and Degatriache, 1998, 2000, Gourinchas et *al.* 2001, Kaminsky and Reinhart, 1999). Since banking crises usually culminate in recessions, an expansion of domestic credit should be associated with growth slowdowns (Loayza and Rancie`re, 2006). Consequently, three measures of financial development are used: private domestic credit (King and Levine, 1993a; Levine and Zervos, 1996; Beck *et al.*, 2000; Levine *et al.*, 2000); liquid liabilities (Goldsmith, 1969; King and Levine, 1993a; Rousseau and Wachtel, 2000; Rioja and Valev, 2004; Levine *et al.,* 2000) and domestic credit (Demirguc-Kunt and Degatriache, 1998, 2000, Gourinchas *et al.* 2001, Kaminsky and Reinhart, 1999). Liquid liabilities (broad money or M3) as a share of GDP is used to measure the overall size of the financial intermediary sector (Saci *et al*, 2009). Broad money consists of currency held outside the banking system plus interest-bearing total deposit liabilities of banks and other financial institutions. Both classical and Keynesian economists recognize the importance of interest rates in GDP determination. We, therefore, include prime lending rate as an interest rate proxy.

The growth literature stresses the importance of openness to international trade, both as a means of affecting the transfer of technical progress and as an engine of growth **(**King and Levine, 1993a; Ghosh and Phillips, 1998; Zang and Kim, 2007, Saci et al., 2009). Following Ghosh and Phillips (1998), we use the ratio of exports plus imports to GDP as a control variable in the model. Studies on finance-growth nexus have included government consumption as a percentage of GDP as a control variable (e.g. Shahbaz, 2009; Saci *et al.,* 2009; Zang and Kim, 2007). We, thus, include this variable as a control variable. The definitions of the variables are given in Table 1.

RESULTS

The results of the ADF unit root and PP unit root tests reported in Tables 2 and 3 indicate that all the variables are stationary at their 1st difference form. These results satisfy the condition for performing cointegration analysis. Johansen Cointegration test is, therefore, performed. Lag length of VAR model is

selected at 3 on the basis of Akaike Information Criterion (AIC), Final Prediction Error and Hannan-Quinn Information Criterion shown in Table 5.

Table 1: Definitions of Variables

Variable	Definition
Log of GDP per capita (LGDPPC)	GDP per capita is gross domestic product divided by midyear population.
Log of Credit to Private sector (LCPS)	Credit to private sector as a share of GDP
Log of the degree of intermediary services (LDIS)	Domestic credit[1] provided by the banking sector as a share of GDP
Log of overall size of the financial intermediary sector (LOSFIS)	Broad money supply (M3)[2] as a share of GDP
Log of openness of the economy of Ghana (LOPEN)	Total exports plus total imports divided by GDP (X+M/GDP)
Log of government spending (LGS)	General government final consumption expenditure as a share of GDP
Log of interest rate (LRATE)	Log of prime lending rate
Financial reforms (FR)	Dummy variable. D=1 from 1988 onwards; otherwise D=0

This table provides the definitions of the variables used in the analysis. [1]Domestic credit provided by the banking sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available (including institutions that do not accept transferable deposits but do incur such liabilities as time and savings deposits). [2]Broad money consists of currency held outside the banking system plus interest-bearing total deposit liabilities of banks and other financial institutions

Table 2: Unit-Root Estimation at Level

	ADF Test at Level			Phillips-Perrron Test at Level		
Variables	Trend and Intercept	p-value	Lags	Trend and Intercept	p-value	Bandwidth
LGDPPC	-0.7505	0.9617	0	-0.9764	0.9358	1
LDC	-2.318	0.4148	0	-2.318	0.4148	0
LOSFIS	-1.583	0.7816	0	-1.668	0.7464	4
LCPS	-3.046	0.1333	0	-3.046	0.1333	0
LOPEN	-2.401	0.3732	1	-1.986	0.5904	1
LGS	-3.105	0.1197	1	-2.660	0.2579	3
LRATE	-1.783	0.6930	1	-1.342	0.8620	3

This table presents the results of unit-root estimation at level. The results indicate that all the variables are nonstationary at level.

