

**A STUDY ON FORCASTING EXCHANGE RATE WITH SPECIAL REFERENCE TO US DOLLARS**

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**ABSTRACT**

Accurate exchange rate forecasting is a key tool for businesses, investors, and governments because exchange rates are crucial to global trade and financial markets. The predicting of exchange rates is the main topic of this abstract, with a special emphasis on the US dollar, which dominates the world's currency markets. The paper identifies the important variables that affect the US dollar exchange rate, such as monetary policy choices, political developments, and trends in the world markets. Researchers and practitioners can learn more about the dynamics of the US dollar and forecast its future movements by analysing historical data and using the appropriate modelling approaches. The abstract also highlights the difficulties in predicting exchange rates, including the lack of data, the choice of model, and the volatility of the market itself. In order to increase the dependability of exchange rate projections, the research highlights the significance of precise data gathering, strong model validation, and risk management measures. With a special emphasis on the US dollar, this abstract concludes by giving a general summary of the significance of exchange rate forecasting. It emphasizes the methods used for predicting exchange rates, the deciding variables, and the difficulties present. The results of this study add to our understanding of exchange rate fluctuations and provide useful information for economic decision-making in a variety of industries.

Keywords: US dollar, Currency forecasting, Exchange rate prediction, Econometric models and purchasing power parity (ppp).

**I. INTRODUCTION**

Exchange rates act as a key metric of the health and stability of the economy, and the global foreign exchange market is essential to international trade and finance. Among the various currencies, the US dollar stands as the most influential, widely adopted, and extensively traded currency worldwide. Its exchange rate fluctuations have far-reaching implications, impacting economies, businesses, and individuals across the globe. Consequently, accurate and trustworthy forecasting of currency rates, particularly concerning the US dollar, assumes essential importance for decision-makers in finance, commerce, and investment. The US dollar dominates other currencies and is the one that is used the most frequently and is traded the most. Its exchange rate swings have far-reaching repercussions, impacting economies, organizations and individuals across the globe. For those making decisions in finance, trade, and investment, accurate and trustworthy forecasting of exchange rates, particularly in relation to the US dollar, assumes paramount importance.

The forecasting of currency rates is a complex task, influenced by a myriad of factors, including macroeconomic indicators, geopolitical events, monetary policy actions, and market emotion. Over the years, researchers, economists, and financial institutions have devoted significant efforts to develop sophisticated models and methodologies to predict currency movements. These activities aim to better risk management tactics, improve investment decisions, and optimize the allocation of resources in an increasingly linked and volatile global marketplace. Over the years, researchers, economists, and financial institutions have devoted significant efforts to develop sophisticated models and methodologies to predict currency movements. These activities aim to better risk management tactics, improve investment decisions, and optimize the allocation of resources in an increasingly linked and volatile global marketplace.

This study's goal is to advance the body of knowledge by looking into the prediction of exchange rates, with a particular emphasis on the US dollar. We aim to develop a comprehensive framework for forecasting the future movement of the US dollar against major currencies by utilising advanced quantitative techniques, investigating various macroeconomic variables, and taking into account market dynamics.

The foreign exchange market is crucial to the global economy because it makes it easier for people to trade and invest abroad by determining how much different currencies are worth. The United States dollar (USD) stands out among the other major currencies because it serves as the primary reserve currency for the entire globe and is frequently used in trade, investments, and as a benchmark in the financial markets. As a result, precisely estimating the exchange rate of the US dollar becomes vital for businesses, investors, politicians, and individuals alike.

Because there are so many variables that can affect how currencies move, such as economic indicators, geopolitical developments, market attitudes, and monetary policies, predicting exchange rates is a difficult undertaking. Predicting the future movements of the US dollar is quite difficult due to the foreign exchange market's extreme volatility and numerous uncertainty.

The purpose of this study is to investigate and evaluate various forecasting processes and procedures, with a specific emphasis on the US dollar. By studying historical data, evaluating existing models, and identifying significant factors that affect the US dollar's exchange rate, this research attempts to add to the field of currency forecasting and give valuable insights for decision-makers.

Identify significant elements impacting the US dollar exchange rate. The study will pinpoint the most important variables influencing the value of the US dollar by looking at economic indicators, geopolitical developments, and market dynamics. The construction of an accurate forecasting model will be supported by this analysis.

Build a solid forecasting model that is specifically designed for anticipating the movements of the US dollar by building on the components that have been discovered and applying appropriate approaches. In order to produce trustworthy short- and long-term forecasts, the model will be built.

Analyze the forecasting accuracy. Using historical data, a detailed evaluation of the created forecasting model's performance will be carried out. The accuracy and dependability of the model will be assessed by comparing the forecasts with the actual changes in the US dollar exchange rate.

