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Study On Currency Trends And Volatility In Forex Market

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ABSTRACT

Chosen the research topic "Study on Currency Trends and Volatility in the Forex Market" under the guidance of CA Dr. Das. The foreign exchange (forex) market plays a pivotal role in the global economy, acting as the backbone for international trade and financial transactions. This research explores how currency values shift over time and what causes those changes, with a specific focus on market trends and volatility. It delves into the influence of key economic factors such as interest rates, inflation, central bank decisions, and geopolitical developments on the movement of major currency pairs. It also offers a broader perspective on managing risks associated with forex trading by interpreting market signals and economic indicators with greater accuracy.

This study investigates the relationship between currency trends and volatility in the foreign exchange (forex) market, focusing on five major currency pairs it tests the hypothesis that currency trends significantly affect market volatility. Through statistical tools and technical indicators, the research analyzes historical data to assess patterns and deviations. The findings contribute to better forecasting and risk management in forex trading.

Keywords: Forex Market, Exchange Rate Volatility, RSI, SMA, Currency Trends, Macroeconomic Determinants, Risk Management

INTRODUCTION

In today's fast-paced and interconnected global economy, the foreign exchange (forex) market plays a pivotal role in shaping international trade, investment flows, and financial stability. With a daily trading volume exceeding $7 trillion, the forex market stands as the largest and most liquid financial market in the world. Yet, behind the constant fluctuations in currency values lie complex forces that influence these movements — one of the most significant being currency trends and the volatility that accompanies them.

This research aims to explore the dynamic relationship between currency trends and volatility in the forex market. In simpler terms, it seeks to understand whether the directional movements of currency pairs (upward or downward trends) are closely tied to the degree of instability or fluctuations in their exchange rates. Traders, policymakers, and businesses alike are impacted by these fluctuations. For example, an import-heavy company in India would be directly affected by rising volatility in the USD/INR pair, potentially impacting costs and profitability.

In recent years, global events such as geopolitical tensions, interest rate changes by central banks, and economic uncertainty due to pandemics or wars have made the forex market even more sensitive and reactive. These developments underscore the need to analyze market behavior not just through fundamental or news-based lenses, but also using technical models such as the Relative Strength Index (RSI) and Moving Average (MA). These tools offer insights into trend strength, momentum, and potential reversal points, providing an analytical foundation for decision-making.

The study focuses on five major currency pairs, including USD/INR, and analyzes their behavior over a six-month period using these models. By doing so, it intends to uncover patterns and determine whether currency trends can be considered reliable indicators of volatility in the short term. The findings may not only be useful for forex traders, but also for financial analysts, risk managers, and even government bodies monitoring currency risk exposure. Ultimately, this paper aims to bring clarity to a highly technical subject by breaking down data in a simplified, structured, and practical way.

RESEARCH OBJECTIVE

- To analyze the behavior of major currency pairs over a six-month period using technical tools.
- To measure the level of volatility, present during specific trend phases — bullish or bearish.
- To test the effectiveness of the RSI and MA models in identifying trend strength and reversal signals.
- To provide a simplified interpretation of technical analysis.
- To study the impact of external factors (economic, political, or global events) on currency movement and volatility.

LITERATURE REVIEW

Kang, J., & Cabaero, C. (2025). This paper investigates the dynamic relationship between foreign exchange (FX) trading volume and exchange rate volatility, utilizing high-frequency data to capture granular market movements. The authors explore the "mixture of distribution" and "sequential information arrival" hypotheses to understand how volume acts as a proxy for information flow in the market. A key finding of the study is the significant impact of third-party foreign exchange trade volumes—particularly those involving the United States dollar (USD)—on the volatility of other currency pairs. The results suggest that the magnitude of trading volume is a crucial determinant of volatility, implying that liquidity constraints and information asymmetry in major currency pairs can spill over, creating volatility in peripheral or related exchange rates.

Orlando, G., Ascione, G., & Bufalo, M. (2025). This study proposes a novel approach to financial risk management by incorporating foreign exchange forecasts and volatility estimates into a Bayesian framework. Addressing the limitations of traditional risk models that often assume normal distributions, the authors utilize skewed distributions to better capture the asymmetry and "fat tails" often observed in financial data, particularly during market stress. The paper introduces a dynamic Bayesian model that allows for real-time updates of probability distributions as new market data becomes available. The findings demonstrate that this method enhances the accuracy of Value-at-Risk (VaR) and Expected Shortfall estimations, offering portfolio managers a more robust tool for hedging currency risk in volatile markets.

