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An Empirical Analysis of Exchange Rate Dynamics, Inflation, Money Supply, and Economic Growth in Bangladesh

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ABSTRACT: *This study analyzes the dynamics of the exchange rate, inflation, money supply and GDP in Bangladesh from FY1995 to FY2023, employing the Autoregressive Distributed Lag (ARDL) model. The empirical findings reveal a long-term equilibrium relationship among these variables. Utilizing time series data from 1995 to 2023, the study explores the impacts of money supply, inflation, exchange rates, and economic growth on Bangladesh's economy. The augmented Dickey-Fuller test is conducted to check for the presence of unit roots and to assess the stationarity of the variables. The ARDL method is then used to establish the relationship between the dependent and independent variables. The results of the ARDL bounds test suggest the existence of long-run cointegration among the money supply, inflation, economic growth, and exchange rate showing a significantly positive coefficient. The findings indicate that the money supply, inflation, and exchange rate have significantly influenced the country's economic growth. This study can assist policymakers in identifying, developing, and implementing effective strategies to promote the nation's economic growth. The paper suggests that to boost investment and production, ultimately driving economic growth, an expansionary and growth-oriented monetary policy should be maintained to make loans more attractive for productive purposes. Policymakers may find this study valuable in identifying, formulating, and implementing effective policies that support the nation's economic growth.*

Keywords: Autoregressive Distributed Lag (ARDL) model, Augmented Dickey-Fuller test, Exchange rate, Money supply, Inflation and Economic growth.

I. Introduction

The main objectives of a developing economy are to achieve lower inflation and promote higher, more sustainable economic growth. In Bangladesh, monetary policy is designed with a focus on sustaining robust growth while curbing inflation. Many economists, policymakers, and experts argue that a low inflation rate, particularly one below a certain threshold, is positively correlated with economic growth and contributes to economic stability. When inflation rises above the threshold level, it negatively affects the economy's smooth functioning. It drives up living costs, adversely impacting the general population, especially the impoverished. Additionally, inflationary pressures increase production costs, which hinder investment and have a negative effect on GDP growth. The exchange rate influences a country's trade balance, which consequently impacts economic expansion. For Bangladesh, the price of imports and exports can be impacted by changes in the exchange rate. A depreciating currency might make less expensive trade and more costly purchases, potentially boosting local industries but also increasing inflationary pressures.

The primary objective of this study is to empirically examine the connections that cause Bangladesh's GDP growth from FY1995 to FY2023 and the exchange rate, money supply, and price level. Specifically, the research aims to understand how the short-term dynamics of these variables relate to their long-term interactions. However, the relationship between the exchange rate, inflation, and money supply growth has received limited attention in Bangladesh. To our knowledge, there has been minimal empirical research in the country on the causal links between inflation, money supply growth, exchange rates, and economic growth.

Exchange rates play a crucial role in shaping monetary policy, making them one of the key variables in modeling open economies. As floating exchange rate regimes have become more common, the issue of inflation targeting has taken

center stage in discussions on monetary policy (Prasertnukul, Kim, and Kakinaka, 2010). The primary rationale for maintaining stable exchange rate regimes is their capacity to enhance monetary policy efficiency and enforce price discipline. However, in a fixed or stable exchange rate regime, a nation with a higher inflation rate than the global average is prone to recurrent balance of payments deficits, leading to reserve losses. These persistent deficits and the resulting depletion of reserves can make the national debt unsustainable.

The relationship between exchange rates and economic growth is a key focus of economic research. The exchange rate represents the value of one country's currency relative to the currencies of other nations. It determines the amount of foreign goods that can be purchased with domestic currency. The nominal exchange rate is unadjusted for inflation, while the real exchange rate accounts for it. Exchange rates can be expressed bilaterally, between two currencies, or multilaterally, involving multiple currencies. The real exchange rate measures short-term fluctuations in a currency's value. In contrast, a fixed exchange rate system involves the central bank setting a specific rate between foreign and domestic currencies. A managed floating exchange rate system combines elements of both fixed and floating exchange rates.