### **1.1 STATEMENT OF PROBLEM**

The difficulty of correctly predicting the US dollar's exchange rate is the issue this study attempts to solve. Since the US dollar is a major medium of exchange for worldwide trade and investment, changes in its exchange rate can have a big effect on the world economy. Predicting the scope and size of these oscillations, however, is a difficult and complex undertaking.

Existing forecasting models might not be accurate because they might not account for all the variables affecting the value of the US dollar. Forecasting is further complicated by rapid and unexpected variations in currency rates that might result from changes in political and economic conditions around the world.

Due to the dynamic nature of the foreign exchange market and the vast array of factors impacting currency movements, projecting exchange rates is a difficult process. The following problem statement can be used to frame the main issue with exchange rate forecasting.

In light of the many and interwoven factors that affect currency values, such as economic data, geopolitical events, market attitudes, and monetary policies, it is difficult to anticipate future exchange rate movements of a particular currency, such as the US dollar.

## 1.2 OBJECTIVES OF THE STUDY

- To Forecast US Dollar exchange rate using PPP model.
- To determine the major determinants of the US dollar's exchange rate.
- To analyze the historical trends and patterns of the US dollar exchange rate.

## II. LITERATURE REVIEW

**1. Joscha Beckmann, Robert L. Czudaj and Vipin Arora (2020)** The link between oil prices and currency rates has been the subject of theoretical and empirical studies, which are reviewed in this essay. Theoretical transmission channels, which suggest bidirectional causality, are where we begin. According to categorical empirical research, the evidence varies greatly depending on the sample, the country of choice, and the empirical methodology. Yet, some do exist. There are two recurrent patterns: (i) over the long run, it is widely noted that exchange rates and oil prices have strong linkages; and (ii) in the short run, either exchange rates or oil prices have the potential to be good predictors of the other variable, but their effects are strongly time-varying. We also point out some crucial directions for future study.

**2. Abid (2019)** the aim of this paper is to complement this literature by investigating the extent to which the exchange rates can be determined by EPU. Even though the literature argues significant effects of monetary and real variables on exchange rates. findings take a step further from some studies showing modest empirical performance of fundamentals in explaining currency movements in emerging economies.

**3. Mahmoudvand, Rodrigues (2019)** daily exchange rates in four of the BRICS emerging economies: Brazil, India, China and South Africa, over the period 2001 to 2015 are considered. In order to predict the future of exchange rate in these countries, it is possible to use both univariate and multivariate time series techniques. Among different time series analysis methods, choose singular spectrum analysis (SSA), as it is a relatively powerful non-parametric technique and requires the fewest assumptions to be hold in practice. Both multivariate and univariate versions of SSA are considered to predict the daily currency exchange rates. The results show the superiority of MSSA, when compared with univariate SSA, in terms of mean squared error.

**4. ADRIEN VERDELHAN (2018)** Sorting nations according to their use of the dollar A fresh cross-section of average currency excess returns is produced by betas. This cross-section of currency risk premia is explained by a slope component, which is long in high beta currencies and short in low beta currencies. The high-minus-low carry trade factor constructed from sorted portfolios of countries is in opposition to this slope component. The interest rates they charge. 18% to 80% of the monthly exchange rate fluctuations can be attributed to the two high-minus-low risk variables. According to the two risk factors, full market models should include at least two global shocks to explain exchange rates in stochastic discount factors.

**5. Tarek A. Hassan Rui C. Mano (2018)** UIP violations are studied separately in the literature using portfolio- and regression-based techniques. We suggest breaking down these violations into cross-currency, between-time-and-currency, and cross-time components so that we may analytically link them to each other. To quantify the joint constraints that portfolio- and regression-based data put on models of currency returns. We discover that the forward premium puzzle (FPP) and the "dollar trade" anomaly are closely related and are both driven primarily by the cross-time component, subject to common assumptions about investors' information sets. The "carry trade" anomaly, in contrast, is mostly caused by cross-sectional UIP violations.

**6. Emine Boz ,Gita Gopinath, Mikkel Plagborg-Møller (2017)** We provide evidence that the value of the U.S. dollar affects trade prices and volumes internationally. We establish the following facts using a freshly created data set of bilateral pricing and volume indexes for more than 2,500 nation pairs: 1) Quantitatively, the dollar exchange rate predominates the exchange rate on a bilateral basis in price elasticity and trade regressions. Dollar fluctuations brought on by U.S. monetary policy heavily influence bilateral import prices.

2) Bilateral terms of trade for non-commodities are essentially unrelated to bilateral exchange rates. 3) The strength of the US dollar is a major indicator of global aggregate trade volume and inflation in producer and consumer prices.

