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Financial sector development and economic growth: evidence from Cameroon

Janice Tieguhong Puatwoe* and Serge Mandiefe Piabuo

* Correspondence:
puatwoejanice@gmail.com
TTRECED-CAMEROON,
YaoundeCentreCameroon

Abstract

For decades, African economies have embarked on financial sector reforms. However, the empirical implications of these reforms have been divergent. This paper investigates the impact of financial development on Economic growth using time series data in Cameroon. This investigation was carried out using three common indicators of financial development (broad money, deposit/GDP and domestic credit to private sector). Using the Auto Regressive Distributive Lag (ARDL) technique of estimation, it was discovered that there exist a short-run positive relationship between monetary mass (M2), government expenditure and economic growth, a short run negative relationship between bank deposits, private investment and economic growth equally exists. However in the long run, all indicators of financial development show a positive and significant impact on economic growth. This paper thus confirms the existence of a positive and long-term impact of all the indicators of financial development on economic growth through bound test. It is therefore proposed that the financial reforms in Cameroon should be pushed forward in order to boost the development of the financial sector thus an increase in its role on economic growth.

Keywords: Financial development, Economic growth, Financial intermediation, Endogenous growth

Background

The accumulation of financial assets at a more rapid rate than the accumulation of non-financial assets is called financial development according to Shaw (1973). According to Levine (2004), financial development occurs when financial instruments, financial markets and financial intermediaries, reduce without necessarily eliminating the costs of obtaining information, the costs of executing contracts and the costs of transaction, as a consequence do a better job by offering financial functions. Economists' understanding of the nature and relationship which exist between financial systems and economic growth has evolved over time.

The role of the financial system on economic development has attracted and received increased attention from both academia and policy makers (Ndikumana 2001), with resulting divergent views emerging. Over the past decades, focus on this area has increased, with mixed findings which remains a theoretical and empirical controversy (Boulika and Trabelisi 2002). Financial development has played a leading role

in many developing economies. There is a widespread believe among policy makers that financial development enhances productivity which promotes growth. The various findings made on financial development and economic growth varies due to different methods used in research. Some researchers found that financial development has a positive effect on economic growth (Kar and Pentecost 2000; Boulika and Trabelisi 2002) while others arrive at an opposite conclusion (Lucas 1988; Stern 1989).

Contemporary finance researchers have extensively investigated the link between financial liberalization and other macroeconomics variables, but the role of financial development is not universally accepted. One of the oldest findings on the relationship between financial development and economic growth is based on Schumpeter (1912) who asserts that, the services provided by the financial intermediaries are important for innovation and development. According to Bagehot (1873) and Hicks (1969), development in the financial system played a critical role in industrialising England through the facilitation of capital mobilisation. Schumpeter (1912) harnesses the importance of the banking system in economic growth; financial institutions support innovation and creativity and thus enhance future growth by identifying and funding productive investments. Therefore, it facilitates the creation of wealth, trade and the formation of capital (Ahmed 2006). A further step taken by Fry (1978, 1980) and Galbis (1977) suggested that, interventions to impose restrictions on the banking system such as credit ceilings and high reserve requirements have a negative impact on the development of the financial sector, which ultimately reduces economic growth. In addition, (Levine 1997) suggested that aiding risk management, improving liquidity and reducing transaction costs leads to financial system development and thus encourages investments.

However, Lucas (1988) and Stern (1989) suggested that there is no relationship between financial system development and economic growth. According to Lucas (1988) finance is an “overstressed” determinant of economic growth. Therefore, any strategies aimed at promoting financial system development would be a waste of resources, as it diverts attention from more relevant policies such as labour and productivity improvement programs, implementation of pro-investment tax reforms, encouragement of exports; amongst others.

Other researchers suggest that the financial system develops in response to improved economic growth. According to Robinson (1952) “where enterprise leads, finance follows”, that is, as an economy grows the financial sector responds to the demands of the economy. A number of studies (Gurley and Shaw 1955; Goldsmith 1969; Jung 1986; Kar and Pentecost 2000; Boulika and Trabelisi 2002; Islam 2004; Guryay et al. 2007) suggest a unidirectional causality running from growth to finance. Countries whose economies grow faster, are forced to devote more investment on improving their financial system in order to stabilise their economic environment (Padilla and Mayer 2002).

On the other extreme are those who suggest that financial system development is anti-growth (Van Wijnberg 1983, Buffie 1984). Development in financial system facilitates risk amelioration and efficient resource allocation; this may reduce the rate of savings and risk, consequently leading to lower economic growth (Levine 2004). However, this follows the basic assertion that, where there is high risk there is high return.

From the empirical evidence above, it can be noticed that there is divergence in the effect of financial development on economic growth. These studies also show divergence in results of the direction of causality between financial development and

economic growth in the short-run and in the long-run. These views vary due to changing dynamics of financial policies in the countries studied and the response of these economies to policies, level of development and governance equally vary substantially. All these divergent views give enough reasons to investigate the impact of financial development on economic growth in Cameroon. Previous studies carried out in Cameroon used co-integration regression model (Tabi et al. 2011), and panel regression model (Elie 2015). This paper distinguishes itself from the others in so many aspects; firstly it uses three indicators of financial development which permits the researchers to capture all aspects of bank based financial development. Secondly to the best of our knowledge, no paper has investigated the relationship between financial development and economic growth in Cameroon using the Auto Regressive Distributive Lag model (ADRL). This model permits the verification of short-run and long-run relationships, it equally allows the use of variables integrated at different levels and it produces robust results (Narayan 2005) and is appropriate when a sample size is small (Odhiambo, 2008). Previous studies in Cameroon did not capture recent economic and financial dynamics since the time frame of their studies date back to 2006. Thirdly, this paper will equally contribute to literature by incorporating recent time series data which captures recent policies aimed at liberation and regulation of the financial sector. In this direction, this paper seeks to respond to the following research question: Is there a short-run or long-run relationship between financial development and economic growth?

