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Financial development, external debt and economic growth: evidence from Ghana

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Abstract

This paper analyses the effect of financial development and external debt on Ghana's economic growth. Low financial sector growth coupled with inability to find innovative ways of generating domestic revenue in developing countries has led to increasing reliance on external borrowing for development finance. Over the recent past, Ghana has resorted to the issuance of bonds and other non-concessional loans, leading to rising debt ratios. Using the Autoregressive-Distributed Lag technique on time series data from 1970 to 2015, we find that external debt has a negative effect on Ghana's economic growth. On the other hand, financial sector development has a positive effect on growth. We also find a one-way causality from financial development and external debt to economic growth.

Keywords: *Economic Growth, Financial Development, External Debt, Debt Burden, Autoregressive-Distributed Lag, Ghana.*

JEL Classifications: E5, F34, O40.

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1. Introduction

External sources of finance are very critical to the development of many developing countries due to the huge savings and investment gaps (Todaro and Smith, 2006). This has become even more relevant in recent years as inflows of private capital have now overtaken those from public sources (Kvangraven, 2016). Many developing countries are unable to generate sufficient revenue to provide basic public services resulting in persistently huge public sector deficits. Gurley and Shaw (1960) postulate that economies at various levels of development possess different levels of financial structures. At the early stages of economic development, capital investments are mainly self-financed but when the economy develops, depository institutions emerge to intervene between surplus spending and deficit spending units. Kuznets (1955) observes that financial markets begin to grow as the economy approaches the intermediate stage, and becomes fully developed once the economy becomes mature. According to Kuznets, financial development enhances production of investment information *ex ante*, the implementation of corporate governance, and mobilisation and pooling of savings. Thus, financial sector development promotes savings and investment for economic growth.

Development economists often cite the Harrod-Domar growth model to explain the role of external debt in closing the savings-investment gap in developing countries. The model assumes that growth occurs through accumulation of capital in the form of savings. According to Eaton (1993), external debt serves as a complement to domestic savings and investment. On the other hand, Krugman (1988) argues that the burden of debt service creates distortions in the domestic economy which discourages savings and investment. Empirical literature have proffered mixed conclusions about the relationship between external debt, financial development and economic growth. While many studies have found the effect of financial development on economic growth to be positive (Caporale *et al.*, 2005; Beck and Levine, 2004; Benhabib and Spiegel, 2000; Levine and Zervos, 1998), the debt-growth relationship, on the other hand, appears to tilt in the negative direction (Reinhart and Rogoff, 2010; Butts, 2009; Were, 2001; Iyoha, 1999; Fosu, 1999; Deshpande, 1997; Elbadawi *et al.*, 1996).

The financial sector in Ghana has undergone a dramatic transformation in the last three decades. In the initial stages of financial sector reforms in 1987, the sector was dominated by state financial institutions. Thirty years on, however, it is now dominated by private local and foreign institutions, with a diverse range of financial services available. According to Aryeetey *et al.* (2000), financial sector development entails effective and efficient financial resource mobilisation for allocation into prioritised real sectors for growth. Prior to the implementation of the Financial Sector Adjustment Programme (FINSAP) in 1988, the repressive financial sector policies exacerbated the low growth performance of the sector. Broad money supply

to GDP (M2/GDP) ratio stood at 12 percent while demand deposit, time deposit and domestic credit were 4.6 percent, 2.6 percent and 15.6 percent of GDP, respectively. The World Bank and International Monetary Fund-inspired FINSAP resulted in the restructuring and liberalisation of the Ghanaian financial sector. Seven distressed banks were restructured, including their nonperforming assets, to restore their viability and profitability. Development of the capital and money markets resulted in the establishment of the Ghana Stock Exchange in 1990 and the improvement in the regulatory and supervisory framework (Bawumia, 2010).

The Financial Sector Strategic Plan (FINSSP), a successor policy, was implemented in 2001 to consolidate the gains of FINSAP and to deepen the performance of the sector. This resulted in improved financial service delivery which impacted positively on financial sector performance (see Table 1). For instance, private sector credit as a share of total credit showed significant growth from 1991 onwards, reaching an average of 67 percent between 2011 and 2015. Other financial sector indicators, such as private sector credit-to-GDP ratio, total credit-to-GDP ratio, and broad money-to-GDP ratio also showed improvements following the FINSAP. The banking sector experienced an increase in the number of banks, rising from 10 in 1988 to 35 as at August, 2017. Evidently, there is clear improvement in many of the financial deepening indicators, pointing to a growing positive influence of the sector on overall economic performance. Real GDP growth rate improved following the structural reforms of the 1980s, averaging more than 5 percent over the past three decades.

Table 1: Economic growth, financial development and external debt, 1961-2015

Indicators	1961- 1970	1971- 1980	1981- 1990	1991- 2000	2001- 2005	2006- 2010	2011- 2015
Real GDP growth	3.04	0.52	2.28	4.30	5.04	6.66	7.71
External debt/GNI		29.19	52.26	93.62	104.41	23.05	40.68
Private sector credit/GDP	7.72	5.89	3.12	7.39	13.05	14.54	17.62
Private sector credit/Total credit	38.95	20.22	14.74	30.15	41.54	56.40	67.25
Broad money/GDP	20.44	24.58	16.50	21.68	31.05	26.40	31.44
Total credit/GDP	22.26	29.11	21.57	23.59	31.78	25.83	32.63
Total bank deposit liabilities/GDP	7.51	7.92	4.16	5.15	7.36	6.63	5.78

Source: Bank of Ghana (2017), World Bank (2017), Adu et al. (2013).

