

## Exchange Rate Volatility, International Trade and Economic Growth in India

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### Abstract

*This study analyses the relationship among the exchange rate volatility, international trade and economic growth in India during 1976-2023. The unit root test result confirms that all the variables are non-stationary at level and it's become stationary at first difference. Further, the cointegration as well as error correction test result confirms the possibilities of the long run relationship among the variables. And granger causality test confirms that the imports of goods and services affect the GDP in positive as well as negative direction and exchange rate (increase or decrease) affects the exports and imports of goods and services (increase or decrease) which leads to overall performance of the country. Therefore, the important policy suggestion that to control the fluctuations in exchange rate is important to control the interest rates, inflation, political stability, economic health, trade and growth of the country.*

**Key Words:** Exchange Rate, Exports, Imports, Economic Growth and India.

**JEL Classification:** B23, F10, F14, F30, F31.

### Introduction

The exchange rate represents the value at which one nation's currency is traded for another country's currency (Mordi, 2006). In other words, it is the price at which international exchange occurs between two countries (Mankiw, 1997). Furthermore, the exchange rate as an indicator of a currency's strength with respect to another country's currency. In the present time, the Indian economy has been faced the by and large exchange rate fluctuations, which have had extensive consequences for the country's international trade and economic growth. As per the theory of exchange rate is determine the country's trade competitiveness, investment attractiveness, and overall economic performance. However, India's exchange rate has been observed volatile, largely due to factors such as interest rates, inflation, balance of payment dynamics, and government as well as monetary authority intervention. The performance of India's international trade in last few decades have been sown to make a significant impact in global trade, with an increasing participation, share and improvement of volume of trade. But due to exchange rate volatility, the Indian economy faces many external and internal economic challenges, which leads to the impact of the overall performance of the economy. Thus, this

paper aims to investigate the impact of exchange rate volatility on international trade and growth performance of Indian economy during 1976-2023.

**Trends of Gross Domestic Product (GDP), Exports of Goods and Services, Imports of Goods and Services and Exchange Rate in India**

This section discusses the performance of GDP, exports and imports of goods and services as well as exchange rate in India during the periods 1976-2023.

**Figure (1): Trends of Gross Domestic Product in India**

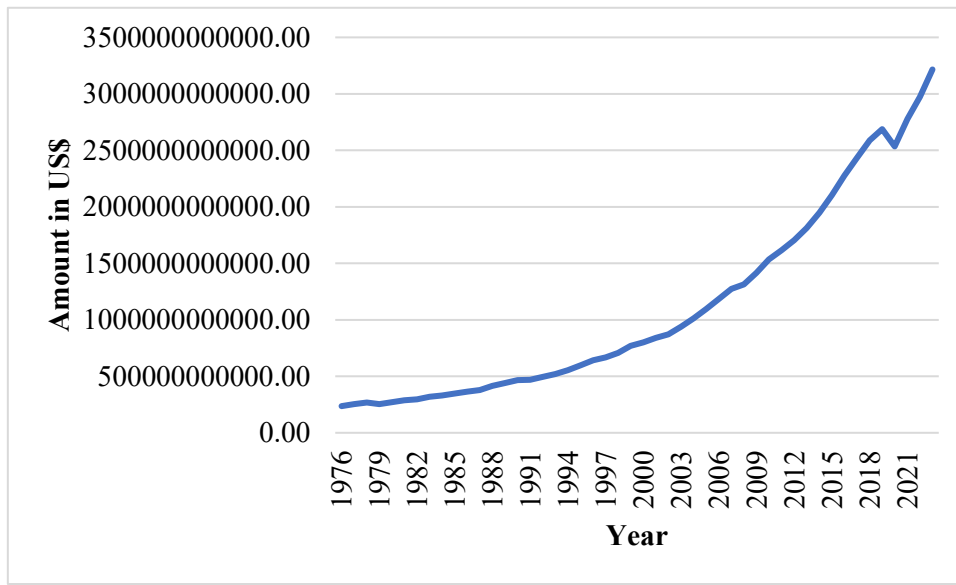


Figure (1) shows the performance of GDP in India during 1976-2023. The GDP are observed increasing trend especially after liberalization periods.

