Fundamental Analysis of the Indian Foreign Exchange Market

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Abstract

Purpose : This study assessed the feasibility of utilizing fundamental analysis to predict foreign exchange rates, focusing on the Nominal Effective Exchange Rate (NEER) of INR and its relationship with various macroeconomic variables in India.

Design/Methodology/Approach : The research employed secondary data, examining quarterly and annual data spanning fiscal years 2011–2012 to 2020–2021. Analytical tools such as covariance, correlation, unit root tests, and Granger causality tests were applied to assess the impact of selected macroeconomic factors on NEER.

Findings : Covariance and correlation analyses revealed a limited association between NEER and the sampled macroeconomic factors. Granger causality experiments, notably, disproved the traditional wisdom regarding the predictive potential of macroeconomic factors by showing that none of them significantly affected NEER swings.

Practical Implications : For professionals in the sector, especially managers and marketers involved in the Indian currency market, this study has significant ramifications. The most important realization was a cautionary tale against placing undue reliance on conventional fundamental analysis to forecast exchange rates. The results highlighted the need for a more dynamic and flexible strategy that takes into account real-time data and acknowledges the limitations of traditional analysis.

Originality/Value : This study, which breaks with earlier studies, was the first to assess how well conventional fundamental analysis worked for predicting changes in foreign currency. The study offered a novel viewpoint on the subject by questioning the perceived forecasting ability of traditional indicators, which prompted a reassessment of the tactics used by market players in the Indian currency market.

Keywords : **foreign exchange market, fundamental analysis, exchange rate, NEER, macro-economic variables**

JEL Classification Codes : F31, G15, G32, E44

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The currency market, which is currently the largest financial market in the world, is a decentralized worldwide market. It boasted a daily turnover of almost $6.6 trillion in April 2019, according to the 2019 Triennial Central Bank Survey of FX and OTC derivatives markets. In significant monetary transactions, the US dollar usually has a crucial role. The currency rate is a highly influential financial variable comparable to factors such as inflation rate (affecting purchasing power), interest rates, and money supply. It represents the

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relative rate or price of one currency quoted in another currency. This metric is often called the exchange rate, foreign exchange rate, forex (FX) rate, or convertibility. Regarding the performance of different industries, both domestically and globally, the exchange rate has a substantial influence on trade and capital movements.

Understanding exchange rate swings is of great importance to many people and companies in order to obtain a pricing advantage over the short and long term. Although a definitive theory that can precisely predict or foresee exchange rate movements does not yet exist, two well-known approaches to forecasting price changes are fundamental analysis and technical analysis. In order to forecast price changes, the fundamental analysis examines basic factors that either directly or indirectly affect changes in exchange rates. This method considers geopolitical events, economic indicators, and other factors that impact a currency's value. Whereas, technical analysis relies on previous price patterns to forecast future prices, utilizing charts and graphs.

The authors evaluate how important macroeconomic variables are to the fundamental study of the Indian currency market. Among the many persistent queries about the foreign exchange market are: How is it possible to forecast changes in exchange rates? What elements affect the exchange rate market? Most critically, can future exchange rates be accurately predicted by these factors?

This study endeavors to unveil the factors that shape and characterize the Indian forex landscape. Furthermore, this investigation will critically evaluate the fundamental factors influencing the Indian currency rate. By delving into key economic indicators, the study aspires to provide valuable insights into the relationship between macroeconomic factors and the Indian currency within the foreign exchange market. The goal is to contribute meaningful perspectives on how these fundamental elements impact and drive movements in the Indian forex market.

Literature Review

Abuhamad et al. (2013) introduced an event-driven business intelligence approach to respond to market status changes promptly. The process is based on using many analyses to produce trade signals as new data is received quickly. The study considers several frequencies and uses multiple methods to acquire and process data for three currencies compared to the USD and nine US macroeconomic indicators. Time-series data is modeled using artificial neural networks for both technical and fundamental indicators, and the signals from these models are integrated using a knowledge base model. Experimental results demonstrate a significant enhancement of the trading signals quality by incorporating diverse analyses in real-time. This approach represents a valuable contribution to the field by improving the timeliness and effectiveness of response to market dynamics.

Bhanumurthy (2004) conducted a study to assess the significance of macroeconomic models compared to models grounded in market microstructure theory, particularly in understanding the short-run behavior of the Indian foreign exchange market. The study aimed to investigate the relative significance of macroeconomic variables, like domestic interest rates, versus microeconomic variables, such as order flows and transaction volume, in influencing short-term fluctuations in foreign exchange rates.