Meanwhile Ghana's external debt has assumed an upward trend in the years following the 1980s. The ratio of external debt to gross national income (GNI) peaked at 104.4 percent between 2001 and 2005 before dropping to an average of

23 percent between 2006 and 2010 after the adoption of the Highly Indebted Poor Country (HIPC) Initiative by the country in 2006. Significantly, the external debt has recorded a steady increase since 2007. The external debt/GNI ratio averaged 41 percent between 2011 and 2015 (see Table 1). The attempt to deal with its debt service burden pre-dates the HIPC Initiative. In the past, Ghana adopted ERP II under which IMF concessionary facilities were used to refinance outstanding debts. These facilities included the Extended Fund Facility (EFF), Structural Adjustment Facility (SAF) and the more favourable Enhanced Structural Adjustment Facility (ESAF). Nevertheless, the country's external debt rose significantly and by the end of 2000, the debt/GDP ratio reached 180 percent. The Highly Indebted Poor Country (HIPC) Initiative and Multilateral Debt Relief Initiatives (MDRIs) led to a decline in the country's debt to a sustainable level; the debt/GDP ratio dropped from 141.82 percent in 2001 to 26.2 percent in 2006. In 2007, Ghana rebased its GDP and became a Lower Middle Income Country. This meant that it could no longer access concessional facilities, and thus had to turn to the commercial market for loans. The country therefore resorted to bonds and other non-concessional loans. This has started to drive the country's debt ratios towards the pre-HIPC levels. The country's debt/GDP ratio reached 72.5 percent in 2016 (Government of Ghana, 2017).

A rising external debt is generally associated with increased debt service payments. The increase in the external debt has brought with it further burden on the public purse in the form of interest payments. The burden of servicing the country's short-term loans became onerous, hitting a level of 56.57 percent of the country's exports of goods and services in 1988 (World Bank, 2001). In the last few years, interest payments on Ghana's public debt have risen rapidly exceeding the sustainable thresholds; as a percentage of total expenditure it increased from 11 percent to 23 percent between 2013 and 2014, rising to 24 percent at the end of 2016, compared to the pre-HIPC value of about 20 percent (Government of Ghana, 2017). Moreover, Ghana's debt service to exports ratio as at 2016 was 23.2 percent, well above the enhanced HIPC (eHIPC) thresholds (15-20 percent). Debt Service to Revenue ratio also stood at 29.7 percent; above the eHIPC threshold (Government of Ghana, 2017). IMF reviews also suggest that Ghana is at risk of a high debt distress¹ compared to countries like Uganda, Kenya, and Nigeria (see Table 2).

¹ *The World Bank's Country Policy and Institutions Assessment (CPIA) ranks Ghana as a medium performer in terms of the quality of policy and institutions (the average CPIA in 2012–14 is 3.61).*

Table 2: IMF debt sustainability analysis

	Ghana (2016)*	Nigeria (2016)*	Kenya (2016)*	Uganda (2015)*	eHIPC Sustainability Thresholds	IMF-World Bank DSA Threshold
PV of Debt-to-GDP (%)	70.40	15.20	55.10	31.10	50.00	HP: 50 MP: 40 LP: 30
Debt-Servicing-to-Exports (%)	17.10	0.70	8.00	15.80	15.00-20.00	HP: 20 MP: 25 LP: 15

Source: IMF, 2014; Government of Ghana, 2017.

Notes: HP means High Performers; MP means Medium Performers

Theoretical and empirical literature have suggested that excessive external debt is often allied with high rates of economic instability and uncertainty, which affect the operations of the economy's financial markets and the development of financial intermediaries, while discouraging investment (Hwang *et al.*, 2010). This situation, in turn, affects the efficient allocation of resources and economic growth. There is limited empirical literature, however, shedding light on the effect of external debt and financial development on economic growth in the Ghanaian context. Available studies have often focused on the effect of the given factors on economic growth independently, without ascertaining their synergistic influences on economic growth. Quartey and Prah (2008), for example, only examined the financial development – economic growth nexus for Ghana. Frimpong and Oteng-Abayie (2003) alternatively investigated the external debt – economic growth relationship.

Besides the controversy regarding the role of external debt and financial development in economic growth, the issue of directional causality between the variables represents another area of dispute. Al-Yousif (2002) opined that failing to assess the existence of causality between variables is a mere assumption of a linear association. This study seeks to estimate the growth effect of financial development and external debt and to test the causality between the variables, using time series data on Ghana covering the period 1970 to 2015. The novelty of this study is that it seeks to capture simultaneously the relationship between external debt, financial development, and economic growth. The study employs the ARDL technique to examine the impact of financial development and external debt on economic growth in Ghana. We find that external debt has a negative effect on Ghana's economic growth. On the other hand, financial sector development has a positive effect on growth. We also find a one-way causality from financial development and external debt to economic growth.

The rest of the paper is organised as follows. Section 2 reviews the literature, while section 3 discusses the methodology and data. The results are presented and discussed in section 4. Conclusions and policy recommendations are offered in section 5.