Table 3: Unit-Root Estimation at 1st Difference

	ADF Test at Level			Phillips-Perrron Test at Level		
Variables	Trend and Intercept	p-value	Lags	Trend and Intercept	p-value	Bandwidth
LGDPPC	-5.128	0.0009***	0	-5.123	0.0009***	3
LDC	-6.237	0.0000***	0	-6.294	0.0000***	4
LOSFIS	-6.550	0.0000***	0	-6.542	0.0000***	3
LCPS	-5.623	0.0002***	0	-5.623	0.0002***	0
LOPEN	-4.612	0.0037***	1	-3.922	0.0206**	6
LGS	-5.098	0.0010**	0	-5.135	0.0009***	7
LRATE	-3.972	0.0186**	1	-3.374	0.0701**	4

*This table presents the results of unit-root estimation at 1st difference. The results indicate that all the variables are stationary at 1st difference. Note: ***, ** and * represent 1%, 5% and 10% levels of significance*

From Table 5 it can be observed that for the null hypothesis of no cointegration (R=0) among the variables in the model, the Trace Test statistic is obtained at 846.20 which is above 1% and 5% critical values as shown by the reported probability values. This, therefore, rejects the null hypothesis R=0 in favor of the alternate hypothesis R=1. For the null hypothesis of at least one cointegrating relationship (R=1), the Trace Test is obtained at 281.37 which is above 1% and 5% critical values as shown by the reported probability values. The hypothesis is, thus, rejected in favor of the alternate hypothesis R=2. The trend continues to hypothesis R=5 which is also rejected in favor of the alternate hypothesis R=6. It is, therefore, tenable for us to conclude that there are six cointegrating relationships among per capital GDP, domestic credit, broad money supply, credit to private sector, openness of the economy of Ghana,

government spending, and interest rate. The Maximum Eigenvalue statistic results, also reported in Table 5, support the conclusion that there are six cointegrating relationships among the seven variables in the model. The presence of cointegration relationship among the seven variables permits the estimation of our models.

Table 4: Johansen and Maximum Eigenvalue Test for Cointegration

Hypotheses	Trace Test	5% Critical Value	P-Value **	Hypotheses	Max. Eigen Value Stat	5% Critical Value	P-Value
R*=0	846.20	125.62	0.0001	R=0	564.83	46.231	0.0001
R=1	281.37	95.754	0.0000	R=1	127.17	40.078	0.0000
R=2	154.20	69.818	0.0000	R=2	61.793	33.877	0.0000
R=3	92.406	47.856	0.0000	R=3	40.617	27.584	0.0006
R=4	51.789	29.797	0.0000	R=4	36.040	21.132	0.0002
R=5	15.749	15.495	0.0458	R=5	14.923	14.265	0.0393
R=6	3.8415	0.3636	3.8414	R=6	0.8253	3.8415	0.3636

*This table presents the results of the Johansen and Maximum Likelihood Test for Cointegration. Notes: ** Implies McKinnon-Haug-Michelis (1999) p-values. R stands for the number of cointegrating vectorsTrace test indicates 6 cointegrating equations at the 0.05 level. *denotes rejection of the hypothesis at the 0.05 level. Max-eigenvalue test indicates 6 cointegrating equations at the 0.05 level*

Table 5: VAR Lag Order Selection Criteria

Lag	FPE[1]	AIC[2]	HQ[3]
0	<0.0001	3.5133	3.6208
1	<0.0001	-7.1731	-6.3135
2	<0.0001	-7.531	-5.9197
3	<0.0001*	-9.2465*	-6.8827*

*This table presents VAR lag order selection criteria. 1=Final Prediction error; 2= Akaike Information criterion; 3=Hannan-Quinn information criterion. *denotes optimal lags to be selected .*

