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Credit Market Development and Economic Growth in Liberia: An Empirical Investigation

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Abstract

The importance of credit market development to economic growth and development in Liberia has gained traction over time and has been widely discussed in Liberia. This paper empirically contributes to the discussion by analyzing, within an endogenous growth framework, the relationship between credit market development and economic growth in Liberia. An autoregressive distributed lag model is employed to estimate the relationship, and the findings reveal that in the long run, credit market development, proxied by domestic credit to private sector as a percentage of gross domestic product, enhances economic growth which is proxied by the growth of gross domestic product per capita. The findings also show a unidirectional relationship, with credit market development Granger causing economic growth in Liberia and the reverse causality being nonexistent.

JEL Classification: E58, G21, O16

Keywords: Credit Market, Economic Growth, Auto-regressive Distributed Lag, Cointegration

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1.0 INTRODUCTION

Credit market plays a major role in economic growth and development of many economies. Some scholars and researchers have propounded that the development of credit market can help enhance economic growth and development through providing credit which helps facilitate entrepreneurship (Schumpeter, 1934; Guiso et al., 2004), reduce inequality and alleviate poverty (Beck et al., 2007), promote education (Levine and Rubinstein, 2013), among other positive impacts. Other researchers have found that a growing economy drives the development of the credit market (Adamopoulos, 2010; Mishra et al., 2009), while some others have shown that there exists a two-way causal relationship between credit market development and economic growth (Greenwood and Jovanovic, 1991; Pradhan, 2009).

In Liberia, the credit market has not been fully developed and functional. The credit market is largely dominated by the banking sector, with a significant informal sector. Some participants in the market have had complaints on why they think the market has not been functioning properly. On one hand, some borrowers (particularly small and medium-sized enterprises) complain of high interest rate and the relatively short period for the repayment of loans as factors which make loans to not actually help them realize significant economic gains, and at times, even make them worse off than they were before taking the loans. On the other hand, most lenders complain of the issue of non-performing loans resulting from borrowers defaulting on loan repayments as a major factor which affects their operations. With these mixed, contending views, there is a need to investigate the impact of the credit market in Liberia. Against this background, this paper analyzes the credit-growth nexus in Liberia in order to shed light on what has been the actual impact of the credit market in the Liberian economy, and thereafter provide recommendations to help inform policy-making on the development of the country's credit market. Esso (2010) conducts a cross-country analysis on the finance-growth nexus in the Economic Community of West African States (ECOWAS) and tries to address this issue by using 1974-2005 data to do a bivariate analysis on the relationship between credit to private sector and gross domestic product per capita in Liberia. The author, however, does not control for other variables which might affect the relationship between credit to private sector and growth. This study overcomes such limitation and contributes to the literature on the credit-growth nexus by utilizing a relatively longer time series on Liberia,

and other control variables, including a polity variable, which controls for the political regime and authority characteristics of the country.

The rest of the paper is organized as follows. Chapter two presents a review of the literature, both theoretical and empirical. Chapter three presents the methodology, detailing the theoretical framework and the empirical model. Chapter 4 presents the empirical findings and analysis. Chapter five concludes the paper and presents policy recommendations.

2.0 LITERATURE REVIEW

The literature on credit market development and economic growth provides theoretical and empirical evidence supporting the view that credit market development (and in general, financial development) affects economic growth and development.

2.1 Theoretical Literature Review

There are many arguments in the theoretical literature on the importance of credit to economic growth and development. Some earlier contributors to the literature argued in favor of the positive role credit market plays in an economy. For example, Schumpeter (1934) argues that development can be occasioned in an economy when entrepreneurs, who are innovative, receive credit to invest. Keynes (1937) emphasizes the need for credit to finance investment which can spur growth and development. In recent times, Guiso et al. (2004) contend that finance fosters entrepreneurship, increases market competition by encouraging the entrance of new firms, and promotes growth.

The credit market being a component of the financial system, significantly contributes to the overall performance of the system. When the financial system performs well, it improves the probability of successful innovation and consequently spurs economic growth (King and Levine, 1993). The financial system also plays an important role in improving the welfare of people living in poverty. Findings from the work of Beck et al. (2007) show that credit to private sector alleviates poverty by promoting economic growth and reducing income inequality which by extension enhances economic development. The financial system also promotes education by providing access to finance particularly through the credit market. Levine and Rubinstein (2013) show that banking sector reforms that ease credit conditions (for example, lower interest rates) increase college enrollment and hence economic opportunities.