Financial system of Cameroon

Cameroon harbors the Bank of Central African States (BEAC), which is the central bank of all the member states of the Economic Community of Central Africa States (CEMAC) to which Cameroon belongs with headquarters being in Yaoundé. Commercial banks, postal banks (CAMPOST), insurance companies, non-banking financial institutions, and the Douala Stock Exchange (established in 2002) are under the supervision of this central bank. This central bank (BEAC) replaced the central bank of the states of Equatorial Africa which Cameroon became a member in 1972. In 1993 the member states of BEAC created a supervisory authority, known as Commission Bancaire de l'Afrique central (COBAC) whose role is to secure and regulate the regions banking system. In 1999, Cameroon's banking system consisted of nine commercial banks with 60 branches. Although bank branches decreased from 105 in the year 1995 to 104 in the year 2005 and as well became concentrated in the big cities, there was however a significant increase in the number of banks from eight banks in 1995 to 10 in 2005. This number has increased further to 15 in 2017 with Credit Communautaire d'Afrique(CCA) gaining the status of a commercial bank. The banking sector plays a major role in the financial sector of Cameroon; it accounted for about 84.4% of the total assets of the financial sector in 2005, and contributed 19.6% to GDP. Although the financial sector in Cameroon is still not well-developed, it encompasses the largest financial sector in the CEMAC zone, and contributes about 55% of CEMAC's financial assets in 2005, the bulk of which is from the banking sector.

Nevertheless, a number of factors have contributed to the current underdevelopment of the Cameroonian financial sector. The financial system in Cameroon which is still in its infancy operates with very limited amount of financial instruments and constitutes

mostly of banks as the main arm, with an underdeveloped financial market. The underdevelopment of the Cameroonian banking sector can be attributed to financial repression with the key elements being the extensive presence of the government within the financial sector and government ownership of major financial institutions. For instance, in 1986, the government was the shareholder in six out of eight commercial banks, and possessed a majority ownership in two of them (IMF, 2007). In addition, there has been no significant development in institutions such as leasing institutions, housing institutions, and hire-purchase companies amongst others, with the activities of commercial banks in the country being reduced to a traditional banking function, focused on short-term lending, accounting for about 87.3% of all credit to the economy in 1995 (IMF, 2007). Also, the distribution of banks in the economy is heavily skewed towards urban centers thus making a significant part of the country denied access to banking facilities. Furthermore, the use of physical cash is as well still much rampant and some economic actors still having very little knowledge on other banking services and financial instruments that can facilitate their transactions.

Literature review

Empirical investigation of the relationship between financial development and economic growth is abundant globally. Empirical evidence over time has not been conclusive on this relationship with three prominent outcomes from these studies; positive, negative and no impact. The tables below shows a summary of studies in different countries or regions, their major findings and it equally indicates the methodology used. The objective is to have a global view of countries or regions with positive, negative and no impact (Tables 1 and 2).

Financial development has played a leading role in many economies of Less Developed Countries (LEDCs) and Africa especially. Although the relationship between financial development and economic growth has received widespread attention in the modern history of economics, the conclusions have been far from conclusive. The finance growth nexus debate can be traced to the work of Schumpeter (1911) during the early twentieth Century. The thrust of the debate has been whether financial development has any impact on economic growth, and if it has, whether the impact is positive or negative. However, there has been a widespread believe among policy makers that financial development enhances productivity and thus promotes growth. From the panel 1 perspective, Fry 1988; Beck et al.(2000), Beck et Levine (2004), King and Levine (1993), Jeanneney et al. (2006) amongst other studies have found evidence that development of the financial sector leads(positive impact) to economic growth. In addition, from panel 2 perspective, Tabi et al. (2011), Elie (2015), Djoumessi (2009) and Madiefe (2015) have reinforced the argument that financial development has a positive impact on economic growth in Cameroon and some sub-Saharan African countries such as South Africa.

Despite the overwhelming evidence that financial system development has a positive impact on economic growth in panel 1 and 2, alternative points of views still exist. There are a number of studies that provide evidence in support of the fact that financial development has a negative impact on economic growth. Al-malkawi et al. (2012), De Gregorio and Guidotti (1995), Bernard and Austin (2011) amongst others found a negative impact of financial development on economic growth in certain countries. A

