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Financial Development, Remittances and Economic Growth in Ghana

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1.0 Introduction

By lowering costs of accessing credit, a well-functioning financial market can help direct remittances to projects that yield the highest return and therefore enhance economic growth. It is argued that remittances might become a substitute for inefficient or non-existent credit markets by helping local entrepreneurs bypass lack of collateral or high lending costs and start productive activities. Notwithstanding this, there seems to be a correlation between financial development, remittances and economic growth. Thus, financial development and remittances have been identified as key sources of growth.

The sources of growth have for a long time been debated upon in the literature and among the perceived sources are the use of surplus labour, physical capital investment, technological change, foreign aid and direct investment as well as new ideas from research and development (R&D). Financial development and remittances were not popular in terms of their contribution to economic growth. In recent times, much emphasis has been laid on the possible effects of financial development and remittances by increasing economic growth through poverty reduction and bridging the income inequality gap. However, the potentials of Ghana's growing financial development and huge remittances in promoting economic growth remains silent in the literature.

Before 1983, the financial system of Ghana was monopolized by state owned banks such as Ghana Commercial Bank, Agricultural Development Bank, Bank for Housing and Construction, National Investment Bank and a few others. Competition was rare so the notion was that liberalization of the financial system would breed competition. One of the reasons for liberalizing the financial sector in 1983 was to introduce competition into the banking and non-banking financial sectors. Indeed, after 1983, the economy has witnessed the influx of foreign banks and more are yet to come. The liberalization of the financial sector under Financial Sector Adjustment Programme (FINSAP) and Financial Sector Strategic Plan (FINSSIP) also brought about improved savings, enhanced deposit mobilization, financial deepening and supposedly competition in the banking sector. Ghana's new Banking Act of 2004 also brought some changes into the banking industry including elimination of secondary reserves and increase in minimum capital requirement among others. The tremendous development in the financial sector does not seem to be translated into the desired growth and poverty reduction in spite of some progress that have been achieved in recent times.

The rate at which the financial sector develops matters. When the financial sector develops too fast causing excessive financial sector deepening, it can lead to some form of instability in the sector. It also may encourage greater risk-taking and high leverage, if poorly regulated and supervised. When it comes to financial deepening, there are speed limits. This puts a premium on developing good institutional and regulatory frameworks as financial development proceeds. Studies that have looked at financial sector development and economic growth have neglected the speed of adjustment in financial sector development and its impact on economic growth which is very important for policy implications. For instance, Cecchetti and Kharroubi (2015) argue that financial booms are not, in general, growth-enhancing and a certain level of financial development can drag economic growth. This implies that there could short-term and long-term effects of financial development on economic growth. This issue has not attracted the attention of financial researchers in recent times. Similarly, the role of remittances as a result of financial development has not been given much attention maybe due to its quantum in the past. Recent studies have looked at the impact of remittances on financial development in Africa (Karikari, Mensah & Harvey, 2016) but how the pass-through affect growth rate was ignored.

Motivation and significance of the study

In recent times, Ghana has witnessed an increase in remittance inflow thus making the role of remittances to economic growth very significant. Policy makers have articulated these objectives in the conviction that the level of financial development and remittances can help poor households improve their lives and spur economic activity but in the case of Ghana this has not been explored. The relevance of this study is to provide evidence of the role financial development and remittances play in promoting economic growth and to provide basis of developing appropriate policies for the financial sector and monitor remittances simultaneously. Specifically, the study seeks to explore the joint effect of financial development and remittances on economic growth, as well as the threshold effect of financial development on economic growth. The joint effect of financial development and remittances if present indicates that growth is enhanced through policies that target financial sector development and remittances simultaneously. Such finding helps in understanding the conflicting results in the literature as many studies rely on single indicators hence unable to identify which financial sector variables have positive growth enhancing effects and which does not.

The rest of the paper is organized as follows. Section 2 presents an extensive review of the empirical literature on financial development and economic growth. Section 3 deals with estimation techniques and data issues. The results and discussion are presented in Section 4 and section 5 concludes the paper with some policy recommendations.

2.0 Literature Survey

Financial Development and Economic Growth

The supply-leading potential of financial development and stock market liquidity exerts an independent and positive influence on economic growth (McKinnon, 1973). Financial development stimulates economic growth by increasing the rate of capital accumulation and by improving the efficiency with which economies use capital in the current and future periods (King & Levine, 1993). In addition, financial deepening contributes more to the causal relationship of economic growth in developing countries than in industrial countries, especially to total factor productivity (TFP) growth (Calderon & Liu, 2003).

Figure 1 shows the trend in financial sector development and real GDP growth in Ghana from 1984 to 2015. The relationship between financial development and growth rate has not been consistent between 1984 and 1994. For instance, as financial development fell from 13.68% to 8.54% in 1995 real GDP growth had a slight upsurge from 3.29% in 1994 to 4.11% in 1995. Beyond 1995, both variables remained relatively stable till the year 2003 where financial development experienced a sharp rise from 9.88% in 2003 to 19.76% in 2004.

(Figure 1)

Furthermore, a clear disparity between the two variables can be identified between the period 2004 and 2015, where the country's financial sector experienced a relatively stable trend, but the sector impacted less on the growth of the economy as real GDP growth experienced some fluctuations between the same period though it recorded its highest value (14.04%) in 2011. The implication from Figure 1 is that even though it seems financial development drives economic growth the relationship has not been consistent and thus the effect of financial development of economic growth in Ghana is unclear.