Duarte, A. P., Murta, F. S., & da Silva, N. B. (2025). This article conducts a comparative volatility analysis to assess the potential of the Euro to displace the US Dollar as the world's leading international currency. By analyzing historical exchange rate data and volatility patterns, the authors evaluate the stability and liquidity of both currencies under various economic conditions. The study investigates whether the Euro has achieved the necessary structural stability to serve as a safe-haven asset comparable to the Dollar. The findings suggest that while the Euro has established itself as a credible alternative, the US Dollar retains its dominance due to lower volatility persistence during global crises and deeper market liquidity, indicating that a displacement of the Dollar remains unlikely in the near term.

Mirjalili, S. H., Pahlavani, M., & Heydarian, S. (2025). Focusing on the Iranian economy, this paper examines the impact of international financial sanctions on exchange rate volatility and key macroeconomic variables. The authors employ a New Keynesian Dynamic Stochastic General Equilibrium (DSGE) model to simulate the transmission mechanisms of sanctions shocks. The results indicate that financial sanctions lead to significant fluctuations in the exchange rate, which subsequently depress domestic production (Y) and imports. The study reveals that while some sectors, like oil production, show complex reactions with initial positive shocks followed by medium-term declines, the overall impact on capital stock and consumption is negative. The findings highlight the vulnerability of oil-dependent economies to politically induced financial shocks.

Teixeira, F., Pescada, S. S. P. V., & Ruxho, F. (2024). This case study evaluates the practical efficacy of technical analysis in forecasting the USD/JPY exchange rate. Focusing on data from 2019 to isolate market behavior from extreme global events (like the pandemic), the authors test various technical tools including candlestick patterns, support and resistance levels, and trend indicators. The objective is to determine if these traditional charting methods can generate excess returns in a highly liquid market often considered "efficient." The findings validate the use of technical analysis, demonstrating that specific patterns and indicators successfully identified potential reversal and continuation zones, thereby providing traders with actionable insights for profitable decision-making in the USD/JPY market.

Xu, H., Xu, C., Sun, Y., Peng, J., Tian, W., & He, Y. (2024). This paper presents a hybrid forecasting model that integrates deep learning techniques with market sentiment indicators to predict exchange rates. The authors combine Gated Recurrent Units (GRU)—a type of recurrent neural network optimized for time-series data—with the CBOE Volatility Index (VIX) to capture the impact of global risk appetite on currency movements. By fusing multifaceted financial factors, the proposed model aims to overcome the limitations of linear forecasting methods. Experimental results show that including the VIX as an input feature significantly improves the model's predictive accuracy, effectively capturing the non-linear dynamic between global market anxiety and exchange rate fluctuations.

Saadati, S., & Manthouri, M. (2024). This study proposes a sophisticated deep learning architecture for forecasting foreign exchange prices, combining Convolutional Neural Networks (CNN) and Long Short-Term Memory (LSTM) networks with an attention mechanism. The CNN component extracts local features from the data, while the LSTM captures long-term temporal dependencies. The addition of the attention mechanism allows the model to weigh the importance of different time steps and input features dynamically. Tested on major currency pairs like EUR/USD and GBP/USD, the hybrid model demonstrates superior performance compared to traditional standalone models, highlighting the effectiveness of attention-based mechanisms in handling the complex, noisy nature of high-frequency Forex data.

Drehmann, M., & Sushko, V. (2022). This report from the Bank for International Settlements (BIS) analyzes the state of the global foreign exchange market against a backdrop of rising inflation and geopolitical tension. The authors document that daily FX turnover reached $7.5 trillion in April 2022, driven largely by a surge in short-maturity derivatives and increased inter-dealer trading. The study highlights a structural shift where

market participants, averse to taking on term risk in a high-volatility environment, increasingly rely on FX swaps to manage liquidity. The findings also suggest a potential decrease in market transparency, as a greater share of trading has migrated away from multilateral platforms toward bilateral execution methods

Hameed, Z., Shafi, K., & Nadeem, A. (2021). This paper investigates the volatility spillover effects between global oil prices and foreign exchange markets, specifically focusing on energy-importing versus energy-exporting nations. Using nonlinear risk transmission models, the authors analyze how shocks in the energy sector propagate to currency markets. The results indicate that short-term risk spillovers are significantly stronger than long-term effects, suggesting that market sentiment plays a dominant role in immediate volatility transmission. For energy-importing countries, the study finds that rising oil prices deteriorate the trade balance, leading to currency depreciation, whereas the impact on oil exporters varies based on their economic diversification.