Table 1 Literature review excluding Cameroon

Panel 1: Financial development and economic growth out of Cameroon			
Authors	Country/Region	Methodology	Main findings
Fry (1988)	14 Asian developing countries	parametric and nonparametric estimation techniques	Positive impact
Ikhide (1993)	Selected African countries	Panel regression	Positive impact
Seck and Elnil (1993)	30 African countries	Multivariate panel regression technique	Positive impact
Luintel and Khan (1999)	90 countries	Multivariate Vector Auto Regressive model	double-causality link between the variables of each country
Christopoulos and Tsionas (2004)	10 countries	model of multivariate co-integration	Long-term causality
Beck et al. (2000)	74 developed and developing countries	transversal analysis, Generalised Method of Moments (GMMs)	Positive impact
Beck and Levine (2004)	40 countries	Generalised Method of Moments (GMMs)	Positive impact
Huran and Chun (2013)	89 countries(INDs, EMEs, ODCs)	Bayesian dynamic factor model	-Positive impact (INDs,EMEs) -No Impact (ODCs)
Kar and Pentecost (2000)	Turkey	Granger causality, Co-integration, Vector Error Correction Model (VECM)	Unidirectional causality (Economic growth to Financial development)
Güryay et al. (2007)	Northern Cyprus	Ordinary Least Squares techniques	Positive impact (Insignificant)
Islam et al. (2004)	Bangladesh	Granger causality	Causal direction (economic growth to financial development)
Adusei (2013)	Ghana	- Cointegration - FMOLS(Fully-Modified Ordinary Least Squares) - Error correction - GMM	-negative impact: Financial development undermines economic growth (Financial development is an anti-growth factor)
Levine and Zervos (1996)	49 countries	Cross-country regression analysis	Robust correlation (No relation of stock market volatility, capitalisation and international financial integration with economic performance)
Al-Malkawi et al. (2012)	United Arab Emirates	ARDL approach	They found that there existed a negative relationship between economic growth and development of financial sector and also bidirectional causality between economic growth and development of Financial sector.
Bloch and Tang (2003)	75 countries	Time-series analysis	They found that there existed no significant relationship between economic growth and development of financial sector.
King and Levine (1993)	80 countries	Contemporaneous regressions and sensitivity analyses	They determined a strong correlation between economic growth and development of financial sector.
Jeanneney et al. (2006)	China	Generalized method of moment system estimation	They reached the finding that development of financial sector affected Productivity growth positively.
Yildirim et al. (2013)	Emerging European economies (Bulgaria, Croatia, Hungary, Latvia, Lithuania,Poland, Romania,Russia, Turkey, and Ukraine)	Asymmetric causality test based on stationary Toda-Yomamoto approach	They found that there was unidirectional causality from economic growth to development of financial sector.
Hakeem and Oluitan (2013)	24 sub-Saharan countries	Panel co-integration test, impulse-response and sensitivity analyses	They found there existed unidirectional causality from real output to development of financial sector.

Table 1 Literature review excluding Cameroon (*Continued*)

Panel 1: Financial development and economic growth out of Cameroon			
Authors	Country/Region	Methodology	Main findings
De Gregorio and Guidotti (1995)	A large number of countries	panel data regressions with random effects	Negative impact (in Latin America)
Adu et al. (2013)	Ghana	autoregressive distributed lag model (ARDL)	Negative impact (when broad money stock to GDP ratio is used as proxies of financial development)
Ujunwa and Salami (2010)	Nigeria	co-integration and error correction modelling technique	Negative impact (when stock market development is proxied by total value of shares traded)
Bernard and Austin (2011)	Nigeria	Ordinary Least Square (OLS) regression techniques	Negative impact (when stock market development is proxied by market capitalization and value traded ratios)
Andersen and Tarp (2003)	74 countries	Panel GMM regression	No impact
Ram (1999)	95 countries	Multiple-growth regression model	No impact

Source: Compiled by author

close view of the major results shows developing countries are more likely to report a negative impact of financial development on economic growth. This can be due to country specific characteristics, institutional framework and governance related issues.

In addition to the strong view that there is a relationship between financial development and economic growth, irrespective of whether this relationship is positive or negative, there have been a few studies that suggest that financial development has no impact on economic growth. These studies provide evidence in support of the notion that financial development and economic growth are not related and they are two different phenomena that are independent of one another. Such studies include Bloch and Tang (2003), Levine and Zervos (1996), Ram (1999), Andersen & Trap (2003). Furthermore, some empirical studies such as Yildırım et al. (2013), Hakeem and Oluitan (2013), Islam et al. (2004), Kar and Pentecost (2000) showed evidence that there exist a unidirectional causality from economic growth to financial development in some countries. On the other extreme, Adusei (2013) provides evidence that financial development undermines growth in an economy (financial development is an anti-growth factor).

Data and methodology

Data

The time series variables retained for this study covers the period 1980-2014(34 years).The variables (dependent and independent) are extracted from the World Development Indicators (WDI, 2016) of the World Bank.

Model

The empirical link between financial development and economic growth to be estimated in this paper is adapted from a simple model developed by De Gregorio and Guidotti (1995) and Abduroluman (2003). In this model the financial development variable is included in an endogenous growth model. The model shows how indicators of financial development through economic relations turn to have an impact on

Table 2 Financial development and economic growth in Cameroon

Author(s)	Country/Region	Methodology	Main findings
Tabi et al. (2011)	Cameroon	Johansen method of co-integration analysis	Positive effect
Elie (2015)	21 Sub-Saharan African (SSA) countries	dynamic panel GMM technique	positive link between financial development and economic growth
Djoumessi (2009)	Cameroon and South Africa	ARDL, VECM	-positive impact (In Cameroon when the two methods of estimation are used) -Positive impact in South Africa when VECM is used and independent relationship when ARDL is used.
Mandiefe (2015)	Cameroon and South Africa	VECM	-(Positive) Long-run relationship between two variables (Cameroon) -Short-run relationship between bank deposits and economic growth, long-run relationship between economic growth financial development and (South Africa)