Some authors support the view that there exists a bidirectional relationship between financial development and growth. For example, Greenwood and Jovanovic (1990) argue that while economic growth enhances financial development**,** a developed financial system also promotes economic growth by allowing more efficient investments to be undertaken. Blackburn and Hung (1998), also support this view that there is a two-way causal relationship between growth and financial development.

The quality of financial services significantly impacts economic growth and development. Levine (2002) supports this argument and confirms the crucial role banks and markets play in mobilizing and directing savings to the most productive investment projects. He highlights the importance of the legal system in financial sector development in terms of protecting the rights of market participants.

As discussed earlier, from a theoretical perspective, credit market has a very germane role to play in the growth and development of an economy. When the credit market functions properly, it enhances growth and development; but when it malfunctions, the economy might be adversely affected. In the literature, a common theme found in the arguments of some of the proponents of the credit-led growth view is the fact that credit is needed to facilitate investment which spurs growth and development. However, the accessibility and affordability of credit are to a great extent dependent on the nature of the credit market.

2.2 Empirical Literature Review

On the empirical front, there have been some studies focused on the nexus between credit market development and economic growth and development. These studies have used many methodologies and have provided mixed results. For example, Akpansung and Babalola (2011), using data for the period 1970-2008, investigate the relationship between banking sector credit and economic growth in Nigeria. They employ a two-stage least squares approach and find that private sector credit, a proxy for credit market development, positively impacts economic growth in Nigeria. Esso (2010) conducts a cross-country analysis to investigate the relationship between financial development and economic growth in the fifteen ECOWAS countries. Using a sample ranging from 1974 to 2005 for Liberia, he finds that there exists a long-run relationship between financial development (proxied by credit to private sector as a percentage of gross domestic product) and economic growth (represented by gross domestic product per capita), with there being a one-way causality running from the former to the latter. Koivu (2002), using a fixed-effects panel model to analyze the relationship between banking sector development and economic growth in 25 transition countries for the period 1993-2002, finds that economic growth does not seem to be accelerated by an increase in the amount of credit to private sector in those countries. The author

argues that banking crises and soft budget constraints in transition countries have made growth in credit to not be sustainable and at times may have even reduced growth.

Adu et al. (2013) use the autoregressive distributed lag approach and principal component analysis to analyze the financial development-growth nexus in Ghana. They find that both credit to private sector and total domestic credit enhance growth. Nkoro and Uko (2013), using vector error correction model (VECM) to analyze data on Nigeria, find that credit to private sector does not enhance growth. They attribute this to the problems of high non-performing loans and a deficient legal system which does not protect contracts in the private sector.

Vazakidis and Adamopoulos (2009) investigate the nexus between credit market development and economic growth in India for the period 1965-2007. They employ VECM and find that in the short run, an increase in economic growth causes an increase in bank lending, a proxy they use for credit market development. Adamopoulos (2010) also analyzes the nexus between credit market development and economic growth in Spain for the period ranging from 1976 to 2007 using VECM. He finds that in the short run, economic growth induces an increase in bank lending. Mishra et al. (2009) use a vector autoregression (VAR) framework and find that economic growth positively affects credit market development in India.

Pradhan (2009) uses a multivariate VAR model to analyze the relationship between financial development and economic growth in India. He finds that there exists two-way causality between economic growth and bank credit. Cappiello et al. (2010) find that changes in the supply of credit, with regards to volumes and credit standards applied on loans provided to enterprises, significantly impact real economic activity in the euro area.

Kar and Pentecost (2000) analyze the nexus between financial development and growth in Turkey and find that the choice of proxy for financial development determines the direction of causality between financial development and economic growth. When private sector credit is considered as a proxy, growth seems to drive financial development.

3.0 METHODOLOGY

3.1 Theoretical Framework

Following the works of Pagano (1993) and Bailliu (2000), this study adopts an endogenous growth model to analyze the nexus that exists between credit market development and economic growth in Liberia. For a closed-economy, the model is specified as:

$$Y_t = AK_t \quad (1)$$

where Y_t, A and K_t are national output, total factor productivity, and capital stock, respectively.

In each period, capital stock is assumed to depreciate at a rate of δ. Hence, gross investment is given by:

$$I_t = K_{t+1} - (1 - \delta)K_t \quad (2)$$

Through financial intermediation in the credit market, savings are transformed into investment by financial intermediaries who take from each dollar saved a fraction, 1- θ, as service fee (or say, transcation cost), and make available θ for investment. It then follows that equilibrium is attained in the market when net savings and gross investment are equal such that:

$$\theta S_t = I_t \quad (3)$$

Making use of equations (1), (2) and (3) and dropping the time subscripts, growth rate of output at steady state, g, with financial intermediation is given by:

$$g = A\left(\frac{I}{Y}\right) - \delta = A\theta s - \delta \quad (4)$$

where s is the gross savings rate. Equation (4) shows that economic growth can be affected by credit market development based on how efficiently financial intermediation directs savings and capital to investment. For example, it is expected that the more intermediation banks do, the more efficient they become at doing so, and thus, transaction cost is reduced. A reduced transaction cost would mean that the fraction of savings available for investment is increased, thereby resulting to an increase in g in equation (4).

