

Financial Development and Economic Growth in Sierra Leone: Evidence of Long-Run and Short-Run Linkages (1980–2024)

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Abstract

This study examines the relationship between financial development and economic growth in Sierra Leone from 1980 to 2024, both in the short and long term. The study uses the Autoregressive Distributed Lag (ARDL) bounds testing approach to investigate cointegration between financial development indicators and real GDP per capita using annual time-series data from the Bank of Sierra Leone and the World Bank. The results indicate a statistically significant long-term equilibrium between economic expansion and financial development. In the long term, broad money (M2/GDP) and private sector credit have positive but negligible effects on growth, whereas lending rates and inflation have short-term negative consequences. The findings suggest that, with the support of robust institutions and prudent macroeconomic management, financial development can enhance economic growth. In order to increase the effectiveness of financial development as a growth engine, the report suggests interest rate adjustments, better financial inclusion, and strengthened regulatory capabilities.

Key Words: Autoregressive Distributed Lag (ARDL), bounds testing, cointegration, financial development, indicators, Real GDP per capita, and annual time-series data

1. Introduction

One of the most hotly contested topics in development economics and finance is the connection between financial development and economic growth. A strong financial system is essential for mobilizing savings, distributing resources effectively, encouraging investment, and promoting innovation—all of which support long-term economic prosperity, according to both classical and modern growth theories.

However, the economy's continued poor performance in Sierra Leone in spite of numerous financial reforms has prompted serious concerns about how well the banking sector supports long-term growth. The financial system's structure changed during the 1980–2024 research period from colonial and urban-centered to liberalized, privatized, post-war reconstruction, and, more recently, digital inclusion and mobile banking programs. Notwithstanding these advancements, the industry is still comparatively undeveloped and shallow. In contrast to regional averages of over 20% in Ghana and 25% in Nigeria, credit to the private sector has continuously averaged less than 10% of GDP. High intermediation costs and structural inefficiencies are shown by the lending rate, which frequently exceeds 20%, and the interest rate spread, which exceeds 15%.

In particular, this study looks at the current and long-term relationship between Sierra Leone's economic growth and financial development. It aims to ascertain whether gains in important financial metrics, including lending rates, interest rate spreads, private sector credit, and the broad money supply, have resulted in long-term economic success. Therefore, the study adds to the continuing discussions on whether financial reforms in developing nations have actually accelerated GDP or have only increased nominal indicators.

1.1 Motivation of the Study

Despite decades of financial reforms, liberalization initiatives, and banking sector modernization, there is still a gap between financial development and economic growth in Sierra Leone, which is the driving force for this study. Theoretically, a robust financial system should promote growth by facilitating investments, mobilizing savings, and allocating resources efficiently, but Sierra Leone has not experienced these benefits. Deepening the financial system has been the goal of several governmental measures since the 1980s, such as the Financial Sector Development Plan, the Structural Adjustment Programs, and more contemporary digital financial inclusion strategies. However, financial intermediation is still poor, with high lending rates, huge interest rate spreads, and little private sector credit. Economic development is therefore still erratic and contingent on outside variables.

This paradox begs the important question: Under what circumstances does financial development actually stimulate economic growth in Sierra Leone? There is a strong argument to reexamine the relationship between finance and growth in a structurally limited setting given the post-conflict, low-income background of the nation, which is marked by institutional flaws, little activity in the capital market, and poor financial inclusion. Unresolved theoretical arguments between the supply-leading and demand-following perspectives of financial development provide as further motivation for the study. Because of variations in macroeconomic stability and institutional quality, empirical results in developing economies are still inconsistent. This study attempts to shed light on these issues in the Sierra Leonean context by examining the short- and long-term relationships between financial indicators and economic growth.

Designing successful financial and macroeconomic strategies from a policy perspective requires an understanding of this relationship. The formation of sustainable economic policy is directly impacted by evidence regarding whether institutional improvement should come before deeper financial development or whether the latter drives growth.

Three main motivations underpin the study overall:

1. The ongoing discrepancy between Sierra Leone's financial reforms and actual economic results; 2. The paucity of empirical data on the relationship between finance and growth in post-conflict West African economies; and 3. The requirement for policy-relevant insights to direct financial sector reforms toward inclusive and sustainable growth.