**Figure (2): Trends of Exports and Imports of Goods & Services**

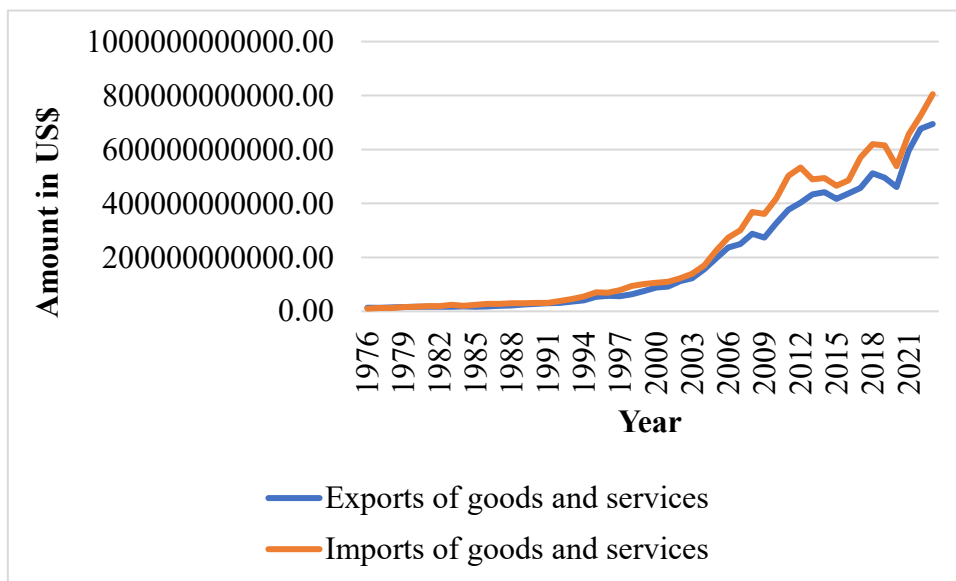


Figure (2) depicts the performance of exports and imports of goods and services in India during 1976-2023. It also confirms that an export always exceeds imports in India but differences have observed and increasing rapidly in 21<sup>st</sup> century.

**Figure (3): Trends of Exchange Rate of the Indian Rupee to US Dollar**

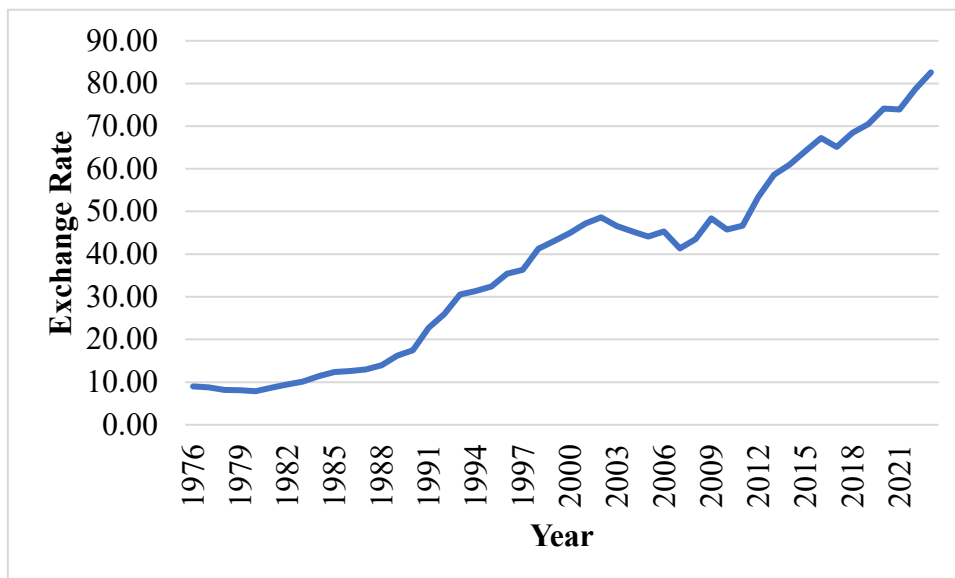


Figure (3) presents the performance of exchange rate volatility in India during 1976-2023. The exchange rate trend confirms that initially it is moving within limited boundaries and is good for international trade and economic growth but when it increasing speedily specially after 2010, then it is affects the international trade and economic growth in India.