An improvement in capital allocation leads to a rise in overall productivity, A, and this drives higher growth. This happens because as financial institutions do more intermediation, they become better able to assess various investment projects and choose those with better returns.

Assume that the economy receives international capital inflows (for example, through foreign direct investment). In this case, higher net inflows of capital in addition to domestic savings would provide increased funds to facilitate investment. Thus, equilibrium in the market becomes:

$$\theta^*(S_t + CI_t) = I_t^* \qquad (5)$$

where CI_t is capital inflows (in this case, from foreign direct investment), and * shows the presence of international factors. By substituting equation (5) into (4), the steady-state growth rate is given by:

$$g^* = A^* \frac{I^*}{Y} - \delta = A^* \theta^* \frac{(S+CI)}{Y} - \delta = A^* \theta^* s^* - \delta \qquad (6)$$

According to Bailliu (2000), a comparison of equations (4) and (6) shows that capital inflows can lead to growth if they increase financial intermediation; if they occasion investments which produce positive spillovers; and primarily, if they cause investment rate to increase such that g^* is greater than g when s^* is greater than s, other things being equal. However, for s^* to be greater than s, net capital inflows should be used to finance investments which do not crowd out domestically financed investments.

3.2 Empirical Model

Following the work of Jalil and Feridun (2011) who built on the work of Christopoulos and Tsionas (2004) to transit from the theoretical model to an empirical specification, the following equation is specified:

$$LGDPPC_t = \beta_0 + \beta_1 CREDIT_t + \beta_2 INFL_t + \beta_3 TROP_t + \beta_4 FDI_t + \beta_5 POLITY_t + u_t \quad (5)$$

where $GDPPC$ is the log of gross domestic product (GDP) per capita; $CREDIT$ represents credit market development; $INFL$ represents the rate of inflation; $TROP$ represents trade openness; FDI represents foreign direct investment; $POLITY$ represents polity score; and u_t is the error term.

To estimate the equation specified in equation (5), this study employs the Auto-regressive Distributed Lag (ARDL) estimation approach, following Pesaran et al. (2001). The ARDL approach is appropriate in situation where the variables are integrated of different orders, namely zero (0) and one (1); and it can be specified as follows:

$$\begin{aligned} \Delta LGDPPC_t = \alpha_0 &+ \sum_{i=0}^{p} \alpha_{1i} \Delta LGDPPC_{t-i} + \sum_{i=0}^{p} \alpha_{2i} \Delta CREDIT_{t-i} + \sum_{i=0}^{p} \alpha_{3i} \Delta INFL_{t-i} + \sum_{i=0}^{p} \alpha_{4i} \Delta TROP_{t-i} \\ &+ \sum_{i=0}^{p} \alpha_{5i} \Delta FDI_{t-i} + \sum_{i=0}^{p} \alpha_{6i} \Delta POLITY_{t-i} + \alpha_7 LGDPPC_{t-1} + \alpha_8 CREDIT_{t-1} + \alpha_9 INFL_{t-1} \\ &+ \alpha_{10} TROP_{t-1} + \alpha_{11} FDI_{t-1} + \alpha_{12} POLITY_{t-1} + u_t \end{aligned} \quad (6)$$

where $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$, and α_6 are parameters representing short-run dynamics of the model, and $\alpha_7, \alpha_8, \alpha_9, \alpha_{10}, \alpha_{11}$, and α_{12} are parameters representing the long-run relationship.

3.3 Data and Variable Description

This study utilizes annual time series data for the period 1974-2015 and they are sourced from the World Bank's World Development Indicators (2017), the Central Bank of Liberia's database and the Polity IV Project (Center for Systemic Peace, 2017). Table 1 describes the variables used in this study.

