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Policy Brief:
The Effects of Interest Rate Volatility and Money Demand in Sierra Leone using ARDL Estimation

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Abstract:

This policy brief investigates Sierra Leone's interest rate volatility, a recurring concern due to its economic instability. Using the ARDL model and bolstered by the stability exhibited in CUSUM and CUSUM square tests, we explore the impact of deposit and lending interest rates on money demand. Short-term findings reveal a positive effect of deposit rates and a negative effect of lending rates on money demand. However, in the long run, these effects become insignificant. To enhance economic stability, we suggest implementing a uniform interest rate for commercial banks and vigilant monitoring of competitive lending rates as policy measures.

Keywords: *Sierra Leone, interest rate volatility, money demand, ARDL model.*
Jel Classification: *C22, C58, E41, E43*

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1. Introduction

Interest rate volatility refers to fluctuations in interest rates over time, which can affect various aspects of the economy, such as investment, consumption, and savings. Changes in interest rates can have significant effects on the demand for money, as well as on economic growth and stability. In Sierra Leone, interest rate stability has been a persistent concern for policymakers due to the country's history of high inflation and economic instability.

Sierra Leone is a low-income country located in West Africa with a population of approximately 8 million people. The country has a long history of economic and political instability, with a civil war that lasted from 1991 to 2002 and several periods of high inflation and currency depreciation

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(Tamuke, Jackson & Sillah, 2018; Jackson, 2017). These factors have contributed to a lack of trust in the financial system and have made it difficult for the country to attract foreign investment.

In recent years, Sierra Leone has made significant progress in stabiliing its economy and improving its financial system. However, interest rate volatility remains a concern, as it can affect the demand for money and, in turn, the country's economic growth and stability. Several studies have investigated the relationship between interest rate volatility and money demand in Sierra Leone. One such study is the "Effect of Interest Rates Volatility on Money Demand in Sierra Leone: An Autoregressive Distributed Lag (ARDL) and Bounds Testing Model," by John Umaru and Abu Sesay (2017). The study used an autoregressive distributed lag (ARDL) and bounds testing model to investigate the long-run relationship between interest rate volatility and money demand in Sierra Leone. The results showed that interest rate volatility has a significant negative impact on money demand in the long run, indicating that higher interest rate volatility leads to lower demand for money, which supposedly is considered a useful guide in informing policy decisions aimed at improving the stability of the financial system.

2. Literature Review

Interest rate volatility has long been a topic of interest in the field of economics. The Quantity Theory of Money (QTM) and Loanable Funds Theory (LFT) are among the theoretical frameworks that have contributed to our understanding of the relationship between interest rates and money demand (Daboh & Jackson, 03). These theories suggest that changes in interest rates can influence the demand for money.

In Sierra Leone, empirical studies have explored this relationship using econometric methods. Notable among these is the application of the Autoregressive Distributed Lag (ARDL) model, as seen in studies by Jackson, Barrie, and Johnson (2021) and Bangura, Caulker, and Pessima (2012). These studies have laid the groundwork for understanding how interest rate volatility affects money demand in Sierra Leone.

3. Methodology and Model Estimation Technique

In this study, we investigate the relationship between interest rate volatility and money demand in Sierra Leone's economy using annual time series data from 1980 to 2020. The variables examined are deposit interest rates, lending interest rates, and broad money demand. Data was sourced from the World Bank Development Indicators (2021), the Bank of Sierra Leone data warehouse, and open data sources.

We employ the Autoregressive Distributed Lag (ARDL) model for cointegration analysis, as recommended by Pesaran and Shin (1999) and Pesaran et al. (2001). Unit root tests were conducted

to assess the stationarity of the variables, with the ARDL model being appropriate for variables integrated at order I(0) or I(1).

Our economic model specifies the relationship between broad money supply (BMG), deposit interest rates (DIR), and lending interest rates (LIR) as follows: $BMG = f(DIR, LIR)$ (Eq. 1)
The econometric estimation of this relationship is expressed as:

$$BMG = \beta_0 + \beta_1 DIR + \beta_2 LIR + \mu_t \qquad \text{(Eq. 2)}$$

4. Empirical Results and Discussion

4.1 Short-Run Effects In the short term, our study identifies a significant relationship between interest rates and money demand in Sierra Leone. Notably, we observe that deposit interest rates have a positive and statistically significant impact on money demand. This implies that when deposit interest rates rise in the short term, individuals and businesses in Sierra Leone are incentivized to deposit more funds into their bank accounts, leading to increased overall money demand. This aligns with conventional economic wisdom, as higher deposit interest rates make saving more attractive, encouraging larger cash balances.

Conversely, lending interest rates exhibit a negative but statistically significant impact on money demand in the short run. This suggests that as lending interest rates increase, borrowing becomes more expensive, prompting individuals and businesses to reduce borrowing, thus decreasing the demand for money. This negative relationship between lending rates and money demand implies that high borrowing costs may discourage spending and investment, potentially leading to a decline in overall money demand.

These short-term dynamics are essential considerations for policymakers in Sierra Leone when crafting monetary policies. For instance, during periods of economic expansion or when stimulating consumer spending is a priority, policymakers may contemplate lowering deposit interest rates to encourage spending and investment. Conversely, during times of inflationary pressures, raising lending interest rates could help restrain excessive borrowing and mitigate inflation.