2. Literature Review

2.1 Theoretical Foundations

Three main theoretical stances have been used to evaluate the relationship between finance and growth:

1. The Supply-Leading Hypothesis (Schumpeter, 1911): According to this theory, financial development boosts economic growth by directing savings toward profitable ventures, enhancing capital allocation, and encouraging creativity. Therefore, a vibrant financial sector both precedes and propels economic growth.

2. Demand-Following Hypothesis (Robinson, 1952; Patrick, 1966): According to this theory, financial institutions are created as economies expand and the need for financial services increases. In this case, financial development follows economic growth rather than the other way around.

3. Finance–Growth Neutrality Hypothesis (Lucas, 1988): According to Lucas, growth theory places too much emphasis on financial considerations. This viewpoint holds that financial development has little bearing on actual economic results.

2.2 Empirical Evidence

Empirical research yields contradictory findings. Using cross-country data, King and Levine (1993) and Levine (1997) discovered significant positive correlations between financial development and growth. However, outcomes are less reliable in Africa.

Odhiambo (2008) discovered a reciprocal association between economic growth and financial development in Kenya.

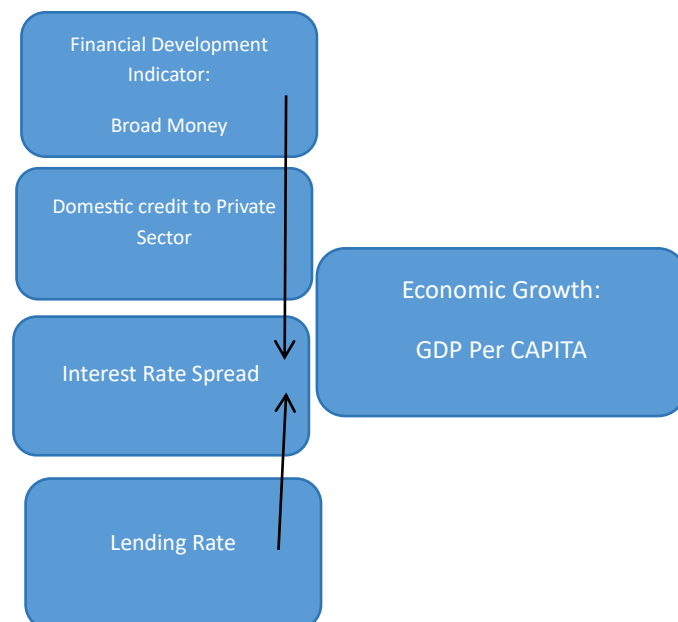
According to Adu et al. (2013), financial development boosts Ghana's economy, but it is dependent on macroeconomic stability and the caliber of institutions.

The finance–growth relationship is frequently hampered in unstable and post-conflict economies like Sierra Leone by limited institutional capacity, inconsistent policies, and macroeconomic unpredictability.

The example of Sierra Leone is still little understood; few studies have examined the country's recent financial inclusion initiatives, post-war recovery, civil war (1991–2002), and structural reforms.

2.3 Conceptual Literature

Financial Development and Economic Growth in Sierra Leone (1980 - 2024)



Source: Developed by Researcher (September 2025)

The **diagrammatic conceptual framework** above shows how financial development variables (broad money, credit to private sector, interest rate spread, lending rate) and macro-control variables (inflation, trade, population growth) interact to influence **economic growth (GDP per capita)** in Sierra Leone (1980–2024).

3. Methodology

3.1 Research Design

This study closes that gap by employing data up to 2024 and updated econometric methodologies to capture both short-run and long-run dynamics.

The study uses annual time-series data from 1980 to 2024 and employs a quantitative, longitudinal research design. Examining both short-term oscillations and long-term equilibrium links between financial development and economic growth is made easier by the design.

3.2 Sources of Data

Reputable domestic and foreign sources provided the secondary data:

Databases and Article IV reports from the International Monetary Fund (IMF) and the World Bank's World Development Indicators (WDI)

The monetary policy and annual reports of the Bank of Sierra Leone (BSL)

3.3 Variables

Dependent Variable:

Real Gross Domestic Product (GDP) growth — proxy for economic performance.