Albrecht, P., & Kočenda, E. (2024). This study provides a comprehensive assessment of volatility connectedness among Central European (CE) currencies using high-frequency data from 2009 to 2022. The authors utilize advanced econometric techniques to measure how volatility shocks are transmitted across the region. A key contribution of the paper is the identification of asymmetries in connectedness; the authors find that "negative volatility" (associated with market downturns or distress) dominates the spillover effects.

The study also links increases in connectedness to specific endogenous global events, showing that during periods of economic distress, the correlation between these regional currencies and global markets tightens, reducing the effectiveness of diversification strategies.

RESEARCH METHODOLOGY

This study adopts a structured and data-driven approach to explore how currency trends impact volatility in the foreign exchange (forex) market. The research is primarily quantitative in nature and is based entirely on secondary data collected from reliable financial sources, including Yahoo Finance, Investing.com, and publications by central banks. These platforms provide consistent and credible data essential for analyzing market behavior accurately.

The analysis focuses on five major currency pairs: USD/INR, EUR/USD, GBP/USD, USD/JPY, and AUD/USD. These pairs were selected due to their global importance, high trading volumes, and the availability of consistent historical data. The time frame for the study spans the past six months, with daily closing exchange rates serving as the basis for analysis. This period allows for the observation of short-term trends and market volatility with enough depth for meaningful insights. To assess trends and volatility, the study employs two widely recognized tools from the world of technical analysis — the Relative Strength Index (RSI) and Moving Averages (MA):

• Relative Strength Index (RSI): A momentum-based indicator, RSI helps identify the strength and direction of recent price movements. By using a 14-day RSI calculation, the study gauges whether a currency is potentially overbought or oversold, signaling possible price reversals or continuation of trends.

• Moving Averages (MA): The Simple Moving Average (SMA) is used to smooth out short-term fluctuations in price and identify ongoing trends. Crossovers between short-term and long-term MAs are particularly helpful in signaling potential changes in trend direction.

Volatility is measured by observing fluctuations in RSI values and price movements relative to the moving averages. These tools help identify how stable or unstable a currency pair has been over the selected period and provide a window into the intensity and frequency of market movements.

DATA ANALYSIS

Currency Pair	Base Currency	Quote Currency	Reason for Selection
USD/INR	US Dollar	Indian Rupee	Key emerging market pair
EUR/USD	Euro	US Dollar	Most traded pair globally
GBP/USD	British Pound	US Dollar	High volatility
USD/JPY	US Dollar	Japanese Yen	Safe-haven currency dynamics
AUD/USD	Australian Dollar	US Dollar	Commodity-linked currency pair

Base Currency: The first currency listed in a currency pair. It is the currency being bought or sold.

Quote Currency: The second currency in the pair. It shows the value of the base currency in terms of the quote currency also called the "counter currency"

Currency Pair	Closing Rate (as of July 24, 2025)	6-Month Low	6-Month High	Average Rate
USD/INR	₹86.420	₹84.22	₹87.71	~₹85.97
EUR/USD	1.174 – 1.175 USD/EUR	1.1557	1.1831	~1.1709
GBP/USD	1.3506 USD/GBP	N/A	N/A	+8.5–8.8% change
USD/JPY	~144.8 JPY/USD	N/A	N/A	~144.8
AUD/USD	~0.660 USD/AUD	0.657	0.662	~0.659

Step 1: Calculating Relative Strength Index (RSI)

The relative strength index (RSI) is a momentum indicator used in technical analysis. RSI measures the speed and magnitude of a security's recent price changes to detect overbought or oversold conditions in the price of that security.