Remittances and Economic Growth

The impact of remittances on economic growth and poverty has been extensively discussed among the academia and policy makers. Although this area of research has been explored extensively and widely, further research on this issue is still required to arrive at overall judgment related to the desirability of remittances for economic growth. On the basis of literature related to effects of remittances on growth, we can summarise the following main channels through which remittances enhance growth in remittances receiving economy.

Fayissa and Nsiah (2008) argued that remittances enhance economic growth in countries where financial systems are not very strong by providing an alternative way to finance investment and help in overcoming liquidity constraints. Iqbal and Sattar (2005) shows that real GDP growth is positively correlated to workers' remittances during 1972-73 to 2002-03 and workers' remittances emerged to be the third important source of capital for economic growth in Pakistan. Adams and Page (2005) used the data on remittances from 71 developing countries to analyse the effect of remittances on inequality, and poverty and concluded that remittances significantly reduce the level, depth and severity of poverty in the developing world.

Figure 2 presents the trend of real GDP growth and remittances for the period 1984 to 2015. It was realised that both variables showed a relatively stable but low value from the period 1984 to 2006 for real GDP growth and up to 2010 for remittances. In the year 2010, remittance recorded a low value of 0.42% while real GDP growth fared well with a value of 7.89 % showing the disparity between the two variables. Furthermore, between the period 2010 and 2011, while remittances increased by 5.4%, real GDP growth further expanded to about 14.04%. However, the increase in economic growth was attributed to the rebasing of the economy coupled with additional revenue from oil exploration that commenced in commercial quantities. Ghana's growth rate reached its peak of about 14% in the year 2011, making it to become one of the fastest growing economies globally during that year (Aryeetey & Baah-Boateng, 2015). Beyond 2011, while remittances attained its peak with a value of 13.27% in 2015, however its impact on real GDP growth was minimal as growth of the economy recorded a low value of about 3.98% in 2015.

(Figure 2)

Joint effect of financial development and remittances on economic growth

In a well-functioning financial sector remittances are supposed to pass through the banking system before getting to the households for spending. This has made some to believe that remittances work well through a developed financial system. Thus, the pass through effect of financial sector development and remittances might be somewhat enormous compared with the individual effects.

In spite of the above theoretical argument, the joint effect of financial sector development and remittances on economic growth has not been clear. While some authors believe that remittances affect growth via the financial sector others believe otherwise. For instance, Freund and Spatafors (2008) and Giuliano and Ruiz-Arranz (2009) noted that remittances can positively affect both investment and economic growth if channelled to projects with higher returns in the presence of well-functioning financial markets that tend to reduce transaction costs. On the contrary, if remittances do not ease liquidity constraints in the financial system or are not used for productive investments, the growth impact of remittances through financial sector channels may be marginal.

3.0 Methodology

Data

The macroeconomic data set for this study spans 1984 to 2015. Annual data for each variable thus real GDP growth, gross fixed capital formation (K), population (L), financial development (FD), remittances (RI), external debt (DEBT), and real exchange rate (REER) were obtained from the 2017 edition of the World Development Indicators (WDI). Data on government revenue (GR) was sourced from the International Monetary Fund (IMF) database while financial development was sourced from the Global Financial Development Database of the World Bank. Real GDP growth from this study is based on annual percentage growth rate of GDP at constant price. Gross fixed capital formation measures the value of acquisitions of new or existing fixed assets by the government and the private sector. Population is defined as the total population between the ages 15 and 64 expressed as a percentage of total population. Furthermore, remittance comprises personal transfers and compensation of employees while the external debt variable is the debt a country owes to a foreign creditor or country. Real Effective Exchange Rate is the nominal effective exchange rate divided by a price deflator or index of costs.

Measurement of Variables

The financial development is an index generated by the World Bank taking into account access, efficiency and stability of the financial system of a country. Remittance is also measured as a percentage of GDP while real GDP growth is assumed as an annual percentage. Furthermore, labour, proxied by population (15-64 years) is also an annual percentage of total population while capital variable was also proxied by the gross fixed capital formation measured as a percentage of GDP. Furthermore, government revenue and external debt variables are also measured as percentages of GDP.

Analytical Technique

Following the neoclassical growth model of Solow (1956), this study adopted the Aggregate Production Function (APF) which expresses the relationship between the capacity of output and the volume of the various inputs used in production. The APF can be expressed below:

$$Y_t = T_t K_t^{\beta_1} L_t^{\beta_2} \dots\dots\dots (1)$$

Where Y_t is the output or income, T_t is the Total Factor Productivity, K_t denotes capital while L_t denotes labour. While “ β_1 ” and “ β_2 ” are the parameters for capital and labour respectively. Total Factor Productivity which takes into consideration the other factors which affects production other than labour and capital is represented. We capture the TFP as seen in equation 2:

$$TFP_t = f (GR_t, FD_t, RI_t, FDRI_t, DEBT_t) \dots\dots\dots(2)$$

In modelling output to be a function of the traditional inputs of labour, we obtain equation (3) taking into account equation (2)

$$Y_t = f\left(K_t^{\beta_1} L_t^{\beta_2} GR_t^{\beta_3} FD_t^{\beta_4} RI_t^{\beta_5} FDRI_t^{\beta_6} DEBT_t^{\beta_7}\right) \dots\dots\dots(3)$$