### Literature Survey

The significant literature related to this study is cover the theoretical as well as empirical frame work. The theory of international trade such as Mercantilist, Absolute Advantage theory, Comparative Advantage Theories, Heckscher-Ohlin Theory Factor Price Equalization Theory and other theories have been explained the importance of international trade for host and partner countries economic development. On the other hand, the theory of exchange rate explains the various causes to determine it and explain its role to improve the country foreign trade and overall development of economic activities such as expos and imports of goods and services. Several studies discuss and empirically examine the positive as well as negative impact of exchange rate volatility on international trade and country economic performance. Brodsky (1984) and Udeh (2010) have a different view of the relationship between exchange rate volatility and international trade performances of both host and partner country. According to Kandil and Mirzaie (2008), Exchange rate volatility refers to the fluctuations in the exchange rate, leading to a persistent depreciation of the domestic currency. Further, this volatility exposes economic agents to greater exchange rate risk, which can be anticipated or unanticipated. Unanticipated fluctuations have a more significant impact, influencing aggregate demand and supply through exports, imports, and the cost of intermediate goods. Such volatility can impact trade, investment, and economic stability, making it essential for businesses and policymakers to monitor and manage exchange rate risks. Exchange rates are closely together to cross-border capital movements in form of FDI or FII, and changes in exchange rates have significant effects on trade flows and overall economic growth (Shehu and

Youtang, 2012). A depreciation of the domestic currency can improve exports and lead to a positive trade balance, while changes in the real exchange rate indicate the strength or weakness of the currency and the competitiveness of domestic industries. Exchange rate volatility occurs when there is a deviation from the benchmark rate over time, indicating misalignment and potential currency instability, particularly in flexible exchange rate regimes where demand and supply forces determine the exchange rate (Agbaeze et al. 2023). On the other hand, the impact of exchange rate volatility on international trade in Nigeria during January 2013 to December 2023. The empirical results confirm that the exchange rate volatility has a significant negative effect on imports and a positive effect on exports on the Nigeria economy. And it was recommended that exchange rate management is crucial for trade policy decisions in Nigeria (Ikpe, et al. 2024). As the volatility of exchange rates significantly influences international trade, understanding their complex interplay is paramount. This study employs performance analysis and science mapping to various publication and citation trends, identify major contributors, and delineate key themes in the domain of exchange rate volatility and international trade. The exchange rate volatility impacts various exporters, sectors, and regions differently. And also finds an imperative for robust risk management strategies to mitigate the repercussions of exchange rate volatility, alongside policy interventions tailored to account for these varied impacts (Ial, et al. 2023). According to Hadebe and Msomi (2023) have examined that how South African exports demand is affected by exchange rate volatility covers the period from the year 2000 first quarter to the beginning of 2021 first quarter. They come to the conclusion and suggested that there is a positive relationship between exchange rate volatility and exports. Hence, policies such as bilateral trade agreements are important to promote export growth of South Africa. On the other hand, Warnes (2022) studied show the impact of exchange rate volatility on economic growth and international trade, which is based on the several studies. There are several studies which show the negative impact of real effective exchange volatility on economic growth. This impact is particularly important for countries with insufficient financial development. Also, most studies show a negative effect of real exchange rate volatility on exports, although the effects on international trade may vary depending on the sector under study. Panel data studies which consider different trade sectors may shed more light on the specific effects of REER volatility on trade. The negative effects of REER on growth may be explained by other factors, besides the relation between REER volatility and international trade. Countries with sluggish economic growth or with difficulties to increase its export volumes should be aware of the problems derived from REER volatility, and much more so in the case of developing countries with scarce financial development.