Table 1: Variable Description

Variable	Description
Dependent	
LGDPPC	The logarithm of gross domestic product per capita used as a proxy for economic growth/development
Independent	
CREDIT	Domestic credit to private sector (% of GDP) used as an indicator of credit market development.
INFL	Annual rate of inflation (GDP deflator)
TROP	Trade openness proxied by the sum of exports (% of GDP) and imports (% of GDP)
FDI	Foreign direct investment inflows (% of GDP)
POLITY	This variable gives yearly information on the political regime and authority characteristics of countries. It is compiled under the Polity IV Project conducted by the Center for Systemic Peace. It shows the difference between democracy and autocracy, and it ranges from +10 (strong democracy) to -10 (strong autocracy).

4.0 ESTIMATION AND ANALYSIS OF RESULTS

4.1 Unit Root Test

Before estimating the ARDL model, it is necessary that the variables are tested to know their order of integration as the model is appropriate in the case where variables are integrated of order zero (0) and order one (1), but not order two (2) and higher. To do this, the Augmented Dickey Fuller Test is conducted on the variables. The results of the test reveal that some variables are integrated of order one (that is, become stationary after first difference) and others are integrated of order zero (that is, stationary at levels), thus confirming the suitability of the ARDL model for this study. The test results are presented in table 2 below.

Table 2: Augmented Dickey-Fuller Test

		Critical Value			
Variable	**Test Statistic**	**1% level**	**5% level**	**10% level**	**Order of Integration**
LGDPPC	-2.115283	-3.610453	-2.938987	-2.607932	I(1)
ΔLGDPPC	-3.823343	-3.605593	-2.936942	-2.936942	I(0)
CREDIT	-1.158096	-4.226815	-3.536601	-3.200320	I(1)
ΔCREDIT	-15.50034	-4.205004	-3.526609	-3.194611	I(0)
INFL	-5.115110	-3.600987	-2.935001	-2.605836	I(0)
TROP	-1.934094	-3.600987	-2.935001	-2.605836	I(1)
ΔTROP	-5.908973	-3.605593	-2.936942	-2.606857	I(0)
FDI	-5.367240	-3.600987	-2.935001	-2.605836	I(0)
POLITY	-0.400153	-3.600987	-2.935001	-2.605836	I(1)
ΔPOLITY	-5.580998	-3.605593	-2.936942	-2.606857	I(0)

4.2 Bounds Test

Since the variables in the model are found to be integrated of different orders, to verify the presence of cointegration among them, a bounds testing approach is employed following Pesaran et al. (2001). The null hypothesis under this approach is that there is no levels relationship. To test this hypothesis, the F-statistic from the bounds test is compared with the values corresponding to the lower bound, I(0) and the upper bound, I(1) of the test. If the F-statistic is less than the lower bound value, there is no rejection of the null hypothesis. If the F-statistic is higher than the upper bound value, there is a rejection of the null hypothesis. If the F-statistic falls between the lower and upper

bounds, the test is inconclusive. Since the bounds test results presented in table 3 show that the F-statistic is greater than the upper bound value, there is a rejection of the null hypothesis. Thus, the conclusion is that there exists a levels (long-run) relationship among the variables in the model.

Table 3: Bounds Test

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	10.37569	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
			Finite Sample:	
Actual Sample Size	38		n=40	
		10%	2.306	3.353
		5%	2.734	3.92
		1%	3.657	5.256
			Finite Sample: n=35	
		10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419

4.3 ARDL Estimation Result

In order to analyze how credit market development affects growth in Liberia, while controlling for other variables such as inflation, trade openness, foreign direct investment and polity, an ARDL model is estimated using EViews 10. In order to choose the appropriate model, a maximum of 4 lags and the Akaike Information Criteria (AIC) are used. The automatically selected ARDL model based on AIC is of the lag order (4, 3, 4, 3 ,4, 4). The top 20 models selected by AIC are presented in the Appendix.

4.3.1 Short Run (Error Correction) Form

The short-run estimates of the ARDL model are presented in table 4. In the short run, the coefficient on CREDIT is negative and not significant, implying that domestic credit to private sector does not exert a significant, negative impact on growth. However, with lags, CREDIT negatively affects growth. Inflation is found to promote growth in the short run, but the variable is found to negatively affect growth with lags. These findings imply that an increase in inflation in previous years would reduce growth in the current year. Trade openness, foreign direct investment and polity are all found to negatively affect growth. However, with lags, these variables are found to increase growth.

The coefficient of the error correction model (ECM) is negative and statistically significant, and it lies in the ideal -1 to 0 range, implying that there indeed exists cointegration (long-run relationship) among the variables. The coefficient of the ECM is -0.775, indicating that any deviation from equilibrium in the current year is corrected by 77.5 percent in the next year. This shows a fast speed of adjustment to equilibrium.