Figure 1: Trend of GDP Growth, Exchange Rate, Money Supply Growth and Inflation

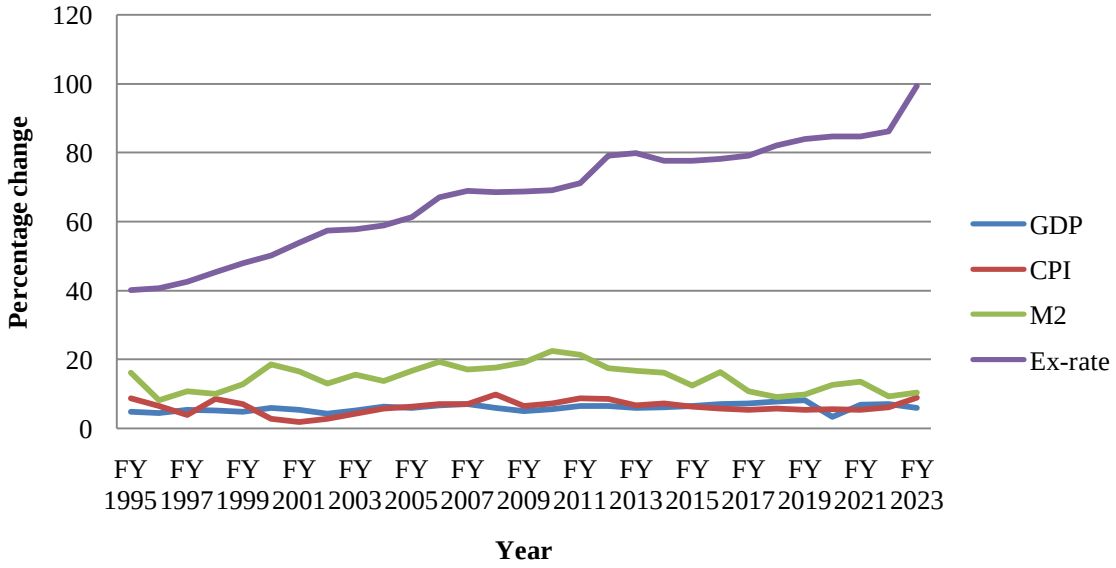


Figure 1 shows the trends in inflation, money supply expansion, exchange rates, and real GDP growth from FY1995 to FY2023. It reveals that GDP growth was relatively modest and highly variable from FY1995 until the end of 2019. Starting in the early 2000s, GDP growth experienced a slight reduction in volatility and accelerated from FY2021 onwards. The graph depicts the percentage changes in GDP, M2, CPI, and exchange rates over this period. The currency has depreciated significantly over time, as indicated by the substantial increase in the exchange rate (Ex-rate). The relative stability in GDP and CPI suggests restrained inflation and modest economic growth. The money supply (M2) has increased slightly, reflecting a gradual rise in the amount of money available in the economy. The figure illustrates how these key economic indicators interact and affect the overall economy. Notably, while the exchange rate shows a considerable rise during the examined period, GDP, CPI, and M2 demonstrate a level of stability.

II. Literature Review

MacDonald (2000) highlights that one significant feature of flexible exchange rates is their extreme volatility, which can influence the economy by means of trade as well as investment. He also employs the Balassa-Samuelson and Houthakker-Magee-Krugman hypotheses to analyze the relationships between sectoral and aggregate growth and the exchange rate. The study's main conclusion is that the current inner and outer exchange rate strategies of the Eurozone are likely to promote economic growth.

Chen (2012) examines the province-by-province rate of expansion in China and the impact of actual exchange rates on the economy. Using dynamic panel data estimation and data from 28 Chinese provinces between 1992 and 2008, he finds

evidence of conditional convergence between inland and coastal provinces. The findings suggest that the appreciation of real exchange rates positively influences provincial economic growth.

Hua (2012) demonstrates that the real exchange rate can impact economic growth in various ways by employing an enhanced Cobb-Douglas production function. While a real appreciation may negatively affect growth by reducing the international competitiveness of the tradable sector, leading to job losses, it can also have positive effects by increasing capital intensity, enhancing human capital, and driving improvements in efficiency. Using panel information from 29 provinces in China between 1987 and 2008 and applying the GMM method calculation methodology, the study finds that real exchange rate appreciation negatively affects economic growth. This effect is more pronounced in coastal provinces compared to inland provinces, leading to a decline in the GDP each person disparity between these regions.

F. McPherson and Rakovski (2000) investigated the connection between Kenya's exchange rate and economic expansion. Using data from 1970 to 1996, they analyzed both direct and indirect connections between GDP growth and nominal and real exchange rates. Their findings show that there is not a direct correlation that is statistically significant between these variables.