Source: Compiled by author

economic growth. The equation below shows the functional and econometric relationship between the variables of the study.

$$\text{Economic growth} = f(\text{financial development, macro-economic environment}) \quad (1)$$

$$\begin{aligned} \text{Economic growth (GDP)} = & \alpha + \beta_1 \text{domestic credit to private sector}_t \\ & + \beta_2 \text{bank deposits}_t + \beta_3 M2_t \\ & + \beta_4 \text{private investment}_t \\ & + \beta_5 \text{government expenditure}_t + \varepsilon_t \end{aligned} \quad (2)$$

Where α = constant, ε_t = error term, while $\beta_1, \beta_2, \beta_4, \beta_5$, are coefficients.

Independent variables

Indicators of financial development

Financial development is captured through two aspects of the financial system of Cameroon; financial depth and financial efficiency.

Financial depth With inspiration from Financial Development and Structure Dataset (FDSD) and finance literature (Asongu 2011a, b, c, d), this paper measures financial depth from two perspectives; Broad money which captures broad money and demand while financial system deposits captures savings and time deposits, which are both expressed as a percentage of GDP. Economic and financial sector indicators will be used, broad money (M2/GDP) and financial system deposits (Deposits).

Financial efficiency The efficiency of a financial system is the ability of the system to perform its principal role of transforming deposits to credits (Asongu 2012). Domestic credit to private sector is used in this paper as an indicator of financial efficiency.

Control variables***Government expenditure***

This control variable captures the effect of government expenditure. The choice of variable is inspired by the fundamental role of public expenditure in spurring economic activities and development.

Private investment

This variable captures gross formation of fixed capital, and permits us to see how investment increases output which subsequently leads to economic growth.

Dependent variable***GDP growth rate***

This variable captures the rate at which the economy grows from 1 year to another; it captures value added from year to year.

Model and estimation procedures

This research will make use of a technique suggested by Pesaran et al. (2001) known as Autoregressive Distributive Lag Model (ARDL), which is based on the general to specific modelling technique. In order words, this research utilises the newly proposed autoregressive distributive lag (ARDL) approach which was developed and introduced by Pesaran and Shin (1995 and 1998), Pesaran et al. (1996), Pesaran (1997) and Pesaran et al. (2001), and later revised by Nayaran (2005) for the case of small sample size data(30-80 observations).

The Autoregressive Distributive Lag (ARDL) model is adopted as a method of estimation in this study. This model is advantageous over other techniques of co-integration because it permits the use of variables that become stationary without differencing $I(0)$ and variables that become stationary after first differentiation $I(1)$, it does not accept variables that become stationary after second differentiation $I(2)$. Also, this technique can be applied irrespective of whether the variable is $I(0)$, $I(1)$ or fractionally co-integrated (Pesaran 1997). Rather than having a multiple equation to estimate as in the case of the Vector Autoregressive (VAR) model, it involves just a single-equation set-up, which makes it simple to implement and interpret. Also different variables can be assigned different lag-lengths as the model is entered. The ADRL technique is free of residual correlation since variables stand as a single equation; it is easy to derive the error correction model from simple linear transformation by integrating short run adjustments with long run equilibrium without loss of information. In addition, this model as well takes sufficient number of lags to capture the data generating process in a dynamic framework of general-to-specific modeling framework. Furthermore, the error correction term (ECT) which integrates short-run adjustments with long-run equilibrium without losing long-run information, can be derived from ARDL through a simple linear transformation.

The long-run and causal relationship between financial development and economic growth in Cameroon using the Narayan (2005) test will be performed in several steps. First, the order of integration of variables will be verified using the test of unit roots through the Augmented Dickey Fuller test (ADF) and Phillip-Perron test. A great advantage of Philips-Perron (PP) test is that it is non-parametric; that is, it does not require the selection of the level of serial correlation as in the case of ADF. Due to the

complicated and dynamic structure of financial time series data, ADF and Phillip Perrons tests are best suited for test of unit roots. It instead takes the same estimation scheme as in Dickey Fuller (DF) test, but corrects the statistic to conduct for autocorrelations and heteroscedasticity. The Augmented Dickey -Fuller (ADF) test is assumed superior due to its popularity and wide application. The ADF test adjusts the DF test to take care of possible autocorrelation in the error terms by adding the lagged difference term of the dependent variable. As for the PP test, it as well takes care of the autocorrelation in the error term and its asymptotic distribution is the same as that of the ADF test statistic. However, ADF is commonly used because of its easy applicability. Then, the number of lags will further be verified using the Akaike information criteria and Schwarz information criteria. Secondly, the model will be estimated using Ordinary Least Square (OLS) technique and test for long-run causality between financial development and economic growth using the Narayan test. The Narayan test is preferred to that constructed by Peseran et al. (2001) because this test is best adapted for small sample sizes (30 to 80 observations) while Peseran et al. (2001) is adapted for large sample sizes (500 to 1000 observations). The third step entails the estimation of the long-run variables, and then residuals are converted and inserted as an error correction term in the model. The model is estimated with the error correction term in order to capture its long-run speed of adjustment. Also, the Wald Test is used to verify the short-run effect of financial development on economic growth.