2. Literature review

The literature has identified the relevance of public debt in financial development via the “safe asset” view. The safe asset argument is that public debt can be regarded as playing a positive role in developing financial sectors by providing a relatively safe asset (Hauner, 2009). De Soto (2000) noted that these assets serve as the bulwark against institutional imperfections that prevent the use of real estate or movable property as collateral. Also, government bonds provide the standard yield curve for pricing corporate bonds and equities (Reinhart and Sack, 2000; World Bank and IMF, 2001). In contrast to these arguments, Hauner (2009) propounded the “lazy banks” view. This view assumes that large public sector borrowing from the banking sector may impede financial development if the sector overly relies on public debt. Although banks' overreliance on public debt may produce more and reliable profit, it is likely to reduce banks' incentives to actively develop the sector. This can weaken financial deepening, as measured for instance, by the number of bank branches (Demetriades and Luintel, 1996). Endogenous financial growth models indicate how financial development may have a positive effect on economic growth (Greenwood and Jovanovic, 1990; Bencivenga and Smith, 1991; Gilles, 1992; King and Levine, 1993). Nonetheless, Mankiw and Elmendorf (1998) argues that the negative impact of finance is exacerbated in countries with weak financial system regulation.

Neoclassical growth models consider labour force and technical progress as the main determinants of long term economic growth (see Solow, 1957). Thus, financial intermediation plays a less important role in output growth within the neoclassical growth models. Endogenous growth models, however, ascribe a clearer and more specific role to financial intermediation via financing of research and development (R&D), and human capital investment (Romer, 1986). McKinnon (1973), Shaw (1973) and Fry (1995) view financial development as a crucial factor of economic growth. They advocate a liberalised financial sector to mobilise financial savings and allocate capital to more productive uses, to enhance the volume and productivity of physical capital for growth. Two schools of thought have emerged about the direction of causation in the finance-growth nexus, namely, supply-leading hypothesis and demand-following hypothesis (Patrick, 1966). The supply-leading hypothesis views financial development as a necessary precondition for economic growth through the provision of financial services for growth. On the other hand, the demand-following hypothesis assumes that financial development plays a minor role in economic growth and is considered as an outcome of growth (see Kuznets, 1955).

The Harrod-Domar growth model establishes a direct relationship between savings and the rate of economic growth. External debt thus helps fill the financing gap to help propel growth (Eaton, 1993). However, the Debt Overhang Hypothesis (DOH) postulates that debt impedes growth where a debtor country benefits very little from the returns to any additional investment due to debt service obligations (Borensztein, 1990). Additionally, huge public debt implies that short term revenue must be used to service the debt, thereby crowding out public investment in the economy (Serieux and Yiagadeesen, 2001). Decline in public investments like education and health may retard economic growth. Moreover, the Liquidity Constraint Hypothesis (LCH) theorises that attempts to correct balance of payments imbalances caused by excessive borrowing, by compressing imports may render imported inputs and capital goods expensive which can lead to low growth (Elbadawi *et al.*, 1996; and Taylor, 1983). The Direct Effect of Debt Hypothesis (DEDH) assumes that external debt can directly influence output growth through its effects on investment decisions and factor productivity. While a drag on investment could reduce growth, external debt may also stifle the productivity of factors of production and hence growth (Fosu 1999). Furthermore, the Debt Laffer curve theory hypothesises a nonlinear relationship between debt and growth; there is an optimal level of debt that promotes growth beyond which further debt accumulation retards growth (Cohen, 1993).

While many studies find support for a positive relationship between financial development and growth (Levine and Zervos, 1998; Benhabib and Spiegel, 2000; Beck and Levine, 2004; Caporale *et al.*, 2005; Durusu-Ciftci *et al.*, 2017; Ibrahim and Alagidede, 2017), some others find a negative relationship (De Gregorio and Guidotti, 1995; Harris, 1997; Aizenmann, 2004; Stiglitz, 2000). Odhiambo (2009) analysed the dynamic relationship between interest rate reforms, financial development and economic growth in South Africa and concluded that financial depth and economic growth exhibit a demand-following path. Shahbaz *et al.*, (2008) employed the ARDL framework on time series data for Pakistan and found a long-run positive correlation between stock market development and economic growth. Similarly, Nowbusting and Odit (2009) found for Mauritius a positive correlation between financial development and economic growth both in the short and long runs. Kutivadze (2011) examined the effect of public debt on financial development and found that the growth of the domestic debt market promotes financial development. De Bonis and Stacchini (2013) established that government debt crowds out the private sector because banks find investing in government bonds more attractive. In the case of developing economies, Emran and Farazi (2009) found that a dollar increase in government borrowing impedes private sector credit by about \$1.40, a result attributed to the “lazy bank” hypothesis. Hauner (2006) examined the relationship between public sector credit absorbed from local banks and financial development and found that public debt is associated with low growth,

and less development of the financial sector. Quartey and Prah (2008) found some evidence in support of the demand-following hypothesis, suggesting a positive relationship between financial sector expansion and economic growth in Ghana using broad money to GDP ratio as a proxy for financial development.

