



Analysis of Exchange Rate Volatility in India

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ABSTRACT

Exchange rate volatility is an important macroeconomic issue that influences international trade, investment, inflation, financial stability, and sustainable economic growth. The present study examines the volatility and movement of the Indian Rupee against selected major foreign currencies during 2025 and assesses its implications for economic stability and sustainable development in India. The study focuses on the US Dollar, Euro, Chinese Yuan, Japanese Yen, and UAE Dirham, considering their importance in India's international trade and financial transactions. A descriptive and analytical research design was adopted using secondary data comprising daily exchange rate observations for the period from January to December 2025. The data were analyzed using descriptive statistical measures, including mean, minimum, maximum, standard deviation, variance, skewness, and kurtosis. Case processing and normality tests were also conducted to assess the completeness and distributional characteristics of the exchange rate data.

The findings indicate an overall upward movement in most selected exchange rates against the Indian Rupee during the study period, reflecting depreciation of the Rupee. The extent of volatility varied across currencies and months. The US Dollar and Euro exhibited comparatively higher fluctuations, while the Chinese Yuan and Japanese Yen showed relatively lower or moderate volatility. The UAE Dirham recorded moderate fluctuations with an overall upward trend. Variations in skewness and kurtosis indicate asymmetric distributions and occasional unusual movements. The Kolmogorov-Smirnov and Shapiro-Wilk tests confirmed that the exchange rate series were not normally distributed, indicating irregular patterns of currency movements. The study highlights the importance of effective exchange rate monitoring, currency-risk management, hedging practices, adequate foreign exchange reserves, and sound macroeconomic policies. Strengthening these measures can help reduce the adverse effects of exchange rate volatility and contribute to greater economic stability and sustainable economic growth in India.

Keywords: Exchange Rate Volatility, Indian Rupee, Foreign Exchange Market, Currency Risk, Sustainable Economic Growth

INTRODUCTION

Exchange rate volatility refers to fluctuations in the value of one currency relative to another and plays an important role in a country's economic development. In India, movements in the value of the Indian Rupee against major currencies affect exports, imports, inflation, investment, trade balance, and capital flows. While currency depreciation may improve export competitiveness, excessive volatility creates uncertainty for businesses and investors and may negatively affect economic stability and sustainable growth. The Reserve Bank of India plays an important role in managing excessive fluctuations through monetary policies and foreign exchange interventions.

India's exchange rate system has evolved from a fixed and controlled regime after independence to a more flexible, market-determined system following the economic reforms of the early 1990s. At present, India follows a managed floating exchange rate system, allowing market forces to determine currency values while enabling intervention to reduce excessive volatility.



Several factors influence exchange rate volatility, including inflation, interest rates, economic growth, political stability, balance of payments, foreign exchange reserves, speculation in the forex market, global economic conditions, government policies, and capital flows. Changes in these factors can cause currency appreciation or depreciation. Therefore, maintaining relative exchange rate stability is essential for promoting investor confidence, international trade, economic stability, and sustainable economic growth in India.

REVIEW OF LITERATURE

Gumma (2024), in “Impact of Exchange Rate Volatility on India's International Trade & Economic Growth,” analysed the relationship between exchange rate volatility, exports, imports, and GDP using secondary data for 2011–2023. Descriptive and trend analyses indicated that exchange rate volatility adversely affected exports and economic growth, while imports showed greater short-term sensitivity. The study concluded that appropriate exchange rate stabilization measures could enhance export competitiveness and contribute to sustainable economic development.

Ullah, Grima, Abdul Kamal, and Sood (2025) examined exchange rate forecasting and market dynamics in India using daily exchange rate data from 2019–2024. Wavelet coherence and quantile causality techniques were employed to analyse the relationship between exchange rate movements and COVID-19 lockdown measures. The findings revealed significant time-frequency relationships between policy restrictions and exchange rate fluctuations, indicating that policy responses can influence currency-market volatility.

Agrawal, Kumar, Bajpai, Mishra, Kumar, and Rana (2025) investigated volatility connectedness among exchange rates, stock markets, gold, oil, and natural gas in India. Using multivariate GARCH models and connectedness indices, the study found that exchange rate volatility was closely connected with other financial-market risks. The findings highlighted the integrated nature of financial-market volatility and the need for comprehensive macroeconomic policies addressing currency and asset-price risks simultaneously.