Table 4: Short Run (Error Correction) Form

ARDL Error Correction Regression
Dependent Variable: D(LGDPPC)
Selected Model: ARDL(4, 3, 4, 3, 4, 4)
Sample: 1974 2015
Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDPPC(-1))	0.290075	0.076367	3.798458	0.0035***
D(LGDPPC(-2))	0.210107	0.080305	2.616373	0.0258**
D(LGDPPC(-3))	0.404046	0.080922	4.993016	0.0005***
D(CREDIT)	-0.004566	0.005099	-0.895443	0.3916
D(CREDIT(-1))	-0.080843	0.013550	-5.966378	0.0001***
D(CREDIT(-2))	-0.050180	0.009337	-5.374490	0.0003***
D(INFL)	0.007287	0.001230	5.923894	0.0001***
D(INFL(-1))	-0.017666	0.002365	-7.469814	0.0000***
D(INFL(-2))	-0.008815	0.001501	-5.871104	0.0002***
D(INFL(-3))	-0.006479	0.001051	-6.164408	0.0001***
D(TROP)	-0.000478	7.21E-05	-6.631287	0.0001***
D(TROP(-1))	-2.23E-05	0.000110	-0.201622	0.8443
D(TROP(-2))	0.000369	0.000108	3.418854	0.0066***
D(FDI)	-0.003010	0.000286	-10.51016	0.0000***
D(FDI(-1))	0.004578	0.000527	8.684615	0.0000***
D(FDI(-2))	0.002539	0.000394	6.449103	0.0001***
D(FDI(-3))	0.001504	0.000301	4.989111	0.0005***
D(POLITY)	-0.056728	0.006912	-8.207282	0.0000***
D(POLITY(-1))	0.119565	0.010706	11.16829	0.0000***
D(POLITY(-2))	0.058022	0.014951	3.880816	0.0031***
D(POLITY(-3))	0.069219	0.013050	5.304340	0.0003***
CointEq(-1)	-0.774815	0.071875	-10.77997	0.0000***

R-squared	0.986888	Mean dependent var	0.003806
Adjusted R-squared	0.969678	S.D. dependent var	0.205297
S.E. of regression	0.035749	Akaike info criterion	-3.531717
Sum squared resid	0.020447	Schwarz criterion	-2.583641
Log likelihood	89.10263	Hannan-Quinn criter.	-3.194399
Durbin-Watson stat	2.277556		

Note: *, **, *** indicate that parameter estimates are statistically significant at 10%, 5% and 1%, respectively.

4.3.2 Long Run (Levels) Equation Form

The levels relationship giving the long-run estimates of the ARDL model are presented in table 5.

Table 5: Long Run Equation Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CREDIT	0.148381	0.009422	15.74775	0.0000***
INFL	0.042186	0.005430	7.769524	0.0000***
TROP	-0.001468	0.000170	-8.621214	0.0000***
FDI	-0.011011	0.002849	-3.865442	0.0031***
POLITY	-0.174046	0.012074	-14.41501	0.0000***
C	4.936001	0.108929	45.31389	0.0000***

Note: *, **, *** indicate that parameter estimates are statistically significant at 10%, 5% and 1%, respectively.

In the long run, credit market development is found to enhance economic growth. A 1-percent increase in domestic credit to private sector (% of GDP) drives economic growth by 0.15 percent. This result is consistent with the credit-led growth view and confirms findings by Esso (2010) who reveals that there is a long-run relationship between credit to private sector and growth in Liberia. The result also corroborates findings by Akpansung and Babalola (2011) and Adu et al. (2013) who reveal that credit market development drives economic growth in Nigeria and Ghana, respectively.

Inflation is also found to drive growth in the long run, albeit minimally. A 1-percent increase in inflation leads to a 0.04-percent GDP growth. This result is in line with findings by Mallik and Chowdhury (2001) who reveal that inflation positively affects growth in the long run in four South Asian countries (Bangladesh, India, Pakistan and Sri Lanka).

Trade openness has a very minimal, negative impact on economic growth in Liberia. A 1-percent increase in trade openness reduces growth by 0.001 percent. This finding is consistent with findings of other studies. This could be as a result of Liberia exporting mainly primary commodities with little or no value addition and importing mainly consumer goods. Hausmann,

Hwang, and Rodrik (2007) find that countries with low-quality products are more likely to be adversely affected by trade openness. Vlastou (2010) also finds that trade openness negatively affects growth in African countries.

Foreign direct investment is also found to decrease growth in the long run. A 1-percent increase in FDI inflows (% of GDP) reduces growth by 0.01 percent. This finding corroborates the view that FDI has sector-specific growth effects, with FDI to primary sector having negative impact on growth. This is the case in Liberia as most of the FDI coming to the country go to the primary sector. Alfaro (2003) finds that FDI flowing to the manufacturing sector enhances growth while FDI to the primary sector has a negative effect on growth.