Where; RI = Remittances, FD = Financial Development, $FDRI$ = Financial Development and Remittances interaction, GR = Government Revenue, $DEBT$ =External Debt whereas $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ are the coefficients of the independent variables, and each is statistically expected not to be equal to zero. Equation (3) can be modelled in an econometric form as:

$$Y_t = \varphi + K_t^{\beta_1} + L_t^{\beta_2} + GR_t^{\beta_3} + FD_t^{\beta_4} + RI_t^{\beta_5} + FDRI_t^{\beta_6} + DEBT_t^{\beta_7} + e_t \dots\dots\dots(4)$$

In operationalizing the model, equation (4) is linearized by logging each variable to obtain equation (5)

$$\ln Y_t = \varphi + \beta_1 \ln K_t + \beta_2 \ln L_t + \beta_3 \ln GR_t + \beta_4 \ln FD_t + \beta_5 \ln RI_t + \beta_6 \ln FDRI_t + \beta_7 \ln DEBT_t + e_t \dots\dots\dots(5)$$

A priori expectations are as follows : $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 > 0$ and $\beta_7 < 0$.

The Autoregressive Distributed Lag (ARDL) Model

In order to establish and analyse the long-run relationships as well as the dynamic interactions among the variables, we model equation (5) following the Autoregressive Distributed Lag technique put forward by Pesaran, Shin and Smith (2001).

First, following Pesaran et al.(2001) as summarized in Choong et al.(2005), an expression of the relationship between financial development and Remittance (FDRI) interaction and growth of output (GDPG) from equation (5) is expressed in an ARDL form as seen in equation (6)

$$\begin{aligned} \Delta \ln Y_t = & \varphi_0 + \phi \ln Y_{t-1} + \alpha_1 \ln K_{t-1} + \alpha_2 \ln L_{t-1} + \alpha_3 \ln GR_{t-1} + \alpha_4 \ln FD_{t-1} + \alpha_5 \ln RI_{t-1} + \\ & \alpha_6 \ln FDRI_{t-1} + \alpha_7 \ln DEBT_{t-1} + \sum_{i=1}^{\rho} \beta_1 \Delta \ln Y_{t-i} + \sum_{i=1}^{\rho} \beta_2 \Delta \ln K_{t-i} + \sum_{i=1}^{\rho} \beta_3 \Delta \ln L_{t-i} + \\ & \sum_{i=1}^{\rho} \beta_4 \Delta \ln GR_{t-i} + \sum_{i=1}^{\rho} \beta_5 \Delta \ln FD_{t-i} + \sum_{i=1}^{\rho} \beta_6 \Delta \ln FD_{t-i} + \sum_{i=1}^{\rho} \beta_7 \Delta \ln FDRI_{t-i} + \\ & \sum_{i=1}^{\rho} \beta_8 \Delta \ln DEBT_{t-i} + \varepsilon_t \dots\dots\dots(6) \end{aligned}$$

Second, to determine the threshold effect of financial development on growth, we present a second ARDL model capturing the quadratic term of financial development in equation (7)

$$\begin{aligned} \Delta \ln Y_t = & \varphi_0 + \phi \ln Y_{t-1} + \alpha_1 \ln K_{t-1} + \alpha_2 \ln L_{t-1} + \alpha_3 \ln RI_{t-1} + \alpha_4 \ln FD_{t-1} + \alpha_5 \ln FD_{t-1}^2 + \\ & \alpha_6 \ln DEBT_{t-1} + \alpha_7 \ln GR_{t-1} + \alpha_8 \ln REER_{t-1} + \sum_{i=1}^{\rho} \beta_1 \Delta \ln Y_{t-1} + \sum_{i=1}^{\rho} \beta_2 \Delta \ln K_{t-i} + \\ & \sum_{i=1}^{\rho} \beta_3 \Delta \ln L_{t-i} + \sum_{i=1}^{\rho} \beta_4 \Delta \ln RI_{t-i} + \sum_{i=1}^{\rho} \beta_5 \Delta \ln FD_{t-i} + \sum_{i=1}^{\rho} \beta_6 \Delta \ln FD_{t-i}^2 + \\ & \sum_{i=1}^{\rho} \beta_7 \Delta \ln DEBT_{t-i} + \sum_{i=1}^{\rho} \beta_8 \Delta \ln GR_{t-i} + \sum_{i=1}^{\rho} \beta_9 \Delta \ln REER_{t-i} + \varepsilon_t \dots\dots\dots(7) \end{aligned}$$

Results

This section presents the cointegration test, stationarity test as well as the short-term and long-term results.

Descriptive Statistics

Table 1 shows the summary statistics of all the variables.

