

IMPACT OF RUPEE – DOLLAR FLUCTUATION ON INDIAN ECONOMY

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ABSTRACT

This research paper explores the impact of Rupee-Dollar fluctuations on the Indian economy over the past decade, analyzing key indicators such as GDP, inflation, interest rates, unemployment, and FDI. The findings reveal that while sectors reliant on exports may benefit from a depreciating rupee, the overall economy often suffers, particularly industries dependent on imports. The research underscores the significance of managing interest rates and inflation to stabilize the currency. It also highlights the need for strategic policies to balance the benefits and challenges posed by currency volatility, ensuring sustained economic growth.

Keywords: Rupee-Dollar fluctuation, Indian economy, GDP, inflation, interest rates, unemployment, FDI, monetary policy, economic stability, exchange rate.

1. INTRODUCTION

The exchange rate between the Indian Rupee and the U.S. Dollar is a crucial economic indicator that has significant implications for the Indian economy. Over the past decade, the Rupee has experienced considerable volatility against the Dollar, influenced by a complex interplay of global and domestic factors. This volatility in the exchange rate has profound effects on various economic dimensions, including GDP, inflation, interest rates, unemployment, and foreign direct investment (FDI). The relationship between currency fluctuations and these economic indicators is intricate, as the depreciation or appreciation of the Rupee can have both positive and negative consequences. For instance, while a weaker Rupee may boost export competitiveness, it can also escalate the cost of imports, leading to inflationary pressures and a potential slowdown in economic growth.

Conversely, a stronger Rupee might stabilize inflation but could hurt export-driven industries. Understanding these dynamics is essential for policymakers to craft strategies that mitigate the adverse effects of currency volatility while leveraging any potential benefits. This research aims to provide a comprehensive analysis of how Rupee-Dollar fluctuations impact the Indian economy, offering insights into the challenges and opportunities these fluctuations present. The study also explores the role of monetary policy in managing these effects, with a focus on maintaining economic stability and promoting sustainable growth.

2. LITERATURE REVIEW

Ria Idicula and Dr. S. Jayadev (2022) examined the challenges and impact of Rupee-Dollar fluctuations on the Indian economy. They identified factors such as the Russia-Ukraine war, interest rate differentials, rising inflation, crude oil prices, current account deficit pressure, and FPI pull-outs as key contributors to the rupee's decline. The depreciation of the rupee increased the cost of imported raw materials, negatively impacting consumers and exports. The study concluded that the rupee is likely to remain under pressure due to a strong dollar, elevated inflation in India, and ongoing FPI outflows.

Nipun Agarwal's (2022) study explores the impact of currency fluctuations on investment behaviors in India, especially post-pandemic. The research examines investor mindsets, interests in equity, and the effects of currency fluctuations and inflation on investment decisions. It uses primary data from surveys and secondary data with an exploratory design. Key limitations include global economic outlooks, managing fluctuating foreign exchange inflows, and risks of using forex reserves. The study highlights the direct impact of currency changes on investments and broader economic implications for India.

Ayush Singh, Vinaytosh Mishra, and Akhilendra B. Singh (2016) analyzed the impact of Rupee-Dollar fluctuations on the Indian economy, focusing on the causes of rupee depreciation and its effects. They examined factors such as inflation, interest rates, FDI, exports, and imports to understand the economic implications. The study found that rupee depreciation reduces foreign capital inflow, increases external debt pressure, and raises subsidies for fertilizer and oil. However, it also encourages exports and restricts imports, helping to improve the current account balance. The research concluded that currency depreciation significantly impacts economic expansion indicators. The government's measures to strengthen the rupee were also explored.

3. RESEARCH DESIGN

3.1 PROBLEM STATEMENT

The Indian economy, recognized as one of the world's fastest-growing, is highly sensitive to fluctuations in the exchange rate between the Indian Rupee (INR) and the US Dollar (USD). These currency fluctuations have wide-ranging effects on key economic indicators such as trade balances, foreign investments, inflation, and overall economic growth. Despite India's strong economic policies and regulatory measures, the rupee's volatility against the dollar creates challenges that may hinder sustainable development. This study aims to explore the diverse impacts of INR-USD exchange rate fluctuations on the Indian economy, identifying the most affected sectors, evaluating both short-term and long-term effects, and proposing strategies to stabilize the currency and protect the nation's economic interests.