**7. Roksolana Holub and Oleksandr Hlushchenko (2017)** The country's monetary regulator's communication strategy must be optimised if excessive exchange rate volatility is to be reduced under the circumstances of a flexible exchange rate arrangement. The last 20 years have seen a growth in communication (information assistance) has grown in importance as a component of monetary policy. In order to affect financial market volatility, increase monetary policy predictability, and accomplish macroeconomic goals, communication is necessary. However, neither in Ukraine nor in industrialised nations has a consensus been established as of yet on what the best central bank communication approach should be. Based on the use of the central bank's verbal interventions in the framework of the aforementioned, methodical techniques to improve the central bank's communication tactics, or For the past 20 years, information support (communication) has grown in importance as a component of monetary policy.

**8. Ferraro, Rogoff, & Rossi, (2015)** This study examines if there is an out-of-sample relationship between oil prices and the nominal exchange rate between the US and Canadian dollars. We discover minimal systematic relationship between oil prices and the exchange rate at the monthly and quarterly frequencies, even using cutting-edge approaches. The key contribution of this study, however, is to demonstrate the existence of a very short-term association at the daily frequency. This relationship is rather stable and persists whether we use contemporaneous (realised) or lagged oil prices in our regression. The latter, however, has ephemeral forecasting capacity that typically only manifests after instabilities have been properly taken into consideration.

**9. Engel, Mark & West, K. D. (2015)** then creates factors using a sample of exchange rates, and then forecast using the factors' unique deviations. We demonstrate how such forecasts can be successful using a stylized data generation method, even when there is essentially no serial correlation in the univariate exchange rate processes. We submit the method to a panel of 17 OECD nations' bilateral dollar exchange rates. We use factors to forecast, as well as factors combined with any fundamentals recommended by the Taylor rule, monetary models, and purchasing power parity (PPP) models. In the late (1999-2007) but not the early (1987-1998) parts of our sample, we tend to outperform the forecast of a "no change" benchmark for long horizon (8 and 12 quarter) forecasts.

**10. Furao Shen n , Jing Chao, Jinxi Zhao (2015)** Exchange rate forecasting is a significant financial issue. An enhanced deep belief network (DBN) for forecasting exchange rates is put forth in this paper. We extend the traditional DBN to handle continuous data by building a DBN utilising continuous restricted Boltzmann machines (CRBMs). The Experiments are used to identify the appropriate structure of the DBN for use in forecasting exchange rates. Additionally, the conjugate gradient approach is used to quicken DBN learning. Three exchange rate series are investigated in the trials, and six assessment criteria are used to gauge how well the suggested strategy works. Comparison with common forecasting techniques, such as feed forward neural network (FFNN), demonstrates that the suggested method is more effective than conventional techniques and is relevant to the prediction of foreign exchange rates.

### III. RESEARCH METHODOLOGY

#### 3.1 RESEARCH TYPE

**Quantitative Research-** (QA) is a technique that uses mathematical and statistical modeling, measurement, and research to understand behavior. The goal of quantitative research is to comprehend and explain occurrences, correlations, or patterns by the systematic and organised collection and analysis of numerical data. It emphasises on gathering factual and quantifiable data, frequently using statistical techniques, to draw inferences and make generalisations about a wider population.

**3.2 SAMPLE SIZE:** 5 years of time period of study (2018-2023).

**3.3 TOOLS: Purchasing Power Parity-**One popular macroeconomic analysis metric to compare economic productivity and standards of living between countries is purchasing power parity (PPP)

$$S = p1/p2$$

**Where:** S= Exchange rate of currency 1 to currency2

P1= Cost of good X in currency 1

P2= Cost of good X in currency 2

**3.4 LIMITATIONS:**

**1. Data accessibility:** A significant amount of historical data is necessary for exchange rate forecasting. However, data might not be reliable or only be available in small amounts, especially in underdeveloped nations.

**2. Volatility:** Exchange rates can be unpredictable and turbulent. Therefore, especially during times of extreme volatility, forecasting models may not be reliable at predicting exchange rates.

**3. Political events:** Elections and other political events can affect currency exchange rates. However, political developments can be erratic, making precise currency rate forecasting difficult.