Table 1: Descriptive statistics

	GDPG	L	K	FD	RI	GR	DEBT	REER
Mean	5.54	2.62	20.26	0.14	1.35	5.91	64.77	144.54
Median	4.85	2.58	21.54	0.13	0.41	5.15	64.41	107.37
Maximum	14.05	3.44	30.93	0.21	13.27	14.05	129.32	559.52
Minimum	3.30	2.25	6.85	0.09	0.01	3.30	18.11	69.46
Std. Dev.	2.22	0.25	6.37	0.04	2.67	2.41	31.01	99.03
Skewness	2.11	1.37	-0.51	0.22	3.18	1.52	0.33	2.99
Kurtosis	7.94	5.22	2.31	1.37	13.65	5.26	2.34	12.01
J-Bera	56.25	16.58	2.03	3.78	205.27	19.07	1.17	155.86
Probability	0.00	0.00	0.36	0.36	0.00	0.00	0.56	0.00
Sum	177.26	83.73	648.20	4.59	43.17	189.02	2072.55	4625.43
S.S. Dev	153.41	2.04	1257.47	0.06	221.71	180.39	29816.6	304003.4
Obs.	32	32	32	32	32	32	32	32

Note: S.S. Dev represents Sum of Square Deviation, Obs. denotes Observation, J-Bera also denotes Jarque Bera and Std. Dev. represents Standard Deviation

Unit Root Tests

The Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests with a constant only, and a constant with trend option were used to test the unit root of each. This was done to ensure that none of the variables were integrated of an order above one before applying the ARDL bounds testing approach to co-integration. The null hypothesis of a unit root for the variables were rejected at the various levels of significance as specified in Table 2 and 3 using the ADF and PP tests respectively.

Table 2: ADF Unit Root Test

Variables	Levels		First Difference	
	Intercept	Intercept+Trend	Intercept	Intercept+Trend
GDPG	-3.47**	-3.94**	-8.04***	-7.87***
K	-2.41	-3.04	-9.83***	-17.83***
L	-3.75**	-3.09	-2.33	-1.99
FD	-1.09	-2.09	-5.98***	-6.11***
RI	7.25	9.62	-2.36	-2.31
GR	-2.64*	-4.19*	-12.04***	-18.38***
DEBT	-1.59	-1.84	-4.31**	-4.29**
REER	-12.88***	-25.64***	-11.31***	-8.12***

Note ***, ** and * denotes the rejection of the null hypothesis at 10%, 5% and 1% significance level

Table 3: Phillip Perron Unit Root Test

	Levels		First Difference	
	Intercept	Intercept+Trend	Intercept	Intercept+Trend
GDPG	-3.43**	-3.94**	-8.43***	-4.35**
K	-2.45	-3.15	-6.75***	-6.78***
L	-2.90*	-1.87	-2.23	-5.56
FD	-1.12	-2.09	-5.90***	-5.93***
RI	1.42	3.33*	-4.22	-4.69**
GR	-0.52	-4.22**	-7.74***	-4.25**
DEBT	-1.32	-1.64	-4.33**	-4.31**
REER	-12.83***	-7.01***	-4.38***	-3.80**

Note ***, ** and * denotes the rejection of the null hypothesis at 10%, 5% and 1% significance level

Bounds Test for Co-integration

The study tested for the cointegration among the variables using the bounds testing approach. The two sets of asymptotic critical values assume that the regressors on one hand are purely I(1) and on the other hand, purely I(0). The F-statistics of 50.66 exceeds the upper bound of 3.9 signifying the presence of a long-run relationship among the variables.

Table 4: Bounds Test Result for Co-integration (Model 1)

Critical Value	10% Level		5% Level		2.5% Level		1% Level	
	I (0)	I (1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
K = 7	1.92	2.89	2.17	3.21	2.43	3.51	2.73	3.9
F(DLGDPG)=F (DLRGD/Ln(K),Ln(L), Ln(FDRI),Ln (FD),RI,GR,Ln(DEBT),)							F-Statistics	
							50.65831***	

Source: Estimated by Author from WDI (2016)

The presence of a long-run relationship among the variables indicates the existence of an error correction mechanism. The study went ahead to estimate the long-run and short-run coefficients.

Table 5: ARDL Results (Dependent Variable is Log of Real GDP Growth)

VARIABLE	ARDL	
	SHORT-RUN	LONG-RUN
lnK	0.11** (0.05)	0.39 (0.30)
lnL	0.46*** (0.05)	2.17 (1.43)
lnL(-1)	0.50*** (0.05)	- -
lnGR	0.12*** (0.01)	0.44* (0.23)
lnGR(-1)	0.55*** (0.05)	- -
lnFDRI	0.84*** (0.13)	0.31** (0.12)
lnFDRI(-1)	0.45*** (0.10)	- -
lnRI	0.41*** (0.06)	0.26* (0.13)
lnFD	0.10** (0.05)	0.17 (0.17)
lnDEBT	-0.16 (0.28)	-0.31** (0.13)
CONS	- -	9.14*** (1.48)
ECT(-1)	-0.61*** (0.02)	-

Note ***, ** and * denotes 1%, 5% and 10% level of significance respectively.

Source: Computed by Author using Eviews 9 package

Long-run Estimates

Capital, proxied by gross fixed capital formation was positive but statistically insignificant. However, the sign of the coefficient indicate that capital is an important component of growth. Labour force was also not statistically significant but positively related to economic growth.

Financial sector development was also not statistically significant but carried a positive coefficient. Recent expansion of the financial industry and the various innovative products emerging from the industry could account for this positive sign of the coefficient although it is not significant. Remittance on the other hand, was positive as expected and statistically significant at 10 percent indicating that if remittances increase by 1 percent it boost the economy by 0.26 percent. The combined effect of financial development and remittances was also positive and significant at 10 percent. The net effect (0.3%) of financial development and remittances is statistically significant at 10 percent meaning that a 1 percent increase in remittances given that the financial sector is well developed, enhances growth by 0.3 percent (see Appendix C).

