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Determinants of Money Demand in Sierra Leone

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Abstract

This study provides a comprehensive analysis of the determinants of money demand in Sierra Leone, focusing on macroeconomic factors such as income, interest rates, inflation, and exchange rates. Money demand is a crucial element in shaping monetary policy, influencing financial stability, and ensuring sustainable economic growth. The research integrates classical, Keynesian, and modern monetary theories to explore the multifaceted interactions that drive money demand in a developing economy like Sierra Leone. Utilizing secondary data spanning from 2010 to 2023, obtained from institutions such as the Bank of Sierra Leone, the World Bank, and the International Monetary Fund. The study employs econometric techniques which include the money demand models, correlation analysis, and unit root tests for stationality. The findings indicate that real GDP has a significant positive impact on money demand, while inflation and exchange rate depreciation negatively influence money holdings. Interest rates exhibit an insignificant effect, highlighting the weak monetary policy transmission mechanism in Sierra Leone. These findings offer critical policy recommendations for the Bank of Sierra Leone and other financial institutions, aiding in the formulation of strategies that foster economic growth and financial stability. The research further emphasizes that a thorough understanding of the determinants of money demand in Sierra Leone is essential for effective monetary policy implementation, macroeconomic stability, and long-term economic development.The policy recommendations derived from this research are expected to aid in designing an efficient and robust monetary policy framework, contributing to economic stability and growth in the country.

Keywords: Determinants, Exchange rate, Inflation, Interest rate, Monetary policy, Money demand, Stationality, Unit root tests.

1. Introduction

Money demand refers to the desire to hold cash or other liquid assets rather than investing them or spending them immediately. It plays a critical role in shaping monetary policy and managing the economy. Money as a medium of exchange, a store of value, and a unit of account, plays an essential role in modern economies. The concept of money demand has been at the center of macroeconomic analysis for decades, influencing central banks' monetary policy decisions, fiscal policies, and broader economic strategies. At the core of monetary policy is the assumption that controlling the money supply influences interest rates, inflation, and overall economic stability. Hence, understanding the factors that strive the demand for money is crucial for maintaining economic equilibrium, ensuring financial stability, and fostering sustainable growth.

The study of money demand began with classical economists like David Hume and was redefined by figures such as John Marynard Keynes and Milton Friedman. Over time, it evolved to include more sophisticated models that account for various factors like income, interest rates, inflation, and exchange rates. Today, in an increasingly complex global economy, the determinants of money demand continue to play a crucial role in shaping economic policy, particularly in both advanced and emerging economies.

In developing countries, understanding the determinants of money demand is especially critical. These economies often face unique challenges such as underdeveloped financial markets, higher inflation rates, frequent exchange rate fluctuations, and a large informal economy. Such conditions can drastically affect the behavior of

money holders and thus influence the demand for money in ways that differs from advanced economies. In this context, the determinants of money demand must be carefully analyzed to reflect the specific realities of these countries.

It is influenced by several factors, including the need for transactions, precautionary measures, and speculative purposes, as outlined in classical economic theories. In developing countries like Sierra Leone, understanding the dynamics of money demand is critical for effective monetary policy formulation and economic stability.

Understanding the demand for money in an economy is an important prerequisite for formulating and conducting monetary policy. A change in monetary aggregates influences national output, interest rates and general price levels. These are important variables that affect the production and consumption decisions in an economy. Economic agents are motivated to hold money to facilitate transactions, precautionary and for speculative purposes. Different measures of money supply exist and they include M0, M1, and M2. M0 includes only currency in the hands of the public, commercial banks' statutory reserve deposits held at the central bank and banks' cash reserves. M1 comprises currency held outside the banking system and the current account deposit liabilities of commercial banks held for transactive purposes. It may also include some foreign currency deposits that are used for domestic transactions. The M2 aggregation of money supply seeks to broaden the range of liquid assets to include some interest earning items, such as savings deposits and fixed or time deposits. These classifications depend on countries, either because of institutional framework or arbitrary specifications.

1.1. Problem Analysis

Over the past few decades, Sierra Leone's economy has faced numerous challenges, including high inflation and fluctuations in GDP growth. A comprehensive analysis of the determinants of money demand is needed to guides policymakers in formulating effective monetary strategies. Previous studies have largely overlooked the unique dynamics of money demand in Sierra Leone, making this study significant in filling that gap.