The study by Razmi et al. (2012) offers (i) econometric evidence on the relationship between the actual exchange rate along with expenditure, and (ii) a formal model to explain these findings. Despite assuming constant returns to scale, their model identifies concealed unemployment as a driver of internal growth. However, policies aimed at promoting growth also affect the external balance, necessitating two instruments to achieve trade balance and growth objectives. One such tool could be the real exchange rate. Our econometric analysis supports the model's predictions regarding the link between real gains in capital and currency rates.

Kogid et al. (2012) examined the impact of exchange rates on Malaysia's economic growth using time series data from 1971 to 2009. Their analysis suggests that real and nominal exchange rates influence economic growth in similar ways. The long run integration between nominal and actual exchange rates and the economy is indicated by the ARDL bounds assessments, with an elevated positive value for the actual exchange rate. Additionally, the ECM-based ARDL results reveal that the causal connection between both exchange rates and economic expansion is comparable.

Aman et al. (2013) conducted a study to explore the correlation between exchange rates and economic growth in Pakistan from 1976 to 2010. Their research, employing a simultaneous equation model and two- and three-stage least squares (2SLS and 3SLS) techniques, finds that exchange rates positively influence economic growth through mechanisms such as export promotion, expansion of investment volumes, increased foreignFDI) flows, and the support of import-substitute industries. However, despite this positive impact, exchange rates cannot be effectively used as a policy tool.

Tarawalie's (2010) study aims to assess the impact of the real effective exchange rate on Sierra Leone's economic growth. Utilizing quarterly information and advanced Economic methods, he examined the connection between economic development and the actual rate of exchange. The methodology included Granger causality testing in two dimensions to explore the causal link between these variables. The empirical results reveal a statistically significant positive correlation ($r = 0.5$) between economic development and the actual exchange rate. The findings also suggest that monetary policy is generally more effective than fiscal policy over an extended period along with provide strong evidence that the real effective exchange rate drives economic expansion.

Empirical literature often reports a negative correlation between inflation and output growth. In certain situations, known as stagflation, inflation rises during periods of stable or declining production. Typically, an economy does not move directly to high inflation; instead, it experiences a gradual increase in inflation before eventually collapsing. While there is a clear short-term correlation between changes in output and the price level, no long-term correlation is evident. To maintain a stable level of inflation, output must remain constant at the natural rate (Jhingan, 2005). The study followed Keynes' quantity theory of money, as it provides theoretical insights into the relationships between money, output, and the price level.

According to Moroney's (2002) long-run version of the quantity theory, which examines the relationships between money growth, real GDP, and price levels, the average growth rate of broad money is a strong predictor of cross-sectional inflation. His analysis shows that countries with rapid increases in both money supply and price levels had estimated coefficients for money supply close to 1, consistent with the quantity theory. In contrast, countries with low growth rates in both money and price levels had a much lower estimated coefficient of 0.69 for money growth. Thus,

inflation cannot be entirely explained by the quantity theory of money alone. While most nations find the quantity theory to be a valid model, exceptions exist, particularly in cases of slower money growth. Ireland (1994) discovered that although growth has a significant impact on money, inflation has only a negligible effect on growth.

Grauwe and Polan (2005) analyzed a sample of approximately 160 countries over a 30-year period to investigate the relationship between GDP growth, money supply, and price level. Their findings revealed a significant positive but less proportional long-term relationship between inflation and money supply in relation to output growth. They argued that countries with high inflation exhibited a strong correlation between inflation and money growth.

Mehra (1989) examined the empirical aspects of the quantity theory of money. The primary conclusion of this theory is that, over the long term, changes in the money supply, rather than changes in output, are the main drivers of changes in price levels. This finding relates to Granger's (1968) concept of cointegration, which demonstrates that nominal interest rates, money supply, and output are all cointegrated with price levels. According to the equation of exchange, these variables collectively form an equation for price levels. Additionally, this cointegrating property is relevant to the Granger Causality Test results, which suggest that both prices and money supply are sources of causality.

Su et al. (2016) utilized causality tests to explore the correlation between money supply growth and price levels in China. Their findings reveal that, during certain subperiods, the expansion of the money supply can either positively or negatively affect price increases, and that inflation similarly influences money growth in China. Simply reducing the money supply will not effectively control inflation if money growth exceeds output growth. The results indicate that maintaining consistent increase in the money supply is essential for sustaining the durability in price levels and economic expansion in China.

