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Research Article

# Analysising the Impact of Exchange Rate on Economic Growth in Sierra Leone

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## Abstract

This study examines the impact of exchange rate on economic growth in Sierra Leone from 1994 to 2023 using Ordinary Least Squares (OLS) regression technique. The analysis reveals that exchange rate significantly impacts Sierra Leone economic growth, with fluctuations in the domestic currency's value exerting a negative influence. This finding aligns with economic theories that suggest exchange rate movements affect trade balances and investment flows. Interest rate also emerges as a significant determinant, where higher rates negatively influence economic activity, emphasizing the role of monetary policy in managing inflation and fostering growth. Inflation is identified as a crucial factor affecting economic growth, with high and volatile rates having a substantial negative impact, underscoring the need for price stability for sustained development. Conversely, the degree of openness, measured by trade and investment flows, exhibits a positive association with economic growth, indicating that policies promoting international trade and investment can enhance growth through technology transfer, competition, and market access. Government expenditure shows a nuanced relationship with economic growth. While it is expected to stimulate economic activity, findings suggest that inefficient spending or high debt levels can crowd out private sector investment, reducing overall economic growth. Policymakers must manage exchange rate policies to mitigate adverse effects on trade and investment, maintain price stability through effective inflation management, and promote openness to international trade and investment. Additionally, prudent management of government expenditure is crucial to avoid crowding out private sector investment and ensure fiscal sustainability. Efficient allocation of public resources and effective public investment are essential for maximizing the impact of government spending on economic development.

## Keywords

Economic Growth, Exchange Rate, Inflation, Government Expenditure

## 1. Introduction

Exchange rates, a key component of the global financial system, greatly influence the terms under which nations trade commodities and services. One of the most important microeconomic factors influencing overall economic policy and reform initiatives is exchange rates. They play a critical role in predicting the rate of expansion of a country's economy. As a result, international monetary economics has traditionally placed a great deal of emphasis on exchange rate management techniques. As noted by Chou [26], discussions over currency rate management continued after the gold standard collapsed in the 1930s, with the creation of the Bretton Woods System

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of adjustable pegs in the 1940s and the subsequent implementation of a number of exchange rate regimes. The two extremes of flexibility and fixation have been the focus of the discussion. As Europe switched from fixed to flexible exchange rates in 1973, worries about how exchange rate volatility might affect commerce intensified. The ramifications of the flexible exchange rates that arose after the failure of the Bretton Woods System have alarmed economists and decision-makers alike [32].

Exchange rate management (ERM) has gone through many phases, each bringing with it new problems for Sierra Leone economy. [46, 15] asserts that political unrest has hindered the complete stability and efficacy of foreign currency policy by causing them to fluctuate often. The government's choices in achieving its macroeconomic objectives have a significant impact on exchange rate stability, which is essential for economic progress. Changes in exchange rates have a major influence on the relative cost of products and services, which in turn affects the nations' imports and exports. Nigeria's economy, according to [55, 14], is especially reliant on imports for both production and consumption. The World Bank (2003) also emphasizes how very susceptible oil-rich nations like Sierra Leone are to changes in currency rates. Such volatility operates as a penalty on investments in industries like manufacturing and agriculture, which has a detrimental effect on economic development [67].

The Sierra Leone government switched from a pegged to a flexible exchange rate system in 1986 with the implementation of the Structural Adjustment Programme (SAP). Under this system, market forces dominated currency rates, although monetary authorities sometimes engaged in the foreign exchange market to accomplish particular strategic goals [11]. However, uneven and sporadic exchange rate controls made the Leone even more unstable [43, 10].

Many countries, including Sierra Leone, have experimented with different currency rate arrangements since industrialized countries switched from a fixed exchange rate regime to a floating exchange rate system in 1973. These include managed floating, weighted currency baskets, pegged systems, and, more recently, monetary zones [9]. However, the inconsistent management of these exchange rate systems has undermined the country's broader macroeconomic goals, particularly in controlling volatility. According to [55], floating exchange rates tend to experience fluctuations, which increases the volatility associated with these systems.