Mohan, Mathew, and Daniel (2025) examined the dynamic relationship between exchange rates and stock returns in India and China using quarterly data from 2015–2024. Cointegration and VECM techniques revealed significant relationships between currency movements and equity-market performance. The study indicated that rupee depreciation could weaken stock-market performance and investor confidence, thereby affecting capital allocation and economic growth prospects.

Chakraborty, Goswami, Roy, and Karmakar (2025) examined exchange rate dynamics and spillovers among BRICS economies using monthly data from 2005–2024. VAR-based models and spillover indices demonstrated significant cross-country transmission of currency shocks. The Indian rupee was found to be influenced by broader BRICS currency movements, suggesting that external currency interdependencies can create additional pressures on India's macroeconomic stability.

Kolape (2025) in the study titled “Exchange Rate Volatility and India’s Export Competitiveness” analysed the impact of exchange rate volatility on export performance in major sectors of India. Johansen cointegration techniques and rolling standard deviation indicated that increased exchange rate volatility was harmful to exports, particularly for engineering goods and textiles. The study found that stabilization of the currency is important in the maintenance of export competitiveness and the support of export-led growth.

Arya, Ayushman, and Chauhan (2025) examined exchange rate volatility, India's export-import performance, and the role of RBI interventions using monthly data from 2007–2024. The study employed rolling standard deviation, ADF testing, and VAR modelling. The findings suggested that India's dependence on relatively inelastic imports, particularly crude oil, electronics, and capital goods, reduced the responsiveness of trade flows to exchange rate changes. The study therefore concluded that sustainable growth requires not only effective currency management but also domestic manufacturing, export diversification, and improved access to hedging instruments.

Kumar (2025), in “Macroeconomic Determinants of Price Dynamics in the Indian Stock Market,” examined the relationships among exchange rates, inflation, money supply, interest rates, and stock-market performance.



Using monthly data from April 2005 to April 2024, the study employed Johansen cointegration, VECM, impulse response functions, and forecast error variance decomposition. The findings established significant long-run relationships among exchange rates and macroeconomic variables and demonstrated that exchange rate shocks influence stock-market volatility and inflation expectations. The study emphasized exchange rate stability as an important condition for investor confidence and macroeconomic stability.

Eusebius (2025) investigated the relationship between exchange rates, oil prices, GDP, and inflation using annual data from 1987–2023 and VECM techniques. The findings confirmed long-run cointegrating relationships among the variables, indicating that exchange rate movements are closely connected with inflation and economic growth. The study concluded that exchange rate considerations should form an integral part of macroeconomic policy formulation.

Goel (2025) compared exchange rate volatility in India and China and examined its implications for bilateral trade and economic stability using monthly data from 2010–2024. The study found substantially greater volatility in the Indian rupee than in the Chinese yuan, particularly during major global shocks. Higher volatility was associated with reduced export competitiveness, increased import costs, and a widening bilateral trade deficit with China. The study highlighted the importance of exchange rate stability in supporting trade and long-term growth.

Singh, Sharma, Singh, Kumar, and Kumar (2025) investigated asymmetric volatility connectedness among emerging foreign exchange markets using a TVP-VAR framework. The findings revealed significant and time-varying transmission of currency volatility, with the Indian rupee responding differently to international shocks and policy changes. The study emphasized the importance of understanding global volatility transmission for strengthening India's macroeconomic resilience.

Although several studies have examined the relationship between exchange rate volatility and India's trade, financial markets, inflation, firm performance, and economic growth, the existing literature remains fragmented across individual economic variables and specific crisis periods. Recent evidence confirms that exchange rate volatility can adversely affect economic growth and trade, but the magnitude and direction of these effects vary across studies and methodologies. There is therefore a need for a comprehensive and updated empirical assessment of the relationship between exchange rate volatility and sustainable economic growth in India that considers the combined influence of major macroeconomic variables rather than examining individual transmission channels in isolation. In particular, limited studies have examined the post-COVID period along with other external shocks within a unified framework. The present study seeks to address this gap by analysing the dynamic relationship between exchange rate volatility and sustainable economic growth in India and providing contemporary evidence to support appropriate macroeconomic and exchange rate policy formulation.