We provide evidence to show the significance of government revenue in economic growth as a 1 percent increase in overall revenue induces growth by approximately 0.44 percent. As expected, we find external debt to have a deleterous effect on growth. A 1 percent increase in the country's sovereign debt by 1 percent retards economic growth by 0.31 percent.

Short-Run Estimates

There is statistical evidence to show that the contemporaneous effect of capital on growth in Ghana is positive. We show that a 1 percent increase in capital stimulates economic growth by 0.1 percent. Labour force is also positive and statistically significant signifying that as the labour force increases by one percent it induces growth by approximately 0.5 percent.

Financial development is positive and statistically significant at 10 percent. We show that if the financial sector develops by 1 percent, it boots growth by 0.1 percent. Remittance is also positive and statistically significant implying that a 1 percent increase in remittances increases economic growth by 0.4 percent. We provide a strong statistical evidence to back our claim that the joint effect of financial development and remittances on growth is higher than their individual effects. We show that a 1 percent increase in remittances given financial development will reduce economic growth by 0.5 percent (See Appendix C). The lag value for the joint effect also shows that a 1 percent increase in the previous year's value of remittance given a financially developed economy leads to a reduction in economic growth by 0.3 percent.

We observe a positive and statistically significant effect of government revenue on economic growth. There is a statistical evidence that as government revenue increases by 1 percent, economic growth also increases by 0.12. External debt carried the expected negative sign but there is no statistical evidence to back in the long-run.

The coefficient of the error correction, -0.61 , implies that about 61 percent of the deviations from the long-run economic growth caused by previous periods shock converges back to the long-run equilibrium in the current period.

Discussion

Our econometric analysis from Table 5 shows the importance of remittances to economic growth. The results indicate that remittances are relevant contributors to the growth of Ghana's economy over the study period. This may be due to remittances incomes flowing through formal financial channels other than being accumulated at home which is later or never invested in economic activities (World Bank, 2009c). Another plausible reason could be that with growing capital markets, remittances are essential in financing investment which could be viewed as supplement to credit and insurance services offered by well-functioning banking system. In this case, remittances are more likely to be devoted to growth generating activities. These results corroborate the conclusions advanced by Fayissa and Nsiah (2008) and Giuliano and Arranz (2009).

Moreover, remittances and financial development interaction proved growth inducing. The net effect of remittance flows into the economy given financial development is growth enhancing. Intuitively, the result indicates that remittances and financial development can jointly be used to promote economic growth in a number of conceivable ways. Theoretically, when remittances enter the financial system, it strengthens the sector and makes funds available for investment. As these funds are channelled into investment in productive activities, output increases overtime thereby enhancing the growth of the economy. Besides, remittances improve the welfare of both the residents receiving remittances and the Other Remaining Residents (ORRs) who do not migrate. This is because, while emigration rules out the possibility of trade in the market for non-traded goods between the migrants and the ORRs, it offers the latter group new trading opportunities in the same market with the families of migrants that attempt to increase their consumption. Such an effect should be even stronger if remittances flow towards the neediest

groups of the population, thus contributing to poverty reduction. Second, by sending remittances, migrants play the role of financial intermediaries, enabling households and small-scale entrepreneurs to overcome credit constraints and imperfections in financial markets when they intend to invest in human and physical capital. It is not surprising that the combined effect of remittances and financial development is stronger than the individual effects. As evident in the literature and chiefly elaborated by Freund and Spatafors (2008), and Giuliano and Ruiz-Arranz (2009), remittances can boost investment and economic growth if channelled to projects with higher returns in the presence of well-functioning financial markets that tend to reduce transaction costs. In such cases, remittances may potentially contribute to raising the country's long-run growth through higher rates of capital accumulation. The combined effect also shows that synergy effect of financial development and remittances on growth which was higher than the individual effect of the variables. This calls for twin policies in terms of financial development and remittances to enhance economic growth. Thus, remittances should be encouraged to pass through the financial system into the country.

Consistent with literature, we also find that financial development facilitates economic growth based on the results from the estimation despite it been statistically not significant in the long-run. One plausible reason is that a well-functioning financial market by lowering costs of conducting transactions, may help channel remittances to projects that yield the highest return and therefore enhances growth. Improving the services provided by financial intermediaries such as banks and insurance companies, will lead to enhancing productivity and result in improving total factor productivity leading to higher rates of growth.

The growth enhancing effect of capital on growth stem from the theoretical conclusions of the classical and neo-classical schools of thought that capital (thus plants, machinery and equipment dichotomised into construction of roads, railways, and others such as schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings) contributes positively to growth of output. The finding concurs that of Shaheen et al., (2013) and Falki (2009). It is also consistent with conclusions reached by Ibrahim (2011) and Asiedu (2013) in the case of Ghana. Ibrahim (2011) and Asiedu (2013) found positive and statistically significant effect of capital on economic growth for Ghana.

Again, we find labour force to be growth inducing but only in the short-run. This supports the neo-classical's argument on growth theory that growth of the labour force (denoting the

proportion of the total population aged between fifteen (15) and sixty-four (64) years) is the active and productive population which boost production as wages for informal workers are bid downwards. This is consistent with the argument of Jayaraman and Singh (2007) and Ayibor (2012) who asserted that there can be no growth achievement without the involvement of labour as a factor input. This result however contradicts the works of Frimpong and Oteng-Abayie (2006), and Sakyi (2011) that found a negative effect of labour on economic growth.