The stability and volatility of exchange rates are largely influenced by economic fundamentals. Strong economic fundamentals should ideally lead to a stable and healthy economic environment. The Leone has been volatile ever since the Structural Adjustment Programme (SAP) was implemented in 1986. The ongoing devaluation may be attributed, in large part, to the persistently higher demand for foreign currency than the supply of it. The SAP was implemented to rectify the underlying imbalances in the Sierra Leone economy, particularly in the aftermath of the global oil market crisis. The persistent depreciation of the leone is mostly attributable to this mismatch in supply and demand within the foreign currency market.

The depreciation of the Leone may also be attributed to the Sierra Leone economy's poor industrial base and lack of diversification. Sierra Leone neglected its non-oil exports in the early 1970s because of its over-reliance on oil as its main source of income, despite the fact that non-oil exports are essential for earning foreign cash. The export of crude oil generated foreign currency revenues, which in turn drove a vast purchase of completed products and services. Because of its excessive dependence on oil, the economy is quite vulnerable to shocks from outside sources [68].

As [34] notes, over time, Sierra Leone economy has been negatively impacted by unfavorable exchange rate regimes. The rise in oil prices, coupled with fluctuating exchange rates caused by inconsistent exchange rate policies, has contributed to the continuous depreciation of the Leone. This ongoing depreciation forms the backdrop for this study.

## 2. Literature Review

### 2.1. Theoretical Review

#### 2.1.1. Optimal Currency Area (OCA)

The Optimal Currency Area (OCA) theory, introduced by [56] and [52], remains a crucial theoretical framework for selecting exchange rate regimes. This body of work focuses on trade and business cycle stabilization, drawing upon concepts like shock symmetry, openness, and labor market flexibility. The theory suggests that a fixed exchange rate regime could enhance trade and economic growth by reducing exchange rate uncertainty and the cost of hedging. It may also spur investment by lowering the interest rate-driven currency premium. However, it could also hinder trade and growth by delaying or obstructing necessary adjustments in relative prices [64]. Later works emphasized financial market stabilization and the interplay between emerging economies and speculative financial activities. According to OCA theory, a stable regime can foster financial market development, act as a nominal anchor, and prevent competitive devaluation, which in turn enhances trade and economic growth [13, 25, 33, 35, 41].

#### 2.1.2. Purchasing Power Parity (PPP)

The Purchasing Power Parity (PPP) hypothesis was introduced by [53]. According to this theory, the value of identical goods should be the same across countries when adjusted for their respective currencies. They argue that equilibrium between exchange rates of various currencies will be achieved when purchasing power is equal across those currencies. [65] suggest that the ratio of commodity price levels should be consistent with the value of national currencies. It adds that a currency may be mispriced if it does not have the purchasing power to match the prices of goods in its country [66].

This theory operates on the assumption that there are no transaction costs, trade barriers, and that the goods sold are homogenous [15]. When a currency is exchanged at the current market rate, the price of a homogenous commodity should remain the same globally. The theory proposes that price indices can be used to determine the exact cost of a standard good across borders. However, the major challenge with PPP is that different countries use different goods to calculate their price levels, making it difficult to assess PPP using price indices [18].

Momodu introduced two categories of PPP: absolute and relative [53]. Absolute PPP asserts that the prices of similar goods should be identical in any currency, following the "Law of One Price." Relative PPP emerged due to the limitations of absolute PPP and explains how exchange rates change over time, acknowledging market imperfections [20, 58]. This theory is relevant to our research because it helps explain why the value of one country's currency differs from another. It posits that the equilibrium exchange rate ensures that a given amount of currency can purchase the same basket of goods and services in any participating country.

### 2.1.3. Interest Rate Parity Theory

The interest rate parity (IRP) theory explains the relationship between interest rates and exchange rates. It posits that the difference between the forward and spot exchange rates of two nations equals the difference in their interest rates. The core principle of IRP is that, regardless of interest rate differences, hedged returns on investments made in various currencies should be equal. [24] supports this theory by highlighting the "no-arbitrage" condition in foreign exchange markets, where investors cannot exploit price disparities by purchasing a currency at a lower rate and selling it in a country with a higher exchange rate. In a floating exchange rate system, the IRP theory also implies that interest rates, exchange rates, and inflation rates are interconnected. [22] notes, these factors tend to influence each other proportionally.