Objectives of The Study

The present study aims to examine the impact of exchange rate volatility on sustainable economic growth in India by analysing the extent to which fluctuations in the value of the Indian Rupee influence the country's overall economic performance. The study seeks to assess the relationship between exchange rate volatility and key indicators of sustainable economic growth, with particular emphasis on macroeconomic stability, international trade, investment, and economic performance. It also aims to compare the trends and movements of the Indian Rupee against major international currencies, such as the US Dollar, Euro, British Pound, UAE Dirham, and Japanese Yen, in order to understand the relative volatility and stability of the Indian currency in the international foreign exchange market. Through this comparative analysis, the study intends to identify major patterns in exchange rate movements and evaluate their implications for India's sustainable economic development.

METHODOLOGY OF STUDY

The present study adopts a descriptive and analytical research design to examine the trends, fluctuations, and volatility of the Indian Rupee against selected major foreign currencies and to assess their implications for



economic stability and sustainable economic growth in India. The study covers a period of one year, from 1 January 2025 to 31 December 2025, using monthly exchange rate observations for the twelve-month period. A sample of five major foreign currencies, namely US Dollar (USD), Euro (EUR), Chinese Yuan (CNY), Japanese Yen (JPY), and UAE Dirham (AED), has been selected based on their significance in India's international trade, investment, and financial transactions. The study relies entirely on secondary data, with daily exchange rate data collected from reliable sources such as the Reserve Bank of India (RBI) and recognized financial databases and online sources. The daily observations are organized into monthly data for systematic analysis. The collected data are analysed using mean, standard deviation, percentage change, coefficient of variation, trend analysis, and comparative analysis to measure the extent of exchange rate fluctuations and identify periods of relatively high and low volatility. The study focuses on understanding the pattern of exchange rate movements and their potential implications for international trade, investment, inflation, macroeconomic stability, and sustainable economic growth in India.

Tools Used For Analysis

The study employs descriptive statistical tools to analyse the characteristics and volatility of exchange rate data. Measures such as mean, minimum, maximum, standard deviation, variance, skewness, and kurtosis are used to examine the central tendency, dispersion, and distribution of the data. Standard deviation and variance measure the extent of fluctuations, with higher values indicating greater exchange rate volatility. Skewness is used to identify the asymmetry and direction of the distribution, while kurtosis indicates the degree of peakedness and the presence of extreme observations. Together, these statistical measures provide a comprehensive understanding of the stability, variability, distribution pattern, and volatility of exchange rates during the study period.

There are some limitations to the study which should be taken into account when interpreting the results. The analysis is limited to selected currencies and only to one year period 2025 which limits the scope for long term assessment. The study is not elaborated upon external factors such as political events, economic conditions, and other market related events, which may affect currency movements and volatility. The future study may consider global political and economic events which affects the exchange rates.

Analysis of Exchange Rate Volatility in India

Table 1 - Descriptive Statistics of Daily Changes in the Value of Rupee (Month- Wise) USD/INR

Months	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
January	31	85.5589	86.6532	86.2487	0.34199	0.117	-0.483	0.421	-1.139	0.821
February	28	86.4701	87.7892	87.0042	0.40606	0.165	0.662	0.441	-0.833	0.858
March	31	85.4358	87.4715	86.5501	0.71091	0.505	-0.376	0.421	-1.525	0.821
April	30	84.5484	86.4572	85.5768	0.41095	0.169	0.158	0.427	0.362	0.833
May	31	84.2197	86.0197	85.2348	0.42349	0.179	-0.468	0.421	-0.075	0.821
June	30	85.3683	86.7399	85.952	0.40209	0.162	0.56	0.427	-0.802	0.833
July	31	85.3983	87.663	86.1548	0.53214	0.283	1.377	0.421	1.829	0.821
August	31	87.0165	88.1746	87.5488	0.2997	0.09	0.435	0.421	0.061	0.821
September	30	87.8832	88.84	88.2945	0.29415	0.087	0.701	0.427	-0.859	0.833
October	31	87.7417	88.8656	88.366	0.40947	0.168	-0.298	0.421	-1.749	0.821
November	30	88.4676	89.6415	88.9023	0.36949	0.137	0.892	0.427	-0.636	0.833