Empirical studies on the debt-growth nexus also reveal mixed conclusions. Warner (1992) and Jayaraman and Lau (2008) found that debt promotes growth. On the other hand, Geiger (1990), Gerald (1994) and Deshpande (1997) found that debt retards growth. Using an augmented aggregate production function, Fosu (1999) and Iyoha (1999) established a negative relationship between external debt and growth in SSA. Were (2001) conducted time series analysis on Kenya and found external debt to be negatively correlated with growth. Reinhart and Rogoff (2010) found that debt ratios above 90 per cent retarded economic growth in developed countries, consistent with the findings of Kumar and Woo (2010). Cohen (1993), Chowdhury (1994), Afrentiou and Serletis (1996), and Frimpong and Oteng-Abayie (2003) found no clear relationship between external debt and growth for Ghana. Thus, there is no consensus in the empirical literature on the relationship between external debt, financial development and economic growth, either examined separately or together. Moreover, amidst the ensuing controversy regarding the impact of external debt on economic growth, we find that work on Ghana is very scanty. This paper therefore examines the impact of financial development and external debt on economic growth in Ghana, using the ARDL technique.

3. Methodology and data

The study adopts an endogenous growth model (the AK model,) which hypothesises that output growth is a function of real capital stock, total factor productivity, savings and the effectiveness of financial intermediation (see, Rebelo, 1991; Pagano, 1993; and Khan, 2008). The model is estimated using the Auto Regressive Distributive Lag (ARDL) technique developed by Pesaran *et al.* (2001). Following the Direct Effect of Debt Hypothesis, the effect of external debt and financial development on economic growth is analysed by incorporating the debt variable into the production function. We estimate the following model;

$$rgdpg = \beta_0 + \beta_1 lngcf + \beta_2 lnlab + \beta_3 lnexp + \beta_4 debtgdp + \beta_5 mgdp + u_t \quad (1)$$

where, *rgdpg* represents real GDP growth (to measure economic growth), *lngcf* is the natural logarithm of gross domestic capital formation (proxy for capital), *lnlab* represents the natural logarithm of labour force, *lnexp* is the natural logarithm of exports, *debtgdp* represents total external debt to GDP ratio (debt burden), *mgdp* is the ratio of broad money supply to GDP (M2/GDP) ratio (proxy for financial development), and *u* is the stochastic error term.

Whilst the empirical measures for nearly all the variables in the model are easy to define, that for financial development can be defined in several ways. This is particularly important in the Ghanaian context, given the findings from Adu *et al.* (2013) suggesting the sensitivity of economic growth to the measure of financial development. Nevertheless, it is worth emphasising that several measures of financial development have been proposed in empirical studies. In general, two broad measures of financial development can be distinguished: credit markets or stock markets (Durusu-Ciftci *et al.*, 2017). For measures that rely on credit markets, Berthelemy and Varoudakis (1996) and King and Levine (1993) are notable examples, with Andersen and Tarp (2003), Bencivenga *et al.* (1996), Demirgüç-Kunt and Levine (1996), and Levine and Zervos (1996; 1998) arguing for stock markets. In this study we focus on the credit markets strand because the stock market is a recent phenomenon in Ghana's financial history. The Ghana Stock Exchange opened in 1990 in the immediate years following the implementation of the financial sector reforms. However, the growth of the stock market was initially slow, only becoming an important component of the financial sector from about the latter parts of the 1990s.

Consequently, in this study we restrict ourselves to measures of financial development that broadly fall into the category of credit markets. The measures in this category include, private sector credit/GDP, private sector credit/total domestic credit, narrow money/GDP, broad money/GDP, total domestic credit/GDP, total bank deposit liabilities /GDP. Intuitively, these measures fall into two broad sub-categories: those that best capture the financial intermediation role (private sector credit/GDP, private sector credit/total domestic credit, total domestic credit/GDP, total bank deposit liabilities /GDP), and those that incorporate a much broader aspect of monetary and financial policies (narrow money/GDP, broad money/GDP). However, considering the period under study, the measures that best capture the financial intermediation role may have a limiting effect on growth. This is because prior to the reforms, the financial sector was dominated by state banks, which followed credit allocation rules set by the Bank of Ghana. Besides, post-reforms most of these state banks were by and large influenced by state policies because until recently the state held a controlling stake in nearly all the public banks. Hence, it is our considered opinion that the growth-enhancing effects of financial development proxied by credit to the private sector may be limiting.

As a result, we focus on the measure of financial development which incorporates the broader notions of financial and monetary policies. Narrow money/GDP captures the effect of monetary policy solely, but broad money/GDP will have a wider dimension of financial development. In other words, it will capture monetary policy actions and its effects on commercial financial sector operators. We are of the view that broad money/GDP captures better the effects of financial and monetary policies

on economic growth in the Ghanaian economy. This is because the dominance of the state in determining sectoral credit allocation is known, with the Bank of Ghana continually involved in influencing the overall direction of banking sector development and growth. Moreover, M2/GDP best captures the McKinnon (1973) conduit effect, which shows how the financial system facilitates growth through the intermediation between savers and borrowers.²

The Bounds test within the ARDL framework is employed to test for long run association between real GDP, financial development, external debt and the other variables in the empirical model. The ARDL model involves estimating equation (2):

$$\Delta rgdp_{it} = \phi + \sum \psi_1 \Delta rgdp_{it-1} + \sum \psi_2 \Delta lngcf_{it-1} + \sum \psi_3 \Delta lnlab_{it-1} + \sum \psi_4 \Delta lnexp_{it-1} + \sum \psi_5 \Delta debtgdp_{it-1} + \sum \psi_6 \Delta mgdp_{it-1} + \lambda_1 rgdp_{it-1} + \lambda_2 lngcf_{it-1} + \lambda_3 lnlab_{it-1} + \lambda_4 lnexp_{it-1} + \lambda_5 debtgdp_{it-1} + \lambda_6 mgdp_{it-1} + \varepsilon_i \quad (2)$$