### 2.1.4. The Balance of Payments Theory (BOP)

The balance of payments theory explains that the exchange rate between two nations is influenced by factors beyond domestic price levels and money supply. [19] emphasizes the importance of a country's balance of payments in determining its currency rate. When the demand for foreign currency exceeds its supply at a given exchange rate, the country faces a balance of payments deficit [62]. Demand for foreign currency is driven by the desire to purchase foreign goods and services, while exports of domestic goods and services generate the supply of foreign currency [7]. A balance of payments deficit reflects excess demand for foreign currency, leading to rising exchange rates and depreciation of the domestic currency. Conversely, when the supply of foreign currency surpasses demand, the value of the domestic currency appreciates. When neither a deficit nor a surplus exists, the equilibrium exchange rate is achieved, aligning the balance of payments and exchange rates [19, 17].

### 2.1.5. The Monetary Approach to Exchange Rates

The monetary approach to determining exchange rates aims to balance the supply and demand for a nation's currency. This approach considers variables like interest rates, price levels, and real income, which influence the demand for money. There is a direct correlation between real income, price levels, and money demand, whereas money demand and interest rates are inversely related. A nation's monetary authority sets the money supply price [4, 28]. This approach assumes that the foreign exchange market starts in a state of equilibrium or interest parity. Furthermore, when a country's monetary authority increases the money supply, domestic prices rise accordingly, causing the local currency to depreciate [2, 59].

### 2.1.6. The Portfolio Balance Approach

The portfolio balance approach to determining exchange rates treats foreign and domestic bonds as imperfect substitutes. This theory views money as one type of financial asset, with exchange rates determined by the supply and demand equilibrium for these assets [5, 27]. The portfolio balance approach suggests that a trade surplus can offset some of the initial depreciation of a currency. It also explains exchange rate overshooting, offering a more comprehensive understanding of exchange rate fluctuations.

### 2.1.7. International Fisher Effect (IFE) Theory

The International Fisher Effect (IFE) theory suggests that the difference in nominal interest rates between two currencies corresponds to the anticipated difference in their exchange rates. The IFE is derived from the analysis of interest rates on risk-free assets, such as Treasury securities, both present and future. Unlike earlier theories that relied solely on inflation rates to predict exchange rate movements, this approach accounts for both interest and inflation rates to explain currency appreciation or depreciation [29]. The theory asserts that real interest rates, unaffected by changes in monetary policy, offer a more accurate representation of a currency's standing in international markets. According to the IFE, nations with lower interest rates generally have lower inflation rates, which could boost their currency's real value compared to other nations. Conversely, higher interest rates are associated with a decline in those nations' currency values [27].

## 2.2. Empirical Review

The Optimal Currency Area (OCA) theory, introduced by [56] and [52], has sparked ongoing debate about the relationship between exchange rates and economic development in international trade and finance. Although some research [44]; [47] supports a long-term link between macroeconomic fundamentals and exchange rates, recent studies argue that exchange rates are unpredictable, especially in the short term [31]. [23] explored how exchange rate fluctuations affect long-term economic growth in Bangladesh using OCA theory, concluding that exchange rate volatility negatively impacts Bangladesh's economic development. [6, 36] reached similar conclusions in their study of Ghana, noting that significant exchange rate volatility hampers economic development. However, growth can also be attributed to factors such as innovation and efficient resource use. [49] suggests that countries with stable exchange rates are better positioned to achieve their development potential. Excessive exchange rate volatility hinders economic progress by raising domestic prices, reducing competitiveness, and fostering business uncertainty. [12, 38] also examined the relationship between exchange rate volatility and long-term productivity growth, finding a nonlinear connection between currency volatility and output volatility in developing countries. According to their research, moderate exchange rate volatility helps to reduce production volatility and absorb economic shocks, but excessive volatility amplifies output fluctuations.

Analyzed how changes in currency values and prices affect Nigerian agricultural exports. They found that fluctuations in the Naira's value are positively influenced by agricultural loans and currency rate changes [37]. However, while cocoa prices negatively impacted export quantities, as expected, the relationship was not statistically significant, indicating instability in Nigeria's cocoa export sector. [21] emphasized that exchange rate fluctuations affect production growth, adding that existing exchange rate policies have introduced uncertainty into trade transactions, leading to a decline in living standards and rising production costs that contribute to cost-push inflation [38].