3.2 OBJECTIVES:

- 1) To identify the economic indicators that are influenced by exchange rate fluctuations.
- 2) To examine the relationship between exchange rate fluctuations and economic indicators.
- 3) To evaluate the influence of exchange rate fluctuations on the degree of changes in the economic indicators.

4. RESEARCH METHODOLOGY

This study uses secondary data from sources like the Reserve Bank of India and the World Bank over a 10-year period, analyzing key economic indicators such as exchange rates and GDP. It employs correlation to measure linear relationships between variables, and the Granger causality test to explore causal relationships between time series. Additionally, the Value at Risk (VAR) model estimates the potential financial loss in investments to manage risk exposure.

4.1 LIMITATIONS

- 1) The study relies on secondary data, which may include errors or outdated information from sources like the Reserve Bank of India and the World Bank.
- 2) Historical data might not accurately reflect current economic conditions or recent rupee-dollar fluctuations.
- 3) The study may overlook global factors influencing exchange rates, such as geopolitical events and trade policies.
- 4) A 10-year analysis might miss long-term trends or the full impact of recent exchange rate changes.

5. DATA ANALYSIS AND INTERPRETATION

5.1 VECTOR AUTOAGRESSIVE ESTIMATES:

Vector Autoregression Estimates
Date: 08/04/24 Time: 12:49
Sample (adjusted): 2016 2023
Included observations: 8 after adjustments
Standard errors in () & t-statistics in []

	DEXCHAN...	D2INTERE...	DGDP	DUNEMPL...	FDI	INFLATION...
DEXCHANGE_RATE(-1)	-1.552365 (1.86676) [-0.83158]	-0.392556 (0.13528) [-2.90185]	-1.298678 (3.27763) [-0.39622]	-0.312789 (0.82319) [-0.37997]	2.332639 (0.79564) [2.93177]	-0.343869 (0.09153) [-3.75675]
D2INTEREST_RATE(-1)	9.877789 (13.2093) [0.74779]	2.289682 (0.95723) [2.39198]	13.81666 (23.1927) [0.59573]	1.095462 (5.82491) [0.18806]	-13.05404 (5.63000) [-2.31866]	3.386532 (0.64770) [5.22857]
DGDP(-1)	-1.430179 (1.72379) [-0.82967]	-0.393429 (0.12492) [-3.14952]	-2.030090 (3.02661) [-0.67075]	-0.159967 (0.76014) [-0.21044]	1.752806 (0.73471) [2.38573]	-0.364264 (0.08452) [-4.30963]
DUNEMPLOYMENT(-1)	1.149982 (3.21683) [0.35749]	0.313345 (0.23311) [1.34418]	2.069953 (5.64807) [0.36649]	-0.255422 (1.41853) [-0.18006]	-1.948961 (1.37106) [-1.42150]	0.461966 (0.15773) [2.92880]
FDI(-1)	2.018810 (2.13763) [0.94441]	0.029226 (0.15491) [0.18867]	0.963660 (3.75322) [0.25676]	0.118826 (0.94263) [0.12606]	-1.606308 (0.91109) [-1.76306]	1.061488 (0.10482) [10.1272]
INFLATION_RATE(-1)	4.130395 (5.35975) [0.77063]	1.320880 (0.38840) [3.40079]	8.006713 (9.41057) [0.85082]	0.471366 (2.36349) [0.19944]	-5.876983 (2.28441) [-2.57265]	1.803209 (2.05109) [6.86135]
C	-36.80590 (41.8306) [-0.87988]	-7.509841 (3.03132) [-2.47742]	-48.37683 (73.4455) [-0.65868]	-3.402649 (18.4460) [-0.18447]	48.95738 (17.8288) [2.74597]	-10.52051 (2.05109) [-5.12922]
R-squared	0.721012	0.991351	0.874294	0.429936	0.917881	0.996838
Adj. R-squared	-0.952918	0.939457	0.120058	-2.990447	0.425170	0.977867
Sum sq. resid.	14.63868	0.076874	45.12783	2.846557	2.659248	0.035195
S.E. equation	3.826052	0.277261	6.717725	1.687174	1.630720	0.187604
F-statistic	0.430730	19.10345	1.159178	0.125698	1.862917	52.54518
Log likelihood	-13.76841	7.228620	-18.27174	-7.218182	-6.945915	10.35362
Akaike AIC	5.192103	-0.057155	6.317935	3.554546	3.486479	-0.838404
Schwarz SC	5.261614	0.012356	6.387446	3.624057	3.555990	-0.768893
Mean dependent	-1.583750	0.230000	0.075000	0.210000	5.095000	4.961250
S.D. dependent	2.737846	1.126829	7.161355	0.844596	2.150847	1.261025
Determinant resid covariance (dof adj.)		0.000000				
Determinant resid covariance		0.000000				
Number of coefficients		42				