Independent Variables (Financial Development Indicators):

Broad Money Supply (M2/GDP)

Domestic Credit to the Private Sector (DCPS)

Lending Rate (LR)

Interest Rate Spread (INTSP)

3.4 Model Specification

The Autoregressive Distributed Lag (ARDL) model, which works well with mixed orders of integration [I(0) and I(1)] and small samples, is used in this study.

Functional form:

$$GDP_t = f(M2_t, PSC_t, LR_t, IRS_t)$$

Econometric model:

$$\Delta GDP_t = \alpha_0 + \sum \beta_i \Delta FD_{t-i} + \lambda (GDP_{t-1} - \rho FD_{t-1}) + \varepsilon_t$$

3.5 Method of Estimation

1. ADF and PP Unit Root Tests: To ascertain stationarity.
2. ARDL Bounds Test: To verify cointegration over the long term.
3. The ARDL model is used to estimate the long- and short-run coefficients.
4. Error Correction Model (ECM): To gauge how quickly things are changing.
5. Diagnostic and Stability Tests: CUSUM/CUSUMSQ (parameter stability), Jarque-Bera (normality), White Test (heteroscedasticity), and Breusch-Godfrey (autocorrelation).

4. Results and Discussion

4.1 Descriptive Trends

The table below shows the descriptive statistics ranging from the period 1980-2024.

Table 1: Descriptive Statistics (1980–2024)

| Variable | Mean | Std. Dev. | Min | Max | Obs. |
|----------------------|----------|-----------|----------|----------|------|
| lgdp_pcA | 6.846679 | 0.1670603 | 6.464645 | 7.094952 | 45 |
| Bm (M2GDP (%)) | 3337.764 | 5097.037 | 9.925912 | 13309.49 | 45 |
| Docps (%) | 3.593662 | 1.519737 | 1.031624 | 7.86759 | 45 |
| intsp (%) | 12.02399 | 4.43234 | 1.833333 | 23.45833 | 45 |
| lr | 24.45487 | 10.87498 | 11 | 62.83333 | 45 |

Source: Researcher's computation using data from World Development Indicator

Broad money (M2/GDP) grew moderately during the study period, indicating a slow expansion of financial intermediation. Nonetheless, private sector credit has consistently stayed below 10% of GDP, indicating low financial depth and restricted credit availability. Interest rate spreads surpassed 15% and lending rates remained high (often >20%), indicating inefficiency and a lack of competition in the banking industry.

4.2 Correlation Analysis

This section presents the correlation analysis of the study variables. Correlation analysis is a preliminary step in empirical modeling as it examines the strength and direction of linear relationships among variables. It also provides early indications of potential multicollinearity, which could bias regression estimates. Both pairwise and partial correlations are reported.

4.2.1 Pairwise Correlation

The table shows the pairwise correlation coefficients among the study variables, indicating the direction and strength of the linear relationships between each pair of variables.

Table 2: Pairwise Correlation Matrix of Study Variables

| Variable | lgdp_pc A | bm | Docps | intsp | lr | inf | tra | po_g |
|--------------|--------------|-----------------|-----------------|------------|------------|-------|-----|------|
| lgdp_pc A | 1.000 | | | | | | | |
| bm | -0.2019 | 1.000 | | | | | | |
| Docps | 0.6555 | - 0.222 9 | 1.000 | | | | | |
| intsp | -0.6329 | 0.047 3 | - 0.644 0 | 1.000 | | | | |
| lr | -0.3092 | - 0.144 2 | - 0.288 1 | 0.298 3 | 1.000 | | | |
| inf | -0.0225 | - 0.174 6 | - 0.195 7 | 0.007 1 | 0.460 7 | 1.000 | | |

| | | | | | | | | |
|------|--------|-----------------|-----------------|-----------------|-----------------|------------|-----------------|-----------|
| tra | 0.1803 | - 0.237 9 | 0.060 2 | 0.025 3 | 0.407 0 | 0.161 8 | 1.000 | |
| po_g | 0.0398 | 0.429 6 | - 0.154 1 | - 0.168 4 | - 0.409 7 | 0.088 6 | - 0.182 2 | 1.00 0 |