The error correction model is specified as,

$$\Delta rgdp_{it} = \phi + \sum \psi_1 \Delta rgdp_{it-1} + \sum \psi_2 \Delta lngcf_{it-1} + \sum \psi_3 \Delta lnlab_{it-1} + \sum \psi_4 \Delta lnexp_{it-1} + \sum \psi_5 \Delta debtgdp_{it-1} + \sum \psi_6 \Delta mgdp_{it-1} + EC_{t-1} + \varepsilon_i \quad (3)$$

where all the variables are as previously defined in equation (1), Δ represents the differences operator; ϕ is the drift component, EC is the error correction term (measures the speed of adjustment), ε_i denotes the white noise error term.

The ARDL bounds test examines the long run relationship between the variables using the F-statistic. The null hypothesis to be tested ($\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = 0$) suggests the nonexistence of a long run relationship and the alternative hypothesis ($\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq 0$) indicates the existence of cointegration. The normalized output function is specified as:

$$Fr(rgdp/lngcf, lnlab, lnexp, debtgdp, mgdp) \quad (4)$$

The estimated F-statistic is compared with the 5 percent (lower critical bound) and the 10 percent (upper critical bound) values estimated by Pesaran *et al.* (2001) leading to appropriate conclusions about cointegration between the variables. The Akaike Information Criteria is used to select the appropriate lags of the variables to be included in the model as predetermined variables while the Pairwise Granger Causality Test is conducted to ascertain the direction of causality between the regressors and the regressand.

Data for the empirical analysis are obtained from the World Bank's World Development Indicators and Ghana's Ministry of Finance online databases. Equation

² Be that as it may, we have also used the other credit market proxies of financial development, namely, private sector credit/GDP, total domestic credit/GDP, and private sector credit/total domestic credit, in our estimations. The results, reported in the appendix, indicate no significant differences between using broad money/GDP and the other measures.

(2) is estimated using the ARDL method since the technique produces more robust results compared to other time series estimators. Firstly, the ARDL does not require that all variables be integrated of the same order. It can be applied when the underlying variables are integrated of order one, order zero or fractionally integrated. Secondly, the ARDL method is relatively more efficient in the case of small and finite sample sizes. Thirdly, applying the ARDL technique produces unbiased estimates of the long-run model (Harris and Sollis, 2003).

4. Results

To avoid the problem of spurious regression, we carry out unit root tests on the variables in the model using the Phillips-Perron (PP) unit roots test proposed by Phillips and Perron (1988). In addition, ADF tests and the Dickey-Fuller Generalized Least Square (DF-GLS) de-trending test proposed by Elliott *et al.* (1996) are used to confirm the PP results. The test results suggest that the variables at levels exhibit stochastic trends. The first differences of the variables, however, are stationary (see Tables 3a and 3b).

The long run model was pre-estimated using the ARDL estimation technique to determine the best lags for the model. Results of the Akaike Information Criterion (AIC) show that the model, ARDL (2, 4, 0, 0, 2, 0), yields robust results because such a lag arrangement of the dependent and the independent variables generates the smallest AIC value of -3.927. (See, Table 4)

Table 3a: PP, DF-GLS, and ADF unit roots test on levels of variables

Variable	PP Test		DF-GLS Test		ADF Test	
	t-statistics	5% critical value	t-statistics	5% critical value	t-statistics	5% critical value
Real GDP growth	-4.43*	-2.93	-3.67**	-1.95	-4.44*	-2.93
Gross capital formation	-1.09	-2.93	-1.27	-1.95	-1.29	-2.93
Labour force	-1.26	-2.93	-1.48	-1.95	-2.76	-2.95
Exports	-1.32	-2.93	-1.05	-1.95	-1.34	-2.93
External debt/GDP	-1.21	-2.92	-0.15	-1.94	-1.10	-2.92
M2/GDP	-1.14	-2.93	-0.90	-1.95	-1.02	-2.93

Source: Authors' computation using Eviews 9. * Model with Intercept, ** Model with constant and trend, Ho: Variable has a unit root

Table 3b: PP, DF-GLS, and ADF unit roots test on variables at first difference

Variable	PP Test		DF-GLS Test		ADF Test	
	t-statistics	5% critical value	t-statistics	5% critical value	t-statistics	5% critical value
Real GDP growth	-16.52*	-2.93	-7.50*	-1.95	-8.70*	-2.93
Gross capital formation	-7.96*	-2.93	-7.50*	-1.95	-6.86*	-2.93
Labour force	-4.46*	-2.93	-0.76	-1.95	-3.66*	-2.93
Exports	-5.27*	-2.93	-5.35*	-1.95	-5.29*	-2.93
External debt/GDP	-6.17*	-2.93	-6.14*	-1.95	-6.17*	-2.93
M2/GDP	-6.41*	-2.93	-6.48*	-1.95	-6.41*	-2.93