Engel and West (2005) demonstrated, through analytical analysis, that within a rational expectations present value model, the behavior of the price of an asset closely resembled a random walk if the underlying fundamentals were integrated of order I(1) and the discounting factor for future fundamentals was approximately equal to one. This revelation clarified a frequently noted enigma wherein key factors such as outputs, inflation, relative money supplies, and interest rates offered restricted guidance in predicting fluctuations in exchange rates. Additionally, the outcomes of their study unveiled an interconnected association consistent with conventional models, suggesting that the forex rate does indeed contribute to forecasting these foundational variables. This result points to a relationship between exchange rates and the fundamentals that are generally consistent with asset pricing models, shedding light on the complex interactions between market dynamics and underlying economic causes.

Gona and Sahoo (2020) focused on analyzing India's currency rate dynamics, exploring the structure of its

forex market, and developing a model for the Indian rupee's exchange rate against the US dollar. Between January 1990 and April 2013, the study investigated the predictive abilities of the monetary model and its variations in the vector autoregressive and Bayesian vector autoregressive models. This research adds to a better understanding of the variables affecting the foreign exchange rates in India and assesses the performance of multiple forecasting models within distinct analytical frameworks.

Karmakar (2017) investigated the dependence structure and estimated portfolio risk using data from the Indian forex market. The study specified both marginal models for foreign exchange returns and a joint model for dependence. This analysis's findings directly affect investors and risk managers, particularly in times of significant fluctuations in the currency market. The results provide insightful information that can guide investing and risk management decision-making in the currency market.

Mačerinskienė and Balciūnas (2014) introduced key fundamental exchange rate forecasting models and delved into their strengths and limitations. Their goal was to identify the variables that could lead to forecasts being inaccurate by investigating these models. With any luck, this project will help people better understand the difficulties involved in exchange rate forecasting and provide some helpful insights into those obstacles.

Mendali and Das (2018) conducted an investigation covering the period from April 1993 to March 2013, wherein they assessed the influence of exchange rate volatility on the exports of gems, jewelry, and textiles from India. Employing the auto-regressive distributive lag (ARDL) co-integration technique, their study concluded that, in the long run, exchange rate volatility did not exert any significant impact on either gems and jewelry or textile exports. The findings suggested that the promotion of exports in these sectors may not solely rely on maintaining a stable exchange rate; other contributing factors should be explored for a comprehensive understanding. This realization underscores the complex interplay of variables impacting global commerce and advances a more sophisticated knowledge of the dynamics determining exports in these particular industries.

Molodtsova and Papell (2012) evaluated the predictive efficacy of Taylor rule models for out-of-sample exchange rate forecasting. These models involved the central bank adjusting interest rates based on inflation and either the output or unemployment gap. The assessment focused on the rate of euro/dollar, using data prior to, during, and following the financial crisis of 2008–2009. Although all Taylor rule specifications performed better than random walk forecasts from 2007:Q1 to 2008:Q2, it was noted that only the specification incorporating both estimated coefficients and the unemployment gap consistently outperformed random walk predictions from 2007:Q1 to 2012:Q1. Furthermore, the performance of the modified Taylor rule models using credit spreads or financial condition indices was better than that of the original Taylor rule models. Notably, purchasing power parity, monetary, and interest rate differential models were all outperformed by Taylor rule models in terms of prediction accuracy.

Sharma and Raju (2013) focused on analyzing the behavior of currency rates during the post-reform period, spanning from April 1, 1994 to March 31, 2012. The study specifically investigated the primary determinants of the Indian Rupee (INR) in the long run. Their discoveries indicate that the forex rate has, for the most part, maintained stability, experiencing occasional fluctuations. Economic fundamentals, including Inflation, Economic Activity, Sensex, Trade Deficit, and Rate of Interest, have emerged as noteworthy factors influencing the exchange rate. Notably, the Bombay Stock Exchange Sensex and Interest Rate proved to be the most influential variables in shaping India's exchange rate dynamics during the specified period.

Sunil et al. (2019) focused on examining the interrelationship among various macroeconomic variables, including Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Sensex, Exchange Rate in US Dollars ER (USD), Gross Domestic Product (GDP), and Balance of Payments (BOP). The study utilized quarterly data and employed various analytical methods, including trend analysis, Augmented Dickey-Fuller Test (ADF), correlation, and regression. The research revealed high correlations among SENSEX, ER (USD), and GDP. Moreover, the study delved into the impact of additional variables on these closely correlated factors. The outcomes suggested that FDI notably influenced GDP and SENSEX, the Exchange Rate (ER) against the US

Dollar, Foreign Portfolio Investment (FPI), and BOP. However, ER (USD) showed no significant influence on FDI, FPI, and BOP, while SENSEX and GDP influenced it. These findings offer valuable insights into the intricate interplays and interdependencies among macroeconomic variables within the specified context.