The evidence of a detrimental effect of debt on growth is not farfetched as Ghana's debt stock has continue to soar over the past one and half decades. In particular, a persistent high level of public debt can consequently trigger detrimental effects on capital accumulation and productivity, which potentially has a negative impact on economic growth (Kumar and Woo, 2010). An important channel through which public debt accumulation can affect growth is that of long-term interest rates. Higher long-term interest rates, resulting from more debt-financed government budget deficits, can crowd-out private investment, thus dampening potential output growth. Indeed, if higher public financing needs push up sovereign debt yields, this may induce an increased net flow of funds out of the private sector into the public sector. This may lead to an increase in private interest rates and a decrease in private spending growth, both by households and firms (Elmendorf & Mankiw, 1999).

Robustness Check for ARDL Model 1

Table 6: Model Diagnostics and Stability Tests (ARDL Model1)

Test Statistics	F-statistics/Chi2	Probability Value
Serial Correlation	X_{auto}^2 $F(2,66)0.19$	0.83
Functional form	X_{Reset}^2 $F(1,67)0.68$	0.43
Normality Test	X_{Norm}^2 Not Applicable	0.62
Heteroscedasticity	X_{BP}^2 $F(18,11)1.04$	0.49

Table 6 presents the diagnostic tests of the entire model. From Table 6, it is evident that the estimated model passes all the diagnostic tests indicating that the model is a fit of the data. It is clear that the model passes the test of misspecification, heteroscedasticity, normality and serial correlation

Financial Development Threshold

Table 7: Long-run Result for the FD Threshold

Variable	Coefficient	Std. Error	T-Statistic	Prob.
LN(K)	0.11**	0.03	4.25	0.01
LN(L)	1.35**	0.24	5.67	0.01
LN(FD)	1.34*	0.36	3.72	0.05
LN(RI)	0.04*	0.05	0.02	0.05
LN(FD^2)	-0.96*	0.40	-2.41	0.07
LN(DEBT)	0.01**	0.00	3.89	0.02
LN(GR)	0.11	0.06	1.75	0.16
LN(REER)	0.01**	0.00	4.02	0.02
C	2.01	1.08	1.85	0.14

*Note: *, ** and *** denotes the rejection of the null hypothesis at 10%, 5% and 1% significance level, LN denotes Logarithm*

Source: Computed by Author using Eviews 9 package

Table 7 presents the long-run coefficients for the analysis for the threshold effect of financial development on economic growth in Ghana. The results indicate the existence of a nonlinear relationship between financial development and economic growth as shown by the quadratic term of financial development. Thus, the presence of an inverted U-shape between the variables is confirmed by the positive coefficient of financial development which has a statistically significant effect on economic growth but up to a threshold, the effect declines eventually. A further evidence to prove the presence of the threshold effect is to determine the rate of change in equation (3) as seen in Appendix C. The ECT in Table 10 was negative confirming the co-integration relationship between the variables of interest (see Appendix A).

We show that a 1 percent increase in financial development results in a 1.3 percent increase in economic growth. However, the quadratic term of financial development on economic growth further indicates that the threshold effect of the coefficient above which it becomes detrimental to economic growth is about 0.70. This further indicates that financial development is associated with higher levels of economic growth in Ghana up to the threshold of approximately 70 percent beyond which it may cause a decline in economic growth. This indicates that expansion of the financial sector propels economic growth however excessive expansion of the financial sector above 70 percent may hinders economic growth (Appendix C).

The threshold effect also indicates that at a certain level, financial institutions assume a higher share in the economy and this can be harmful to growth. Though Ghana has not experienced

such economic situation, excessive expansion of the sector could result in a less efficient use of financial resources. Such a situation could happen when the financial resources are allocated to less productive activities which causes the country's overall productivity to fall hence slowing down economic growth. Thus, too much expansion of the financial sector could cause the '*heating up*' of the economy. This further suggest that though the Ghanaian financial sector helps in propelling economic growth when given the needed support, it is important for the Central Bank to initiate measures to control the expansion of the sector in the economy in order not for it to become detrimental to the economy.

Diagnostic tests for the model as shown in Table 9 in Appendix A indicate that the model does not show any problem of a serial correlation, heteroscedasticity, model misspecification, and normal distribution. Moreover, the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squared Recursive Residuals (CUSUMSQ) tests of stability in Figure 3 of Appendix A show convergence and no erratic or systematic changes in parameters.

Conclusions and Policy Implications

This paper examined the relationship between financial development, remittances and economic growth in Ghana. First, the focus of the study was to determine the joint effect of financial development and remittances on economic growth empirically. Second, the study estimated the level of financial development in Ghana beyond which growth can be hampered. The financial development threshold indicates that an over expansion of the financial sector could have a declining effect on economic growth. This might be due to the fact that the financial sector may compete with the rest of the economy for limited resources. A key policy implication derived from this study is that measures that attract remittances and those that will enhance the financial sector should be implemented simultaneously. For instance, government should allow individuals to own repatriable foreign accounts with the local banks to grant them the permission to make deposit into such accounts even when outside the country. However, effective monitoring of such accounts should be undertaken to avoid it from being used for money laundering activities. Furthermore, the threshold effect of the financial development on economic growth signals that an over expansion of the financial sector could have negative consequences on growth thus care should be taken in order to avoid the adverse effect of an over expanded of financial system.