Qayyum (2006) conducted a correlation analysis to examine the correlation between increases in the money supply and price levels. He found a positive correlation between money supply growth and price levels. The study highlights that money supply growth affects both real output growth and inflation in Pakistan. This perspective aligns with monetarist views, which argue that excessive money growth leads to higher inflation. The study recommends implementing a strict fiscal management for containing inflation in Pakistan and suggests that monetary policy should consider the development of the financial as well as the real sectors.

Awomuse and Alimi (2012) identified a long-term, unidirectional correlation between inflation and the money supply, supporting monetarist theory. According to Fisher's hypothesis, there is an inverse relationship rather than a strict causal link between inflation and interest rates. By applying the Wald test to examine output and money constraints, they validated the quantity theory of money, which asserts that inflation is fundamentally a monetary phenomenon.

Emerson (2006) employed the Johansen method to identify long-term relationships between the money supply, real output, price level, and nominal interest rate. The Likelihood Ratio Test results indicate that, throughout the entire sample period, it is challenging to reject the constraints imposed by the Quantity Theory of Money. However, Emerson found conflicting results when examining sub-periods, especially in more recent decades, with respect to the quantity theory of money.

Nevertheless, understanding the relationships among money, real output, and the price level is essential. While theoretical knowledge offers insights into the current interactions between these variables, empirical research continues to produce varied results regarding their impact, methodology, and national perspectives.

III. Data and Methodology

Types and Sources of Data

This research utilizes secondary data sourced from the Bangladesh Bank and the Bangladesh Bureau of Statistics. The dataset includes Exchange rate, Gross Domestic Product (GDP), money supply (M2), and the consumer price index. The data spans from FY1995 to FY2023, with annual frequency.

Exchange Rate (Ex-rate):

The exchange rate is the value of one currency relative to another, indicating how much of one currency can be exchanged for another. Fluctuations in exchange rates can affect global investment, business operations, and economic stability. For instance, a weaker domestic currency can lead to lower import prices and higher export prices.

Consumer Price Index (CPI):
The Consumer Price Index (CPI) is determined by the prices of goods and services frequently utilized by households. The base years for CPI data can vary. For econometric analysis, the authors standardized all CPI data to the base year FY2005–06.

Money Supply (M2):
The term "money supply" in its broader sense is reflected by M2. This includes not only demand and time deposits but also money held by the public that is not kept in banks.

Gross Domestic Product (GDP):
GDP evaluates the total amount of goods and services generated in an economy over a one-year period, using current prices. For econometric analysis, however, the authors adjusted all GDP data to the base year FY2005–06.

Model Specification
ARDL Model
The order of integration of variables is critical for cointegration techniques. However, in the ARDL approach, variables must be either purely I(0), purely I(1), or a combination of both (Pesaran et al., 2001). The ARDL method offers certain advantages over the cointegration techniques introduced by Engle & Granger (1987) and Johansen & Juselius (1990). In cointegration techniques, all variables must have the same number of lags, while the ARDL method allows each variable to have a different number of lags. Additionally, when a few regression coefficients are endogenous, the ARDL method still yields accurate and valid t-statistics for the long-term model (Harris & Sollis, 2003). Moreover, the ARDL method can correct for bias in small samples (Pesaran & Shin, 1999).

The analysis utilized quarterly time series data from the fiscal years 1995 through 2023. The study utilized secondary data obtained from the Bangladesh Bank and the Bangladesh Bureau of Statistics (BBS). All econometric tests were conducted using E-Views 10 software. In this study, the budget deficit serves as the independent variable, while inflation is the dependent variable. Additional control variables include the money supply, interest rate, exchange rate, and GDP. The study employs the following model to examine the connection between the exchange rate, money supply, inflation and GDP growth.

A conditional unrestricted error correction model (ECM) is estimated using Ordinary Least Squares (OLS), which underpins the ARDL bounds testing methodology. Based on this approach, our Equation (1) can be defined as follows:

$$\text{Ex} - \text{rate}_t = \beta_0 + \beta_1(GDP)_t + \beta_2(CPI)_t + \beta_3(M2)_t + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Here, in equation-1

1. Ex-rate= Exchange rate represents the value of one currency in terms of another currency.
2. GDP= Real Gross domestic product (GDP) used as GDP of current market price.
3. CPI= Inflation represented by Consumer Price Index (CPI).
4. M2= Money supply represented by broad money (M2) as growth in percentage.
5. μ_t= random error term

The formula represents a linear regression model where GDP, CPI, and M2 are the independent variables, and the exchange rate is the dependent variable.