The presence of an error-correction term among a number of co-integrated variables shows that changes in the dependent variable is a function of both the level of disequilibrium in the co-integration relationship (represented by the ECM) and the changes in other explanatory variables. This therefore implies that any deviation from the long-run equilibrium will feed back into the changes in the dependent variable, thereby forcing the movement towards the long-run equilibrium (Masih, 2002). However, this research explores the issues surrounding co-integration analysis and the Error Correction model within the Distributed Lag model framework that is, the Autoregressive Distributed Lag Approach to co-integration.

Recall that the basic form of an ARDL model is:

$$y_t = \beta_0 + \beta_1 y_{t-1} + \dots + \beta_k y_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + \dots + \alpha_q x_{t-q} + \epsilon_t \quad (3)$$

Where ϵ_t is the random disturbance term which is serially independent and assumed to be well behaved or constant.

An Autoregressive Distributive Lag model is considered as an ARDL (p q) model whose reduced form is presented as:

$$y_t = \mu + \sum_{i=0}^p \alpha_i \Delta Y_{t-i} + \sum_{i=0}^q \beta_i \Delta X_{t-i} + \epsilon_t \quad (4)$$

Where, Y_t is the dependent variable with its lags as independent variables. X_t Is the lagged independent variables and ϵ_t being the white noise.

Generally, using the lag operator L applied to each component of a vector.

$L^k X_t = X_{t-k}$, it is easy to defined the lag polynomial A(L) and the polynomial vector B(L).

The ARDL (p, q) is

$$\begin{aligned}
 A(L)Y_t &= \mu + B(X_t) + \mu_t \\
 A(L) &= 1 - \alpha_1 L - \alpha_2 L^2 - \dots - \alpha_p L^p \\
 B(L) &= 1 - B_1 L - B_2 L^2 - \dots - B_p L^p
 \end{aligned}
 \tag{5}$$

$$A(L)Y_t = \mu + B_1(L)X_{1t} + B_2(L)X_{2t} + \dots + B_k(L)X_{kt} + \mu_t
 \tag{6}$$

A detail specification of the model with respect to the variables of this study is presented below.

$$\begin{aligned}
 \Delta economic\ growth_t &= \alpha_0 + \sum_{i=1}^p \alpha_i \Delta economic\ growth_{t-i} \\
 &+ \sum_{i=0}^q \beta_i \Delta financial\ development_{t-i} \\
 &+ \sum_{i=0}^q \partial_i \Delta other\ factors_{t-i} + \mu_1 economic\ growth_{t-1} \\
 &+ \mu_2 financial\ development_{t-1} + \mu_1 other\ factors_{t-1} + \varepsilon_t
 \end{aligned}
 \tag{7}$$

Where Δ refers to the first difference operator and ε_t being the error term.

After the estimation of the above model, the long-run causality test is carried out by comparing the results from the F-statistics of the Wald test. Implying the null hypothesis of the test will be:

$$\mu_1 = \mu_2 = 0 \text{ (no long-run relationship).}$$

Against the alternative hypothesis.

$$\mu_1 \neq \mu_2 \neq 0 \text{ (a long-run relationship exists thus co-integration).}$$

The F-statistics of this test is then compared with that of the Narayan critical values at 5% level of significance with unrestricted and no trend series. The long run variables are regressed and the error term inserted as an explanatory variable, this gives the error correction model (ECM) as seen below:

$$\begin{aligned}
 \Delta economic\ growth_t &= \gamma + \sum_{i=1}^p \phi_i \Delta economic\ growth_{t-i} \\
 &+ \sum_{i=0}^q \beta_i \Delta financial\ development_{t-i} \\
 &+ \sum_{i=0}^p \partial_i \Delta other\ factors_{t-i} + \alpha \text{ect}_{t-1}
 \end{aligned}
 \tag{8}$$

Where ect is the Error correction term.

The Wald test used is meant to verify if there exist short-run causality from financial development to economic growth.

The two sets of critical values reported in Pesaran et al. (2001) provides critical value bounds for all classifications of the regressors into purely I(1), purely I(0) or mutually co-integrated. If the calculated F-statistics lies above the upper level of the band, the null hypothesis is rejected indicating the presence of co-integration. On the other hand, if the calculated F-statistics is below the upper critical value, we cannot reject the null hypothesis of no co-integration. However, if the critical value lies between the bounds, a conclusive inference cannot be made without knowing the order of integration of the underlying regressors. Recently, Narayan (2005) argues that existing critical values which are based on large sample sizes cannot be used for small sample sizes. Hence, Narayan (2005) regenerated the set of critical values for the limited data ranging from 30 to 80 observations by using the Pesaran et al. (2001)'s GAUSS code. With a limited

annual time series data on Cameroon financial development and economic growth, this study employs the critical values of Narayan (2005) for the bounds F-test rather than Pesaran et al. (2001).

Tests of goodness of fit

Serial correlation

To verify the presence of serial correlation in the model, the Breusch-Godfrey Serial Correlation LM Test is applied. If the probability of R-squared is significant, the null hypothesis is accepted and concluded that the model has no serial correlation, but if it is insignificant, the null hypothesis is rejected and concluded that the model is serially correlated.