Limitation of the study

Data on remittances that do not pass through the banking system is not available. We therefore, used formal remittances which might underestimate the effect of remittances on growth.

REFERENCES

- Adams R. H. & Page, J. (2005). Do International Migration and Remittances Reduce Poverty in Developing Countries. World Bank, Washington, DC, USA
- Ahmed, A. D. (2006). The Impact of Financial Liberalization Policies: The case of Botswana, *Journal of African Development*, 1(7), 13-38.
- Calderon, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, 72(1), 321-334.
- Cecchetti, S.G. & Kharroubi, E (2015). Why does financial sector growth crowd out real economic growth? BIS Working Papers No 490.
- De Gregorio, J., & Guidotti, P. E. (1995). Financial development and economic growth. *World Development*, 23(3), 433-448.
- Demirguc-Kunt, A. & Levine R. E. (2008). Finance financial sector policies, and Long Run Growth in M. Spence Growth Commission Background paper, No 11 Washington, D. C. World Bank.
- Fayissa, B. & Nsiah, C. (2008). The impact of remittances on economic growth and Development in Africa. Department of Economics and Finance Working Paper Series.
- Freund C., & Spatafora, N. (2008). Remittances, transaction costs, and informality, *Journal of Development Economics*, 86(2), 356-66.
- Giuliano P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth, *Journal of Development Economics*, 90(1), 144-52.
- Iqbal, Z & Abdus, S. (2005). The contribution of workers' remittances to economic growth in Pakistan. Research Report. Pakistan Institute of Development Economics.
- Karikari, N. K., Mensah, S., & Harvey, S. K. (2016). Do remittances promote financial development in Africa? *SpringerPlus*, 5(1), 1011. <http://doi.org/10.1186/s40064-016-2658-7>
- King, R.G., Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics* 108, 717-738.

- Levine, R., Zervos, S. (1998). Stock markets, banks, and economic growth. *American Economic Review* 88, 537–558.
- McKinnon, R.I. (1973). *Money and Capital in Economic Development*. Brookings Institution, Washington, DC.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326.
- Svirydzenka, K. (2016). *Introducing a new broad-based index of financial development*. International Monetary Fund.

APENDICES

APPENDIX A

Table 8: Bounds Test Result for Co-integration (ARDL MODEL 2)

Critical Value	10% Level		5% Level		2.5% Level		1% Level	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
K = 8	1.92	2.89	2.17	3.21	2.43	3.51	2.73	3.9
Dependent Variable							F-Statistics	
F(DLGDPG)=F (LN(K), LN(PG),LN(FD),LN(FD ²),								
LN(RI), LN(DEBT)),LN(GR),LN(REER))								
							5.8960***	

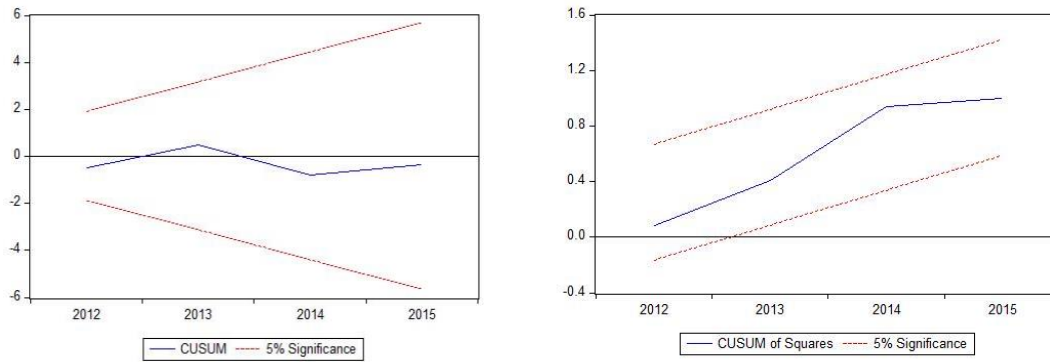
Source: Estimated by Author from WDI (2016) using Eviews 9.0 package; the critical values were obtained from Pesaran et al (2001)

Table 9 :Model Diagnostics (ARDL MODEL 2)

Test Statistics		F-statistics	Probability Value
Serial Correlation	X_{auto}^2	F (1,3)3.81361	0.1459
Functional form	X_{Reset}^2	F (1,3)2.085455	0.2444
Normality Test	X_{Norm}^2	Not Applicable	0.6945
Heteroskedasticity	X_{BP}^2	F (25,4)1.5190	0.3734