## Literature Gap

It is clear that a significant number of studies have been focused on the importance of exchange rate volatility to promote international trade and economic growth in developing as well as developed country. But as per literature survey, very limited or no study has been focused to examine the relationship among the exchange rate volatility, international trade (export as well as import) and economic growth in India during 1976-2023.

## Objectives

The main objectives of this paper are as following:

1. To evaluate the Trends of Gross Domestic Product (GDP), Exports of Goods and Services, Imports of Goods and Services and Exchange Rate in India during 1976-2023.
2. To examine the short run as well as long run relationship among the exchange rate volatility, international trade (export as well as import) and economic growth in India during 1976-2023.

## Significance

The classical to modern theory of international trade, it has been concluded that international trade has significance on economic growth and improves the welfare of the host country as well as the trading country. So, this study is importance because in the recent time a number country has been changing their trade policy to increase the exports and decrease the imports. Further, the exchange rate volatility is also play a significant role to improve the trade of the country, but fluctuating exchange rate in India can affects the International trade as well as growth adversely. Thus, this paper has been concentrated on the exchange rate volatility, international trade and economic growth in India during 1976-2023.

## Data Source

The data of GDP (constant 2015 US\$), exports of goods and services (constant 2015 US\$), imports of goods and services (constant 2015 US\$) and Official exchange rate (LCU per US\$, period average) during the period 1976-2023 have been collected from the World Development Indicators, World Bank. The GDP is used for the proxy of economic growth.

## Methodology

There are several methodologies such as Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root test have been applied to determine the order of integration or stationary/non-stationary in time series data and semi-log linear trend regression model has applied to calculate the average annual growth. Further, Engle-Granger (EG) and Johansen cointegration test have been employed to establish the long run relationship among the variables and Error Correction Mechanism (ECM) has been used to confirm the long run relationship among the variables. Finally, the short run relationships among the variables were examined by the granger causality test. The detail methodology is as followings:

## Unit Root Test

### *Augmented Dickey-Fuller (ADF)*

There are three different models in time series. The first model is without drift, second model is with drift and third model is with drift plus time trend. The equations of all three model is:

Without drift and without time trend (Model - 1):

$$Y_t = \alpha Y_{t-1} + \varepsilon_t \dots \dots \dots (1)$$

With drift and without time trend (Model - 2):

$$Y_t = \mu + \alpha Y_{t-1} + \varepsilon_t \dots \dots \dots (2)$$

With drift and with time trend (Model - 3):

$$Y_t = \mu + \alpha Y_{t-1} + \gamma t + \varepsilon_t \dots \dots \dots (3)$$

Specifically, assuming their absence of trend term in equation (2), and then the equation (2) can be written as:

$$\Delta Y_t = \mu + \delta Y_{t-1} + \varepsilon_t \dots \dots \dots (4)$$

Where:  $\Delta Y_t = Y_t - Y_{t-1}$  and  $\delta = \alpha - 1$ .

The null hypothesis is that there is unit root, i.e.

$$H_0: \delta = \alpha - 1 = 0$$

The alternative hypothesis is that there is no unit root, i.e.

$$H_1: \delta < 0 \text{ or Negative}$$

More generally, if the time series follows a autoregressive process of order p or even moving average process, an extended Dickey-fuller test called augmented Dickey-fuller (ADF) test.

So, if the original time series follows AR (p) process, the augment Dickey-fuller (ADF) test uses the following regression:

$$\Delta Y_t = \mu + \delta Y_{t-1} + \sum_{i=1}^n \gamma_i \Delta Y_{t-i} + \epsilon_t \dots \dots \dots (5)$$

In equation (5), the residual sequence is now white noise and free from problem of autocorrelation.

**Phillips-Perron**

P. C. Phillips and P. Perron (1988) have developed a Unit Root Test, Which involves the calculation of t ratio of the coefficient, so that serial correlation does not affect the asymptotic distribution of the test statistics. They are developed the generalization of ADF test procedure that allows for fairly mild assumption concerning the distribution of error.