December	31	89.4761	90.952	90.0161	0.37665	0.142	0.853	0.421	0.09	0.821
Valid N (list wise)	28									

Source: Secondary data

The Table 1 indicates that the USD/INR exchange rate showed an overall upward movement during 2025, suggesting depreciation of the Indian Rupee against the US Dollar. Volatility was relatively high in March and July, as reflected by higher standard deviation values, while August and September recorded comparatively lower volatility. The varying positive and negative skewness values indicate that the distribution of exchange rate movements was asymmetric. The kurtosis values also varied considerably across months, suggesting the presence of irregular movements and occasional extreme observations. Overall, the USD/INR exchange rate exhibited noticeable volatility and non-normal distribution during the study period.

Table 2 - Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
USD vs INR	365	100.00%	0	0.00%	365	100.00%

The Table 2 shows that all 365 observations were valid, accounting for 100% of the dataset, with no missing observations. This confirms that the USD/INR analysis was conducted using a complete daily dataset for the study period.

Table 4.3 - Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
USD vs INR	0.098	365	0	0.96	365	0
^a . Lilliefors Significance Correction						

The Kolmogorov-Smirnov and Shapiro-Wilk tests both recorded significance values of 0.000, which are below the 0.05 level. Therefore, the null hypothesis of normal distribution is rejected. This indicates that the USD/INR exchange rate data do not follow a normal distribution and exhibit irregular exchange rate movements.

Table 4 - Descriptive Statistics of Daily Changes in the Value of Rupee (Month- Wise) EUR/INR

Months	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
January	31	88.0918	90.5515	89.2857	0.78249	0.612	0.205	0.421	-1.473	0.821
February	28	88.7645	91.6256	90.5971	0.55628	0.309	-1.335	0.441	3.559	0.858
March	31	90.7783	95.1759	93.5181	1.22743	1.507	-0.546	0.421	-0.644	0.821



April	30	92.4306	98.1077	96.1766	1.67336	2.8	-0.934	0.427	-0.584	0.833
May	31	94.2283	97.0975	96.1342	0.70045	0.491	-0.418	0.421	0.057	0.821
June	30	97.1383	101.018	99.0991	1.05	1.103	-0.29	0.427	-1.161	0.833
July	31	99.7827	101.7	100.672	0.5902	0.348	0.426	0.421	-1.047	0.821
August	31	101.019	103.071	102.05	0.54741	0.3	-0.164	0.421	-0.183	0.821
September	30	102.421	104.92	103.595	0.52079	0.271	0.063	0.427	0.798	0.833
October	31	101.894	104.199	102.902	0.69014	0.476	0.537	0.421	-0.714	0.821
November	30	101.81	103.684	102.812	0.52824	0.279	0.001	0.427	-0.91	0.833
December	31	104.024	106.864	105.464	0.70901	0.503	0.059	0.421	-0.768	0.821
Valid N (list wise)	17									

Source: Secondary Data

The Table 4 reveals a clear upward trend in the EUR/INR exchange rate during the year, indicating depreciation of the Indian Rupee against the Euro. Volatility was highest during April and March, whereas August and September showed comparatively lower fluctuations. The positive and negative skewness values demonstrate that the distribution changed from right-tailed to left-tailed across different months. The kurtosis values, particularly the higher value in February, indicate the possibility of extreme movements during certain periods. Overall, EUR/INR experienced considerable volatility and irregular distribution during 2025.

Table 5 - Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Euro vs INR	365	100.00%	0	0.00%	365	100.00%

The Table 5 indicates that all 365 daily observations were valid, representing 100% of the total dataset, with no missing values. Hence, the EUR/INR analysis is based on a complete set of observations.