Tran and Dao (2020) delved into the impact of several economic variables on exchange rate movements, examining both short-term and long-term effects and assessing their positive or negative contributions to currency fluctuations. The focus of their analysis encompassed three exchange rates—the Japanese Yen, the United States Dollar, and the Euro to the Vietnamese Dong. The selected macroeconomic variables under scrutiny included economic growth, exports, imports, inflation, foreign direct investment, budget deficit, stock market index, crude oil prices, and the BOPs between Vietnam and other countries. Their research spanned 15 years, from 2003 to 2017, on a quarterly basis. This comprehensive study contributes valuable insights into the complex dynamics of exchange rates within the specified timeframe and across different economic variables.

The collection of studies provides a comprehensive exploration of exchange rate dynamics, market behavior, and forecasting models. These investigations cover diverse aspects, including economic growth in India, innovative event-driven business intelligence approaches for trading signals, the evaluation of Taylor rule models during financial crises, and analyses of specific currency market dynamics. When taken as a whole, they draw attention to the complex interactions between underlying elements and the continuous efforts to enhance models in order to make better predictions and comprehend currency markets more thoroughly. This collection of papers shines light on a number of aspects of market behavior and forecasting techniques, greatly contributing to the field's evolution in exchange rate studies.

Objective of the Study

(1) To determine whether applying basic analysis to forecast fluctuations in foreign exchange rates is a feasible strategy.

Methodology

Data and Sample

The authors used secondary data for the study collected from the official RBI website. The Nominal Effective Exchange Rate (NEER), a six-currency trade-weighted index of INR, is employed to represent the exchange rate, and certain macroeconomic variables related to India are considered fundamental factors. For this study, quarterly and annual data for the following variables were considered from the financial year 2011–2012 to 2020–2021.

- NEER index of INR (six-currency trade-weighted) to represent exchange rate.
- Wholesale Price Index to represent inflation rate.
- Bank Rate to represent monetary policy and/or interest rate.
- Balance of Payment to represent the economic position of the country.
- Nifty represents the stock market.
- Gross value added to represent overall production activities.
- Foreign Exchange Reserve to represent Central bank intervention.
- Forward Premia and Turnover in FX Market to represent market sentiment and speculation.

Analysis Tools

In this analysis, covariance and correlation tools were applied to explore the relationship between the NEER index and other variables within the selected dataset. A unit root test was conducted to evaluate the data's stationarity, and a Granger causality test was utilized to investigate the causality of macroeconomic variables on the NEER index. The statistical analyses were performed using MS Excel and EViews software.

Scope of the Study

The purpose of the study is to assess fundamental analysis's applicability to the FX market critically. It is limited to the Indian FX market and concentrates on the years 2011–2012 to 2020–2021.

Hypothesis

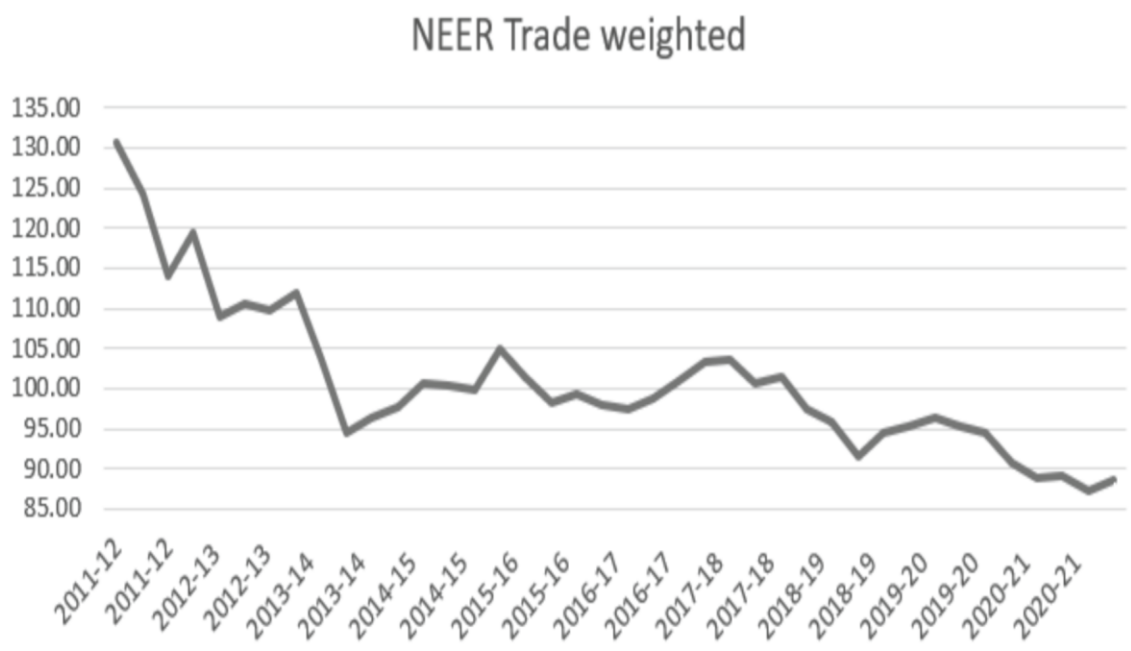
- **H_0 :** NEER has no association with the sample macroeconomic variables.