In many developing economies, including Sierra Leone, the determinants of money demand have not been fully explored. While studies on the demand for money in advanced economies have provided insights into the relationship between income, inflation, interest rates and exchange rates, these models do not always fit the context of developing nations, which have different structural and institutional characteristics. For instance, Sierra Leone's which may influence money demand determinants.

Moreover, fluctuations in Sierra Leone's exchange rates and inflation rates, coupled with weak monetary policies transmission have created an environment where the factors influencing money demand are not fully understood. Policymakers, particularly at the Bank of Sierra Leone, require a more detailed understanding of these determinants to design effective interventions that promote financial stability and economic growth.

1.2. Aim and Objectives of the Study

The aim of this study is to investigate the determinants of demand for money in Sierra Leone, whose results will provide useful information that could contribute in improving monetary policy, influencing financial stability, and ensuring sustainable economic growth.

To achieve this aim, four objectives were investigate based on their effects on money demand: (a)Income (b) Interest rate (c) Inflation (d) Exchange rate on money demand in Sierra Leone.

2. Literature Review

In an economy, the aggregate demand for money is a result of money demanded by households, firms and government, each with distinct money demand function. Money provides liquidity by facilitating transactions and can earn interest. Demand for money results from the trade-off between the liquidity advantage of holding money and the interest advantage of holding other assets (Handa, 2009,)

The demand for money is mainly influenced by the level of prices, the level of interest rates, and the level of real national output (real GDP) and the pace of exchange rate (Mankiw, 2008; Barrrow, 1997). The demand for money has direct relationship with the general price levels. Generally, nominal demand for money has direct relationship with nominal output (such as gross domestic product), and an inverse relationship with interest rate. The liquidity preference and money supply curve (LM) provides the combinations of interest rates and output levels for equilibrium in the money market (Handa, 2009).

Inflation is one of the most critical determinants of money demand in Sierra Leone. As a developing country, Sierra Leone has faced inflationary pressures driven by both domestic and external factors. Research by Korsu (2024) and Swaray (2022) show that during periods of high inflation, the demand for money in nominal terms increases, as the public seeks to hold more currency to conduct transactions. Inflationary periods erode purchasing power, and people often demand more cash for everyday transactions, even though the real value of their money declines.

Sierra Leone's monetary system is characterized by periods of hyperinflation, where inflation rates exceed 50% annually, leading to a flight to foreign currencies. Fofanah (2020) highlighted that during such periods, Sierra Leoneans increasingly prefer to hold foreign currencies (e.g., the US dollar) instead of the local Leone, leading to a shift in the structure of money demand. This phenomenon is referred to as currency substitution and is typical of economies facing unstable currencies. In Sierra Leone, interest rates are often relatively high due to inflationary pressures and limited access to financial products. High interest rates discourage the demand for holding cash, as economic agents prefer to invest in financial assets that offer returns (Daboh et al 2024).

However, in times of economic uncertainty or instability, the demand for money may increase despite high interest rates, particularly when the perceived risk of investment outweighs the potential returns.

Political instability has a profound impact on the demand for money in Sierra Leone. The country has experienced civil wars, changes in government, and political unrest, all of which have undermined confidence in the banking system and currency. Kargbo (2004) found that during periods of political unrest, the demand for money, particularly physical cash, and increases. People often seek to hold money outside formal financial institutions due to fears of asset expropriation or currency devaluation during times of crisis.

The financial sector in Sierra Leone is underdeveloped, with limited access to banking services, especially in rural areas. This lack of access means that people are more reliant on cash for their daily transactions. Kamara (2020) pointed out that financial inclusion plays a significant role in shaping the demand for money. As the banking sector develops and mobile banking becomes more widespread, the demand for cash may decline, but this shift is gradual, and many Sierra Leoneans still prefer to transact in cash.

Sierra Leone's currency, the Leone, has experienced considerable depreciation against major currencies, particularly the US dollar. A weak currency increases the demand for foreign currencies, particularly for savings and international trade.

Dilber et al (2020) noted that currency depreciation drives individuals and businesses to hold more foreign exchange, thereby affecting the structure of money demand in Sierra Leone.

Sierra Leone's economy is heavily dependent on exports of natural resources, including diamonds, iron ore, and agricultural products. The prices of these commodities on the global market significantly affect the liquidity in the economy, influencing the demand for money. Kabbah (2016) showed that during periods of high commodity prices, the influx of foreign currency boosts economic activity, leading to an increased demand for money for transactions. Conversely, during periods of low commodity prices, economic activity slows, reducing the demand for money.