The ADF test for stationarity was developed to determine the order of integration and address the unit root problem. Subsequently, the ARDL bounds test is used in this study as a recommended estimation technique because it avoids issues of endogeneity and homogeneity (Pesaran & Shin, 1998). Consequently, Equation 2 will be employed to analyze the model's long-term estimates, while Equation 3 will utilize the ECM to assess the model's short-term estimates. Mathematically:

$$\Delta\text{Ex} - \text{rate}_t = \beta_0 + \sum_{k=1}^{n} \beta_1 \Delta GDP_{t-k} + \sum_{k=1}^{n} \beta_2 \Delta CPI_{t-k} + \sum_{k=1}^{n} \beta_3 \Delta M2_{t-k} + \mu_{1t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots(2).$$

Here, n is the optimum lag length.

$$\Delta \text{Ex} - \text{rate}_t = \beta_0 + \sum_{k=1}^{n} \beta_1 \Delta GDP_{t-k} + \sum_{k=1}^{n} \beta_2 \Delta CPI_{t-k} + \sum_{k=1}^{n} \beta_3 \Delta M2_{t-k} + \phi ECM_{t-1} + \mu_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3).$$

where Δ denotes the first difference and ϕ represents the coefficients of the error correction term for short-run dynamics. The ECMt-1 captures the extent of disequilibrium that will be corrected. The negative sign indicates the degree of correction, and its value should range between -1 and 0. By considering both short- and long-term effects, the ARDL model provides a more flexible dynamic correlation between the exchange rate and the independent variables.

Empirical Findings

Unit Root Test for Stationarity

Table 1: Unit Root Tests

Augmented Dickey-Fuller (ADF) Test					
Variable	Level		First-Difference		Stationary
	t-Statistic	p-value	t-Statistic	p-value	
GDP	-3.983661	0.0049	-	-	I(0)
CPI	-2.893939	0.0588	-	-	I(0)
M2	-2.189639	0.2141	-6.835227	0.0000	I(1)
Ex-rate	0.056956	0.9563	-3.696902	0.0103	I(1)

Note: 1. ADF statistic considering only constant.
2. Optimal lag selection is based on the Schwarz Information Criterion (SIC)

Table 1 shows that the ADF test indicates the money supply and exchange rate are stationary at the first difference, while GDP and inflation are stationary at the level. Since the dataset has no unit roots, the risk of a spurious regression is eliminated. This study found a mix of stationary and non-stationary variables. Time series econometrics suggests that the Autoregressive Distributed Lag (ARDL) model is the most suitable tool for assessing the impact of the independent variables on the dependent variable.

The unit root test using the ADF method was applied to Ex-rate, CPI, M2, and GDP at both their levels and first differences. The results show that M2 and Ex-rate are stationary at the first difference with 5% significance, while GDP and CPI are stationary at the level at the same significance level. This indicates that M2 and Ex-rate are I(1) (integrated of order 1), whereas GDP and CPI are I(0) (integrated of order 0).

ARDL Bound Test

Table 2: Long-run Cointegration and Bound Test

Estimates	Statistical Value	Significant Level	Lower Bound	Upper Bound	Decision
F-statistic	**5.558844**	10%	2.37	3.20	Cointegration
		5%	2.79	3.67	
		1%	3.65	4.66	

Note: F-statistic is bold when level of significance is 1%.

Table 2 presents the results of testing the null hypothesis of no cointegration. According to Narayan (2004), for small sample sizes, a critical value between 2.962 and 3.91 is appropriate. Since the F-statistic of 5.558844 exceeds the upper bound critical value at all significance levels, the bound test result shown in Table 2 is statistically significant. This indicates that the variables have a cointegrating relationship.