Evaluation of Fundamental Analysis of INR Exchange Rate

For this study, the INR exchange rate will be represented by the six-currency trade-weighted NEER index of INR. According to Figure 1, From 2011–2012 to 2020–2021, the NEER index of the INR shows a downward pattern. End of the third quarter of 2020–2021, the rupee had dropped to 88.54.

Let's delve into several pivotal macroeconomic variables that could wield a substantial impact on the INR. This exploration will involve quarterly and annual data from the NEER index, along with an examination of other fundamental factors.

Figure 1. ***NEER Six-Currency Trade-Weighted of INR***



Source: from Appendix Table A1.

The authors computed relative annual and quarterly data in Tables 1 and 2, respectively, to facilitate a more accessible analysis. Consequently, the percentage change of each time series data is utilized here for examination. The formula used to compute this is = $\frac{(V_1 - V_0)}{V_0}$ x 100

where V_1 = Value of a variable for the period1 of which change is calculated.
V_0 = Value of variable for the previous period of period1.

Table 1. ***Annual Data of Economic Variables (Averages of Percentage Change)***

Year	NEER Trade Weighted	Bank Rate	BOP	CNX Nifty	Foreign Exchange Reserve	Forward Premia	Gross Value Added	Turnover in the FX Market	WPI
2011–12	–2.86	19.44	–1807.10	–2.25	2.91	15.54	3.09	–5.75	0.00
2012–13	–1.49	–2.70	–145.68	3.23	1.50	–1.19	1.16	1.47	2.11
2013–14	–3.19	1.79	692.69	1.62	3.61	7.14	1.16	–1.08	1.30
2014–15	1.80	–1.39	59.99	8.39	3.95	–2.49	1.57	3.00	–0.96
2015–16	–1.67	–4.67	–191.76	–3.70	2.65	–1.35	2.12	0.79	–0.49
2016–17	1.34	–1.82	–166.67	4.28	0.32	–7.17	1.67	–0.58	1.26
2017–18	–1.48	–0.96	18.15	4.71	3.59	–2.39	1.81	5.43	0.68
2018–19	–0.45	1.04	–139.51	1.21	0.92	–0.21	1.21	0.93	0.77
2019–20	–1.22	–7.96	62.43	0.59	5.69	2.58	0.91	0.05	0.11
2020–21	–0.61	–2.15	–5.26	8.02	4.31	8.06	2.32	6.43	1.93

Table 2. ***Quarterly Data of Economic Variables in Percentage Change***

Year	Quarter	NEER Trade Weighted	Bank Rate	BOP	CNX Nifty	Foreign Exchange Reserve	Forward Premia	Gross Value Added	Turnover in the FX Market	WPI
2011–12	Q2	–4.91	0.00	–94.81	–6.62	9.73	–34.78	–2.84	0.41	0.00
2011–12	Q3	–8.30	0.00	–5270.68	–5.37	3.70	52.64	8.40	–19.89	0.00
2011–12	Q4	4.64	58.33	–55.79	5.25	–4.70	28.77	3.70	2.23	0.00
2012–13	Q1	–8.63	–5.26	–109.79	–2.13	8.42	–19.65	–3.54	0.77	5.30
2012–13	Q2	1.39	0.00	–130.89	4.86	–4.86	0.44	1.29	–1.00	2.18
2012–13	Q3	–0.66	0.00	–585.21	7.61	4.65	–2.32	6.33	–5.97	–0.46
2012–13	Q4	1.96	–5.56	243.18	2.56	–2.20	16.77	3.16	12.07	1.40
2013–14	Q1	–7.51	–2.94	–113.33	–0.86	6.41	–19.31	–1.78	3.51	1.38
2013–14	Q2	–8.83	15.15	3230.96	–1.88	1.54	50.55	–0.56	–9.32	3.81
2013–14	Q3	2.09	–7.89	–283.91	7.21	6.86	–8.16	5.52	–7.86	–0.79
2013–14	Q4	1.52	2.86	–62.96	2.02	–0.36	5.47	1.45	9.36	0.79
2014–15	Q1	2.90	0.00	52.26	13.54	3.62	–5.51	1.22	7.90	0.79
2014–15	Q2	–0.21	0.00	–37.47	9.99	2.07	–3.66	0.09	3.55	1.04
2014–15	Q3	–0.50	0.00	95.31	4.95	4.85	–11.51	3.26	–6.45	–3.69
2014–15	Q4	5.00	–5.56	129.85	5.07	5.24	10.72	1.69	7.00	–1.96