Sierra Leone has a large diaspora, and remittances form a critical part of the economy. Studies by Sesay & Jalloh (2017) have shown that remittances have a significant impact on money demand, as they represent a major source of income for many households. The receipt of remittances often leads to an increased demand for cash, as families use this money for both consumption and savings.

Despite advancements in mobile banking and digital financial services, Sierra Leone remains a predominantly cash-based economy. This cultural preference for cash is particularly evident in rural areas, where mobile phones and banking services are less accessible. Fofanah (2020) found that cash remains the most preferred medium of exchange, as it offers a more immediate and tangible form of transaction, especially in the absence of widespread electronic payment systems.

Numerous empirical studies have examined the determinants of money demand in Sierra Leone. Bangura (2022) used time series data to assess the relationship between money demand and its key determinants, such as income, inflation, and interest rates. The study found that money demand in Sierra Leone is highly responsive to changes in inflation and income levels, but less so to interest rate changes.

Fofanah (2020) employed a cointegration approach to investigate the long-run and short-run dynamics of money demand in Sierra Leone. The study concluded that inflation and exchange rate volatility are significant long-term determinants of money demand. Similarly, Bockarie et al (2024) used an autoregressive distributed lag (ARDL) model to highlight the influence of external factors, including exchange rates and commodity prices, on money demand.

Understanding the determinants of money demand in Sierra Leone is crucial for formulating effective monetary policies. The empirical studies reviewed suggest that traditional macroeconomic variables such as income, inflation, and interest rates play a significant role in shaping money demand. However, Sierra Leone's unique political instability, underdeveloped financial sector, and external economic vulnerabilities add additional layers of complexity. Future research should focus on the effects of financial inclusion, mobile money adoption, and the impact of external shocks, particularly exchange rate movements, on money demand in Sierra Leone.

This review provides a comprehensive foundation for policymakers and researchers to further investigate the dynamics of money demand in Sierra Leone, an essential element for understanding economic behavior and improving economic stability in the country.

3. Methodology

3.1. Research Design

Secondary research design was employed in the study which focused on desk review numerical data collected from Bank of Sierra Leone spanning from 2010 to 2023 to capture long-term trends in money demand in Sierra Leone.

3.2. Data Collection Method

The desk survey method of data collection was employed using secondary data sourced from the official document of the Bank of Sierra Leone, which included data on total savings mobilization, deposit from various classes of bank account, foreign currency, and domiciliary deposit. Furthermore, qualitative data was collected from observations, interviews, or verbal interactions of bank officials and customers. Records on the savings pattern of customers were used to determine Money Demand in respect of interest rate, exchange rate, real income and price level. The coverage period is from 2010 to 2023 financial year.

3.3. Models Specification

The money demand model was mainly used to estimate the determinants of money demand in this study. The general functional form of the money demand model is given in Equation 1.

$$RMD = f(Y, Pt, INT, EXR) \quad (1).$$

Where: *RMD* represent money demand at time t, which can be measure using monetary aggregates such as broad money *(M2)*, Y refers to the real income (proxied by real GDP), P refers to the price level, typically measured by the inflation rate, *INT* is the interest rate, representing the opportunity cost of holding money, *EXR* is the exchange rate, capturing the impact of currency fluctuation on money demand.

The specification econometric model estimated is presented in Equation 2.

$$LnRMD = \alpha + \beta 1 LnRGOD + \beta 2 INF + \beta 3 INT + \beta 4 EXRD + U \quad (2).$$

Where: *Ln* denotes natural logarithms, which are used to linearize the relationships between the variables and stabilize the variances of variable with unit of measurement that is not percentage point, α is the intercept term, *B1*, *B2*, *B3*, *B4* are the coefficients of the respective independent variables,

Other key theories of money demand included in the study were: (a) The classical money demand theory: here money is demanded for transaction purpose and it depends on income. (b) Keynesian liquidity preference theory: according to Keynes, the demand for money is driven by three motives – transactional, precautionary, and speculative. This framework suggests that individuals and firms hold money for day-to-day transactions, to guard against unforeseen events, and to take advantage of future investment opportunities. (c) Friendman's Modern quality theory: Milton Friedman posited that money demand is a function of several factors, including permanent income, wealth, and interest rates. This framework extends the classical quantity theory of money by recognizing the influence of alternative financial assets on money demand. (d) Baumol-Tohin Model: This model explains the demand for money as a function of transaction costs and interest rates. It ensures that individuals seek to minimize the costs of converting bonds or other financial assets into cash, balancing between holding cash for transactions and investing in interest-bearing assets.