Stability test (CUSUM test)

In addition, due to the structural changes in the Cameroon economy, it is likely that macroeconomic series may be subjected to one or multiple structural breaks. As a result of this, the stability of the short-run and long-run coefficients is checked through the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests proposed by Brown et al. (1975). Unlike the Chow test which requires break point(s) to be specified, the CUSUM and CUSUMSQ tests are quite general tests for structural change in that they do not require a prior determination of where the structural break takes place. That is, the robustness of the model is verified using the tests for serial correlation, CUSUM and CUSUM squares test for the stability of the model.

Results

Preliminary results 1.1 unit root test for Cameroon

The results of preliminary test will be presented in this section and it permits us to know the structure of the time series data. The results of the Unit root test, granger causality, lag length determination will as well be presented. Table 3 below shows the results of the unit root test.

The results above shows all the variables are integrated in the same order. This implies, all these variables will become stationary after first difference thus, they are integrated of order one. The conformity of these results is equally tested using the Phillips-Perron unit roots test, it shows that all variables are integrated of order one. This is in conformity with the results obtained from the Augmented Dickey Fuller test. This means that a linear combination of the variables will give a stationary series, thus a great possibility of co-integration. It is therefore imperative to test for the presence of co-integration, the bound test will be used, before that the number of optimal lags will be determined, this is done using the akaike and Swartz criteria, Table 4 below shows the results of this test.

Choice of lag length

It is very important to know the optimal lag length, especially in order to estimate the direction of causality. The Akaike and Schwarz criterion is used in this study. Table 4 below shows the results of these tests.

The Akaike information and Schwarz criteria used for determination of optimal lag length requires that, the lag length with the smallest critical value for both criterions be chosen. We see from above that lag 1 have the smallest Akaike and Schwarz

Table 3 Unit root test

Variables	Trend & inter				Decision
	Level		First difference		
	Augmented Dickey Fuller	Phillips- Perron	Augmented Dickey Fuller	Phillips- Perron	
GDP growth (annual %)	-3.370565	-3.370565	-3.605024 ^b	-3.605024 ^b	I(1)
Domestic credit to private sector (% of GDP)	-0.829053	-0.880052	-5.007785 ^a	-5.161468 ^a	I(1)
Bank deposits as % of GDP	-1.532913	-1.619798	-4.227425 ^a	-4.2245425 ^b	I(1)
Money and quasi money (M2) as % of GDP	-1.501459	-1.564212	-4.555150 ^a	-4.555150 ^a	I(1)
Government expenditure(%GDP)	-2.753952	-2.093615	-4.803761 ^a	-4.742368 ^a	I(1)
Private investment	-2.245010	-2.245010	-4.459368 ^a	-4.459368 ^b	I(1)

^{a/b/c} indicates stationarity at 1%/5%/10% respectively

Source: Author

information criteria. With information on the lag length, it is now possible to verify if the variables are co-integrated using the bound test technique.

Bound testing for co-integration analysis

The results of the co-integration test are presented below in Table 5, unrestricted intercept and unrestricted trend is used. It is clear from the table that there is a long run relationship amongst the variables. The computed F-statistics (8.4) is higher than the critical values of 3.79, 4.25 and 5.23 at 10%, 5% and 1% respectively from the Narayan (2005) table. This means that the null hypothesis of no co-integration between financial development indicators and economic growth is rejected.

The table above indicates estimates of the finance-growth nexus, the effect of credit to private sector, money supply and deposits on economic growth was assessed. The results show that the 1 period lag has a positive and significant impact in the long run. The long run analysis reveals that, a 1% increase in credit to private sector leads to an increase in economic growth by 0.38% while 1% increase in money supply triggers an increase in GDP by 1.9%. The results equally indicate that increasing deposits by 1% leads to an increase in GDP by 1.24%. This therefore means there is a long run relationship between financial development and economic growth.

This finding confirms that of Mandiefe (2015) who analyzed the impact of financial development on economics growth for Cameroon and South Africa. Table 6 below shows the coefficients of the long run impact of financial development on economic growth in Cameroon.

The table above confirms the bound test results with a positive and significant long run relationship between the financial development indicators and economic growth. This positive and significant impact is coherent with the findings by Khan et al. (2005) and Khan and Qayyum (2006).

Table 4 Akaike and Schwarz lag length test

Lag length	Akaike information criteria	Schwarz criterion
3	4.639583	5.749767
2	4.650764	5.475241
1	4.614442	5.198627

Source: Author using Eviews 8

Table 5 Bound testing for co-integration analysis

Computed F-statistic	Critical bounds					
	10%		5%		1%	
8.48	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	2.55	3.33	3.12	3.93	4.25	5.20

Source: Author

Error correction model (Table 7)

The regression table above shows that there is a negative but not significant relationship between credit to private sector and economic growth in the short run, however in the long-run, this effect is positive and statistically significant. This therefore means that the efficient allocation of credit to profitable projects has the potential of improving economic activities and subsequently economic growth.

The supply of money (M2) has a positive and significant impact on economic growth in the short-run, thus using the banking sector to increase the supply of money would facilitate the financing of the economy. The regression results show a negative but significant impact on economic growth in the short-run. This is principally due to the over-liquid nature of the financing system where deposits are dominated with short term deposits (Piabuo et al. 2015). However, in the long-run, deposits can be used as a vital resource for long term investments which have significant effects on output and economic growth.