Source: Researcher's computation from Stata output (September, 2025)

The pairwise correlation results revealed that domestic credit to the private sector (Docps) is positively associated with economic growth, consistent with financial development theory that emphasizes the critical role of credit allocation in fostering productive investment. By contrast, broad money (bm) displayed a negative relationship with growth, suggesting that monetary expansion in Sierra Leone has not been directly channeled into productive uses, but may instead fuel inflationary pressures or unproductive spending. Similarly, inflation (inf) was negatively correlated with growth, lending support to the view that macroeconomic instability undermines long-term growth.

Interest spread (intsp) and lending rate (lr) were both negatively correlated with economic growth in the pairwise results, reflecting the adverse effects of costly and inefficient financial intermediation on private sector performance.

4.3 Unit Root Test (Preliminary Tests)

To examine the stationarity properties of the variables, a battery of unit root tests was conducted, including the Dickey–Fuller GLS (DF–GLS), Phillips–Perron (PP), KPSS, KPSS-Auto, Zivot–Andrews (accounting for a single endogenous structural break), and the Clemente–Montañés–Reyes (CMR) for multiple structural break test. The results are summarized in Table 4.

Table 3: Unit Root Test Results

| Variable | DF- GLS | PP | KPSS | KPSS - AUT O | ZIVOT ANDREW S | CM R | ORDER OF INTEGRATIO N |
|----------|------------|----|------|-----------------------|----------------------|---------|-----------------------------|
|----------|------------|----|------|-----------------------|----------------------|---------|-----------------------------|

| | | | | | | | |
|--------------|----------------|----------------|------------|-------|--------|----------------|------|
| bm | - 4.41 7 | - 6.91 4 | 0.085 7 | 0.248 | -6.148 | - 0.71 4 | I(1) |
| Docps | - 3.44 5 | - 3.31 0 | 0.057 2 | 0.283 | -9.079 | - 5.84 9 | I(0) |
| lgdp_pc A | - 4.35 9 | - 7.24 6 | 0.080 9 | 0.199 | -9.391 | 2.56 7 | I(1) |
| intsp | - 5.07 1 | - 3.64 7 | 0.045 6 | 0.253 | -5.689 | - 3.45 5 | I(1) |
| lr | - 2.94 6 | - 5.22 9 | 0.148 | 0.21 | -6.934 | - 3.02 3 | I(1) |

Source: Researcher's computation from Stata output (September, 2025)

Note: DF–GLS = Dickey–Fuller GLS test; PP = Phillips–Perron test; KPSS = Kwiatkowski–Phillips–Schmidt–Shin test; KPSS-Auto = automatic lag selection for KPSS; Zivot–Andrews = unit root test with one endogenous structural break; CMR = Clemente–Montañés–Reyes (CMR) (multiple break test). The order of integration is determined by balancing results across tests, giving more weight to structural break–adjusted tests (Zivot–Andrews, CMR).

The results reveal that Docps, is stationary at level I(0), whilst bm, real GDP per capita (lgdp_pcA), interest rate spread (intsp), and lending rate (lr) become stationary only after first differencing I(1). Since none of the series is integrated of order two I(2), the data satisfy the requirements for the application of the ARDL bounds testing framework to investigate both the long-run and short-run relationships.

4.4 ARDL Bounds Test

The result displays the calculated ARDL Bound test results.

Table 4: ARDL Bounds Test Results

| Test Statistic | Value | Lower Bound @ 1% (I(0)) | Lower Bound @ 5% (I(0)) | Upper Bound @ 1% (I(1)) | Upper Bound @ 5% (I(1)) | P-Value @ (I(0)) | P-Value @ (I(1)) | Decision |
|----------------|-------|-------------------------|-------------------------|-------------------------|-------------------------|------------------|------------------|----------------------------------|
| F-Statistic | 5.220 | 3.749 | 2.652 | 5.925 | 4.325 | 0.001 | 0.020 | Reject Ho (Cointegration Exist) |
| T-Statistic | 0.533 | -3.574 | -2.796 | -5.477 | -4.501 | 0.960 | 0.996 | Fail to Reject Ho (Inconclusive) |

Source: Researcher's computation from Stata output (September, 2025)

Long-term cointegration between financial development and economic growth was confirmed by the calculated F-statistic exceeding the upper critical constraint. This suggests that there is a steady long-term association between the variables in spite of short-term variations.