Table 6 - Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Euro vs INR	0.135	365	0	0.923	365	0
^a . Lilliefors Significance Correction						

The Kolmogorov-Smirnov and Shapiro-Wilk tests produced significance values of 0.000, which are less than 0.05. Thus, the null hypothesis of normality is rejected. The EUR/INR exchange rate data are therefore not normally distributed, indicating irregularity and volatility in exchange rate movements.



Table 7 - Descriptive Statistics of Daily Changes in the Value of Rupee (Month- Wise) CNY/INR

Months	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
January	31	11.7007	12.0839	11.8241	0.10697	0.011	1.069	0.421	0.561	0.821
February	28	11.8676	12.1214	11.9765	0.06583	0.004	0.194	0.441	-0.654	0.858
March	31	11.7764	12.0627	11.937	0.10401	0.011	-0.542	0.421	-1.442	0.821
April	30	11.5917	11.8049	11.7256	0.0488	0.002	-0.431	0.427	0.462	0.833
May	31	11.5451	11.9366	11.8008	0.10979	0.012	-1.284	0.421	0.271	0.821
June	30	11.8575	12.0661	11.9687	0.05701	0.003	0.208	0.427	-0.667	0.833
July	31	11.9191	12.2157	12.0129	0.06982	0.005	1.182	0.421	1.052	0.821
August	31	12.0867	12.3652	12.2029	0.07038	0.005	0.777	0.421	1.103	0.821
September	30	12.3255	12.4868	12.3924	0.04242	0.002	0.577	0.427	-0.277	0.833
October	31	12.312	12.4745	12.4096	0.0605	0.004	-0.422	0.421	-1.68	0.821
November	30	12.426	12.6287	12.5104	0.07309	0.005	0.652	0.427	-1.319	0.833
December	31	12.6719	12.9152	12.7813	0.06347	0.004	0.217	0.421	-1.118	0.821
Valid N (list wise)	28									

Source: Secondary Data

The Table 7 shows a gradual increase in the CNY/INR exchange rate over the study period, indicating depreciation of the Indian Rupee against the Chinese Yuan. The standard deviation values are relatively low compared with USD/INR and EUR/INR, indicating comparatively lower volatility. January and May recorded relatively higher fluctuations, while April and September showed greater stability. The changing skewness values indicate variations in the direction of the distribution, while the kurtosis values suggest occasional extreme observations. Overall, CNY/INR displayed a relatively stable pattern with moderate volatility.

Table 8 - Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
CYN vs INR	365	100.00%	0	0.00%	365	100.00%

The Table 8 shows that 365 observations, representing 100% of the dataset, were valid, with no missing observations. This confirms that the CNY/INR analysis is based on a complete daily dataset.



Table 9 - Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CYN vs INR	0.131	365	0	0.946	365	0
^a . Lilliefors Significance Correction						

Both the Kolmogorov-Smirnov and Shapiro-Wilk tests reported significance values of 0.000, below the 0.05 significance level. Hence, the null hypothesis of normality is rejected. The CNY/INR data are not normally distributed and show irregular exchange rate movements.

Table 10 - Descriptive Statistics of Daily Changes in the Value of Rupee (Month- Wise) JPY/INR

Months	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
January	31	0.5425	0.5618	0.5508	0.0057	0	0.013	0.421	-1.268	0.821
February	28	0.5575	0.5859	0.57368	0.00803	0	-0.563	0.441	-0.631	0.858
March	31	0.5675	0.5948	0.58037	0.00762	0	-0.177	0.421	-1.083	0.821
April	30	0.5713	0.605	0.5938	0.00839	0	-1.08	0.427	0.446	0.833
May	31	0.5724	0.5978	0.58901	0.00585	0	-0.756	0.421	0.985	0.821
June	30	0.591	0.6018	0.59438	0.00284	0	0.756	0.427	-0.23	0.833
July	31	0.5775	0.5971	0.58587	0.00524	0	0.52	0.421	-0.33	0.821
August	31	0.5885	0.5997	0.59399	0.00271	0	0.394	0.421	0.32	0.821
September	30	0.5927	0.6016	0.59667	0.00245	0	-0.122	0.427	-0.725	0.833
October	31	0.5738	0.6032	0.58434	0.00851	0	1.122	0.421	0.562	0.821
November	30	0.5636	0.5796	0.57309	0.00367	0	-0.944	0.427	1.471	0.833
December	31	0.5678	0.5876	0.5769	0.00479	0	-0.059	0.421	-0.053	0.821
Valid N (list wise)	28									