2015–16	Q1	–3.43	–2.94	–61.34	–3.52	5.69	–11.02	2.46	0.39	1.73
2015–16	Q2	–3.05	–6.06	–107.67	–1.67	2.11	–9.52	0.70	–2.80	–1.70
2015–16	Q3	1.03	0.00	–580.69	–3.01	0.77	–6.62	2.28	–11.98	–0.45
2015–16	Q4	–1.24	–9.68	–17.34	–6.60	2.04	21.74	3.01	17.54	–1.55
2016–17	Q1	–0.69	0.00	110.90	7.01	2.89	–14.55	3.03	10.07	3.71
2016–17	Q2	1.44	0.00	22.26	8.72	1.30	–4.49	–0.24	–12.78	–0.27
2016–17	Q3	2.07	–3.57	–114.69	–3.46	–0.85	–33.55	1.56	2.20	0.27
2016–17	Q4	2.54	–3.70	–685.15	4.85	–2.05	23.90	2.34	–1.83	1.34
2017–18	Q1	0.18	0.00	50.04	7.67	4.32	–5.31	1.25	2.47	–0.44
2017–18	Q2	–2.75	–3.85	–16.93	5.20	4.26	–11.23	0.29	4.29	1.95
2017–18	Q3	0.68	0.00	0.00	3.55	0.35	–5.39	2.92	7.06	0.70
2017–18	Q4	–4.02	0.00	39.47	2.44	5.43	12.38	2.76	7.89	0.52
2018–19	Q1	–1.57	4.00	–189.18	1.09	0.76	–5.95	1.04	1.28	2.41
2018–19	Q2	–4.35	3.85	–82.75	5.98	4.42	7.26	–0.65	–2.66	1.51
2018–19	Q3	3.07	0.00	136.28	–5.95	–5.22	–14.41	2.16	–2.68	–0.99
2018–19	Q4	1.05	–3.70	–422.40	3.73	3.69	12.24	2.30	7.80	0.17
2019–20	Q1	0.87	–7.69	–2.56	6.48	3.35	2.50	1.08	–5.06	1.33
2019–20	Q2	–1.04	–5.83	–62.93	–4.20	3.78	–6.87	–1.02	5.34	–0.16
2019–20	Q3	–0.69	–4.42	326.81	5.73	6.66	–12.14	1.02	–9.64	1.40
2019–20	Q4	–4.01	–13.89	–11.58	–5.65	8.97	26.83	2.57	9.57	–2.11
2020–21	Q1	–2.04	–8.60	10.69	–15.42	7.78	–23.08	–24.31	–37.97	–0.91
2020–21	Q2	0.35	0.00	55.94	17.55	4.05	8.06	18.18	39.66	3.02
2020–21	Q3	–2.35	0.00	2.03	13.76	7.09	–6.17	10.12	–4.73	2.03
2020–21	Q4	1.62	0.00	–89.69	16.17	–1.68	53.42	5.29	28.75	3.59

Analyzing how each macroeconomic component affects the value of INR, we will compare each one with the NEER index.

The relationship or association between two variables can be shown using the covariance and correlation coefficients. The degree to which two variables vary in tandem (positive covariance) or in opposition to each other (negative covariance) is indicated by covariance. Correlation, on the other hand, measures how much a change in one variable causes a corresponding change in the other. The correlation coefficient, which varies from –1 to +1, gives information about the direction and strength of the association between the variables.

Covariance is an absolute measure that tells us the direction of the relationship between two variables, which is

Table 3. ***Covariance and Correlation Results***

Statistical Tool	Data	NEER Trade Weighted	Bank Rate	BOP	CNX Nifty	Foreign Exchange Reserve	Forward Premia	Gross Value Added	Turnover in the FX Market	WPI
Covariance	Quarter	11.79	5.66	302.94	9.24	–6.90	–3.27	3.13	9.70	–1.81
	Year	2.29	–4.18	174.92	3.60	–0.53	–6.34	–0.17	1.91	–0.25
Coefficient of	Quarter	1.00	0.16	0.09	0.39	–0.54	–0.05	0.16	0.23	–0.29
Correlation	Year	1.00	–0.40	0.19	0.63	–0.22	–0.66	–0.18	0.39	–0.18

important to understand. This is not the case with correlation, which is a relative measure that provides a standardized metric ranging from –1 to +1 and exposes both the direction and intensity of the link.