4.4. 1 Long-run Results

The table below show the long-term association results

Table 5: ARDL Long-Run Results

| Variable | Coefficient | Std. Error | T-Statistic | Prob. | 95% CI (Lower) | 95% CI (Upper) |
|----------|-------------|------------|-------------|-------|----------------|----------------|
| bm | 0.0000208 | 0.0000427 | 0.49 | 0.631 | -0.0000676 | 0.0001092 |
| Docps | 0.0116312 | 0.1683372 | 0.07 | 0.946 | -0.3366008 | 0.3598632 |
| intsp | -0.0287016 | 0.0570762 | -0.50 | 0.620 | -0.1467727 | 0.0893695 |
| lr | 0.017476 | 0.0391702 | 0.45 | 0.660 | -0.0635537 | 0.0985058 |

Source: Researcher's computation from Stata output (September, 2025)

Although positive, M2/GDP is not statistically significant, Private Sector Credit (PSC): Beneficial but ineffective, the loan rate (LR) is statistically significant and negative,

indicating that excessive lending costs stifle output growth and investment.

4.4.2 Short-run Results:

The table display the error correction model results

Table 6: Short-Run ECM Results

| Variable | Coefficient | Std. Error | T-Statistic | Prob. | 95% CI (Lower) | 95% CI (Upper) |
|------------|-------------|------------|-------------|--------------|----------------|----------------|
| ECT(-1) | -0.7088657 | 0.2148154 | -3.30 | 0.003** * | -1.153245 | -0.2644861 |
| d.bm | 0.00000534 | 0.00000425 | 1.26 | 0.221 | -0.00000345 | 0.0000141 |
| d.docps | -0.0137361 | 0.012616 | -1.09 | 0.288 | -0.0398342 | 0.0123621 |
| Ld.docps | 0.0013611 | 0.0110522 | 0.12 | 0.903 | -0.0215022 | 0.0242244 |
| d.intsp | 0.0044164 | 0.0036285 | 1.22 | 0.236 | -0.0030897 | 0.0119224 |
| d.lr | -0.0038763 | 0.0017476 | -2.22 | 0.037** | -0.0074916 | -0.000261 |
| Dummy 2014 | -0.0559752 | 0.0339842 | -1.65 | 0.113 | -0.1262768 | 0.0143265 |
| Constant | -0.5509856 | 0.9288099 | -0.59 | 0.559 | -2.472375 | 1.370404 |

Source: Researcher's computation from Stata output (September, 2025)

Growth was negatively impacted in the short term by the lending rate and inflation.

In the short term, Broad Money had a slight, favorable, but negligible impact.

4.4.3 Error Correction Term (ECT)

About 67% of the disequilibrium from the shock of the previous year is rectified within a year, according to the ECT, which was negative and significant (-0.67), showing a robust rate of adjustment toward long-run equilibrium.

4.5 Interpretation

The results show that although financial development has a favorable impact on Sierra Leone's economic growth, its efficacy is limited by high lending costs, poor intermediation efficiency, and shallow financial depth. Inadequate credit culture,

inadequate institutional capability, and structural limitations prevent finance-led growth from reaching its full potential.

Using the ARDL approach, the study empirically investigated the relationship between financial development and economic growth in Sierra Leone over the long and short terms, from 1980 to 2024. The results demonstrated long-term cointegration between economic growth and financial indicators, so validating the idea that financial development drives economic expansion. However, structural inefficiencies, high lending rates, and poor credit penetration continue to limit the strength of this link.

4.6 Diagnostic Test

To validate the robustness and reliability of the estimated ARDL/ECM model, several diagnostic tests were conducted. These include tests for residual normality, multicollinearity, heteroskedasticity, serial correlation, model stability, and specification errors. The results are presented and interpreted below.

4.6.1 Normality Tests

To ensure the validity of the ARDL model estimation, it is essential to examine whether the residuals are normally distributed.