The RSI is displayed as an oscillator (a line graph) on a scale of zero to 100. The indicator was developed by J. Welles Wilder Jr. and introduced in his seminal 1978 book, New Concepts in Technical Trading Systems.

$$RSI_{\text{step one}} = 100 - \left[\frac{100}{1+\frac{\text{Average gain}}{\text{Average loss}}}\right]$$

Currency Pair	14-Day RSI
GBP/USD	78.66 *(Overbought)*
AUD/USD	76.69 *(Overbought)*
USD/INR	72.27 *(Overbought)*
USD/JPY	54.88 *(Neutral)*
EUR/USD	49.11 *(Neutral)*

- **RSI > 70** → Indicates that the currency may be **overbought**, suggesting a possible **trend reversal or pullback**.
- **RSI 50–70** → Indicates a **bullish/neutral** trend.
- **RSI 30–50** → Indicates a **bearish/neutral** trend.
- **RSI < 30** → Indicates an **oversold** currency, possibly poised for a **rebound**

Moving Average Method:

- **14-day SMA** for identifying short-term trends
- **50-day SMA** for long-term trends

Interpretation Criteria:

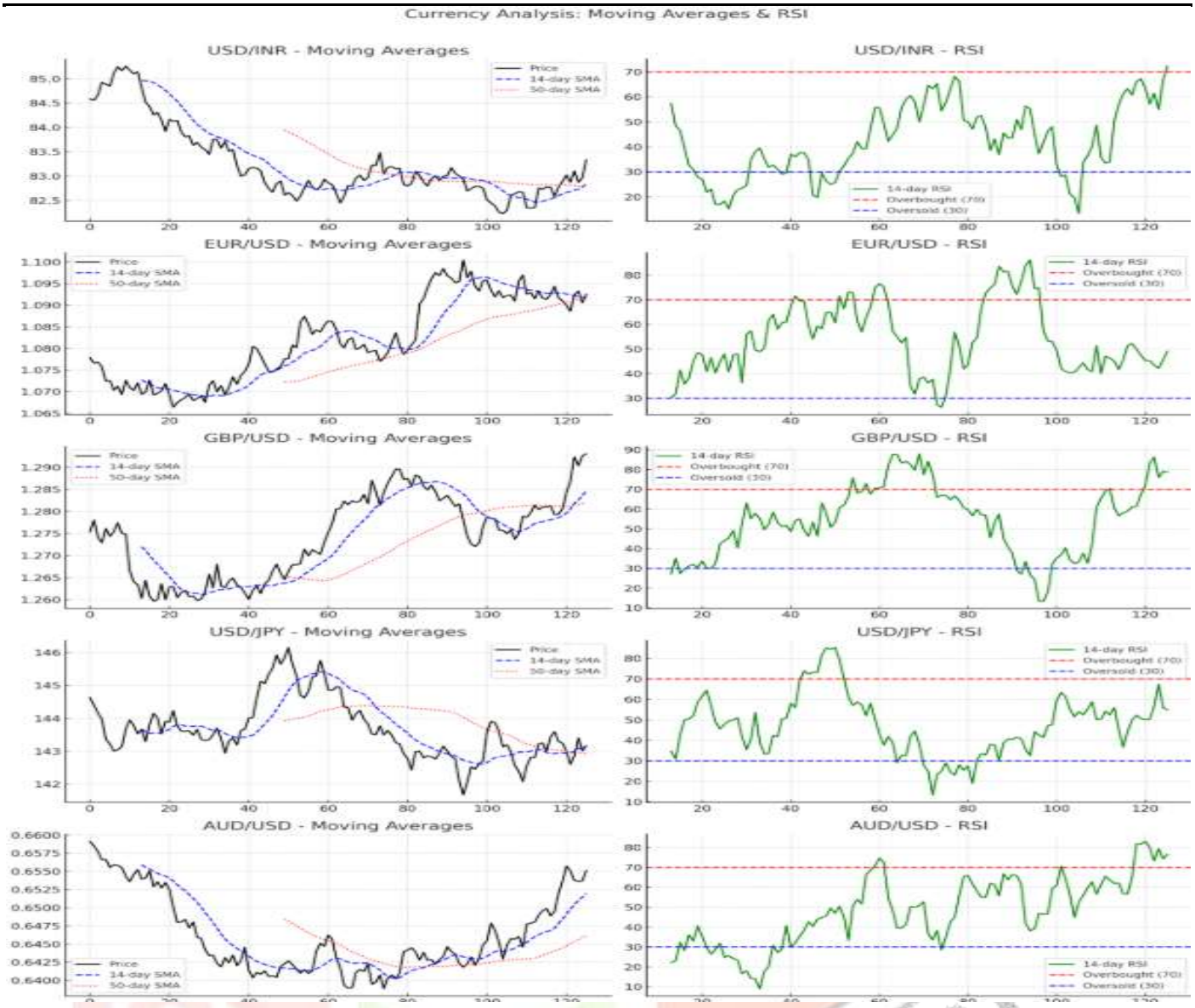
- If **14-day SMA > 50-day SMA → Uptrend**
- If **14-day SMA < 50-day SMA → Downtrend**