Source: Authors' computation using Eviews 9. * Model with Intercept, Ho: Variable has a unit root

Table 4: Model selection criteria (top 5 models), akaike information criteria

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
6865	96.485	-3.927	-3.348	-3.715	0.996	ARDL(2, 4, 0, 0, 2, 0)
9990	95.310	-3.919	-3.381	-3.722	0.996	ARDL(1, 4, 0, 0, 2, 0)
7365	96.249	-3.916	-3.337	-3.704	0.996	ARDL(2, 3, 1, 0, 2, 0)
6864	97.220	-3.915	-3.294	-3.687	0.996	ARDL(2, 4, 0, 0, 2, 1)
6740	97.100	-3.909	-3.288	-3.682	0.996	ARDL(2, 4, 1, 0, 2, 0)

Source: Authors' computation using Eviews 9.

The ARDL cointegration approach developed by Pesaran *et al.* (2001) was employed to test the long run association among the variables. The decision to accept the null hypothesis is based on the comparison between the F-statistic of Wald and the Pesaran critical values. From Table 5, Pesaran 1 percent critical value at the lower bound is 3.74, and 5.06 at the upper bound. Since the Wald F-statistic is greater than the upper bound value, one can reject the Null Hypothesis in favour of the alternative hypothesis. Thus, the variables being used for the empirical analysis are cointegrated at the 1 percent level of significance.

Table 5: ARDL bound test results for cointegration, akaike information criteria

ARDL (2, 4, 0, 0, 2, 0)								
Wald F Statistic	10%		5%		1%		DW	LM
	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound		
17.46	2.45	3.52	2.86	4.01	3.74	5.06	8.63	12.09

Notes: H_0 : variables are not cointegrated H_a : variables are cointegrated. Critical Values are cited from Pesaran *et al.* (2001)

Subsequent to the determination of cointegration among the variables, long run coefficients are estimated for the model and the results are shown in Table 6. The results show that external debt has a significant negative effect on growth. All other factors constant, an increase in the external debt/GDP ratio by 1 percent leads to a 0.22 percent decrease in real GDP growth. Thus, external debt retards growth of GDP in Ghana. This result is consistent with the findings of Fosu (1999) and Iyoha (1999), but contrasts the results of Frimpong and Oteng-Abayie (2003) who found no clear relationship between external debt and growth in Ghana. Financial development positively affects real GDP growth in Ghana. An increase in the M2/GDP ratio by 1 percent leads to a 0.39 percent increase in real GDP growth, *ceteris paribus*. This result is consistent with Levine *et al.* (2000) and Quartey and Prah (2008), and more generally, fits within the literature relating financial development to economic growth. As noted by Arestis *et al.*, (2015), empirical literature on the financial development growth nexus, shows the existence of a genuine positive effect between financial development and economic growth.

Table 6: Estimated long run coefficients (ARDL 2, 4, 0, 0, 2, 0)

Variable	Coefficient	Standard error	t-Statistic	Probability
Gross capital formation	0.052***	0.008	5.896	0.000
Labour force	0.497***	0.032	15.432	0.000
Exports	0.094**	0.006	14.342	0.015
External debt/GDP	-0.219***	0.073	-3.947	0.003
M2/GDP	0.385***	0.092	4.185	0.001
R-Squared	0.945	Mean dependent variable		23.458
Adjusted R-Squared	0.945	S.D. dependent variable		0.517
S.E. of Regression	0.121	Akaike info criterion		-1.283
Sum Squared Residual	0.600	Schwarz criterion		-1.085
Log Likelihood	34.518	Hannan-Quinn criterion		-1.209
Dirbin-Watson Stat	0.332			

Source: Authors' computation using Eviews 9.

Notes: *** significant at 1 percent; ** significant at 5 percent.

We also find that growth of gross capital formation exerts a positive effect on economic growth. This is consistent with Dao (2014; 2012), who finds a positive impact of gross capital formation on economic growth for developing countries. Furthermore, we find that growth of labour force positively affects real GDP growth at the 1 percent significance level. The importance of a growing labour force in stimulating economic growth has been noted by Bloom *et al.*, (2010) and Tyers and Shi (2007). In general, the positive impact of gross capital formation and labour force growth on economic growth affirm the neoclassical school of thought on the role of investment and labour force in output growth. We also find that exports exert a positive influence on economic growth at the 5 percent level of significance. All other factors constant, a percentage increase in exports leads to a 0.09 percentage points increase in real GDP growth. These findings confirm the assumptions of the endogenous model about labour and capital, while the positive effect of exports on growth is consistent with the findings of Fosu (1999).

4.1. Short-run Results

Table 7 reports the short-run results of the ARDL model. The short-run dynamics show that real GDP growth is positively affected by its second lag at the 5 percent level of significance, while gross capital formation has a contemporaneous impact in addition to a first lag effect; both significant at the 5 percent level. Labour force has a positive impact on real GDP, while the impact of the external debt is negative. This suggests that external debt impacts unfavourably on growth in the short run as well. Financial development, on the other hand, has no significant impact on economic growth in the short run. The coefficient of the error correction term (-0.76) is negative and significant at the 5 percent level, and indicates the speed of adjustment of the model as it approaches the long run equilibrium; the speed of adjustment here is 76 percent annually. We confirm the existence of a stable long run relationship among the variables given a significant error correction term (see Banerjee *et al.*, 1993). The model also passes the diagnostic tests for serial correlation and heteroscedasticity.