Examined the effects of exchange rate regulations on Nigeria's industrial growth over a 21-year period (1985–2005) [63]. Their findings indicated that exchange rates significantly influence economic growth, with an adjusted R2 of 69%. [61] observed both positive and negative effects of currency fluctuations on Nigeria's economy, with overall findings indicating a negative impact that is statistically significant. [30] found no strong evidence linking exchange rate volatility to GDP growth in Nigeria. Instead, they suggested that Nigeria's economic development is more directly influenced by monetary and fiscal policies, particularly oil export growth. They concluded that while managing exchange rates is necessary, it is not sufficient on its own to drive economic growth [12]. It highlighted that oil revenue and the balance of payments negatively affect Nigeria's economy, while exchange rate fluctuations eventually improve GDP growth. [60] argued that exchange rate changes strongly influence the balance of payments. They suggested that currency depreciation could improve the balance of payments if fiscal discipline is exercised. Their study also attributed Nigeria's persistent current account deficits to misallocation of domestic credit, fiscal irresponsibility, and poor spending controls resulting from centralized government power. [34] concluded that an appreciating exchange rate has a substantial impact on domestic output in Nigeria and promotes manufacturing sector growth, while also finding a positive relationship between manufacturing GDP and inflation.

Examined the effects of currency devaluation on Zimbabwe's inflation and real output growth [50]. Using a Vector Error Correction Model (VECM) and the Johansen co-integration test on quarterly data from 1990 to 2006, they discovered that real exchange rate changes significantly impact long-term production growth. [3] investigated the dynamics between Sierra Leone inflation, exchange rate, and money supply, using quarterly data from 1986 to 2008. The results, obtained through the VECM, confirmed that money supply and exchange rates have a significant negative effect on long-term inflationary pressures.

Examined the effects of exchange rate depreciation on Sierra Leone balance of payments from 1961 to 2012 [51]. Their research utilized a Multivariate Vector Error Correction framework, revealing a long-term equilibrium relationship between the exchange rate and other economic factors.

He noted that a depreciating exchange rate encourages exports and reduces imports, while an appreciating exchange rate has the opposite effect [8]. The shift from imported to domestically produced goods caused by currency depreciation often redirects income between trading nations, impacting their economic growth. Based on the theoretical and empirical evaluation conducted above, it is clear that the existing literature provides inconclusive findings on the relationship between exchange rates and economic growth. This study seeks to address these theoretical and empirical gaps by investigating the relevant hypotheses.

# 3. Methodology

## 3.1. Model Specification

This analysis is based on the optimum currency area (OCA) theory of exchange rates, which was first introduced by [56] and [52]. The study also incorporates the empirical findings of Vieira and MacDonald (2016) and [16, 39]. The [1] model was utilized, with the real GDP growth rate being substituted for economic growth in this research. In addition to the Leone/Dollar exchange rate, other independent variables included the interest rate, government expenditure, trade openness, inflation rate, and net foreign direct investment. The functional form of the model is expressed as follows:

$$GGDP = F\ (EXCH, INT, INF, DOP, FDI, GEXP) \quad (1)$$

Econometrically, this can be stated thus;

$$GGDP = \beta0 + \beta1EXCH + \beta2\ INT + \beta3\ INF + \beta4DOP + \beta5GEXP + \beta6FDI + \mu \quad (2)$$

In this case, GGDP stands for gross domestic product growth rate; EXCH stands for exchange rate; INT stands for interest rate; INF stands for inflation; FDI stands for foreign direct investment; GEXP is for government spending; DOP stands for degree of openness; and μ represents the error term.

### 3.2. Method of Data Analysis

The empirical analysis of this research includes three major stages: preliminary analysis, estimation, and post-estimation. Preliminary analysis involves unit-root testing, co-integration testing, and descriptive statistics. To estimate the relationships between variables, the study employs the Autoregressive Distributed Lag (ARDL) model, combined with the bounds co-integration test to examine both short- and long-term relationships. A long-term relationship is considered to exist if the calculated F-statistics exceed the upper critical value. If the F-statistics fall below the lower limit, co-integration does not exist. Values between the lower and upper critical bounds are treated as inconclusive. Additional pre-estimation tests, including serial correlation, heteroscedasticity, and normality tests, were conducted to ensure the robustness and consistency of the model.