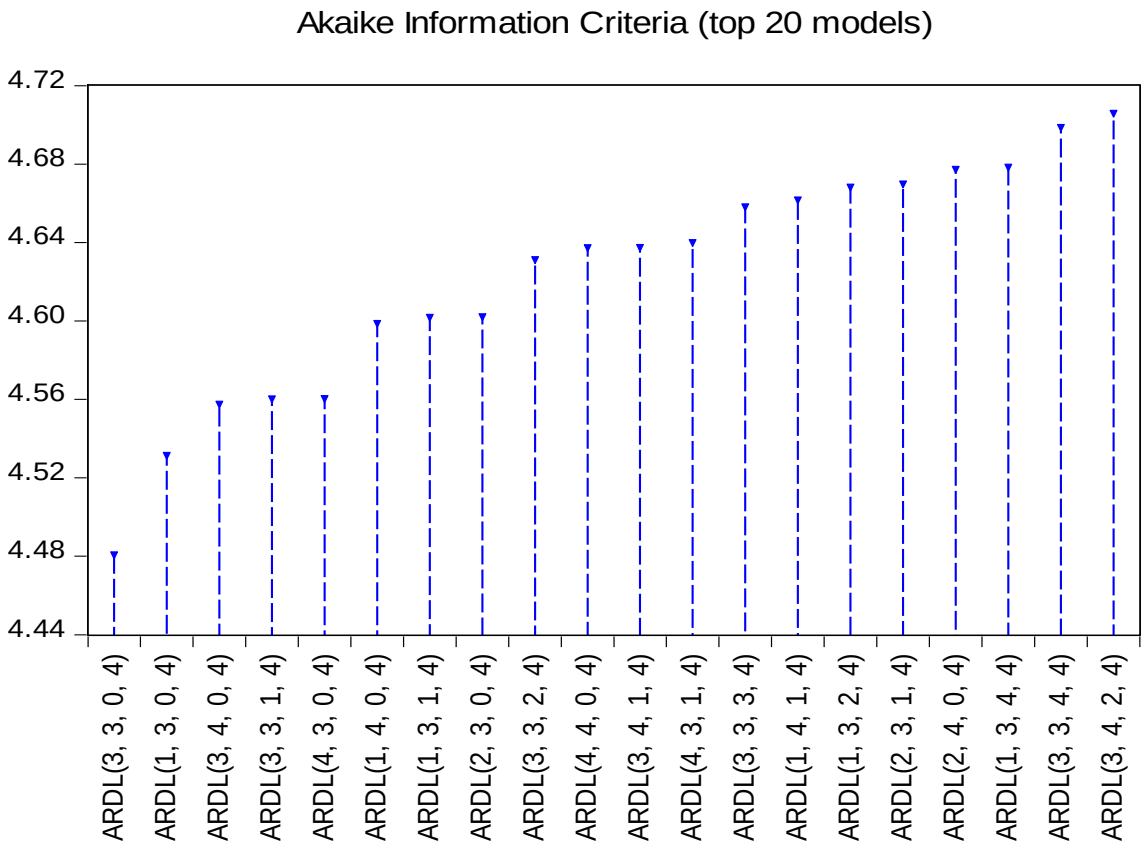
The bounds test was used to assess the long-term relationship between the variables. According to Table 2, the estimated F-statistic of 5.558844 exceeds all the bound values at various significance levels. This result leads us to reject the null

hypothesis of no relationship. Consequently, we conclude that GDP, CPI, M2, and the exchange rate have a long-term relationship.

Model Selection Criteria

The Akaike Information Criterion (AIC) was used to identify the optimal lag length. Based on AIC, the ARDL (3, 3, 0, 4) model emerged as the best among the top 20 models. Figure 2 illustrates the lag order selection for the variables using AIC.

Figure: Akaike Information Criterion (AIC)



Short-run Dynamics

Table 3: Short Run Dynamics

Dependent Variable: Δ Ex-rate		
Variables	Coefficients	t-values (Prob.)
Δ Ex-rate(t-1)	0.001152	0.006359 (0.9950)
Δ Ex-rate(t-2)	-0.386889***	-2.125352 (0.0570)
Δ GDP	-0.158203	-0.433356 (0.6731)
Δ GDP (t-1)	2.095241**	5.522842 (0.0002)
Δ GDP (t-2)	2.165389**	6.122862 (0.0001)
Δ M2	-0.113232	-0.836929 (0.4204)
Δ M2 (t-1)	0.473015**	3.395947 (0.0060)
Δ M2 (t-2)	0.400421	3.006323 (0.0119)
Δ M2 (t-3)	0.354191**	2.887046 (0.0148)
ECT(t-1)*	0.083796**	6.156396 (0.0001)
R-squared 0.812412		
Adjusted R-squared 0.699859		
Durbin-Watson stat 1.676664		

Note: Figures in the parenthesis are p-values. ** and *** indicate the coefficients are significant at 1% and 5% levels. "Δ" stands for difference operator.