We classified the elements influencing NEER by their direction and evaluated the proportion of influence based on the data from Table 3.

Table 4 presents an elaboration of the impact of fundamental elements on NEER. While Forward premia and WPI show relatively minor negative impacts in the context of quarterly data, Forex reserves have a considerable negative impact. The currency market's bank rate, Nifty, BOP, gross value added, and turnover all point to a minimally favorable influence. On the other hand, when yearly data is examined, the Bank rate, Forex reserves, Gross Value Added, and WPI show minimal negative effects. In the currency market, BOP and Turnover simultaneously exhibit a minimally favorable impact. Surprisingly, Nifty shows a strong positive impact, whereas forward premia shows a significant negative impact.

From the information presented, it seems that there is a limited association between NEER data and other macroeconomic variables in the sample. Drawing from the findings above, it can be concluded that fundamental factors have a negligible impact on NEER.

Unit Root Test

The unit root test was conducted by selecting the entire time series, and the testing process utilized the ADF test with a significance level set at 5%. The ADF test results for each time series are presented in the table below, including the full *t*-value and *p*-value.

Table 4. ***Factors and their Influence on INR NEER Index (Exchange Rate) Based on Covariance and Correlation***

Factors	Classification	Quarter results		Annual results	
		Covariance/ Correlation	Influence on NEER	Covariance/ Correlation	Influence on NEER
Bank Rate	Quantitative	Positive	Low impact	Negative	Low impact
BOP	Quantitative	Positive	Low impact	Positive	Low impact
Nifty	Quantitative	Positive	Low impact	Positive	High impact
Forex Reserve	Quantitative	Negative	High impact	Negative	Low impact
Forward Premia	Quantitative	Negative	Low impact	Negative	High impact
Gross Value Added	Quantitative	Positive	Low impact	Negative	Low impact
Turnover in the FX Market	Quantitative	Positive	Low impact	Positive	Low impact
WPI	Quantitative	Negative	Low impact	Negative	Low impact

Table 5. ***Unit Root Test Summary***

Augmented Dicky–Fuller Test

Exogeneous : None

Lag length : 0 (Fixed)

Included Observations : 38 for quarter data and 9 for year after adjustment.

Null Hypothesis	Quarter		Year	
	t-Statistic	Prob.	*t*-Statistic	Prob.
NEER exhibits a unit root.	–6.3802	0.0000	–3.4618	0.0033

Bank Rate exhibits a unit root.	–6.2714	0.0000	–6.4996	0.0002
BOP exhibits a unit root.	–6.1612	0.0000	–6.8897	0.0001
CNX Nifty exhibits a unit root.	–4.2593	0.0000	–2.4475	0.0212
Forex Reserve exhibits a unit root.	–5.0353	0.0000	–0.9530	0.2781
Forward Premia exhibits a unit root.	–8.7978	0.0000	–3.8679	0.0016
Gross Value Added exhibits a unit root.	–7.0475	0.0000	–1.2346	0.1833
Turnover in the FX Market exhibits a unit-root.	–9.4448	0.0000	–3.0249	0.0072
WPI exhibits a unit root.	–4.9850	0.0000	–1.7360	0.0785

The sample data series is level and stationary according to the ADF test in Table 5. All time series data, with the exception of Forex reserve, gross value added, and WPI of annual data, have *p*-values less than 0.05 (5% significant). Due to the rejection of the null hypothesis for the majority of the annual series and all of the quarter series, we can state that the data is stationary and lacks a unit root. Because the variance and mean of a time series remain essentially constant throughout time, this conclusion suggests that the data is not randomly distributed in practice.

Granger Causality Test

This section presents the Granger Test for causation between two variables. Robust results are obtained using this test, which is useful for examining correlations between time series over a short period. It also provides estimates to evaluate relationships within a given framework and acts as a first step toward formalizing the idea of co-integration. The Granger Causality Test can be used after the unit root test, which shows that all variables are stationary. One is the specified lag. Table 6 presents the Granger Causality results for each variable, along with the *p*-value and *F*-statistic. This test's significance level is still set at 5%.

As the *p*-values are greater than 0.05, all hypotheses are accepted. The findings indicate that the macroeconomic factors considered in this study do not Granger cause the NEER. Consequently, based on the results of this test, it is inferred that fundamental factors are not significantly useful in predicting NEER movements, suggesting that fundamental analysis is ineffective in analyzing changes in the exchange rate.