The study examines various metrics to assess the relationship between economic indicators and exchange rates. R-squared values indicate that interest rates, GDP, FDI, and inflation strongly correlate with exchange rates, with inflation showing the strongest fit. Adjusted R-squared values reveal interest rates and inflation as significant predictors, while GDP, unemployment, and FDI show weaker or less consistent relationships. The sum of squared residuals highlights how each factor influences exchange rate variability, with interest rates and inflation having notable impacts. Standard errors and F-statistics further emphasize the precision and significance of these relationships, with interest rates and inflation rates being most influential. Lastly, the Akaike Information Criterion and Schwarz Criterion suggest that models including interest rates and FDI are more effective, while GDP, unemployment, and inflation may offer less predictive value.

5.2 WALD TEST

Wald Test: System: {%system}			
Test Statistic	Value	df	Probability
Chi-square	0.6998	2	0.7047
Null Hypothesis: C(1)=C(2)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(1)	-1.5524	1.866761	
C(2)	9.8778	13.20931	

5.3 Wald Test between Exchange Rate and Interest Rate- The Chi-Square value is **0.6998** at 2 degrees of freedom. The p-value is **0.7047**, which is greater than **0.05**. So, we fail to reject null hypothesis. We accept the null hypothesis and reject the alternative. So finally, Interest Rates [C(2)] have no significant effect on Exchange Rate[C(1)].

Wald Test: System: {%system}			
Test Statistic	Value	df	Probability
Chi-square	0.710903	2	0.7009
Null Hypothesis: C(1) = C(3) = 0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(1)	-15.523	1.866761	
C(3)	-1.4301	1.723791	

5.4 Wald Test between Exchange Rate and GDP- The Chi-Square value is **0.710903** at 2 degrees of freedom. The p-value is **0.7009**, which is more than **0.05**. So, we fail to reject null hypothesis. We accept the null hypothesis and reject the alternative. So, GDP [C(3)] have no significant effect on Exchange Rate[C(1)].

Wald Test: System: {%system}			
Test Statistic	Value	df	Probability
Chi-square	0.772562	2	0.6792
Null Hypothesis: C(1)=C(4)= 0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(1)	-1.5524	1.866761	
C(4)	1.1499	3.216833	

Wald Test between Exchange Rate and Unemployment.

The Chi-Square value is **0.772562** at 2 degrees of freedom. The p-value is **0.6792**, which is greater than **0.05**. So, we fail to reject null hypothesis. We reject the alternative hypothesis and accept the null hypothesis. So, Unemployment

		EXCHANGE RATE	GDP
EXCHANGE RATE	Pearson Correlation	1	0.144
	Sig. (2-tailed)		0.673
	N	11	11
GDP	Pearson Correlation	0.144	1
	Sig. (2-tailed)	0.673	
	N	11	11

[C(4)] have no significant effect on Exchange Rate[C(1)].

Wald Test between Exchange Rate and FDI.

Wald Test: System: {%system}			
Test Statistic	Value	df	Probability
Chi-square	0.927621	2	0.6289
Null Hypothesis: C(1) = C(5) = 0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(1)		-1.5524	1.866761
C(5)		2.0188	2.137631

The Chi-Square value is **0.927621** at 2 degrees of freedom. The p-value is **0.6289**, which is greater than **0.05**. So, we fail to reject null hypothesis. We reject the alternative hypothesis and accept the null hypothesis. So finally, FDI [C(5)] have no significant effect on Exchange Rate[C(1)].