Table 7: Estimated short run coefficients (ARDL 2, 4, 0, 0, 2, 0)

Variable	Coefficient	Standard error	t-Statistic	Probability
D(real GDP growth(-1))	0.013	0.056	0.232	0.402
D(real GDP growth(-2))	0.403**	0.125	3.224	0.022
D(gross capital formation)	0.043**	0.008	5.375	0.017
D(gross capital formation (-1))	0.116**	0.045	2.578	0.041
D(gross capital formation (-2))	5.969	4.903	1.161	0.255
D(gross capital formation (-3))	3.589	2.803	1.280	0.325
D(gross capital formation (-4))	2.365	3.558	0.665	0.805
D(labour force)	0.018***	0.002	9.003	0.001
D(exports)	0.636	0.452	1.408	0.626
D(external debt/GDP)	-0.298*	0.108	-2.759	0.076
D(external debt/GDP(-1))	-2.819	4.012	-0.702	0.477
D(external debt/GDP(-2))	0.955	2.504	0.397	0.653
D(M2/GDP)	0.159	1.328	0.120	0.373
Error correction(-1)	-0.763	0.172	-4.436	0.025
R-Squared	0.872	Mean dependent variable		22.582
Adjusted R-Squared	0.735	S.D. dependent variable		0.569
S.E. of Regression	7.892	Akaike info criterion		7.203
Sum Squared Residual	21.450	Schwarz criterion		7.180
Log Likelihood	37.600	Hannan-Quinn criterion		7.364
Dirbin-Watson Stat	0.832			
Breusch-Pagan-Godfrey Serial Correlation test	(F=16.078)	(P=0.000)		
Breusch-Pagan-Godfrey Heteroskedasticity test	(P=0.000)	(P=0.007)		

Source: Authors' computation using Eviews 9

Notes: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

4.2. Directional Causality

We carried out the pairwise Granger Causality test to ascertain the direction of causality between the dependent variable and the independent variables. In such tests, the choice of lag length is an empirical matter (Urbain, 1989). And as is typically the case, the researcher chooses the number of lags (Halcoussiss, 2005). In other words, discretion is important in choosing the lag length, which is guided by an expectation about the time range over which one variable predicts the other. Thus, considering the theoretical relations between the variables, we do not expect any contemporaneous effects. Thus, we are of the view that because of the existence of structural rigidities in the economy, a lag length of 2 years will allow for a better causal relation to be revealed. The results of the Granger Causality test are presented in Table 8.

Table 8: Pairwise granger causality tests

Null Hypothesis:	Observations	F-Statistic	P-value
Gross capita formation does not Granger cause Real GDP growth	44	7.390***	0.002
Real GDP growth does not Granger cause Gross capita formation	44	6.234***	0.005
Labour force does not Granger cause Real GDP growth	44	6.567***	0.003
Real GDP growth does not Granger cause Labour force	44	3.560**	0.038
Exports does not Granger cause Real GDP growth	44	13.501***	4.E-05
Real GDP growth does not Granger cause Exports	44	0.893	0.418
External debt/GDP does not Granger cause Real GDP growth	44	2.906*	0.067
Real GDP growth does not Granger cause External debt/GDP	44	0.181	0.835
M2/GDP does not Granger cause Real GDP growth	44	5.351***	0.007
Real GDP growth does not Granger cause M2/GDP	44	2.381	0.106

Source: Authors' computation using Eviews 9.

Notes: *** denotes significant at 1 percent, ** denotes significant at 5 percent, * denotes significant at 10 percent

The results indicate the existence of bi-directional causality among some of the variables. We find a two-way causal relationship between gross capital formation and labour force, on the one hand, and real GDP growth on the other. Thus, capital and real GDP granger causes each other at 1 percent; labour granger causes real GDP growth at 1 percent; and real GDP growth granger causes labour at 5 percent. There is, however, a one-way causality between exports, financial development (M2/GDP) and external debt/GDP on one hand, and real GDP growth on the other. Exports granger causes real GDP growth at 1 percent level, and external debt causes real GDP growth at 10 percent level. Financial development granger causes real GDP at 1 percent level, a finding that is consistent with the demand-following hypothesis.

5. Conclusion

The paper examined the effect of financial development and external debt on economic growth in Ghana covering the period of 1970 to 2015. The results show that Ghana's financial sector development positively affects economic growth whiles external debt negatively affects growth. We also found a one-way causal relationship, from gross capital formation, labour force, financial development and external debt, to economic growth in Ghana. This suggests the need to implement policies that help increase investment, and facilitate further deepening of the financial system. Furthermore, the regulatory environment needs to be strengthened to address inherent and future risks that affect the financial sector. It is without doubt that there exists a savings and investment gap in Ghana. Consequently, the country cannot do

without external financing in the form of debt. Nevertheless, the adverse effects of debt on economic growth imply that government must ensure that debt inflows are used to finance long-term investment projects that have the potential to expand the country's productive capacity. Additionally, foreign investment into specific sectors of the economy can be promoted in order to free government of the need to borrow and undertake investments that fall under the domain of the private sector. Finally, it is important that efforts at increasing domestic revenue be intensified so that the country's reliance on foreign loans reduce, and thereby limiting the adverse impact of mounting external debt on economic growth.