The error correction mechanism (ECM) is used to verify the short-run relationship between credit to private sector, deposits, monetary mass (M2) and economic growth (GDP). The rule for the existence of a short-run relationship between financial development and economic growth is that the coefficient of the error correction term should be negative and it should be significant. Our results above confirms this, thus we can conclude that there is a return to equilibrium in case of disequilibrium at a rate of adjustment of 80.5%. This implies 80.5% of errors of previous year are corrected within the current year. The divergence of results in the short-run and long-run equilibrium explains the fragility of the financial system of Cameroon. The system cannot quickly adjust to shocks in the short-run, this is principally due to the dominance of the banking sector which is over liquid and information efficiency is very low in the system. The financial system is made up of the Douala stock exchange which is still at its embryonic stage (Piabuo et al. 2015) with very low capitalization and few listed firms, thus limiting short-run adjustments. The underdeveloped nature of the financial system is equally characterized by high information asymmetry which limits the effective financing of the private sector by banks thus reducing short run benefits to the economy.

Table 6 ARDL coefficients for long-run

Variable	Coefficient	Std. Error	t-Statistic
Credit to private sector(% GDP)	0.387269 ^b	0.139261	2.780880
Deposits (% GDP)	1.246879 ^p	0.507556	2.456631
M2 (% GDP)	1.977286 ^a	0.582636	3.393687
Government expenditure	0.159012	0.225122	0.706338
Private investment	0.744684	0.456850	1.630042

Note: ^a, ^b and ^c imply significant at the 1, 5 and 10% levels respectively

Source: author analysis

Table 7 Short- run impact of financial development on economic growth

Variable	Coefficient	Std. Error	t-Statistic
Δ GDP	-0.253700 ^c	0.125958	-2.014158
ΔCredit to private sector(% GDP)	-0.016350	0.160491	-0.101872
ΔDeposits (% GDP)	-1.536301 ^a	0.528120	-2.909000
ΔM2 (% GDP)	1.458098 ^a	0.406698	3.585214
ΔGovernment expenditure	0.644298 ^a	0.285455	2.257095
ΔPrivate investment	-2.476650 ^b	0.607828	-4.074589
ECM(-1)	-0.805787 ^a	0.184469	-4.368139
R-squared	0.685374		
Adjusted R-squared	0.612768		
S.E. of regression	2.213418		
Sum squared resid	127.3797		
Log likelihood	-69.11095		

Note: ^a, ^b and ^c imply significant at the 1, 5 and 10% levels respectively
 Source: Author

Test for existence of serial correlation Here the Breusch-Godfrey Serial Correlation LM Test is used; the table below shows the results of this test (Table 8).

The table above shows that there is no serial correlation and that our model is good. To further verify this, the stability test is used to see if our model is stable in the long-run.

Result of stability tests To assess the stability of the long-run and short-run relationship between financial development and economic growth, the CUSUM and CUSUM-squared tests are applied at 5% level of significance. When the CUSUM line lies in-between the lines of the level of significance, it shows the model is stable. However, variables are unstable when the CUSUM line is out of these two lines.

CUSUM stability test (Fig. 1) We see from the graph above that the blue line lays within the 5% level of significance, thus there is a long- run stability between the variables in our model.

CUSUM square stability test This test is used to verify the stability of the model over time. This can be seen on the graph presented below (Fig. 2).

From the graph above, it can be seen that the CUSUM of Squares line lays in-between the lines of the level of significance. This implies the model is stable and thus can be used for causality, bound test and long-run association. The different tests carried out above have proven our model is suitable to estimate the causal link as well as the long and short-run relationship between financial development and economic growth.

Table 8 Serial correlation test

Breusch-Godfrey serial correlation LM test:			
F-statistic	0.559023	Prob. F(2,13)	0.5849
Obs*R-squared	2.534166	Prob. Chi-Square(2)	0.2817

Source: Author analysis

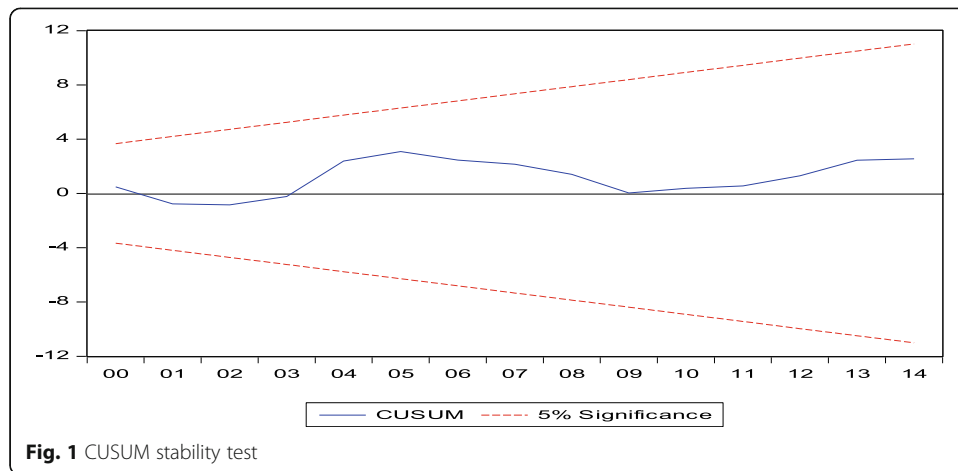


Fig. 1 CUSUM stability test

Discussion of results, policy implication and conclusion

Discussion of results

The findings in this paper have broadly confirmed the conventional view which sustains that financial development has a positive and significant impact on economic growth. Although the view may not be universal, it is widely believed that financial system development boosts economic activities in an economy which leads to economic growth. These results confirm those of Tabi et al. (2011) who used a time series data of 35 years to show that financial development had a positive and significant long-run effect on economic growth in Cameroon. These results as well collaborates with the findings of a study carried out by Beck et al. (2000) on the impact of financial development on economic growth in which it was discovered that there exist a positive link between the exogenous component of financial development and economic growth.