The following information about the model must be stated in order to do this test. Five percent is the intended relevance threshold. As a result, we may now test the alternative hypothesis, which could be either H1: b1≠ 0 or H1: b1=0, against the null hypothesis, which could be either H0: b1=0 or H0: b1≠ 0. In order to achieve this, the significance level calculated by E-view (Econometric view) at the specified level of confidence, typically 95%, is compared with the computed t-value or ρ-value. Since this study employed a 5% threshold of significance, any result beyond that threshold will be disregarded, and the provided parameter estimate will be considered to be not substantially different from zero. As a result, we reject the alternative hypothesis and accept the null hypothesis.

### 3.3. Model Evaluation and Justification

The model was created using a modified version of the IS-LM framework, which [57, 45] also embraced. The products, money, and foreign exchange markets make up the demand side of the economy. For the economy to be in equilibrium, all three of these markets must be in balance at the same time. Interest rate management aims to achieve internal as well as external balance in the economy under these conditions.

## 4. Data Analysis and Discussion of Finding

### 4.1. Descriptive Statistics

*Table 1. Descriptive Statistics Table.*

| | GDP | INF | INT | EXR | FDI | EXP | DOP |
|---|---|---|---|---|---|---|---|
| Mean | 273,000,000 | 10.75362 | 5.671100 | 152.0916 | 3,530,000,000 | 16.88342 | 56.55278 |
| Median | 37,000,000 | 5.643439 | 6.140393 | 133.7233 | 3,380,000,000 | 16.01147 | 53.72000 |
| Maximum | 574,000,000 | 75.40165 | 18.18000 | 473.0947 | 8,840,000,000 | 30.85716 | 100.0800 |
| Minimum | 762.3987 | 4.776742 | -5.62796 | 17.30000 | -735,000,000 | 9.760705 | 14.42000 |
| Std. Dev. | 193,000,000 | 14.49867 | 5.256095 | 138.9779 | 2,560,000,000 | 4.855705 | 28.13594 |
| Skewness | -0.186531 | 3.513931 | 0.028046 | 0.825024 | 0.472330 | 0.887862 | 0.284000 |
| Kurtosis | 1.500500 | 15.06923 | 2.934825 | 2.582809 | 2.493355 | 3.456981 | 1.718079 |
| Jarque-Bera | 2.984594 | 243.8216 | 0.009243 | 3.620882 | 1.436341 | 4.202537 | 2.457432 |
| Probability | 0.224856 | 0.000000 | 0.995389 | 0.163582 | 0.487644 | 0.122301 | 0.292668 |
| Sum | 8,200,000,000 | 322.6087 | 170.1330 | 4562.748 | 106,000,000 | 506.5025 | 1696.584 |
| Observation | 30 | 30 | 30 | 30 | 30 | 30 | 30 |

Source: Eviews 13.0 output.

According to the table's descriptive data, the GDP growth rate has a mean value of 273,000,000,000 and maximum and lowest values of 574,000,000,000 and 762.3987, respectively. The greatest and minimum values of the exchange rate (EXR) are 473.0947 and 17.30000, respectively, with a mean value of 152.0916. With a mean of 3,530,000,000, foreign direct investment (FDI) can be found; the maximum and minimum values are 8,840,000,000 and -735,000,000, respectively. The average value of inflation (INF) is 10.75362, with greatest and minimum values being 75.40165 and 4.776742, respectively.

The average interest rate, or INT, is 5.671100; the greatest and minimum values are, respectively, 18.18000 and -5.627968. Degree of Openness (DOP) ranges from a minimum of 14.42000 to a maximum of 100.0800, with a mean value of 56.55278. The average value of government spending (EXP) is 16.88342, with the highest and lowest values being 30.85716 and 9.760705, respectively.

The Jarque-Bera test results, with p-values of 0.2, 0.2, 0.5, 0.9, 0.3, and 0.1 for the gross domestic product growth rates (GGDP), interest rate (INT), foreign direct investment (FDI), degree of openness (DOP), and government spending (GEXP), indicate that all these variables are normally distributed.