The relationship can therefore be expressed as in Equation 3:

$$(Md/P) = f(Y, R) \qquad (3)$$

Where *Md* is the demand for nominal money demand balances, *P* is the price level, *Y* is the scale variable (income, wealth or expenditure, in real terms) and *R* is a vector of expected rate of return (the opportunity cost of holding money).

It is assumed that in the long run, the money market is in equilibrium such that money demand will equal money supply. Therefore, the real money supply *M* which is the nominal money supply, deflated by the price level *P* is equal to the real money demand for money (*Md/P*).

3.4. Data Analysis

Data was analyzed using the statistical package for social scientists version 16.0 (SPSS 16.0).

4. Discussion of Result

4.1. Correlation Analysis of Model Variables

Figure 1 shows the scatter plots of real money demand and each of the regressors with their line of best fits. Panel A shows that real money demand is positively correlated with real GDP and the relationship is strong. Panel B shows that the relationship between money demand and interest rate are negatively correlated, though it is weak. Real money demand and exchange rate relationship is also observed to be Positive from Panel C while D shows that the relationship between real money demand and inflation is negative. A comparison of the four graphs shows that the strongest relationship is between real money demand and real GDP.

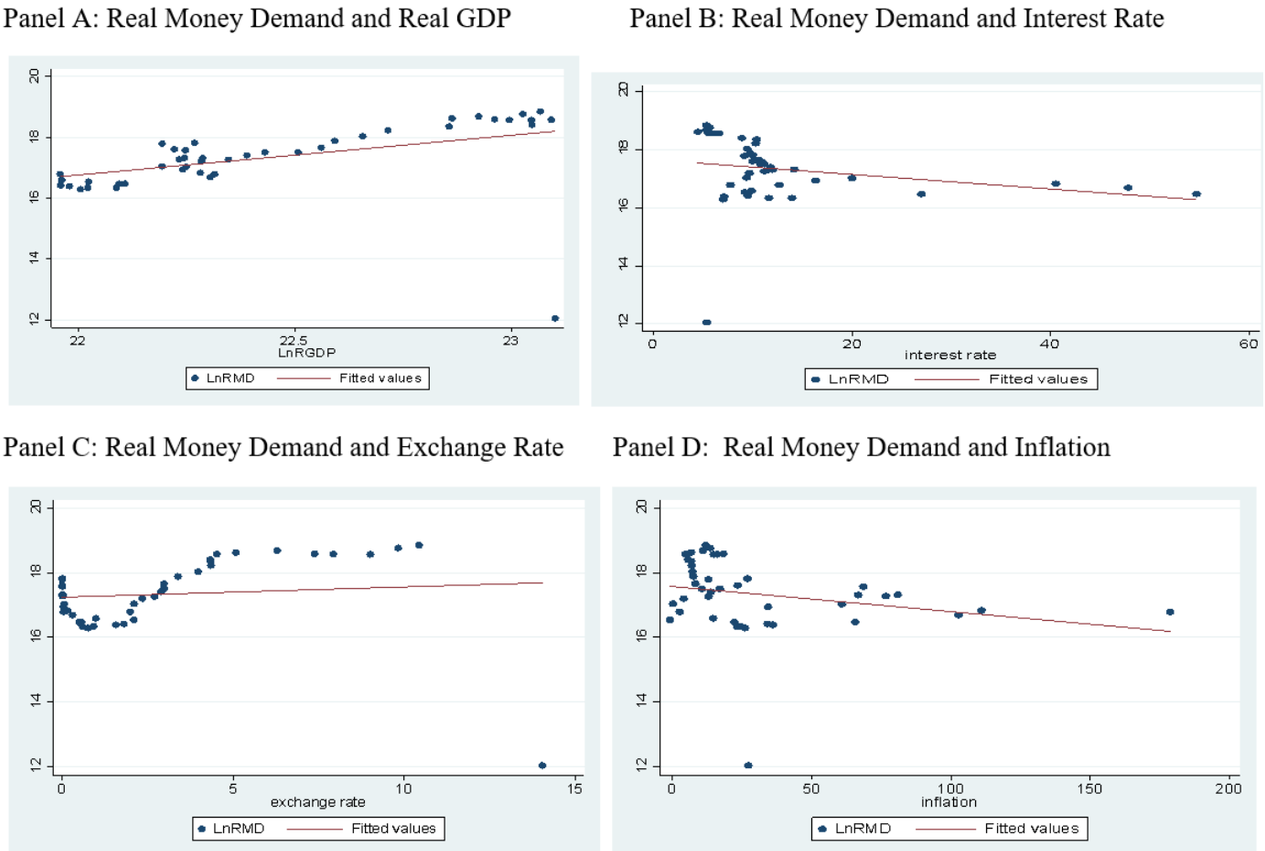

Figure 1. Scatter Plot of Real Money Demand and the Regressor.

Figure 1 - Panel A shows that there is a positive linear correlation between real money demand and real GDP and is significant at the 1 % level. Interest rate and real money demand are negatively correlated with a correlation of -0.23 (Panel B). However, the correlation is not significant as the p-value is 0.13. Inflation and real money

demand are negatively correlated with a correlation of -0.24 and is not significant as the p-value is 0.12 (Panel C). Exchange rate and real money demand are positively correlated with a correlation of 0.09 but the correlation is not significant, with a p-value of 0.5 (Panel D).

For the correlation among the independent variables, the correlations between real GDP and interest rate, real GDP and exchange rate, interest rate and inflation, interest rate and exchange rate, inflation and exchange rate are significant at either the 5 % or 1 % level. However, none of the correlation is perfect, as the highest is between real GDP and exchange rate, which is 0.84.

Table 1. Partial and Semi-Partial Correlation of Real Money Demand and the Regressors.

Variable	Partial Correlation	Semi-Partial Correlation	Partial Correlation Square	Semi-Partial Correlation	Significance Value
LnRGDP	0.7019	0.6746	0.4926	0.4551	0.0000
INT	-0.156	-0.1081	0.0243	0.0117	0.3364