Source: Secondary Data



The Table 10 indicates that the JPY/INR exchange rate experienced gradual changes throughout the year, with relatively small standard deviation values. Volatility was comparatively higher in February, April, and October, while June, August, and September showed greater stability. The skewness values varied between positive and negative across the months, indicating an asymmetric distribution. The kurtosis results also show some deviation from normality, suggesting occasional unusual movements. Overall, JPY/INR recorded relatively low to moderate volatility compared with the other currencies examined.

Table 11 - Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
JPY vs INR	365	100.00%	0	0.00%	365	100.00%

The Table 11 confirms that all 365 observations were valid and that there were no missing observations. Thus, the JPY/INR analysis was conducted using a complete dataset covering the study period.

Table 4.12 - Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
JPY vs INR	0.087	365	0	0.926	365	0
^a . Lilliefors Significance Correction						

The significance values for both the Kolmogorov-Smirnov and Shapiro-Wilk tests are 0.000, which is below 0.05. Therefore, the null hypothesis of normality is rejected. The JPY/INR exchange rate data are not normally distributed and demonstrate irregular exchange rate movements.

Table 13 - Descriptive Statistics of Daily Changes in the Value of Rupee (Month- Wise) AED/INR

Months	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
January	31	23.3126	23.6044	23.4893	0.09361	0.009	-0.502	0.421	-1.174	0.821
February	28	23.5417	23.9019	23.6941	0.11321	0.013	0.647	0.441	-0.885	0.858
March	31	23.2797	23.825	23.5698	0.19493	0.038	-0.383	0.421	-1.517	0.821
April	30	23.0371	23.5576	23.3052	0.11469	0.013	0.275	0.427	0.089	0.833
May	31	22.9486	23.4387	23.2107	0.11558	0.013	-0.406	0.421	-0.177	0.821
June	30	23.2436	23.6192	23.408	0.10749	0.012	0.564	0.427	-0.789	0.833
July	31	23.2699	23.8865	23.4677	0.14541	0.021	1.429	0.421	2.033	0.821
August	31	23.6946	24.0095	23.842	0.08237	0.007	0.37	0.421	-0.179	0.821
September	30	23.9377	24.207	24.0484	0.08299	0.007	0.731	0.427	-0.821	0.833



October	31	23.891	24.1976	24.0667	0.11046	0.012	-0.321	0.421	-1.678	0.821
November	30	24.0889	24.4245	24.2134	0.099	0.01	0.895	0.427	-0.57	0.833
December	31	24.3631	24.7834	24.5184	0.10496	0.011	0.871	0.421	0.222	0.821
Valid N (list wise)	28									

Source: Secondary Data

The Table 13 indicates an overall upward movement in the AED/INR exchange rate during 2025, reflecting depreciation of the Indian Rupee against the UAE Dirham. Volatility was highest in March, while August and September recorded comparatively lower standard deviations and greater stability. The skewness values alternate between positive and negative, indicating an asymmetric distribution of exchange rate movements. The kurtosis values also vary, with July showing relatively higher kurtosis and the possibility of extreme observations. Overall, AED/INR displayed a gradual upward trend with moderate volatility and non-normal distribution.

Table 14 - Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
AED vs INR	365	100.0%	0	0.0%	365	100.0%

The Table 14 shows that all 365 observations were valid, representing 100% of the total observations, with no missing data. Therefore, the AED/INR analysis is based on a complete daily dataset.

Table 15 - Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
AED vs INR	.096	365	.000	.960	365	.000
^a . Lilliefors Significance Correction						

The Kolmogorov-Smirnov and Shapiro-Wilk tests both reported significance values of 0.000, which are below the 0.05 level. Therefore, the null hypothesis of normality is rejected. The AED/INR exchange rate data are not normally distributed and exhibit irregular exchange rate movements.