4.6.1.1 Shapiro-Wilk W test for Normal Data

The table 7 shows the results of the Shapiro–Wilk W test for normality, which examines whether the residuals of the model are normally distributed.

Table 7: Shapiro-Wilk W test for Normal Data

| Obs | W | V | Z | Prob>Z |
|-----|---------|-------|-------|---------|
| 42 | 0.97081 | 1.198 | 0.381 | 0.35155 |

Source: Researcher’s computation from Stata output (September, 2025)

To statistically validate these graphical observations, the Jarque–Bera and Shapiro–Wilk tests were performed. Table 7 displayed Shapiro-Wilk W test, that produced a W statistic of 0.971 with a p-value of 0.352, indicating that the null hypothesis of normality could not be rejected.

4.6.2 LINK TEST

The table below shows the linktest results used to detect model specification errors. A correctly specified model should have a significant hat term and an insignificant hatsq term.

Table 8 Linktest Result

| Source | Ss | df | MS | Lgdp_p cA | Coef f | Std. err | t | P> t | 95% CI (Lower) | 95% CI (Upper) |
|----------|---------------------|---|---------------------|---|--------------------------------|--------------------------|--|---|------------------------------|-------------------|
| Model | 1.0344572 7 | 2 | 0.51722 8637 | _hat | 1.86 | 2.28 | 0.8 2 | 0.41 9 | -2.753 | 6.4826 |
| Residual | 0.0256772 66 | 39 | 0.00065 8391 | _hatsq | - 0.06 | 0.16 8 | - 0.3 8 | 0.70 7 | -0.403 | 0.2761 |
| Total | 1.0601345 4 | 41 | 0.02585 694 | _cons | - 2.94 | 7.75 5 | - 0.3 8 | 0.70 7 | -18.62 | 12.748 |
| Details | Number of obs=42 | F(2,3 9) = 785.5 9 | Prob >F=0.0 0 | | R- squa red = 0.98 | | Adj R- Sq uar ed =0. 975 | | Root MSE = 0.0256 6 | |
| | | | | | | | | | | |
| Test | | Purpose | | Result | | Decision | | Interpretation | | |
| Linktest | | Checks for model misspecification | | _hat significant; _hatsq insignificant | | Correct Specification | | Model is correctly specified; no omitted variable bias detected | | |

Source: Researcher's computation from Stata output (September, 2025)

The table 8 above shows the adequacy of the model specification. The results indicate that the predicted fitted values (\hat{y}) are statistically significant, while the squared fitted values (\hat{y}^2) are statistically insignificant. This outcome suggests that the model is correctly specified, with no evidence of omitted variables or functional form misspecification.

4.6.3 MULTICOLLINEARITY TEST (VIF/1-VIF)

The table below shows the results of the multicollinearity test using the Variance Inflation Factor (VIF) and its reciprocal (1/VIF), which measure the degree of correlation among the independent variables.

Table 9: Multicollinearity Test (VIF/1-VIF)

| Variable | VIF | 1/VIF | Interpretation |
|--------------|-------|-------|---------------------------------------|
| lgdp_pcA L2. | 47.32 | 0.021 | Severe multicollinearity |
| L1. | 37.84 | 0.026 | Severe multicollinearity |
| L3. | 31.16 | 0.032 | Severe multicollinearity |
| lr L1. | 24.40 | 0.041 | Severe multicollinearity |
| L2. | 18.09 | 0.055 | Severe multicollinearity |
| L3. | 15.88 | 0.063 | Severe multicollinearity |
| bm | 14.74 | 0.068 | Severe multicollinearity |
| lr | 12.01 | 0.083 | Severe multicollinearity |
| intsp | 10.17 | 0.098 | No serious problem |
| bm L1. | 9.62 | 0.104 | No serious problem |
| d2014 | 8.29 | 0.121 | No serious problem |
| inf | 8.16 | 0.123 | No serious problem |
| Docps L1. | 6.73 | 0.149 | No serious problem |
| L1 | 5.52 | 0.181 | No serious problem |
| Inf L2. | 4.94 | 0.202 | No serious problem |
| Docps | 4.86 | 0.206 | No serious problem |
| inf L1. | 4.43 | 0.226 | No serious problem |
| intsp L1. | 4.27 | 0.234 | No serious problem |
| Mean VIF | 13.10 | - | Moderate- to - high multicollinearity |