Table 6. ***Summary of Granger Causality Test***

Granger Causality Test

Sample : 1 to 39 for quarter data and 1 to 10 for year data

Lags : 1

Null Hypotheses	**Quarter**			**Year**		
	Obs.	***F*-Statistic**	**Prob.**	**Obs.**	***F*-Statistic**	**Prob.**
Bank Rate does not Granger Cause NEER.	38	2.3603	0.1335	9	0.9004	0.3793
BOP does not Granger Cause NEER.	38	1.0482	0.3129	9	2.3091	0.1794
CNX Nifty does not Granger Cause NEER.	38	0.3072	0.5829	9	0.2308	0.6480
Foreign Exchange Reserve does not Granger Cause NEER.	38	0.0958	0.7587	9	0.4579	0.5238
Forward Premia does not Granger Cause NEER.	38	0.2637	0.6108	9	0.3753	0.5626
Gross Value Added does not Granger Cause NEER.	38	0.1266	0.7241	9	0.0694	0.8010
Turnover in the FX Market does not Granger Cause NEER.	38	3.0602	0.089	9	0.1781	0.6877
WPI does not Granger Cause NEER.	38	0.4289	0.5168	9	0.1413	0.3265

Conclusion

In this study, the primary focus is on assessing the predictability of the INR value through fundamental factors, specifically macroeconomic variables. The analysis spanned from the fiscal year 2011–2012 to 2020–2021, utilizing quarterly and annual data of the NEER of INR and relevant macroeconomic indicators. The research reveals disparities in the movements of NEER and other influential variables despite sharing a common downward trend. The unit root tests indicate that all economic time series considered are essentially random, with inconsistent variance and mean over time. Furthermore, covariance and correlation analyses suggest a lack of close connection between NEER and the sampled macroeconomic factors. The Granger causality tests provide evidence that any of the examined macroeconomic variables did not significantly influence NEER. The study concludes that fundamental analysis, incorporating the examined macroeconomic variables, is ineffective in predicting exchange rate movements. This inefficacy is attributed to factors such as the immediate availability of information in the market, the market's efficiency in swiftly incorporating information into exchange rates, as well as the adeptness of market participants in utilizing available information.

Implications

For professionals in the field, this study has important ramifications, especially for managers and marketers who work in the Indian currency market. The finding that using macroeconomic variables in fundamental analysis is not useful for forecasting changes in exchange rates emphasizes the difficulties of depending only on conventional analytical methods. When using these fundamental studies as a primary source of information for currency-related choices, industry experts should exercise caution. Rather, efficient decision-making in the constantly shifting forex market may require a more dynamic and adaptive strategy that takes real-time information and market efficiency into account.

Managers might investigate alternate approaches that integrate technical breakthroughs and timely market information, given their understanding of the limitations of basic analysis. This flexible method could improve strategic decision-making and risk management in the context of the unstable currency market.

By questioning the accuracy of basic analysis in predicting changes in exchange rates, the study adds to the body of knowledge. Existing theories gain depth with the recognition that market efficiency and participant knowledge are important factors that contribute to traditional analyses being less effective. The study underscores the need for a more sophisticated comprehension of the relationship between market efficiency, information availability, and the constraints of fundamental analysis.

The theoretical implications extend to taking into consideration alternative variables, models, and methodologies for studying currency market dynamics. By questioning existing models and highlighting the impact of real-time information, the study encourages further exploration of innovative approaches to enhance the theoretical frameworks underpinning exchange rate predictions.

Limitations of the Study and Scope for Further Research

It is critical to acknowledge the limitations of the study. The study focused on a certain period of time, and changes could affect how useful fundamental analysis is in a given market. Moreover, the study's scope of macroeconomic variables was limited; a larger range of variables or an examination of data from other periods could provide a variety of insights. Future research endeavors could involve refining the fundamental analysis model by incorporating additional relevant variables, exploring alternative methodologies, or extending the temporal scope. Investigating the impact of global economic events and technological advancements on exchange rate predictability could contribute to a more comprehensive understanding of the dynamics in the Indian forex market.

Authors' Contribution

The study plan was created by Mr. Gangadhara B. Reputable research papers were found by Mr. Nemani Satish, who then used keywords to filter them and identify study ideas and codes. Overseeing the study and reviewing the analytical techniques was Dr. Bheemanagouda. With collaboration from both authors, Mr. Gangadhara B. authored the text and performed numerical computations using MS Excel and EViews software.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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Appendix