The result appears to be a regression analysis where the dependent variable is the change in the exchange rate (Δ Ex-rate). The study examines the relationship between the exchange rate's evolution and a number of lagged values of itself as well as other macroeconomic factors like the money supply and GDP (M2). This regression analysis explores the factors influencing the change in the exchange rate (Δ Ex-rate) using lagged values of the exchange rate, GDP, and money supply (M2), along with an error correction term (ECT). The Error Correction Term (ECT) has a coefficient of 0.083796**, which is statistically significant at the 5% level (t-value: 6.156396, p-value: 0.0001). This indicates that there is a significant adjustment speed towards equilibrium after a shock to the system. The error correction term is significant, indicating a strong adjustment mechanism towards long-term equilibrium after short-term deviations. The model demonstrates that past changes in GDP and money supply, as well as the error correction term, significantly influence the current exchange rate change. Specifically, lagged changes in GDP and money supply have a strong positive effect, while the exchange rate change from two periods ago has a negative effect. The inclusion of a substantial error correction term highlights a robust adjustment towards equilibrium following short-term shocks. R-squared is 0.812412, meaning that the model accounts for 81.24% of the deviation in the fluctuation in the exchange rate. Adjusted R-squared is 0.699859, showing that the model remains robust even after adjusting for the number of predictors. Durbin-Watson statistic is 1.676664, suggesting no significant autocorrelation in the residuals.

Diagnostic Tests

Table 4: Diagnostic Tests

Test for	Test Statistics	Probabilities	In summary
1. Normality (JB test)	0.063264	0.968863	The residuals are dispersed normally.
2. Breusch-Godfrey Serial Correlation (LM Test)	1.952970	0.1975	No Autocorrelation
3. Heteroscedasticity (Breusch-Pagan-Godfrey)	0.745030	0.6967	No heteroskedasticity
4. Ramsey RESET Test	0.763053	0.4029	No specification error

The robustness of the ECM was assessed using primary diagnostic tests, including tests for normality, autocorrelation, heteroscedasticity, and model specification errors. Table 4 presents the results of these diagnostic tests. The residuals' normal distribution is verified by the Jarque-Bera statistics. The Breusch-Godfrey serial autocorrelation (LM) test indicates that there is no serial autocorrelation present in the ARDL model.

The homoscedasticity of the residuals is confirmed by the Breusch-Pagan-Godfrey test. The Ramsey Regression Specification Error Test (RESET) indicates that the equation is correctly specified. Additionally, we conducted the CUSUM and CUSUM of squares tests, with the statistics presented in Appendix-1. The plots for CUSUM and CUSUM of squares demonstrate that the estimated coefficients of the ECM remain stable throughout the sample period, as the statistics fall within the 5% confidence interval bands for parameter stability.

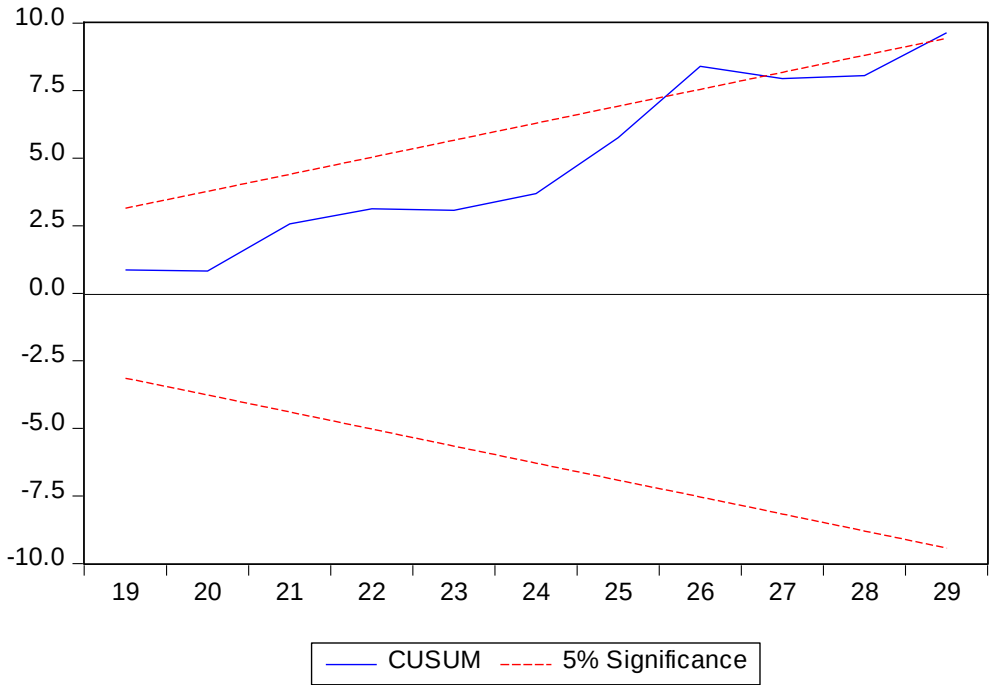
The diagnostic tests indicate that the estimated model's residuals do not exhibit serial correlation, as confirmed by the Breusch-Godfrey statistics. Additionally, the variance of the error term is homoscedastic, consistent with the Breusch-Pagan-Godfrey test results. The Ramsey RESET test further validates the accuracy of the model specification. Overall, the results demonstrate that the model is correctly specified, free from serial correlation and heteroscedasticity, and that the residuals are normally distributed. These findings suggest that the model is reliable and robust for drawing conclusions.