Wald Test between Exchange Rate and Inflation Rate.

The Chi-Square value is **0.692276** at 2 degrees of freedom. The p-value is **0.7074**, which is greater than **0.05**. So, we fail to reject null hypothesis. We reject the alternative hypothesis and accept the null hypothesis. So, Inflation Rate [C(6)] have no significant effect on Exchange Rate[C(1)].

Wald Test: System: {%system}			
Test Statistic	Value	df	Probability
Chi-square	0.692276	2	0.7074
Null Hypothesis: C(1) = C(6) = 0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(1)		-15.523	1.866761
C(6)		4.1304	5.359751

5.5 CORRELATION

Correlation between Exchange Rate and GDP

The p-value for the Pearson correlation coefficient between Exchange Rates and GDP is 0.673, which is more than the significance level of 0.05. Therefore, we fail to reject the H_0 .

This shows that the exchange rate and GDP do not differ significantly, suggesting that the exchange rate has no statistically significant effect on GDP.

		EXCHANGE RATE	FDI
EXCHANGE RATE	Pearson Correlation	1	.164
	Sig. (2-tailed)		.630
	N	11	11
FDI	Pearson Correlation	.164	1
	Sig. (2-tailed)	.630	
	N	11	11

Correlation between Exchange Rate and FDI

The p-value for the Pearson correlation coefficient between Exchange Rate and FDI is 0.630, which is greater than the significance level of 0.05. Therefore, we fail to reject the null hypothesis (H₀). This indicates that there is no significant difference between the Exchange Rate and FDI, suggesting that the exchange rate does not have a statistically significant effect on foreign direct investment.

		EXCHANGE RATE	Inflation Rate
EXCHANGE RATE	Pearson Correlation	1	.514
	Sig. (2-tailed)		.106
	N	11	11
Inflation Rate	Pearson Correlation	.514	1
	Sig. (2-tailed)	.106	
	N	11	11

Correlation between Exchange Rate and Inflation Rate

The p-value for the Pearson correlation coefficient between Exchange Rate and Inflation Rate is 0.106, which is greater than the significance level of 0.05. Therefore, we fail to reject the null hypothesis (H₀). This indicates that there is no significant difference between the Exchange Rate and Inflation Rate, suggesting that the exchange rate does not have a statistically significant impact on the inflation rate.

		EXCHANGE RATE	Interest Rate
EXCHANGE RATE	Pearson Correlation	1	-.441
	Sig. (2-tailed)		.175
	N	11	11
Interest Rate	Pearson Correlation	-.441	1
	Sig. (2-tailed)	.175	
	N	11	11

Correlation between Exchange Rate and Interest Rate

The p-value for the Pearson correlation coefficient between Exchange Rate and Interest Rate is 0.175, which is more than the significance level of 0.05. Therefore, we fail to reject the H₀. This implies that there is no statistically significant difference between the interest rate and the exchange rate, suggesting that the exchange rate has no influence on the interest rate.

Correlation between Exchange Rate and Unemployment

		EXCHANGE RATE	Unemployment
EXCHANGE RATE	Pearson Correlation	1	-.913**
	Sig. (2-tailed)		.000
	N	11	11
Unemployment	Pearson Correlation	-.913**	1

	Sig. (2-tailed)	.000	
	N	11	11

The p-value for the Pearson correlation coefficient between Exchange Rates and Unemployment is 0.000, which is less than the significance level of 0.05. Therefore, we reject the null hypothesis (H0). This indicates the Exchange Rates differ significantly from one another and Unemployment, suggesting that the exchange rate has a statistically significant effect on unemployment.

6. FINDINGS

1. R-SQUARED:

- **Inflation Rate** has the strongest the ability to explain currency rates variations.
- **Interest Rate**, **GDP**, and **FDI** also have strong relationships with the exchange rate, but to a lesser extent than inflation.
- **Unemployment Rate** has the weakest connection to exchange rate variability.

2. ADJUSTED R-SQUARED:

- **Interest Rate** and **Inflation Rate** are highly effective predictors of the exchange rate.
- **FDI** has a moderate predictive value.
- **GDP** shows a weak predictive relationship.
- **Unemployment Rate** is not a relevant predictor and might be misleading.