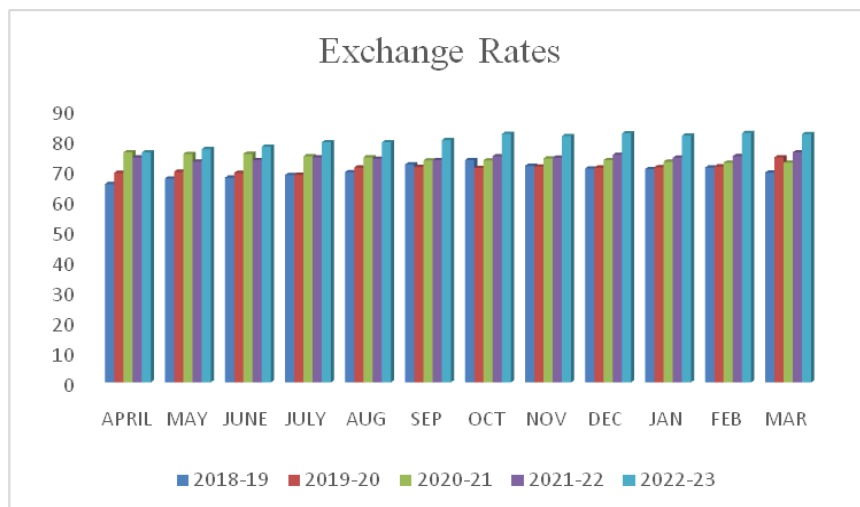
**4. Economic shocks:** Changes in interest rates or economic policies, for example, can have a big impact on exchange rates.

**IV. DATA ANALYSIS AND FINDINGS**

**Table No.4.1 Average of monthly exchange rates from 2018-2023**

MONTHS	2018-19	2019-20	2020-21	2021-22	2022-23
APRIL	65.68429	69.41045	76.20091	74.50455	76.19238
MAY	67.53087	69.77	75.66048	73.1881	77.295
JUNE	67.81857	69.3955	75.72409	73.62773	78.08636
JULY	68.69409	68.75435	74.92652	74.53636	79.56762
AUG	69.62348	71.18045	74.5781	74.11409	79.53652
SEP	72.204	71.36143	73.515	73.64591	80.25545
OCT	73.61043	71.0187	73.55909	74.95524	82.31762
NOV	71.73227	71.50429	74.21	74.48091	81.62409
DEC	70.81429	71.15955	73.63696	75.36174	82.50636
JAN	70.68435	71.2587	73.11286	74.44524	81.75727
FEB	71.177	71.544	72.809	74.964	82.6295
MAR	69.50143	74.57136	72.80087	76.21261	82.27435

**Graph No.4.1 Movement of monthly exchange rates from 2018-2023**



## FINDINGS

The offered information displays the US dollar's exchange rates versus an unspecified currency for the months of April 2018 to March 2023. Several conclusions can be drawn from the analysis of the data. First off, there is a general increasing tendency in the US dollar exchange rate over the specified time frame. The exchange rate grew steadily from its starting point of 65.68429 in April 2018 to its peak of 82.27435 in March 2023.

This suggests that the US dollar is getting stronger in relation to the unknown currency. Additionally, there are monthly changes in the currency rate. Numerous variables, such as economic statistics, geopolitical developments, and market emotion, may have an impact on these changes. For instance, the exchange rate saw a modest decrease in the months that followed before gradually rising to reach its peak in March 2019 at 74.57136. Thirdly, the rate of change varies noticeably from year to year. The exchange rate increased moderately in the years 2018–2019. The rate of increase slowed down in the years that followed (2019–2020 and 2020–2021). It is important to remember that the exchange rate increased significantly between 2021 and 2022, then increased just slightly between 2022 and 2023. Overall, the results point to a typically upward trend for the US dollar exchange rate relative to the unidentifiable currency over the studied period. It's crucial to keep in mind, though, that exchange rates are influenced by a variety of outside factors and can be unpredictable. These results can be used as a starting point for more in-depth research and predictions of the US dollar exchange rate, which will take into consideration additional economic and geopolitical variables.

## V. CONCLUSION

Analysing and predicting exchange rates with a focus on the US dollar is a difficult undertaking. Currency fluctuations are influenced by a wide range of variables, including macroeconomic statistics, market mood, geopolitical events, and investment behaviour. To predict exchange rates, researchers use a variety of research methods, including fundamental analysis, technical analysis, sentiment analysis, econometric models, market microstructure analysis, and machine learning techniques. Researchers should regularly assess and improve their models, taking into account fresh data and making adjustments for shifting market conditions. Forecasting the exchange rate should be considered a tool for decision-making rather than a surefire indicator of future fluctuations. In the end, the study of predicting exchange rates with a focus on the US dollar helps market players make wise financial decisions by deepening their awareness of the dynamics of global currency markets. Researchers work to produce accurate forecasts by applying a variety of research methodologies, including as fundamental analysis, technical analysis, sentiment analysis, econometric models, market microstructure analysis, and machine learning techniques. While forecasting techniques and models can offer insightful information, they should be employed as decision-support tools rather than as perfect forecasters. Continued study in this area helps market players reduce risks and make wise judgements by deepening our understanding of the dynamics of the foreign currency market.

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