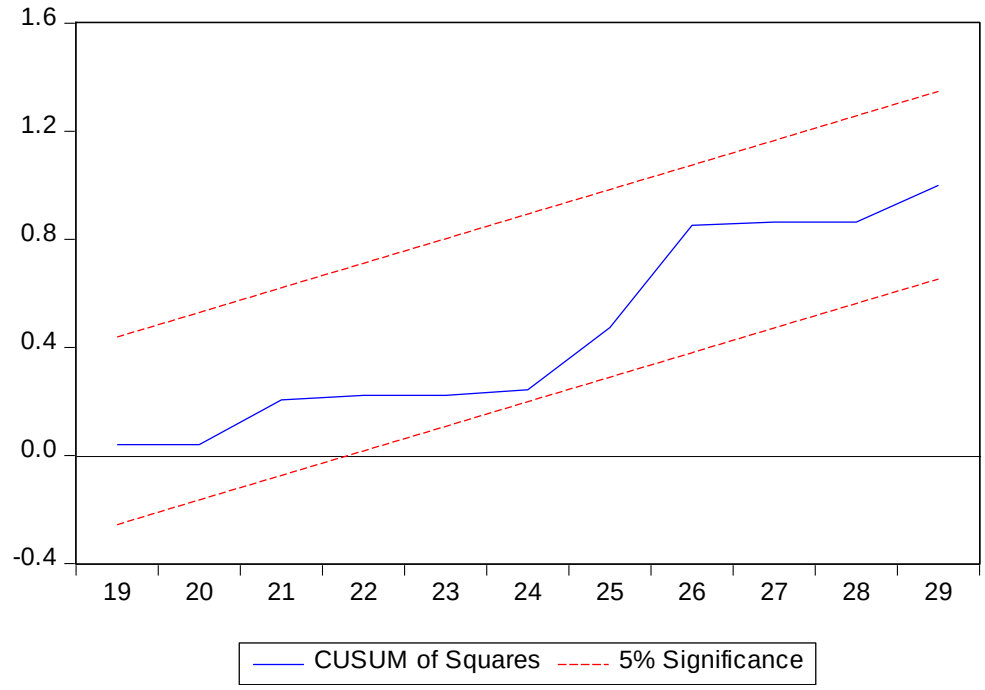
IV. Concluding Remarks:

This study investigates the relationship between GDP growth, money supply, price level, and exchange rate. Using annual data from FY1995 to FY2023 on the exchange rate, consumer price index, broad money, and GDP growth, we employed a bound testing approach within the ARDL framework to explore this relationship. The empirical results reveal that variables like money supply, exchange rate, inflation, and real GDP are cointegrated and have a significant

long-term impact on price levels. Conversely, the money supply is positively correlated with the price level, indicating that increases in money supply eventually lead to higher inflation. In contrast, real GDP exhibits a negative relationship with the price level, suggesting that higher output reduces inflationary pressures. In the short term, however, the money supply shows an inverse relationship with the price level, implying that an increase in money supply boosts aggregate demand. This boost allows consumers to allocate some of their income to consumption while using the rest for productive activities. Recent trends in Bangladesh's money supply, exchange rate, inflation, and GDP growth reveal that real GDP growth has notably outpaced inflation, which remains at a manageable level. This observation highlights that the money supply positively impacts output growth in the short term. The findings of this study indicate that while the money supply has a short-term inverse effect on the price level, it positively influences prices over the long term. In contrast, real GDP does not affect the price level in the short term but has a negative impact over time. Policymakers should focus on crafting and refining strategies to foster economic development and growth.

Appendix 1





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