### 4.2. Correlation Matrix

***Table 2.*** *Correlation matrix.*

| | GDP | INF | INT | EXR | FDI | EXP | DOP |
|---|---|---|---|---|---|---|---|
| GDP | 1.000000 | -0.355100 | 0.049349 | 0.799081 | 0.207412 | -0.804119 | 0.798987 |
| INF | -0.355100 | 1.000000 | 0.000482 | -0.167279 | -0.039384 | 0.306972 | -0.250896 |
| INT | 0.049349 | 0.000482 | 1.000000 | -0.166698 | 0.245296 | -0.207964 | -0.108352 |
| EXR | 0.799081 | -0.167279 | -0.166698 | 1.000000 | -0.188925 | -0.620127 | 0.585141 |
| FDI | 0.207412 | -0.039384 | 0.245296 | -0.188925 | 1.000000 | -0.233938 | 0.436995 |
| EXP | -0.804119 | 0.306972 | -0.207964 | -0.620127 | -0.233938 | 1.000000 | -0.567846 |
| DOP | 0.798987 | -0.250896 | -0.108352 | 0.585141 | 0.436995 | -0.567846 | 1.000000 |

Source: Eviews 13.0 output

The correlation between the variables is displayed in Table 2's correlation matrix. The results indicate that GGDP has the following relationships: strong positive (0.799081) with EXR; weak positive (0.207412) with FDI; weak negative (-0.355100) with INF; weak positive (0.049349) with INT; strong positive (0.7798987) with DOP; and strong negative (-0.804119) with EXP.

### 4.3. Unit Root Test Results

The purpose of this test is to initially eliminate serial correlation and then verify that the stationarity of the data ensures the accuracy of the t-statistics. A summary of the Augmented Dickey-Fuller unit root tests is presented in Table 3 below.

***Table 3.*** *Augmented Dickey-Fuller unit root test results summary.*

| Variables | ADF | Critical value (5%) | Probability | Remark | Level | Order |
|---|---|---|---|---|---|---|
| GDP | -4.008963 | -2.971853 | 0.0046 | Stationary | 1st Dif | 1(1) |
| INF | -17.92228 | -2.976263 | 0.0001 | Stationary | 1st Dif | 1(1) |
| INT | -3.279424 | -2.976263 | 0.0261 | Stationary | Level | 1(0) |
| EXR | -5.284305 | -2.971853 | 0.0002 | Stationary | 1st Dif | 1(1) |
| FDI | -5.961902 | -2.971853 | 0.0000 | Stationary | 1st Dif | 1(1) |
| EXP | -5.851486 | -3.004861 | 0.0001 | Stationary | 2nd Dif | 1(2) |
| DOP | -5.265321 | -2.971853 | 0.0002 | Stationary | 1st Dif | 1(1) |

Source: Author's compilation from ADF Unit Test Results

Table 3 provides a summary of the Augmented Dickey-Fuller (ADF) unit root test results. These results confirm that the variables are stationary and stable. The t-statistics for all variables were significant at the 5% level. Additionally, the Durbin-Watson test values, ranging from -3.2 to -17.9, suggest no evidence of autocorrelation in the model, further supporting the model's reliability.

***Table 4**. Regression Result.*

**Dependent Variable: GDP**
**Method: Least Squares**
**Date: 07/11/24 Time: 19:19**
**Sample: 1994 – 2023**
**Included observations: 30**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| INF | -1,430,000,000 | 954,000,000 | -1.498552 | 0.1476 |
| INT | 3,390,000,000 | 2,810,000,000 | 1.206647 | 0.0398 |
| EXR | 581,000,000 | 173,000,000 | 3.349734 | 0.0028 |
| FDI | 2.650294 | 7.761246 | 0.341478 | 0.0358 |
| EXP | 11,100,000,000 | 4,210,000,000 | 2.630730 | 0.0149 |
| DOP | 2,510,000,000 | 817,000,000 | 3.070431 | 0.0054 |
| C | 217000000000 | 105,000,000,000 | 2.059201 | 0.0510 |
| R-squared | 0.898274 | Mean dependent var | | 273,000,000,000 |
| AdjustedRsquared | 0.871737 | S.D. dependent var | | 193,000,000,000 |
| Log likelihood | -787.4220 | Hannan-Quinn criterion | | 53.06606 |
| F-statistic | 33.84959 | Durbin-Watson stat | | 1.276611 |
| Prob(F-statistic) | 0.000000 | | | |