FMOLS Analysis

Tables 5 and 6 report the results of the FMOLS regressions. It can be observed that whereas total domestic credit as a share of GDP as well as broad money supply as a share of GDP has a strong, statistically significant negative relationship with economic growth in equations 1 and 2, credit to the private sector as a share of GDP has a positive, statistically insignificant relationship with economic growth. The negative relationship between domestic credit as a share of GDP and growth strikes a chord with the banking and currency crisis literature (e.g., Demirguc-Kunt and Degatriache, 1998, 2000, Gourinchas, Landerretche, and Valde´s, 2001, Kaminsky and Reinhart, 1999). This coupled with the negative relationship between the overall size of the intermediary sector and growth implies that financial intermediation undermines economic growth in Ghana. This smacks of excessive liberalization of the financial intermediary sector resulting in over-lending or careless lending. De Gregorio and Guidotti (1995) have observed that over-lending or careless lending could actually trigger a reduction in economic growth, due to its association with high, but less efficient, investment. A combination of channels could account for over-lending or careless lending. These include a limited monitoring capacity of regulatory agencies, lax supervision, the inability of banks to distinguish between good and bad projects during investment booms, the presence of an explicit or implicit insurance against banking failures, lack of skills in the banking personnel, repeated and substantial interventions by the government leading to moral hazard problems (Schneider and Tornell, 2004; Brownbridge and Kirkpatrick, 2000; De Gregorio and Guidotti, 1995). We are inclined to argue that any of these factors might have accounted for the negative effect between finance and growth. Our finding is in congruence with that of De Gregorio and Guidotti (1995) who report a negative relationship between financial development and growth in 12 Latin

American countries during the 1950–85 period as well as the finding of Shen and Lee (2006) who also provide evidence that banking development has an unfavorable, if not negative, effect on growth.

According to Barro and Sala-i-Martin (1995), government productive spending such as spending on education, infrastructure or some other form of productive capital promotes growth while non-productive spending could undermine growth. However, crowding effect theory postulates that government size should be negatively related to growth. Higher government spending obstructs economic growth by transferring additional resources from the productive sector of the economy to government, which uses them less efficiently. Government consumption expenditure has a positive but statistically insignificant relationship with economic growth, suggesting that an increase in government consumption expenditure may not significantly contribute to the growth of the real sector.

Trade, either in the form of exports or imports, is a proxy of growth-enhancing interactions (specialization, exchange of ideas through exports or acquiring foreign technology through quality imports) among countries acting as conduit for knowledge dissemination. Therefore, highly open economies should exhibit higher growth rates (Grossman and Helpman, 1995; Barro and Sala-i- Martin, 1995; and Edwards, 1992). Exports plus imports as share of GDP (trade volume) used to measure the effect of openness of Ghana's economy to the rest of the world has a positive but statistically insignificant correlation with growth. This falls in tandem with the extant literature which tends to find that the effect of trade on growth is ambiguous or insignificant (Rodriguez and Rodrik 1999). Expectedly, there is a negative statistically significant relationship between interest rate and growth. This is in line with the loanable funds theory which argues that there is an inverse relationship between GDP and interest rates in an economy.

Table 6: FMOLS Regression Results: Equation 1

Dependent Variable: *LGDPPC*				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	735.7	82,181	0.0090	0.9929
LDC	-0.3834	0.1757	-2.182	0.0368**
LOSFIS	-0.5726	0.1928	-2.970	0.0057**
LCPS	0.1656	0.1312	1.262	0.2163
LOPEN	0.0787	0.1531	0.5137	0.6111
LGS	0.2168	0.1954	1.109	0.2758
LRATE	-0.3015	0.1154	-2.612	0.0138**
AR(1)	0.9998	0.0181	55.151	0.0000***
R^2=0.93, Adjusted R^2=0.91 F-statistic=57.55		Durbin-Watson stat= 2	Prob.(F-statistic)=0.0000 N=40	
Breusch-Godfrey Serial Correlation LM Test= 1.547 (0.4613)*			ARCH Test= 0.4198(0.8107)	