Polity is found to have an adverse effect on economic growth in Liberia. A 1-unit increase in the polity score occasions a 0.17 percent decline in economic growth in the long run, revealing that democracy in Liberia is not growth-enhancing. This result corroborates findings from the work of Tavares and Wacziarg (2001) who show that democracy negatively affects growth. Barro (1996) and Barro (1999) also argue that democracy has negative effects on growth through encouraging rich-to-poor redistributions of income and enhancing the power of interest groups in systems which have legislative representations.

4.4 Post-estimation Diagnostics

Several post-estimation diagnostic tests verify the robustness and stability of the estimated ARDL model. The results contained in table 6 below reveal that there are no heteroskedasticity and serial correlation, and that the residuals are normally distributed since the null hypotheses of all three tests are not rejected.

Table 6: Post-estimation Tests

Test	**Null Hypothesis**	**Test Statistic and P-value**
Breusch-Pagan-Godfrey Test for Heteroskedasticity	Homoskedasticity (or no heteroskedasticity)	F-statistic = 0.912724 Prob. F(27,10) = 0.6002
Breusch-Godfrey Serial Correlation LM Test	No serial correlation	F-statistic = 2.824819 Prob. F(8,2) = 0.2877
Normality Test	Residuals are normally distributed	Jarque-Bera = 0.260087 Prob. = 0.878057

4.4.1 Stability Diagnostics

To verify the stability of the estimated ARDL model, three tests are conducted. The Cumulative Sum of Recursive Residuals (CUSUM Test) and the Cumulative Sum of Squares of Recursive Residuals (CUSUM of Squares Test) show that the model is dynamically stable and that there is no problem of structural break. The plots of these stability tests using the 5-percent confidence interval are found in the Appendix.

The results of the Ramsey RESET Test of functional form presented in table 7 below show that the estimated model is correctly specified since the null hypothesis of the test is not rejected.

Table 7: Ramsey RESET Test

Null Hypothesis	**Test Statistic and P-value**
The functional form is correctly specified	F-statistic = 1.110473 Prob. = 0.4069

4.5 Pairwise Granger Causality Test

Since it is established that the variables used in this study are cointegrated, it is safe to conclude that there is either unidirectional Granger causality or bidirectional Granger causality. Following the work of Granger (1969), this study tests Granger causality between credit market development and economic growth. The following VAR model is estimated to establish the direction of causality:

$$Y_t = a_0 + a_1 Y_{t-1} + \ldots + a_p Y_{t-p} + b_1 X_{t-1} + \ldots + b_p X_{t-p} + U_t \quad \ldots\ldots\ldots\ldots\ldots (7)$$

$$X_t = c_0 + c_1 X_{t-1} + \ldots + c_p X_{t-p} + d_1 Y_{t-1} + \ldots + d_p Y_{t-p} + V_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (8)$$

The following hypotheses are then tested:

H_0: $b_1 = b_2 = \ldots = b_p = 0$, against H_A: $Not\ H_0$

The null hypothesis is that X does not Granger-cause Y

H_0: $d_1 = d_2 = \ldots = d_p = 0$, against H_A: $Not\ H_0$

The null hypothesis is that Y does not Granger-cause X

In each case, a rejection of the null hypothesis implies that there is Granger causality.

The results of the Pairwise Granger Causality Tests displayed in table 8 indicate that there is a unidirectional or one-way causal relationship running from credit market development to economic growth, as the null hypothesis that D(CREDIT) does not Granger cause D(LGDPPC) is rejected at the 10-percent level of significance. The null hypothesis that D(LGDPPC) does not Granger cause D(CREDIT) is not rejected. The variables are first differenced because they are both integrated of order one, I(1).

Table 8: Pairwise Granger Causality Tests

Sample: 1974 2015 Lags: 3			
Null Hypothesis	**Obs.**	**F-Statistic**	**Prob.**
D(CREDIT) does not Granger Cause D(LGDPPC**)**	38	2.67417	0.0645
D(LGDPPC) does not Granger Cause D(CREDIT**)**		0.32809	0.8050

5.0 CONCLUSION AND POLICY RECOMMENDATIONS

This study analyzes, within an endogenous growth framework, the impact of credit market development on economic growth in Liberia, while controlling for other factors such as inflation, trade openness, foreign direct investment inflows and polity. An ARDL model is utilized to estimate the relationship and the findings show that, in the short run, domestic credit to private sector (% of GDP), the proxy for credit market development, has no significant impact on growth but adversely affects growth with lags. However, in the long run, domestic credit to private sector (% of GDP) enhances growth. This implies that even though the credit market in Liberia is not fully developed and is still challenged, it has the potential to drive growth and development in the long run if it is developed and the challenges which affect it are addressed. The results show that a 10-percent increase in domestic credit to private sector (% of GDP) drives growth by 1.5 percent in the long run. This, however, requires proper policy formulation and implementation by the Government of Liberia (GoL), mainly through the Central Bank of Liberia.