INF	-0.3274	-0.2372	0.1072	0.0563	0.0392
EXR	-0.6425	-0.574	0.4128	0.3295	0.0000

Table 1 shows the partial and semi-partial correlation between real money demand and the regressors. The Table shows that real GDP has the highest partial correlation coefficient square, at 0.4926, which is followed by exchange rate (0.4128), then inflation (0.1072) and interest rate (0.0243).

This means that real GDP is the most important determinant of money demand, followed by exchange rate and then inflation and interest rate. However, while the impact of real GDP is positive, those of interest rate, inflation and exchange rate are negative.

4.2. Tests for Stationarity

Table 2 presents summary of the Unit Root Test for stationarity results The Dickey – Fuller GLS(DF-GLS) tests for stationarity (unit root test) presented in Table 2 show that both interest rate and inflation are stationary while the other variables are not stationary. Hence, the variables were subjected to further unit root tests taking structural break into consideration as the existence of a structural break could lead to failure to reject the null hypothesis not because there is actually non-stationarity but because there is a structural break (Type II Error).

Table 2. Summary of Unit Root Test Results.

Variable	DF-GLS Test	Tests Accommodating Structural Break			Conclusion
		Zivot-Andrews	Perron-Vogelsang	Clement-Montane-Reyes	
Ln RMD	I (1)	I(2)	I(2)	I(1)	I(1)
Ln RGDP	I (1)	I(1)	I(0)	NT	I(0)
INT	I (0)	NT	NT	NT	I(0)
EXR	I (p), p>2	I(1)	I(2)	I(2)	I(1)
INF	I (0)	NT	NT	NT	I(0)

NT means the test was not done for the variable because a test without structural break or with one structural break found the variable to be stationary (I(0)).

Based on the combined unit root test results, money demand is stationary after first differencing (I(1)), exchange rate is stationary after first differencing and all other variables are stationary in level.

5. Conclusion

The concept of money demand has been at the center of macroeconomic analysis for decades, influencing central banks' monetary policy decisions, fiscal policies, and broader economic strategies. The demand for money in Sierra Leone, as in other economies, is influenced by a complex set of macroeconomic determinants, including income, inflation, interest rates, expectations, and exchange rates. A clear understanding of these factors is crucial for designing effective monetary and fiscal policies. By improving the financial sector, managing inflation, stabilizing exchange rates, and leveraging remittances, Sierra Leone can create a more stable and predictable environment for money demand. This, in turn, will help foster economic growth, reduce inflationary pressures, and improve the overall financial stability of the country. Effective management of money demand remains central to the formulation of sound economic policies in Sierra Leone.