The test statistics for the Phillips-Perron (PP) test is AR (1) process is

$$\Delta Y_t = \mu_0 + \delta Y_{t-1} + \epsilon_t \dots \dots \dots (6)$$

In the ADF test corrects the higher order serial correlation by adding lagged difference terms on dependent variable in right hand side, the PP test makes a correction to the t-statistic of the coefficient of  $\delta$  from AR(1) regression to account for the serial correlation in disturbance term.

**Semi-Log Linear Trend Regression Model**

The average annual growth gives the overall scenario of a countries economic performance. The semi-logarithmic linear model is:

$$\ln(Y_t) = \alpha + \beta t + u_t \dots \dots \dots (7)$$

In the equation, (7) the dependent variable is in natural log and  $\alpha$ , and  $\beta$  are the parameters. The slope coefficient of time is the average annual growth for selected variable in this paper.

**Cointegration Test**

**Engle-Granger (EG) Cointegration Test**

The Engle-Granger (EG) has developed a cointegration test to determine the long run relationship between the variables. The specific model is:

$$GDP_t = \beta_0 + \beta_1 EXP_t + \beta_2 IMP_t + \beta_3 EXC_t + U_t \dots \dots \dots (8)$$

Where  $GDP_t$  is gross domestic product,  $EXP_t$  is export of goods and services,  $IMP_t$  is imports of goods and services,  $EXC_t$  is exchange rate,  $\alpha$  is intercept,  $\beta_i$  are slope coefficients and  $U_t$  is error term.

$$U_t = GDP_t - (\beta_0 + \beta_1 EXP_t + \beta_2 IMP_t + \beta_3 EXC_t) \dots \dots \dots (9)$$

In equation (9), we estimate the error series and then apply the unit root test in following equation (10);

$$\Delta U_t = \delta U_{t-1} + \varepsilon_t \dots \dots \dots (10)$$

Where  $U_t$  is error term and  $\varepsilon_t$  is white noise error term. Thus if the value of  $\delta$  is negative then we proceed for error correction model.

**Error Correction Mechanism (ECM)**

The specific error correction model is

$$\Delta GDP_t = \alpha_0 + \alpha_1 \Delta EXP_{1t} + \alpha_2 \Delta IMP_{2t} + \alpha_3 \Delta EXC_{3t} + \alpha_5 U_{t-1} + \varepsilon_t \dots \dots \dots (11)$$

Where  $U_{t-1}$  is the lagged value of error term and  $\varepsilon_t$  is white noise error term.

**Johansen Cointegration Test**

Johansen has developed one of the celebrated tests to identify the co-integration relationship between the variables. In the Johansen multivariate co-integration frame work, the following system is estimated;

$$\Delta x_t = \Gamma_1 \Delta x_{t-1} + \dots + \Gamma_{k-1} \Delta x_{t-k-1} + \pi x_{t-1} + \mu + \varepsilon_t \dots \dots \dots (12)$$

$$\Delta x_t = \Gamma_1 \Delta x_{t-1} + \dots + \Gamma_k - 1 \Delta x_{t-k-1} + \Pi x_{t-1} + \mu + \varepsilon_t \dots \dots \dots (13)$$

Where  $\Delta$  is the first difference operator,  $x$  denotes vectors of variables,  $\mu$  is the drift parameter,  $\varepsilon_t$  is the independently and identical distributed n-dimensional vector with zero mean and variance matrix,  $\Pi$  is a (p x p) matrix of the form  $\Pi = \alpha\beta$ , where  $\alpha$  and  $\beta$  are both (p x r) matrixes of full rank, with  $\beta$  containing the r co-integrating relationships and  $\alpha$  carrying adjustment coefficients in each of the r vectors. In this approach the first step is the estimation of an unrestricted, closed  $p^{th}$  order VAR in k variables. Consequently, Johansen suggested two test statistics to determine the co-integration rank (Feridun, 2004). The first of these is known as the trace statistics

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^n \ln(1 - \widehat{\lambda}_i) \dots \dots \dots (14)$$

And second is known as max statistics;

$$\lambda_{max}(r, r + 1) = -T \ln(1 - \widehat{\lambda}_{r+1}) \dots \dots \dots (15)$$

Where  $\widehat{\lambda}_i$  are the estimated values of the characteristics roots (also called Eigen values) obtained from the estimated  $\pi$  matrix.