Evidence of long-run co-integration between financial development and economic growth in this study collaborates with the verifications made by Luintel and Kaln

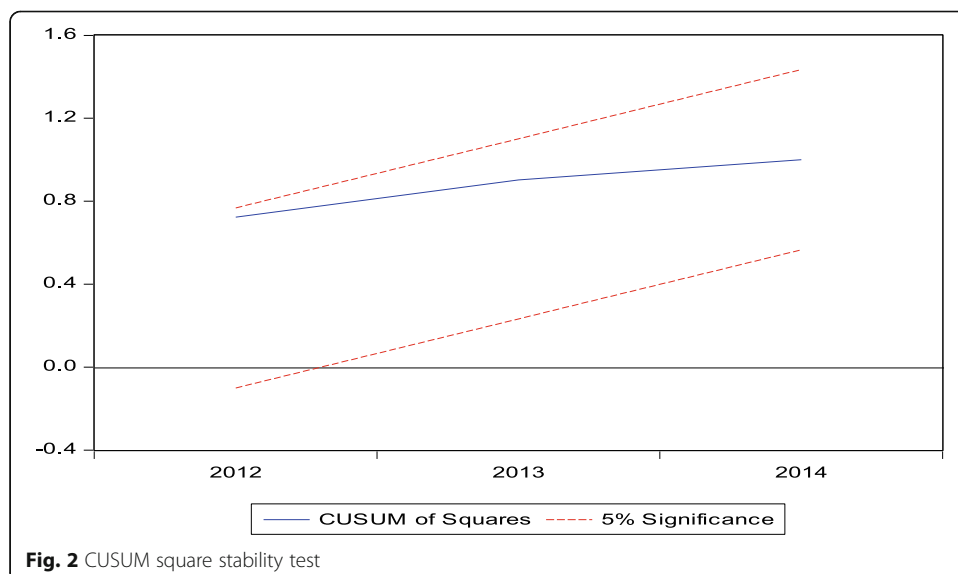


Fig. 2 CUSUM square stability test

(1999) using the Multivariate Vector Auto Regressive model and found a double-causality link between financial development and economic growth in sample of 90 countries. However, these results contradict with the findings of Aghion et al. (2004) who found an insignificant direct impact of financial development on economic growth and further concluded that the level of credits as a percentage of GDP influences growth only in the intermediary stages of development.

The long-run relationship between financial development and economic growth in this study is in collaboration with the works of Mandiefe (2015) which shows that improvement in the financial sector consistently mitigates investment and therefore boosts growth in an economy. Hence, the structural reforms such as financial liberalization which was engineered by the IMF in the 1980s and has been adopted by policy makers in Cameroon play most of the part to financial sector development. The objective of these reforms has been to reduce trade barriers and increase foreign investment in the country (Asongu 2014). However, it is interesting to note that effective economic freedom has consistently been found to improve on financial allocation efficiency (Asongu 2013d) which diminishes issues of surplus liquidity. This eventually recourse both formal and informal financial services and therefore leads to investment in both formal and informal sectors (Piabuo et al. 2015). In addition, with advancement in ICTs, the Cameroonian banking industry is increasingly becoming synchronized that is, the rate at which banks adjust when is shocks is growing leading to a fall in bank crisis.

The mechanism that translates financial development to economic growth is divergent in Africa. This is principally because the level of financial development and liberalization is not uniform among countries. The results of this study indicates that there is a long-run relationship between financial development and economic growth, in the short-run, credit to private sector and investment have a positive impact on economic growth. Mandiefe (2015) highlights that countries with well-developed financial system turn to converge towards their long-run equilibrium faster than countries with less developed financial system.

Policy implication

This study outlines the importance of suitable financial policies in Cameroon and goes further to extend literature on the positive impact of financial development on economic growth. From the empirical results which was based on financial system development, it has been proven consistently that financial development is a fundamental determinant of economic growth of many nations with Cameroon inclusive and an increase in the activities of this sector further mitigates growth. The principal policy recommendation therefore is that adequate consideration and proper recognition such as provision of suitable financial reforms should be given to the financial sector in Cameroon as a determinant of economic growth.

Conclusion

This paper highlights the positive and significant impact of financial development on economic growth which was earlier analyzed by authors such as Bangehot (1873) and Schumpeter (1911). The unit root, co-integration and the granger causality tests were

conducted to reveal these interesting results. The results from this study show that all variables included in the model were integrated in the same order. It equally shows that there exist co-integration between financial development and economic growth; there is a long-run relationship between the variables in the study. In addition, unilateral relationships were discovered to run between variables in this study. This therefore implies that by increasing the amount of money supply in the economy, improving the functions of financial institutions and intermediaries, and improving the investment environment of Cameroon will boost economic growth, which will eventually lead to economic development.

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Authors' contributions

This work was carried out in collaboration between all authors. Author PJT designed the study developed the theoretical and empirical literature review equally contributed in the discussion of results. Author SMP performed the statistical data analysis and discussion of results. Both authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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