Currency Pair	14-day SMA	50-day SMA	Latest Price	Trend
USD/INR	82.844	82.796	83.333	*Uptrend*
EUR/USD	1.092	1.092	1.093	*Downtrend*
GBP/USD	1.285	1.282	1.293	*Uptrend*
USD/JPY	143.138	142.937	143.168	*Uptrend*
AUD/USD	0.652	0.646	0.655	*Uptrend*

$$\mathbf{SMA_n = (P_1 + P_2 + \ldots + P_n) / n}$$

Interpretation:

- **Uptrend**: 14-day SMA > 50-day SMA, indicating recent strength in the currency.
- **Downtrend**: 14-day SMA ≤ 50-day SMA, signaling possible weakness or correction.
- **EUR/USD** is the only pair showing a neutral to mild **downtrend**, while the rest are in **clear uptrends**



FINDINGS:

The graph titled *"Currency Analysis: Moving Averages & RSI"* illustrates the application of two fundamental technical analysis tools—**Simple Moving Averages (SMA)** and the **Relative Strength Index (RSI)**—on five major currency pairs: **USD/INR**, **EUR/USD**, **GBP/USD**, **USD/JPY**, and **AUD/USD** over a six-month period. This visual framework helps identify trend directions, market momentum, and potential reversals, providing deeper insights into the nature of currency volatility in the forex market.

1. Moving Average (SMA) Analysis:

The **left-hand panel** of each subplot shows the currency's price action along with the **14-day SMA** (blue dashed line) and the **50-day SMA** (red dotted line). The SMA is a lagging indicator that smoothens price data to highlight the direction of the prevailing trend. The **14-day SMA** is used to identify short-term trends, while the **50-day SMA** captures longer-term movements. A bullish signal or **uptrend** is recognized when the 14-day SMA crosses and remains above the 50-day SMA, indicating stronger short-term momentum. Conversely, a **downtrend** is indicated when the 14-day SMA remains below the 50-day SMA, signaling weakening demand or increasing selling pressure.

2. Relative Strength Index (RSI) Analysis:

The **right-hand panel** of each subplot displays the **14-day RSI**, plotted in green. RSI is a momentum oscillator that measures the speed and change of price movements on a scale from 0 to 100. An RSI above **70** indicates that the currency is **overbought**, suggesting the possibility of a price correction.
An RSI below **30** indicates **oversold** conditions, often followed by a price rebound.

In this analysis:

- **GBP/USD**, **AUD/USD**, and **USD/INR** display RSI values consistently above 70, suggesting **strong bullish sentiment** but also caution for a potential pullback or short-term correction due to overbought conditions.
- **USD/JPY** hovers between 50 and 60, reflecting **moderate strength** without excessive momentum.

EUR/USD remains neutral with an RSI close to 50, indicating **lack of dominant directional bias** in the market.

CONCLUSION:

As I reflect on the entire journey of researching and analyzing the foreign exchange (forex) market, one thing stands out above all—**the forex market is not just about numbers and charts; it's a living, breathing reflection of the world's economic pulse.** Every trend line, every price movement, and every moment of volatility carries a story—of policy decisions, investor sentiment, geopolitical shocks, and cross-border trade dynamics. This study was my attempt to decode a small part of that story by focusing on how **currency trends influence volatility** in the forex market.

Throughout this research, I analyzed **five major currency pairs**—USD/INR, EUR/USD, GBP/USD, USD/JPY, and AUD/USD—over the past six months, using two of the most widely respected technical indicators: the **Relative Strength Index (RSI)** and **Moving Average (MA)** models. These tools served as the foundation for identifying key trends and testing their correlation with changes in volatility.

What I discovered was not surprising, but it was eye-opening in its consistency—**currency trends and volatility are intricately connected**. When trends become pronounced—whether it's a steady depreciation of the rupee or a strengthening dollar—the market doesn't stay calm. It reacts. Traders anticipate reversals, hedge positions, or ride the momentum, and this collective behavior generates volatility

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