T = Number of usable observation.

In the first statistic tests, the null hypothesis that number of co-integrating vector is less than or equal to r against the alternative. The second statistics tests the null hypothesis is the number of co-integrating vectors r against the alternative of r+1 co-integrating vectors. And if the estimated value of the characteristic root is close to zero,  $\lambda_{max}$  will be small. Thus, if both

the statistics confirm the cointegration among the variables then we proceed for the Vector Error Correction Mechanism (VECM).

**Vector Error Correction Mechanism (VECM)**

The VECM model specification is as following;

$$\Delta GDP_t = \delta_0 + \delta_1 \Delta GDP_{t-1} + \delta_1 \Delta EXP_{t-1} + \delta_2 \Delta IMP_{t-1} + \delta_3 \Delta EXC_{t-1} + \delta_5 U_{t-1} + \varepsilon_t \dots \dots \dots (16)$$

$$\Delta EXP_t = \delta_0 + \delta_1 \Delta GDP_{t-1} + \delta_1 \Delta EXP_{t-1} + \delta_2 \Delta IMP_{t-1} + \delta_3 \Delta EXC_{t-1} + \delta_5 U_{t-1} + \varepsilon_t \dots \dots \dots (17)$$

$$\Delta IMP_t = \delta_0 + \delta_1 \Delta GDP_{t-1} + \delta_1 \Delta EXP_{t-1} + \delta_2 \Delta IMP_{t-1} + \delta_3 \Delta EXC_{t-1} + \delta_5 U_{t-1} + \varepsilon_t \dots \dots \dots (18)$$

$$\Delta EXC_t = \delta_0 + \delta_1 \Delta GDP_{t-1} + \delta_1 \Delta EXP_{t-1} + \delta_2 \Delta IMP_{t-1} + \delta_3 \Delta EXC_{t-1} + \delta_5 U_{t-1} + \varepsilon_t \dots \dots \dots (19)$$

Where  $U_{t-1}$  is the lagged value of error term and  $\varepsilon_t$  is white noise error term.

**Granger Causality Test**

C. W. J. Granger (1969) has given causality test shows the relationship between the variable. “A variable is x is said to be Granger Causes y if and only if the forecast of y is improved by using the past value of x together with the past value of y. Therefore in this test involve following regression:

$$Y_t = \sum_{i=1}^n \alpha_i X_{t-i} + \sum_{i=1}^n \delta_i Y_{t-i} + U_{1t} \dots \dots \dots (20)$$

$$X_t = \sum_{i=1}^n \alpha_i X_{t-i} + \sum_{i=1}^n \delta_i Y_{t-i} + U_{2t} \dots \dots \dots (21)$$

In this above equation (20) and equation (21) measures the direction of causality either unidirectional (Y causes X or X causes Y) or Bidirectional or no causality between Y and X.

**Empirical Results**

The empirical results have been discussed in this section. The results are as followings:

**Table (1): Unit Root Test**

Variable	Augmented Dickey–Fuller (ADF) Test			Phillips-Perron (PP) Test		
	None	Intercept	Trend & Intercept@	None	Intercept	Trend & Intercept@
GDP at Level	12.95 (1.00)	1.00 (1.00)	-2.70 (0.24)	16.96 (1.00)	1.48 (1.00)	-2.59 (0.29)
GDP at First Differences	-1.38 (0.15)	-6.84*** (0.00)	-7.04*** (0.00)	-2.02** (0.04)	-6.88*** (0.00)	-7.24*** (0.00)
Exports of goods and services at Level	6.73 (1.00)	0.27 (0.97)	-1.81 (0.68)	6.16 (1.00)	0.21 (0.97)	-1.93 (0.62)
Exports of goods and	-3.47*** (0.00)	-5.87*** (0.00)	-5.78*** (0.00)	-3.33*** (0.00)	-5.87*** (0.00)	-5.78*** (0.00)