*This table presents the FMOLS regression results of equation 1. * Figures in parentheses are probability values. Note: ***, ** and * represent 1%, 5% and 10% levels of significance*

Table 7: FMOLS Regression Results: Equation 2

Dependent Variable: *LGDPPC*				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	901.32	57175.9	0.0158	0.9875
LDC	-0.3538	0.1595	-2.219	0.0342**
LOSFIS	-0.6381	0.1757	-3.633	0.0010***
LCPS	0.1575	0.1189	1.325	0.1952
LOPEN	0.2413	0.1497	1.612	0.1174
LGS	0.0376	0.1875	0.2008	0.8422
LRATE	-0.5366	0.1329	-4.038	0.0003***
FR	0.4643	0.1647	2.819	0.0085**
AR(1)	0.9998	0.0114	87.540	0.0000***
R^2=0.94, Adjusted R^2=93 F-statistic=62.66760		Durbin-Watson stat=2	Prob.(F-statistic)= 0.0000 N=40	
Breusch-Godfrey Serial Correlation LM Test= 4.491(0.1059)*			ARCH Test= 0.1551(0.9253)	

*This table presents the FMOLS regression results of equation 2. * Figures in parentheses are probability values. Note: ***, ** and * represent 1%, 5% and 10% levels of significance.*

Error Correction Analysis

The results of the ECM are presented in Table 8. All the variables have maintained their long-run relationship with growth in the short run. It can be observed that whereas total domestic credit as a share of GDP as well as broad money supply as a share of GDP has a strong, statistically significant negative relationship with economic growth, credit to private sector as a share of GDP has a positive, statistically insignificant relationship with economic growth. The coefficient of the error correction term (CRt –1) shows the speed of adjustment to long-run solution that enters to influence short-run movements in GDP. It should be negative and less than unity in absolute terms, since one cannot expect a 100% or instantaneous adjustment. The estimated value of equilibrium correction coefficient (CRt –1),-0.1695, has the correct sign, and is statistically significant at 10% significance level, implying that there is an adjustment to equilibrium level after a shock. Approximately, 17% of disequilibrium from the previous year's shock converges back to the long-run equilibrium in the current year.

Table 8: Results of ECM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	Dependable Variable=ΔLGDPPC			
C	0.0941	0.0339	2.776	0.0095**
ΔLDC	-0.3672	0.1728	-2.125	0.0422**
ΔLOSFIS	-0.4393	0.2010	-2.185	0.0371**
ΔLCPS	0.1173	0.1226	0.9566	0.3467**
ΔLOPEN	-0.0576	0.1585	-0.3633	0.7190
ΔLGS	0.3063	0.1911	1.603	0.1197
ΔLRATE	-0.2192	0.1140	-1.923	0.0643*
ΔLGDPPC(-1)	0.2024	0.1423	1.422	0.1657
CRt-1	-0.1695	0.0992	-1.709	0.0981*
			Prob.(F-statistic)=	
R^2=0.54, Adjusted R^2 = 0.42 F-statistic=4.293671 Durbin-Watson stat= 2.0		0.0017 N=40		
Breusch-Godfrey Serial Correlation LM Test= 1.398924 (0.496853)*		ARCH Test=0.716535 (0.397283)		

*This table presents the results of the ECM version of FMOLS model. * Figures in parentheses are probability values. Note: ***, ** and * represent 1%, 5% and 10% levels of significance*

Robustness Check

To ascertain the robustness of our findings, Equation 1 is first-differenced and re-estimated using the GMM technique with lagged dependent variable as well as lagged explanatory variables as instrumental variables. The results are reported in Table 9. The J-statistic of .02 which is less than .05 indicates that the model fits the data well. As can be observed, the GMM model confirms the robustness of our findings: domestic credit as a share of GDP as well as broad money supply as a share of GDP has a negative, statistically significant relationship with economic growth. Credit to the private sector as a share of GDP has a positive but statistically insignificant relationship with economic growth.