4.2 Long-Run Effects In the long term, our analysis indicates that the relationship between interest rates and money demand in Sierra Leone becomes less pronounced, with both deposit and lending interest rates displaying an insignificant impact on money demand. This implies that while short-term fluctuations in interest rates can influence money demand, these effects tend to dissipate over time.

The insignificant long-term relationship between deposit interest rates and money demand suggests that, in the larger context of the Sierra Leonean economy, changes in deposit rates have limited overall impact. Similarly, the negligible long-term effect of lending interest rates on money

demand implies that, over time, borrowers and lenders adapt to the prevailing interest rate environment, reducing the influence of interest rates on money demand.

The long-term stability of money demand holds significant implications for monetary policy formulation. It suggests that Sierra Leone's central bank can adopt a more predictable and less interventionist approach to interest rate policy, particularly concerning deposit and lending rates. However, it is crucial to emphasize that while these long-term relationships appear insignificant, they should not be entirely disregarded. Interest rates still play a role in shaping economic behavior, even if their impact diminishes over extended periods.

4.3 Post-Estimation Results To assess the model's stability, a post-estimation analysis was conducted. It began with the Breusch-Godfrey Serial Correlation LM Test to detect autocorrelation in the residuals, which showed no evidence of serial correlation. Additionally, the Breusch-Pagan-Godfrey test revealed no heteroskedasticity in the residuals, confirming the models' reliability and adherence to linear regression assumptions. Furthermore, the Ramsey Regression Specification Error test demonstrated the absence of specification errors, affirming a linear relationship between the dependent and independent variables. Lastly, stability tests using CUSUM and CUSUM of Squares (Figures 1 and 2) provided clear evidence of the models' stability.

Figure 1: CUSUM Test Plot

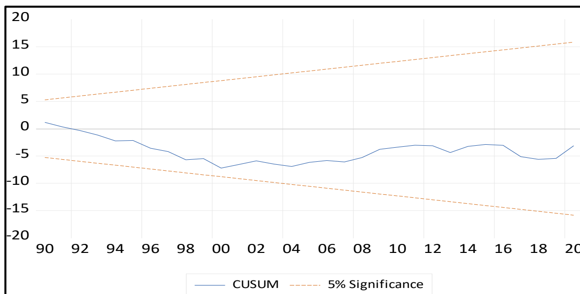
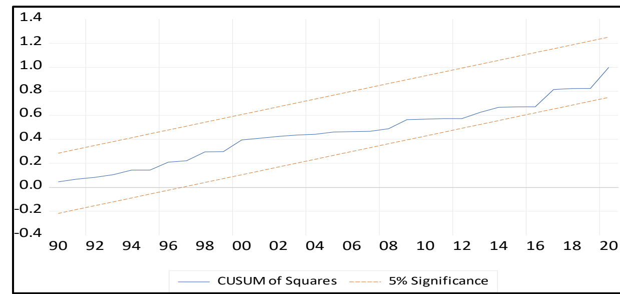


Figure 2: **The Cumulative Sum of Squares Recursive Plot**



Source: Authors Estimation

4.4 Implications for Policy

Short-Term Policy Recommendations

- *Adjusting Deposit Interest Rates*: Given the positive relationship between deposit interest rates and money demand in the short run, the Bank of Sierra Leone can utilize this insight during economic contractions or stagnation. Lowering deposit interest rates can stimulate spending and investment, fostering economic growth.
- *Managing Lending Interest Rates*: To address economic overheating or inflation, the central bank should consider raising lending interest rates. This can make borrowing more expensive, curbing demand and helping control inflationary pressures.

Long-Term Policy Implications

- *Stable Monetary Policy*: The insignificant long-term effects of interest rates on money demand suggest that the central bank can adopt a more stable and predictable monetary policy, reducing the need for frequent interest rate adjustments.
- *Economic Stability*: A stable monetary policy environment can contribute to overall economic stability, attracting foreign investment and fostering economic growth.
- *Financial System Monitoring*: While long-term relationships between interest rates and money demand are weak, monitoring the financial system for signs of instability or credit market imbalances remains essential to ensure a healthy and resilient financial sector.

5. Conclusion

In conclusion, our study conducted a comprehensive analysis of the short and long-term effects of interest rate volatility on money demand in Sierra Leone, employing the ARDL and bounds testing approach. In the short run, we found a significant positive influence of deposit interest rates on money demand, while lending interest rates exhibited a negative impact. However, as we shift our focus to the long run, these effects gradually diminish, highlighting a diminishing relationship between interest rates and money demand over extended periods.

The implications of these findings for policy formulation are substantial. In the short term, the Central Bank of Sierra Leone possesses a powerful lever in the form of deposit and lending interest rates, enabling it to actively stimulate or cool down the economy depending on the prevailing economic conditions. This flexibility can be harnessed to bolster economic growth during periods of stagnation.

Looking towards the long term, our study underscores the importance of maintaining stable monetary policies that bolster investor confidence and foster sustainable economic growth. The limited long-term impact of interest rates on money demand suggests that adopting a more predictable approach to interest rate policy can be beneficial.

Crucially, our research emphasizes the necessity for the Bank of Sierra Leone to consider both the short-term and long-term implications of interest rate adjustments. By doing so, the central bank can play a pivotal role in advancing the objectives outlined in this study: enhancing financial stability and promoting lasting economic growth in Sierra Leone.

Furthermore, it is noteworthy that our econometric models demonstrated stability and reliability throughout the analysis, as confirmed by the CUSUM and CUSUM of Squares tests (Figures 1 and 2). This stability lends further credence to the policy recommendations and underscores the robustness of our findings.

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