services at First Differences						
Imports of goods and services at Level	6.19 (1.00)	-0.98 (0.75)	-1.36 (0.86)	5.90 (1.00)	-0.97 (0.76)	-1.61 (0.78)
Imports of goods and services at First Differences	-4.20*** (0.00)	-6.52*** (0.00)	-6.46*** (0.00)	-4.33*** (0.00)	-6.53*** (0.00)	-6.47*** (0.00)
Exchange Rate at Level	2.43 (1.00)	-0.98 (0.75)	-0.74 (0.96)	2.88 (1.00)	-0.90 (0.78)	-1.26 (0.89)
Exchange Rate First Differences	-2.14** (0.03)	-4.71*** (0.00)	-4.77*** (0.00)	-3.55*** (0.00)	-4.74*** (0.00)	-4.71*** (0.00)

\*\*\*Significant at the 1% level, \*\*Significant at the 5% level, \*Significant at the 10% level, () p-value.  
@Indicates the Trend Coefficient is Insignificant. #Author’s Calculation.

Table (1) shows the unit root test results for GDP, exports of goods and services, imports of goods and services and exchange rate during the period 1976-2023. Further, the Augmented Dickey–Fuller (ADF) and Phillips-Perron (PP) test result indicates that all the variables are non-stationary at level in the three models but it’s become stationary at first differences. It is conclude that the variables are time varying mean, variance and co-variance at level and after taking first differences the mean, variance and co-variance are constant over the period of time.

**Table (2): Average Annual Growth (%)**

Variables	1976-1987	1988-1999	2000-2011	2012-2023
GDP	4.26	5.50	6.64	5.39
Exports of goods and services	3.48	11.05	13.80	4.57
Imports of goods and services	8.67	12.69	15.23	4.05
Exchange Rate	4.46	10.09	-0.17	3.39

Note: Average Annual Growth has been calculated by the semi-log linear trend model.  
#Author’s Calculation.

Table (2) depicts the average annual growth rate (%) for GDP, Exports of goods and services, Imports of goods and services and exchange rate for the periods 1976-1987, 1988-1999, 2000-2011 and 2012-2023. The growth rate of GDP, exports of goods and services, imports of goods and services have been recorded 4.26%, 3.48%, 8.67% for 1976-1987, 5.50%, 11.50%, 12.69 for 1988-1999, 6.64, 13.80, 15.23 for 2000-2011 and 5.39, 4.57, 5.05 for 2012-2023 respectively. Further, the average annual growth (%) for exchange rate was noted 4.46 for 1976-1987, 10.09 for 1988-1999, -0.17 for 2000-2011 and 3.39 for 2012-2023. Thus, the fluctuations in the exchange rate is affects the imports of goods and services and exports of goods and services, which leads the economic growth of the country.

**Table (3): Cointegration Test**

Engle Granger Methodology (Dependent Variable GDP)							
Intercept	Slope Exports of goods and services	Slope Imports of goods and services	Slope Exchange Rate	R-square	F-statistics (Probability F-statistics)	ECT	Durbin-Watson Statistics
14.08*** (21.67)	0.37*** (2.97)	0.14 (1.10)	0.14** (2.26)	0.98	879.97*** (0.00)	-0.06	0.171
Error Correction Mechanism (ECM) (Dependent Variable ΔGDP)							