Table 9: Results of GMM Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	Dependable Variable=ΔLGDPPC			
C	0.1495	0.0463	3.231	0.0029***
ΔLDC	-0.5923	0.2393	-2.475	0.0188**
ΔLOSFIS	-0.5974	0.3057	-1.954	0.0594*
ΔLCPS	0.1908	0.1593	1.1978	0.2398
ΔLOPEN	0.4640	0.2595	1.788	0.0832*
ΔLGS	0.1582	0.4074	0.3884	0.7003
ΔLRATE	-0.4800	0.1946	-2.466	0.0192**
R^2=0.34, Adjusted R^2 = 0.23 Durbin-Watson stat= 2.4 J-statistic=0.02				

Instrument list: LGDPPC (-1), LDC (-1), LOSFIS (-1), LCPS (-1), LOPEN (-1), LGS (-1), LRATE (-1) Figures in parentheses are probability values. Note: ***, ** and * represent 1%, 5% and 10% levels of significance.*

To establish the direction of causality between the significant financial development variables and economic growth, Granger Causality Test is employed. One lag is selected based on Final Prediction Error, Akaike Information Criterion, Schwarz information Criterion and Hannan-Quinn Information Criterion. The test results are presented in Table 10. As can be observed, we reject the null hypothesis that domestic credit does not Granger cause economic growth. We also reject the null hypothesis that growth does not Granger cause financial development. However, we fail to reject the null hypothesis that broad money supply (the proxy for the overall size of the financial intermediary sector in Ghana) does not Granger cause economic growth. We, therefore, argue that there is uni-directional causality from broad money supply and economic growth in Ghana.

Table 10: Pairwise Granger Causality Tests Lag: 1

Null Hypothesis:	Obs	F-Statistic	Probability
LDC does not Granger Cause LGDPPC	39	0.9832	0.3280
LGDPPC does not Granger Cause LDC		0.6268	0.4337
LOSFIS does not Granger Cause LGDPPC	39	4.565	0.0395**
LGDPPC does not Granger Cause LOSFIS		0.2635	0.6108

Figures in parentheses are probability values. Note: ***, ** and * represent 1%, 5% and 10% levels of significance

CONCLUDING COMMENTS

The paper seeks to answer two questions: (1) Does financial development promote economic growth in the long run? (2) Does financial development promote economic growth in the short run? It employs annual time series data spanning from 1971 to 2010 gathered from the World Development Indicators of the World Bank. Using FMOLS and ECM techniques, the findings suggest that whereas domestic credit to GDP ratio as well as broad money supply as a ratio of GDP hampers economic growth both in the short run and in the long run, credit to private sector as a share of GDP ratio has a positive but statistically insignificant relationship with economic growth. The robustness of these findings has been ascertained by GMM estimation technique. Our findings support the conclusion that financial development undermines economic growth in Ghana.

One policy implication is that Bank of Ghana should tighten the prudential standards for all financial institutions in Ghana as a way of sanitizing the financial sector. It appears that some unproductive lending activities are inherent in the financial system. Not only should Bank of Ghana tighten the prudential standards for financial institutions but also put in place effective monitoring mechanisms to ensure compliance.

Our study has found that an increase in the size of the financial intermediary sector undermines growth, implying that financial liberalization is not in the best interest of the Ghanaian economy. Although it is expected that as the sector increases, competition increases which should ideally culminate in quality intermediation service as well as better prices for customers, yet competition could also result in unconventional practices that could have dire consequences for the economy. In tandem with our conclusion and in congruence with banking and currency crises literature, we therefore caution against financial liberalization in Ghana.

One limitation of this paper is that it has relied on data from the World Bank. Thus, the validity of the findings and conclusions is limited to the extent to which these data are credible. We would, therefore, recommend a follow-up study using a dataset gathered by a different but equally reliable institution. In addition, our study has focused on Ghana one of the African countries. It will, therefore, be advisable for

future researchers to consider using our methodology to study other African countries. Notwithstanding these limitations, the paper makes a significant contribution to the finance-growth discourse.

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