To ensure an increase in domestic credit to private sector which would enhance growth, there is a need for GoL to put in place policies to provide protection for both borrowers and lenders in the credit market. The necessary legal and regulatory frameworks should be instituted and enforced to ensure that borrowers who acquire loans from financial institutions (lenders) make repayments as and when due. This would help to address the problem of non-performing loans. Also, GoL should ensure that borrowers are not charged excessive interest rates on loans they acquire, because high interest rates could make loans unattractive or could make borrowers default on loan repayments. Either of these factors could negatively impact the volume of credit given out, and by extension, inhibit economic growth.

The ongoing reforms of the financial sector by the Central Bank[2] is a positive step in the right direction. However, there is a need for greater support from other players, including the three (3) branches of Government to ensure full implementation of these reforms.

[2] The reforms, which are meant to enhance the efficiency in the financial sector, include strengthening the regulation and supervision of financial institutions; deepening the financial system to cover other financial institutions and agent banking; and improving the national payment system to include mobile money and digital financial services.

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APPENDIX

Figure 1: Cumulative Sum of Recursive Residuals (CUSUM Test)

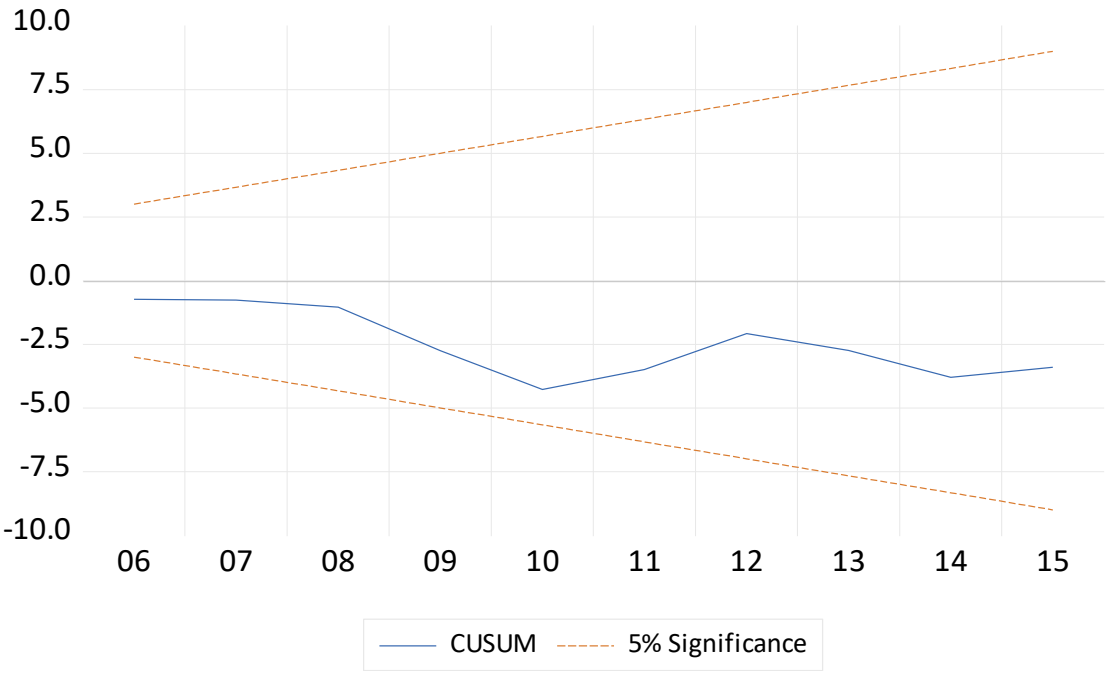

Figure 2: Cumulative Sum of Squares of Recursive Residuals (CUSUM of Squares Test)