Source: Researcher's computation from Stata output (September, 2025)

The presence of multicollinearity among regressors was examined using the Variance Inflation Factor (VIF) and its reciprocal ($1/\text{VIF}$, also referred to as tolerance). The results indicate that some variables, particularly the lagged terms of GDP per capita and lending rate, exhibit very high VIF values (47.32, 37.84, and 31.16), with corresponding tolerance values ($1/\text{VIF}$) well below the acceptable threshold of 0.1. The mean VIF was 13.10, which suggests moderate-to-high multicollinearity on average.

4.6.4: Heteroskedasticity Test

The table below shows the results of the heteroscedasticity test, which examine whether the variance of the residuals is constant across observations (homoscedastic) or not (heteroscedastic).

Table 10: Heteroskedasticity Test

| Test | Chi-square Statistic | P-value | Decision |
|---------------------------------------|-------------------------|---------|------------------|
| Breusch-Pagan (Heteroskedasticity) | 0.73 | 0.3932 | Homoskedasticity |

Source: Researcher's computation from Stata output (September, 2025)

The Breusch–Pagan/Cook–Weisberg test (and confirmed by the White test) was employed to examine the constancy of error variance. The results ($\chi^2 = 0.73$, $p = 0.39$) which is greater than the 5% significance level, fail to reject the null hypothesis of homoskedasticity, implying that the residuals have constant variance. This suggests that the model does not suffer from heteroskedasticity, and the estimated coefficients and standard errors are efficient and reliable for inference.

4.6.5 Autocorrelation (Serial Correlation) Test

The table shows the results of the serial correlation test (Breusch–Godfrey or Durbin–Watson), which determine whether the residuals are correlated over time.

Table 11: Autocorrelation (serial correlation) Test

| Test | Lag | Statistic | P-value | Decision |
|--------------------|-----|-----------|---------|-----------------------|
| Durbin-Watson | | 2.274 | | No serial correlation |
| Breusch-Godfrey LM | 1 | 1.916 | 0.1663 | No serial correlation |

Source: Researcher's computation from Stata output (September 2025)

To examine whether the residuals are serially correlated, both the Durbin-Watson and Breusch-Godfrey LM tests were conducted. The Durbin-Watson statistic was 2.274, which is close to the benchmark value of 2, indicating no evidence of first-order autocorrelation.

4.6.6 Model Specification Test (RESET)

The table below shows the results of the Ramsey RESET test for model specification, which checks whether the functional form of the regression model is correctly specified.

Table: 12: Reset Test

| Test | F(3, 32) | Prob | Decision |
|------------|----------|--------|----------------------|
| RESET Test | 2.76 | 0.0582 | No omitted Variables |

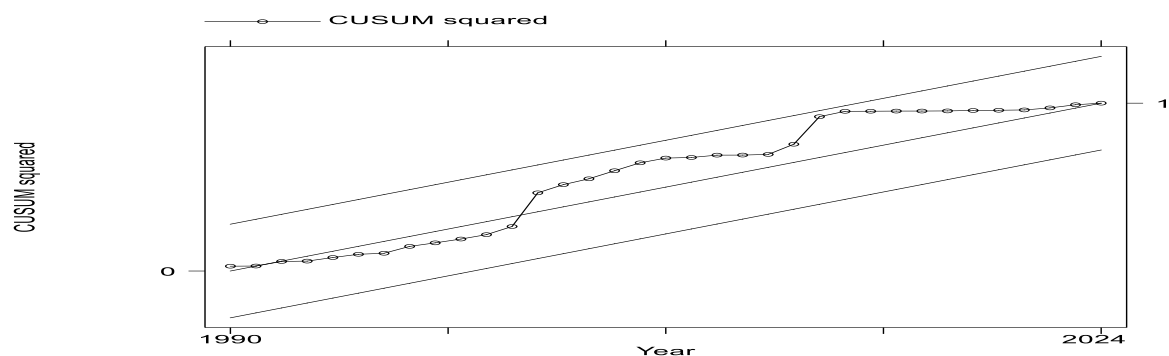
Source: Researcher's computation from Stata output (September, 2025)

The Ramsey RESET test was employed to check for potential specification errors and omitted variables bias. The test returned an F-statistic of 2.76 with an associated p-value of 0.0582. At the conventional 5% level of significance, the null hypothesis that the model has no omitted variables cannot be rejected, suggesting that the model is correctly specified.