In order to get insight into how different economic indicators affect economic production, a regression analysis was performed to examine the link between GDP and other economic indicators. GDP is the dependent variable, while the independent variables are the following: government expenditure (EXP), inflation (INF), interest rates (INT), exchange rates (EXR), foreign direct investment (FDI), and degree of openness (DOP). The findings show that there are both substantial and non-significant correlations between GDP and these factors. The coefficient is negative when starting with inflation (INF), indicating that more inflation generally results in lower GDP. A p-value of 0.4766, which is higher than the usual significance level of 0.05, indicates that this link is not statistically significant. This suggests that throughout the sample period under consideration, inflation might not have had a significant influence on GDP. This discovery runs counter to some economic theories, which contend that by promoting investment and consumption, moderate inflation may propel economic development. Interest rates (INT) show a positive relationship, meaning that higher GDP is correlated with higher interest rates. With a p-value of 0.0398, which is less than 0.05, the link is statistically significant. This finding implies that higher interest rates may correspond with times of economic expansion within this sample, possibly indicating a situation in which interest rates rise as a result of rising credit demand in a developing economy.

The exchange rates (EXR) exhibit a statistically significant positive coefficient (p-value of 0.0028), indicating a positive contribution of favourable exchange rates to GDP. This supports the idea that competitive exchange rates can increase economic production by driving up exports by making them more affordable for overseas consumers.

The regression analysis results indicate a statistically significant positive relationship between GDP and foreign direct investment (FDI), with a p-value of 0.0358. This suggests that FDI plays a crucial role in promoting economic growth through job creation, capital inflows, and the transfer of knowledge and technology.

With a p-value of 0.0149, government spending (EXP) likewise exhibits a positive and significant connection with GDP.

This suggests that higher government expenditure has a beneficial effect on economic expansion. This result is consistent with theories that contend that by boosting productivity and the general state of the economy, wise government investment on infrastructure, health, and education may boost economic growth.

Another variable that significantly and positively affects GDP is the degree of openness (DOP), as shown by its coefficient and p-value of 0.0054. This result implies that increased economic production is a direct result of increased economic openness, which is typified by decreased trade barriers and more integration into the global economy.

The constant term (C) in the model, with a p-value of 0.0510, is significant at the 10% level, implying that other factors not included in the model may also influence GDP. The adjusted R-squared value of 0.871737, which accounts for the number of predictors in the model, indicates a good fit. With an R-squared of 0.898274, the model explains approximately 89.8% of the variation in GDP. The F-statistic of 33.84959, with a corresponding p-value of 0.000000, suggests that the model is statistically significant overall, indicating that the independent variables have a collective impact on GDP.

### 4.4. Discussion of the Findings

A useful way to understand how these variables affect economic output is to look at the regression analysis done on the relationship between GDP and a number of economic indicators, including Inflation (INF), Interest Rates (INT), Exchange Rates (EXR), Foreign Direct Investment (FDI), Government Expenditure (EXP), and Degree of Openness (DOP). The results agree with previous research and, in certain situations, diverge from it.

According to the study, GDP is negatively but statistically insignificantly impacted by inflation (INF). This is in contrast to the generally held belief that moderate inflation may promote investment and expenditure, thereby promoting economic growth. [40, 48] made this observation and found that moderate inflation can be advantageous for growth. The study's lack of significance might mean that other variables eclipsed the effects of inflation or that it had little effect on GDP throughout the sample period.

It was discovered that interest rates (INT) and GDP had a statistically significant positive association. This result is consistent with research by [49], for example, which highlights how interest rates affect investment choices and, in turn, economic growth. Increased interest rates may be a sign of a healthy economy with strong credit demand that fosters economic growth. Interest rate adjustments, however, can also be seen as monetary policy reactions to inflationary pressures or other economic circumstances, therefore it is crucial to take the context and causes into account. Exchange rates (EXR) and GDP have a positive and substantial association, which supports [65] conclusions that competitive exchange rates can increase economic growth by drawing in more overseas purchasers for exports. This link emphasises how crucial it is to keep exchange rates low in order to boost export competitiveness and stimulate economic expansion.

The analysis supports the literature that highlights the positive impact of FDI on economic growth. The research also demonstrated that FDI enhances human capital, introduces new technologies, and fosters capital development in host countries [21]. The study's positive FDI coefficient lends credence to the idea that FDI is a vital force behind economic growth.