Source: Computed by the author using Eviews 9.0 Package

Figure 3: Plots of CUSUM and CUSUMSQ for Model 2



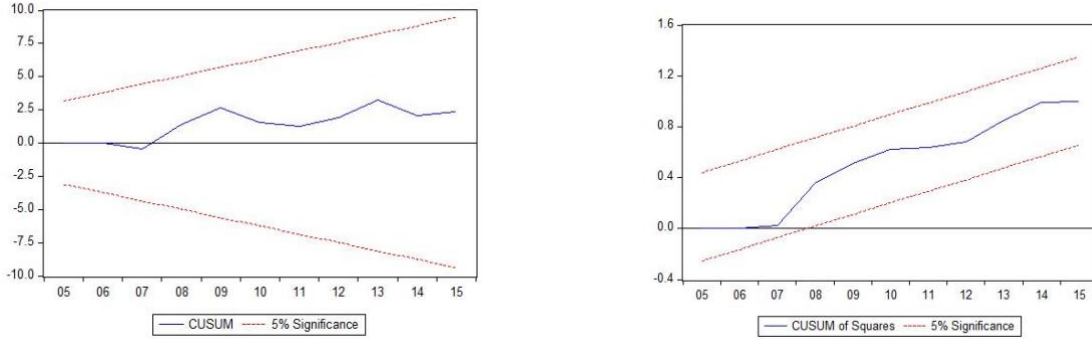
APPENDIX B

Table 10: Short-run Result for the Threshold (Model 2)

Variable	Coefficient	Std. Error	T-Statistic	Prob.
DLN(GDP(-1))	0.7517***	0.0354	21.2136	0.0000
DLN(K)	0.0839***	0.0063	13.3213	0.0002
DLN(K(-1))	0.1885***	0.0137	13.7622	0.0002
DLN(PG)	-0.9759***	0.0785	-12.4403	0.0002
DLN(PG(-1))	1.6169***	0.1236	13.0858	0.0002
DLN(RI)	-0.0001	0.0013	-0.0673	0.9496
DLN(RI(-1))	0.0056*	0.0012	4.4039	0.0117
DLN(FD)	-0.4750***	0.0346	-13.7298	0.0002
DLN(FD(-1))	0.1253***	0.0138	9.0503	0.0008
DLN(FD ²)	0.4149***	0.0329	12.6184	0.0002
DLN(FD(-1)) ²	0.3346***	0.0262	12.7814	0.0002
DLN(DEBT)	-0.0072***	0.0005	-14.3386	0.0001
DLN(DEBT(-1))	-0.0003*	0.0005	-4.2606	0.0130
DLN(GR)	0.0529***	0.0029	17.9727	0.0001
DLN(REER)	-0.0061***	0.0004	-14.3357	0.0001
DLN(REER(-1))	-0.0005**	0.0001	-7.2031	0.0020
ECM	0.6781***	0.0489	13.8427	0.0002

Note *, ** and *** denotes the rejection of the null hypothesis at 10%, 5% and 1% significance level

Figure 4: Plot of CUSUM and CUSUMSQ (Stability Test for Model 1)



APPENDIX C

Calculation the effect of the interaction between FD and RI and the threshold of FD.

In this appendix we demonstrate how the interaction between financial development (FD) and remittances (RI) are calculated. We also show how the turning point or the threshold effect of financial sector development is calculated.

1. Interaction between FD and RI (FDRI)

Long-run

$$\begin{aligned}
 LN(GDPG) &= 0.31LN(FD) + 0.26LN(RI) + 0.31LN(FDRI) \\
 \frac{dGDPG}{dRI} &= 0.26 + 0.31LN(FD) \\
 &= 0.26 + 0.31(0.14) \\
 &= 0.26 + 0.04 \\
 &= 0.3\%
 \end{aligned}$$

Thus the joint effect of FD and RI on economic growth is estimated at 0.3%.

Testing for the significance of the Interaction

$$H_0: FDRI = 0$$

$$F(1, 24) = 4.85$$

$$\text{Prob} > F = 0.0375^{**}$$

Short-run

For FDRI:

$$\begin{aligned}
 LN(GDPG) &= 0.10LN(FD) + -0.41LN(RI) + -0.84LN(FDRI) \\
 \frac{dGDPG}{dRI} &= -0.41 - 0.84 LN(FD) \\
 &= -0.41 - 0.84(0.14) \\
 &= -0.41 - 0.12 \\
 &= -0.53\%
 \end{aligned}$$

For $FDRI_{t-1}$

$$LN(GDPG) = 0.10LN(FD) + -0.41LN(RI) + 0.45LN(FDRI)$$

$$\begin{aligned} \frac{dGDPG}{dRI} &= -0.41 + 0.45 LN(FD) \\ &= -0.41 + 0.45(0.14) \\ &= -0.41 + 0.07 \\ &= -0.34\% \end{aligned}$$

2. Threshold Effect for Financial Development

$$LN(GDPG) = B_0 + 1.34 LN(FD) + -0.96LN(FD^2) \dots\dots\dots(1)$$

First Order Condition:

$$\begin{aligned} \frac{dGDPG}{dFD} &= 1.34 + 2(-0.97)LN(FD) \dots\dots\dots(2) \\ &= 1.34 + -1.93 LN(FD) \end{aligned}$$

$$-1.34 = -1.93LN(FD)$$

$$\frac{-1.34}{-1.93} = LN(FD)$$

$LN(FD) = 0.70$. This implies that any expansion of the financial sector beyond 70% may contribute decline in economic growth.

Testing for the significance of the Coefficient

$$H_0: FD = 0$$

$$F(1, 24) = 11.94$$

$$\text{Prob} > F = 0.0021***$$

Second Order Condition:

$$\frac{dGDPG}{dFD} = 1.34 + 2(-0.97)LN(FD)$$

$$\frac{dGDPG}{dFD^2} = 2(-0.97) < 0 \dots\dots\dots(3)$$

$$= -1.94\%$$