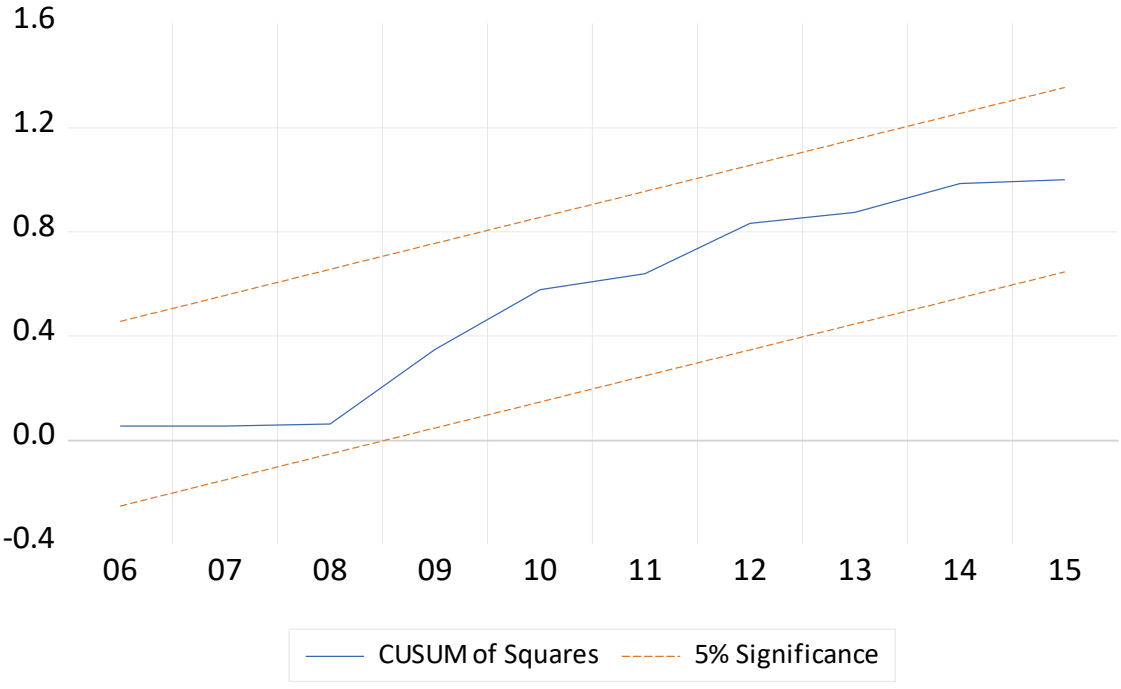

Figure 3: Normality Test

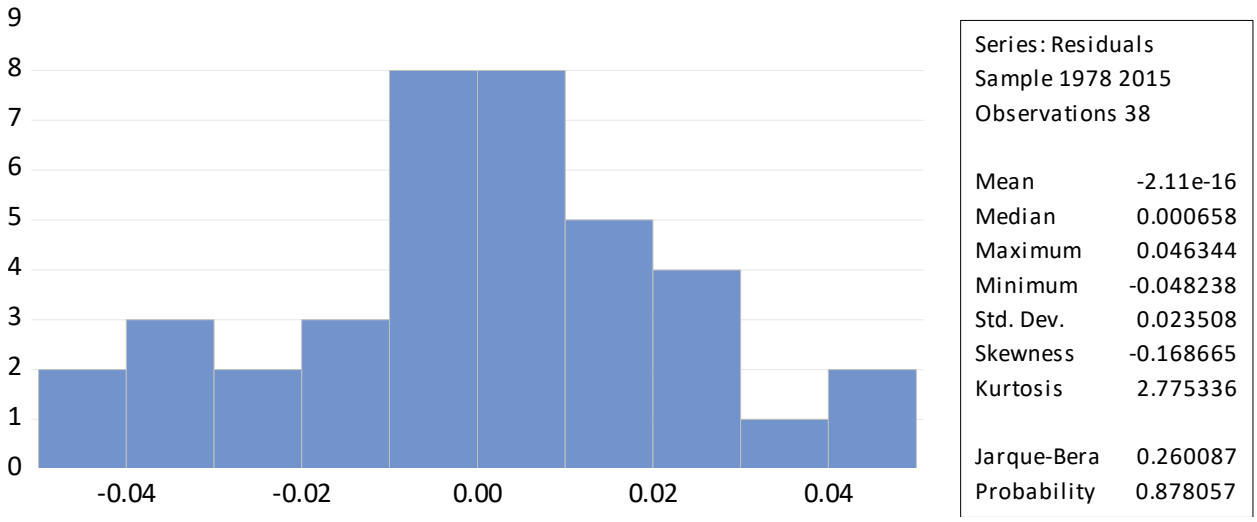

Figure 4: Top 20 ARDL Models