Overall, the tables demonstrate that the selected currency exchange rates generally moved upward against the Indian Rupee during 2025, indicating depreciation of the Rupee. USD/INR and EUR/INR showed comparatively greater volatility, while CNY/INR and JPY/INR exhibited relatively lower volatility. The AED/INR series displayed moderate fluctuations. The normality tests consistently indicate that the exchange rate data are not normally distributed, supporting the presence of irregular and volatile exchange rate movements during the study period.

FINDINGS OF THE STUDY

- USD/INR: The Indian Rupee showed a general depreciation against the US Dollar during 2025, with the mean exchange rate increasing over the year. Volatility was relatively high in March and July, while August and September recorded comparatively lower volatility.



- EUR/INR: The Euro exhibited a clear upward movement against the Indian Rupee, indicating depreciation of the Rupee. The highest volatility was observed in April and March, whereas August and September showed comparatively greater stability.
- CNY/INR: The Chinese Yuan showed a gradual increase against the Rupee during the study period. Compared with USD and EUR, the exchange rate exhibited relatively moderate volatility, with higher fluctuations in January and May and lower volatility in April and September.
- JPY/INR: The Japanese Yen exhibited comparatively low volatility throughout the study period. Higher fluctuations were observed in February, April and October, while June, August and September were relatively stable.
- AED/INR: The UAE Dirham showed an overall increasing trend against the Indian Rupee, indicating depreciation of the Rupee. Volatility was relatively higher in March and July, while August and September recorded lower fluctuations.
- The Skewness values varied across months and currencies, indicating that exchange rate movements were not perfectly symmetrical and differed between right- and left-tailed distributions.
- The kurtosis values varied considerably across the months, indicating the presence of irregular movements and occasional extreme fluctuations in exchange rates.
- The Kolmogorov-Smirnov and Shapiro-Wilk tests for USD/INR, EUR/INR, CNY/INR, JPY/INR and AED/INR produced significance values below 0.05. Therefore, the null hypothesis of normality was rejected, confirming that the exchange rate data were not normally distributed.
- Each currency pair contained 365 valid observations with no missing values, providing a complete basis for the statistical analysis.
- Among the selected currencies, the results indicate different levels of exchange rate volatility. USD and EUR showed comparatively greater fluctuations, while JPY and CNY generally displayed lower or moderate volatility during the study period.

Suggestions of The Study

- The Reserve Bank of India (RBI) should continue effective exchange rate monitoring and intervention measures whenever excessive volatility threatens economic and financial stability.
- Exporters and importers should adopt suitable currency hedging techniques, such as forward contracts and other risk-management instruments, to reduce the impact of exchange rate fluctuations.
- Businesses engaged in international trade should regularly monitor global economic developments, interest-rate changes, inflation and currency movements for better financial planning.
- Investors should consider exchange rate risks while making international investment and portfolio decisions.
- Policymakers should strengthen foreign exchange reserves and maintain adequate liquidity to manage periods of excessive currency volatility.
- Greater emphasis should be placed on diversifying India's export and import markets to reduce dependence on movements in any single foreign currency.
- Financial institutions should provide greater awareness and guidance to small and medium-sized enterprises regarding foreign exchange risk management.
- Continuous monitoring of exchange rate volatility through statistical and econometric techniques should be encouraged to support timely policy decisions.
- Long-term policies aimed at controlling inflation, strengthening economic fundamentals and promoting sustainable economic growth should be given priority.

CONCLUSION

The study concludes that the Indian Rupee experienced noticeable fluctuations against the selected major foreign currencies during 2025, with an overall tendency towards depreciation against the USD, EUR, CNY and AED, while the JPY/INR rate remained comparatively stable. The analysis shows that exchange rate volatility differed across currencies and months, with certain periods experiencing substantially higher fluctuations. The non-normal distribution identified through Skewness, kurtosis and normality tests further indicates that exchange rate movements were irregular and influenced by changing economic and financial



conditions. The findings highlight the importance of effective foreign exchange risk management for businesses, investors and policymakers. Maintaining macroeconomic stability, strengthening foreign exchange management, promoting appropriate hedging practices and ensuring timely policy intervention can help reduce the adverse effects of exchange rate volatility and support sustainable economic growth in India.

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