3. SUM OF SQUARED RESIDUALS:

- **GDP** and **FDI** support currency appreciation by reflecting economic strength and increased investment.
- **Interest Rates** can influence currency appreciation through investment and capital flows.
- **Unemployment Rate** affects the exchange rate indirectly through economic stability.
- **Inflation Rate** tends to lead to currency depreciation.

4. STANDARD ERRORS (SE):

- **Interest Rate** estimates are reliable.
- **GDP** estimates are highly sensitive to exchange rate fluctuations.
- **Unemployment Rate** shows moderate variability, indicating less pronounced impact on exchange rates.
- **FDI** and **Inflation Rate** have moderate standard errors, reflecting relatively stable relationships with exchange rates.

5. F-STATISTIC:

- **Interest Rate** and **Inflation Rate** are highly significant in influencing exchange rates.
- **GDP**, **Unemployment Rate**, and **FDI** show less significance.

6. LOG-LIKELIHOOD:

- **Interest Rates** and **Inflation Rates** improve the model fit for exchange rates.
- **GDP**, **Unemployment Rate**, and **FDI** show less model fit significance.

7. AKAIKE INFORMATION CRITERION (AIC):

- **Interest Rates** and **FDI** have better AIC values, indicating a good balance between model fit and complexity.
- **GDP**, **Unemployment Rate**, and **Inflation Rate** have less favorable AIC values, suggesting they are less effective in explaining exchange rate variations.

8. SCHWARZ CRITERION (SC):

- Low **Interest Rates** can weaken the currency.
- Strong **GDP** generally supports a stable or stronger currency.
- Low **Unemployment Rate** indicates economic health and can strengthen the currency.
- High **FDI** usually supports a stronger currency.
- **Inflation Rate** can impact currency strength in various ways, with deflation potentially weakening it.

9. MEAN DEPENDENT:

- High **FDI** and low **Unemployment Rate** support a stronger currency.

- o High **Inflation Rate** weakens the currency.
- o **Interest Rates** and **GDP** provide additional context but have a less direct impact.

10. STANDARD DEVIATION DEPENDENT:

- o High variability in **GDP** and **Interest Rates** suggests strong potential impacts on exchange rate fluctuations.
- o High variability in **Inflation Rates** also indicates a significant impact on exchange rates.

Overall, **Interest Rates** and **Inflation Rates** are the most significant predictors of exchange rate variations, while **GDP**, **FDI**, and **Unemployment Rate** have more impacts are more complex and involve various factors or conditions that can influence their overall effect on the exchange rate.

WALD TEST :

- Interest Rates (C(2)) have no major impact on the Exchange Rate (C(1)).
- GDP (C(3)) has no appreciable impact on the Exchange Rate (C(1)).
- Unemployment (C(4)) has no notable impact on the Exchange Rate (C(1)).
- FDI (C(5)) has no major impact on the Exchange Rate (C(1)).
- Inflation Rate (C(6)) has no notable impact on the Exchange Rate (C(1)).

CORRELATION:

- The GDP and rate of exchange have no evident relationship.
- The exchange rate does not significantly impact foreign direct investment.
- The relationship between the rate of exchange and inflation rate is not statistically significant.
- The rate of interest is not statistically significantly impacted by the exchange rate.
- There is a remarkable and consistent inverse link between unemployment and the rate of exchange.

7. CONCLUSION

The fluctuating rupee-dollar exchange rate has significant implications for the Indian economy, impacting GDP, inflation, interest rates, unemployment, and FDI. A weaker rupee generally raises import costs and inflation, eroding consumer purchasing power, but can boost export competitiveness, potentially stimulating economic growth and job creation. Conversely, rising inflation may prompt the RBI to increase interest rates, which, while curbing inflation, can dampen domestic investment. Unemployment trends are affected as well, with job creation in export-oriented sectors balanced by pressure on import-reliant industries. FDI can be influenced by currency stability, with a stronger rupee attracting investors, whereas a weaker rupee might deter them due to increased costs and perceived instability. Effective policy management is essential to balance these effects and ensure economic stability and growth.

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