Table A1. ***Quarterly Data of Macro-Economic Variables***

Year	Quarter	NEER Trade Weighted	WPI	Bank Rate	Gross Value Added	BOP	CNX Nifty	Forward Premia	Foreign Exchange Reserve	Turnover in the FX Market
		Index	Index	%	Rupees Crore	Rupees Crore	Index	%	Rupees Crore	US Dollar Million
2011–12	Q1	130.74	100.00	6.00	1,969,132	24,333	5,601	6.67	1,388,955	3,758,868
	Q2	124.32	100.00	6.00	1,913,207	1,262	5,230	4.35	1,524,081	3,774,133
	Q3	114.00	100.00	6.00	2,073,896	–65254	4,949	6.64	1,580,470	3,023,393
	Q4	119.29	100.00	9.50	2,150,712	–28,846	5,209	8.55	1,506,130	3,090,837
2012–13	Q1	109.00	105.30	9.00	2,074,589	2,823	5,098	6.87	1,632,950	3,114,673
	Q2	110.51	107.60	9.00	2,047,909	–872	5,346	6.90	1,553,570	3,083,448
	Q3	109.78	107.10	9.00	2,177,528	4,231	5,753	6.74	1,625,760	2,899,474
	Q4	111.93	108.60	8.50	2,246,251	14,520	5,900	7.87	1,590,060	3,249,471
2013–14	Q1	103.52	110.10	8.25	2,206,230	–1,935	5,849	6.35	1,691,980	3,363,597
	Q2	94.38	114.30	9.50	2,193,897	–64,454	5,739	9.56	1,717,960	3,050,192
	Q3	96.35	113.40	8.75	2,314,941	118,539	6,153	8.78	1,835,840	2,810,527
	Q4	97.81	114.30	9.00	2,348,579	43,904	6,277	9.26	1,829,200	3,073,512
2014–15	Q1	100.65	115.20	9.00	2,377,154	66,847	7,127	8.75	1,895,490	3,316,219
	Q2	100.44	116.40	9.00	2,379,356	41,799	7,839	8.43	1,934,790	3,434,021
	Q3	99.94	112.10	9.00	2,457,010	81,638	8,227	7.46	2,028,560	3,212,668
	Q4	104.94	109.90	8.50	2,498,612	187,641	8,644	8.26	2,134,910	3,437,429
2015–16	Q1	101.34	111.80	8.25	2,560,191	72,547	8,340	7.35	2,256,340	3,450,836
	Q2	98.25	109.90	7.75	2,578,225	–5,563	8,201	6.65	2,303,900	3,354,270
	Q3	99.26	109.40	7.75	2,637,004	26,741	7,954	6.21	2,321,640	2,952,320
	Q4	98.03	107.70	7.00	2,716,448	22,104	7,429	7.56	2,369,010	3,470,061
2016–17	Q1	97.35	111.70	7.00	2,798,726	46,617	7,950	6.46	2,437,510	3,819,609
	Q2	98.75	111.40	7.00	2,791,994	56,994	8,643	6.17	2,469,290	3,331,505
	Q3	100.79	111.70	6.75	2,835,614	–8,373	8,344	4.10	2,448,280	3,404,643
	Q4	103.35	113.20	6.50	2,901,951	48,995	8,749	5.08	2,398,200	3,342,367
2017–18	Q1	103.54	112.70	6.50	2,938,107	73,512	9,420	4.81	2,501,850	3,424,914
	Q2	100.69	114.90	6.25	2,946,670	61,065	9,910	4.27	2,608,540	3,571,995
	Q3	101.37	115.70	6.25	3,032,795	61,068	10,262	4.04	2,617,690	3,824,153
	Q4	97.29	116.30	6.25	3,116,598	85,171	10,512	4.54	2,759,770	4,125,710
2018–19	Q1	95.76	119.10	6.50	3,149,109	–75,956	10,627	4.27	2,780,850	4,178,399
	Q2	91.59	120.90	6.75	3,128,794	–13,103	11,262	4.58	2,903,820	4,067,253
	Q3	94.40	119.70	6.75	3,196,347	–30,960	10,592	3.92	2,752,310	3,958,259
	Q4	95.39	119.90	6.50	3,269,953	99,814	10,987	4.40	2,853,940	4,266,856
2019–20	Q1	96.22	121.50	6.00	3,305,273	97,254	11,699	4.51	2,949,520	4,050,953
	Q2	95.22	121.30	5.65	3,271,453	36,049	11,208	4.20	3,060,999	4,267,436

	Q3	94.56	123.00	5.40	3,304,890	153,861	11,850	3.69	3,264,729	3,855,999
	Q4	90.77	120.40	4.65	3,389,855	136,042	11,181	4.68	3,557,630	4,224,827
2020–21	Q1	88.92	119.30	4.25	2,565,909	150,582	9,457	3.60	3,834,323	2,620,532
	Q2	89.23	122.90	4.25	3,032,285	234,814	11,117	3.89	3,989,568	3,659,942
	Q3	87.13	125.40	4.25	3,339,272	239,583	12,647	3.65	4,272,332	3,487,007
	Q4	88.54	129.90	4.25	3,515,963	24,702	14,692	5.60	4,200,668	4,489,610

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