At the core of monetary policy is the assumption that controlling the money supply influences interest rates, inflation, and overall economic stability. Hence, understanding the factors that strive the demand for money is crucial for maintaining economic equilibrium, ensuring financial stability, and fostering sustainable growth. The study therefore investigated the determinant of money demand in Sierra Leone using the data 2010 to 2023 annual data.

The methodology included testing for unit root tests of key model variables like the Dickey Fuller GLS, Zivot-Andrews, Perron-Vozelsang and Clement-Montane-Reyes Unit Root Tests. The Dickey Fuller GLS unit root tests were applied because of its good small sample properties over earlier test. However, it was complemented with test that account for structural break in a series. Specifically, the following test were used; Zivot-Andrews unit root test, Dickey Fuller root test, Perron-Vozelsang unit root test and Clement-Montane-Reyes Unit Root Test. The combined result show that Real Gross Domestic Product (Ln RGDP) Interest Rate (INT) and Inflation (INF) are I(0) while Real Money Demand (Ln RMD) and Exchange Rate (EXR) are I(1). This means that real GDP is the most important determinant of money demand, followed by exchange rate and then inflation and interest rate. However, while the impact of real GDP is positive, those of interest rate, inflation and exchange rate are negative.

6. Recommendations

Based on the results of this study, the following recommendations could be made:

1) *Improvement of Monetary Policy Frameworks:* The Central Bank of Sierra Leone, like other central banks, needs to adopt a robust monetary policy framework that carefully considers both short-term and long-term factors affecting money demand. Interest rate policies should be used prudently to manage inflation and stabilize the domestic currency. Transparent communication regarding monetary policy can help anchor expectations and reduce volatility in money demand.
2) *Inflation Targeting*: The Central Bank to adopt a more proactive inflation-targeting approach, which could help manage expectations and stabilize the demand for money. Given the inflationary tendencies in Sierra Leone, the central bank should work toward creating more credible inflation control mechanisms.
3) *Enhance Financial Sector Development:* Increasing access to formal banking services is critical in shaping the demand for money. The government and central bank should focus on expanding financial inclusion by improving access to banking services, particularly in rural areas, and promoting the use of mobile banking and digital financial services. Financial literacy programs would also help individuals and businesses understand and manage their money demands better.
4) *Digital Payment Systems:* The adoption of digital payment systems, such as mobile money and e-wallets, can reduce the reliance on physical cash. Encouraging financial institutions to develop more inclusive and accessible digital platforms would help reduce the cash dependency in the economy and lead to more efficient money demand management.
5) *Stabilize the Exchange Rate:* To reduce currency substitution and stabilize money demand, it is important to manage exchange rate fluctuations. Policies aimed at reducing volatility, such as increasing foreign exchange reserves, stabilizing the Leone, and improving the export sector's competitiveness, will help reduce the uncertainty that drives people to hold foreign currencies.
6) *Exchange Rate Policy:* The government could work to adopt a more flexible exchange rate policy that avoids sharp devaluations. Implementing policies that support exporters which, in turn, stabilizes the demand for money.
7) *Inflation Control:* In Sierra Leone, controlling inflation is a priority. The government should focus on structural reforms to increase the supply of goods and services to reduce inflationary pressures. Additionally, improving agricultural output and diversifying the economy away from heavy reliance on a few export commodities would reduce vulnerability to price shocks and inflation.
8) *Improvement in Monetary Transmission Mechanism*: The government and central bank should strengthen the transmission mechanism of monetary policy, ensuring that changes in interest rates influence investment and consumption patterns. This would help control the money supply and, by extension, manage money demand.
9) *Policy Coordination:* Effective coordination between fiscal and monetary policies is essential to control inflation and ensure stable money demand. Policymakers need to take a comprehensive approach that integrates both fiscal discipline (through government spending and taxation) and monetary control (via interest rates and money supply management).
10) *Leverage Remittances:* Sierra Leone, like many other developing nations, relies heavily on remittances. These inflows can play a crucial role in shaping money demand, as they often increase the money supply in the economy. The government could focus on facilitating the efficient transfer of remittances and potentially channel them into productive investments, which could stabilize the money demand in the longer term.

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