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APPENDICES

Appendix 1: Estimated long run coefficients

Variable	Dependent variable		
	PSC/GDP	TDC/GDP	PSC/TDC
Gross capital formation	0.042*** (0.012)	0.747 (0.252)	0.074*** (0.019)
Labour force	0.535*** (0.027)	2.005 (10.320)	0.529*** (0.324)
Exports	0.406*** (0.051)	-0.817 (1.980)	0.042* (0.059)
External debt/GDP	-0.166* (0.083)	-0.936 (2.669)	-0.290** (0.112)
PSC/GDP, TDC/GDP, PSC/TDC	0.024*** (0.006)	-0.106 (0.112)	0.191 (0.327)
R-Squared	0.959	0.274	0.947
Adjusted R-Squared	0.955	0.204	0.941
S. E. of Regression	0.109	4.138	0.125
Sum Squared Residual	0.484	701.972	0.645
Log Likelihood	39.485	-127.952	32.876
Durbin-Watson Statistics	0.339	1.559	0.271
Mean dependent variable	23.458	3.851	23.458
S. D. dependent variable	0.518	4.637	0.518
Akaike information criterion	-1.499	5.781	-1.212
Schwarz criterion	-1.301	5.979	-1.013
Hannan-Quinn criterion	-1.425	5.855	-1.138

Source: Authors' computation using Eviews 9.

Notes: : *** significant at 1 percent; ** significant at 5 percent

Appendix 2: Estimated short run coefficients

Variable	Dependent variable		
	PSC/GDP ³	TDC/GDP ⁴	PSC/TDC ⁵
D(real GDP growth(-1))	0.800*** (0.053)	0.709*** (0.101)	1.008*** (0.136)
D(real GDP growth(-2))			0.230 (0.143)
D(gross capital formation)	0.084*** (0.019)	0.073*** (0.023)	0.042** (0.021)
D(gross capital formation (-1))	0.011 (0.020)	0.022 (0.024)	-0.001 (0.023)
D(gross capital formation (-2))	-0.041** (0.019)	-0.055** (0.023)	-0.057** (0.022)
D(gross capital formation (-3))	0.032* (0.017)	0.057** (0.021)	0.042** (0.020)
D(labour force)	0.606*** (0.198)	-18.443 (5.980)	-1.431*** (0.513)
D(labour force(-1))		22.447 (10.654)	1.431** (0.568)
D(exports)	2.E-04 (0.019)	-0.001 (0.021)	0.010 (0.021)
D(exports(-1))	0.017 (0.018)	-0.020 (0.028)	
D(exports(-2))	0.006 (0.020)	0.021 (0.024)	
D(exports(-3))	0.020 (0.022)	0.008 (0.024)	
D(exports(-4))	0.052*** (0.018)	-0.039* (0.021)	
D(external debt/GDP)	-0.003 (0.032)	-0.027 (0.045)	0.028 (0.034)
D(external debt/GDP(-1))	0.094** (0.042)	0.056 (0.046)	0.077* (0.044)
D(external debt/GDP(-2))	-0.113*** (0.035)	-0.045 (0.043)	-0.130*** (0.033)
D(external debt/GDP(-3))		-0.080* (0.042)	0.212 (0.135)

³ Model based on AIC lag arrangement of ARDL(1,3,0,4,2,2).⁴ Model based on AIC lag arrangement of ARDL(1,3,1,4,3,4).⁵ Model based on AIC lag arrangement of ARDL(2,3,1,0,2,0).

Variable	Dependent variable		
	PSC/GDP ³	TDC/GDP ⁴	PSC/TDC ⁵
PSC/GDP, DC/GDP, PSC/TDC	0.008** (0.004)	-0.003 (0.002)*	0.212 (0.135)
PSC/GDP, DC/GDP, PSC/TDC (-1))	-0.094** (0.042)	0.003* (0.002)	
PSC/GDP, DC/GDP, PSC/TDC (-2))	0.014*** (0.004)	0.002 (0.002)	
PSC/GDP, DC/GDP, PSC/TDC (-3))		0.004** (0.001)	
PSC/GDP, DC/GDP, PSC/TDC (-4))		-0.003** (0.001)	
Error correction(-1)	-0.361*** (0.077)	-0.482*** (0.128)	-0.638** (0.167)
R-squared	0.998	0.958	0.997
Adjusted R-squared	0.997	0.957	0.996
S.E. of regression	0.024	0.026	0.029
Sum squared residual	0.014	0.012	0.024
Log likelihood	89.034	111.857	99.760
Durbin-Watson stat	1.123	1.919	1.932
Mean dependent variable	23.502	23.502	23.491
S.D. dependent variable	0.521	0.521	0.520
Akaike info criterion	-4.335	-4.184	-3.989
Schwarz criterion	-3.590	-3.190	-3.415
Hannan-Quinn criterion	-4.062	-3.820	-3.778
Breusch-Pagan-Godfrey Serial Correlation test	(F=17.098) (P=0.000)	(F=28.054) (P=0.052)	(F=18.005) (P=0.000)
Breusch-Pagan-Godfrey Heteroskedasticity test	(F=3.835) (P=0.000)	(F=3.256) (P=0.000)	(F= 4.342) (P=0.000)

Source: Authors' computation using Eviews 9; *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.