Intercept	Slope $\Delta$ Exports of goods and services	Slope $\Delta$ Imports of goods and services	Slope $\Delta$ Exchange Rate	ECT <sub>t-1</sub>	R-squared	F-statistics (Probability F-statistics)	Durbin-Watson Statistics
0.05*** (6.28)	0.04 (0.69)	0.05 (0.99)	-0.03 (-0.42)	-0.07 (-1.62)	0.15	1.86 (0.14)	2.03
***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level, () t-statistics. #Author's Calculation.							
<b>Johansen Cointegration Test</b>							
Unrestricted Cointegration Rank Test (Trace)				Unrestricted Cointegration Rank Test (Maximum Eigenvalue)			
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value		
None*	0.459760	61.69624	54.07904	28.32413	28.58808		
At most 1	0.264702	33.37211	35.19275	14.14407	22.29962		
At most 2	0.237243	19.22804	20.26184	12.45751	15.89210		
At most 3	0.136866	6.770528	9.164546	6.770528	9.164546		
<b>Error Correction Mechanism (ECM)</b>							
Dependent Variable	Intercept	Error Correction Term	Slope $\Delta$ GDP	Slope $\Delta$ Exports of goods and services	Slope $\Delta$ Imports of goods and services	Slope $\Delta$ Exchange Rate	
$\Delta$ GDP	0.04* (3.87)	0.000265 (0.42)	-0.09 (-0.55)	0.07 (1.15)	0.05 (0.96)	0.10 (1.31)	
$\Delta$ Exports of goods and services	0.10* (3.49)	-0.004989* (-3.13)	-0.10 (-0.24)	-0.08 (-0.53)	0.16 (1.21)	-0.40* (-2.05)	
$\Delta$ Imports of goods and services	0.14* (3.86)	-0.005159* (-2.62)	-0.58 (-1.15)	0.11 (0.57)	-0.06 (-0.39)	-0.45 (-1.88)	
$\Delta$ Exchange Rate	0.02 (0.61)	0.001134 (0.84)	0.14 (0.41)	0.03 (0.25)	0.04 (0.32)	0.42* (2.57)	

\*Significant and () t-statistics. #Author's Calculation.

Table (3) indicates the cointegration test results of GDP, exports of goods and services, imports of goods and services and exchange rate during the period 1976-2023. The Engle Granger cointegration test and the negative sign of the error correction term confirm the long run association among the variables during 1976-2023. Additionally, the error correction model indicates that all the coefficients are statistically insignificant except intercept which leads to inconclusive results. Further, Johansen cointegration test result confirms the variables are cointegrated or long run association among the variables. At the same time, the vector error correction results indicate that some variables are statistically significant and some are statistically insignificant. Thus, the test results confirm that the long run relationship among the variables and any disequilibrium in the long run is restored by the exchange rate and error correction term during the period 1976-2023.

**Table (4): Granger Causality Test**

Null Hypothesis	F-Statistic
GDP does not Granger Cause Exports of goods and services	0.24
Exports of goods and services does not Granger Cause GDP	1.66
GDP does not Granger Cause Imports of goods and services	0.41
Imports of goods and services does not Granger Cause GDP	2.36*
GDP does not Granger Cause Exchange Rate	0.58
Exchange Rate does not Granger Cause GDP	1.37
Exports of goods and services does not Granger Cause Imports of goods and services	1.86
Imports of goods and services does not Granger Cause Exports of goods and services	1.69
Exports of goods and services does not Granger Cause Exchange Rate	0.19
Exchange Rate does not Granger Cause Exports of goods and services	8.01***
Imports of goods and services does not Granger Cause Exchange Rate	0.26
Exchange Rate does not Granger Cause Imports of goods and services	3.99**

\*\*\*Significant at the 1% level, \*\*Significant at the 5% level, \*Significant at the 10% level.

#Author's Calculation.

Table (4) represents the granger causality test for GDP, exports of goods and services, imports of goods and services and exchange rate during the period 1976-2023. The test result indicates that the unidirectional causal relationship with statistical significant has been observed for imports of goods and services causes GDP, exchange rate causes exports of goods and services and exchange rate causes imports of goods and services, while others have been found no causal relationship between the variables. Therefore, it is concludes that the imports of goods and services affect the GDP in positive as well as negative direction and exchange rate (increase or decrease) affects the exports and imports of goods and services (increase or decrease) which leads to overall performance of the country.

### Concluding Remarks

The empirical investigation confirms that the long run association among the variables and the disequilibrium in the long run is restore by the exchange rate. Further, the favorable exchange rate increases the prices of exports of goods and services and decreases the prices of imports of goods and services, which leads to overall performance as well as economic growth of country while the unfavorable exchange rate affects the exports and imports of goods and services which leads to affects the country overall performance as well as economic growth. Thus, the important policy suggestion that to control the fluctuations in the exchange rate is important to control the interest rates, inflation, political stability, economic health, trade and growth of the countries.

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