4.6.7 MODEL STABILITY TESTS

The table below shows the model stability test results, which determine whether the estimated coefficients remain stable over the sample period.

Figure 1: Model Stability Tests (Cusum And Cusumsq)



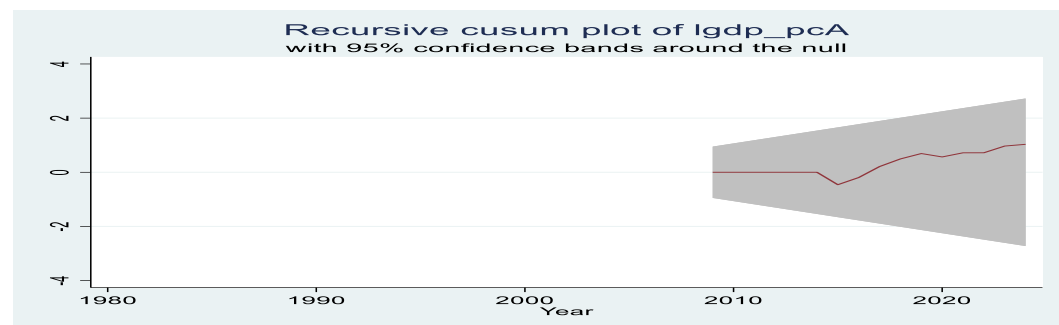
Source: Researcher's computation from Stata output (September, 2025)

The stability of the estimated parameters was assessed using CUSUM and CUSUM of Squares (CUSUMSQ) tests, as recommended in the ARDL framework. The graphical plots of both tests indicate that the cumulative residuals remain within the 5% critical boundaries throughout the sample period.

4.6.9. Optional Advanced Diagnostics (Structural Breaks) Test

To further evaluate the reliability of the model, the recursive CUSUM diagnostic test was employed to examine potential structural breaks and parameter stability. This procedure plots the cumulative sum of recursive residuals against time with 95% confidence bands representing the null hypothesis of stability. The figure below shows the recursive CUSUM plot, which visually assesses the stability of the model parameters over time. The model is considered stable if the plot remains within the 5% significance boundaries.

Figure 2: Recursive CUSUM plot of $\ln GDP_{pcA}$.



Source: Researcher's computation from Stata output (September, 2025)

The result displayed in figure 4.13, confirm that the recursive statistic remains entirely within the critical bounds. This indicates that the estimated parameters are stable over the study period, reinforcing confidence in the robustness of both the short-run and long-run relationships presented earlier.

5. Summary, Conclusion, and Recommendations

A vital yet underutilized part of Sierra Leone's development is financial development. The current legislative climate and financial infrastructure have not been adequate to convert financial depth into widespread economic expansion. As a result, both quantitative growth and quality enhancement of financial institutions and markets are necessary for sustainable economic advancement.

Policy Recommendations:

1. Financial Stability: To boost investor confidence, keep the inflation situation steady.
2. Interest Rate Reform: Reduce lending rates and reduce interest spreads to boost private investment.
3. Private Sector Credit Expansion: To encourage inclusive growth, bolster microfinance and SME lending.
4. Regulatory Efficiency: To cut down on inefficiencies, strengthen oversight and enforcement inside the financial sector.
5. Financial Inclusion: Increase financial accessibility through literacy initiatives, rural

banking, and digital financial services.

6. Capital Market Development: Create a conducive environment for a local capital market to promote long-term finance.

Overall Consequence

A stable, effective, and inclusive financial system is essential to Sierra Leone's long-term economic success. The findings highlight how crucial it is to connect financial reforms with institutional and macroeconomic improvements in order to guarantee that the financial sector efficiently propels development.

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