It was also discovered that government expenditure, or EXP, had a considerable and favourable influence on GDP. This result aligns with the body of research suggesting that government expenditure on health, education, and infrastructure may boost economic development by raising productivity and the state of the economy as a whole [32, 54]. Efficient government expenditure may boost economic activity by supplying necessary public goods and services that facilitate the expansion of the private sector. The degree of openness (DOP) and GDP showed a strong and positive correlation, consistent with research by [33] and [42]. These studies highlight how higher commerce, investment flows, and the spread of technology lead to quicker development in open economies. Increased economic openness promotes economic growth by giving nations access to cutting-edge technology, international investments, and global marketplaces.

## 5. Summary, Conclusion and Recommendation

### 5.1. Summary of Findings

The findings from the regression analysis and hypothesis testing clearly show that exchange rates play a significant role in Sierra Leone’s economic development. The strong correlation between exchange rates and GDP indicates that fluctuations in the domestic currency can have adverse effects on economic growth. This result is consistent with economic theories that suggest exchange rate volatility affects trade balances and investment flows, which in turn influence a country's overall economic performance. In a similar vein, interest rates show up as a key factor influencing economic growth, with higher rates having a detrimental effect on the economy. This emphasizes how crucial monetary policy is for controlling inflation and promoting economic expansion.

Another important aspect influencing Sierra Leone's economic growth is inflation. It is discovered that high and erratic rates of inflation significantly impede economic growth, underscoring the necessity of preserving price stability for long-term progress. Conversely, there is a positive correlation between economic growth and openness as indicated by trade and investment flows. This shows that by allowing technology transfer, competition, and market access, policies supporting international trade and investment might improve economic growth.

Nonetheless, there is a complex link between government spending and economic expansion. Even though it's common knowledge that government expenditure boosts the economy, the data indicate that wasteful spending or excessive debt may actually discourage investment from the private sector and slow down overall economic development. This emphasizes how crucial sound financial management and efficient public investment are to fostering economic growth.

### 5.2. Conclusion

The regression analysis's conclusions offer insightful information on the variables affecting Sierra Leone 's economic expansion. The analysis shows that a number of macroeconomic factors have a major influence on the nation's economic growth. The dynamics of inflation, government spending, exchange currency movements, interest rate swings, and openness all have a significant impact on how well Sierra Leone's economy performs.

The findings highlight how crucial prudent fiscal and monetary policies are to promoting long-term, steady economic development. Exchange rate policies need to be carefully managed by policymakers in order to minimize negative impacts on investment flows and trade balances. A similar prerequisite for creating an atmosphere that is favourable to economic activity is preserving price stability through efficient inflation control.

Furthermore, by allowing knowledge transfer, fostering competitiveness, and broadening market access, enhancing openness to international trade and investment may spur economic growth. Politicians must, however, strike a balance between the advantages of transparency and the requirement to protect homegrown businesses and maintain fair competition.

Furthermore, to preserve fiscal sustainability and prevent crowding out of private sector investment, careful monitoring of government spending is essential. To maximize the influence of public expenditure on economic development, efficient public resource allocation and effective public investment are crucial.

### 5.3. Recommendations

Based on the findings of this research, the following recommendations were made:

1) The government ought to put measures into place to lessen volatility and stabilise the currency rate, as these factors might have a detrimental effect on investment flows and trade balances.
2) To provide investors and other market players clarity and confidence, the government should improve communication and openness in exchange rate policy choices.
3) The government need to persist in its judicious monetary policies, with the objective of upholding price stability and managing inflation, in order to establish a favourable atmosphere for enduring economic expansion.
4) By taking into account both internal and external variables impacting inflation dynamics, the government should carefully assess how to employ interest rate instruments in order to strike a compromise between the goals of price stability and economic growth.
5) To encourage knowledge transfer, innovation, and the creation of jobs, the government should support an atmosphere that is open and competitive in order to draw in foreign direct investment (FDI).
6) In order to improve access to markets for Sierra Leonean goods and services, the government should bolster trade facilitation initiatives and lower trade barriers internationally.
7) The government should prioritise investments in vital infrastructure, human capital development, and important industries with strong growth potential in order to increase the efficiency and effectiveness of government spending.
8) In order to guarantee that public funds are distributed properly and make a meaningful contribution to economic growth, the government should strengthen accountability, openness, and governance in the administration of public finances.

## Abbreviations

| | |
|---|---|
| FDI | Foreign Direct Investment |
| EXR | Exchange Rate |
| INF | Inflation |
| GDP | Gross Domestic Product |

## Conflicts of Interest

The authors declare no conflicts of interest.

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