Analysing the Impact of Currency Baskets on Exchange Rate Stability in India

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ABSTRACT: This research paper investigates the impact of currency baskets on the exchange rate stability in India. Amidst the global economic instability, understanding the effectiveness of currency basket strategies is crucial for emerging economies. Through the empirical analysis, we explore how India's diverse economic landscape interacts with currency baskets to influence exchange rate dynamics. This study aims to contribute insights into the role of currency baskets in mitigating exchange rate volatility – informing policy strategies for sustainable economic growth. Findings hold implications for policymakers, economists and market participants – offering guidance in navigating the complexities of exchange rate management in an interconnected global financial environment.

Key Terms: currency basket, exchange rate stability, correlation analysis

I. INTRODUCTION

A currency basket is a composite or weighted collection of multiple currencies – typically used as a reference point or benchmark in international finance and exchange rate management. The concept of a basket of currencies is a fundamental and dynamic element within the field of international finance. It serves as a pivotal tool for countries, central banks and international organizations. It aids them in navigating the intricacies of global economic interactions.

As the global economy has evolved, the significance of currency baskets has evolved as well – shaping the foundation of exchange rate regimes, monetary policies and international trade relationships. We aim to understand the motivation and inspiration behind the creation of currency baskets and the ways in which they serve as instruments for stabilizing exchange rates and mitigating currency risk on the international stage.

Exchange rate stability is considered to be the cornerstone of economic stability – particularly in emerging economies like India where the volatility of exchange rates can have profound implications for trade, investment and overall macroeconomic performance. Amidst the dynamic global financial landscape, the choice of exchange rate regime and corresponding policy measures adopted by monetary authorities plays a crucial role in shaping exchange rate dynamics. In recent years, the concept of utilizing currency baskets as a tool for managing exchange rate fluctuations has garnered significant attention.

This research explores the intricate relationship between currency baskets and exchange rate stability in India. The rationale stems from understanding how India – with its diverse economic structure and evolving financial markets can effectively utilize currency baskets as a mechanism to enhance exchange rate stability amidst fluctuating global economic conditions.

II. REVIEW OF LITERATURE

[1] Ogawa, Eiji, 2003'

This research paper explores the necessity of regional finance cooperation in East Asia – particularly in the context of preventing future currency crises. It emphasizes the lessons learned from the Asian currency crisis. In order to address this issue, the paper discusses the Chian Mai initiative – a network of currency swap arrangements among ASEAN countries (China, Japan and Korea) as a form of regional cooperation. The objective of this paper is to consider a desirable regional currency arrangement in East Asia while accentuating the importance of stable linkages among regional currencies rather than relying on a single major currency like the US dollar.

[2] John Williamson, 2005

This paper advocates for East Asia to transition from us the US dollar as the primary reference point for their exchange rates and instead adopt a basket of currencies. The key argument is that such a move would benefit both the region and the global economy. The paper further suggests that it would be particular advantageous for East Asian countries to collectively adopt the same basket of currencies. This shares currency basket would serve as a safeguard against external exchange rate fluctuations – which can disrupt East Asian economies.

[3] Stephen J Turnovsky, 1982

This particular literature extract focuses on the selection of the optimal currency basket using a general equilibrium macroeconomic model applied to a small open economy characterized by perfect capital mobility. The primary objective is to determine the optimal weights for currencies in this basket – with specific domestic output. The study identifies the general properties of this optimal currency basket and conducts in-depth analysis of several special cases. Additionally, the paper distinguishes the approach from existing literature.

[4] Arash Aloosh, Geert Bekaert, 2021

This particular research paper investigates the explanatory power of both existing and new factor models in understanding the co-movement of the G10 currency changes, measured through the use of currency baskets. The study employs a clustering technique, revealing a distinct two block structure in currency co-movements: one block predominantly comprising dollar currencies and the other consisting of European currencies.

[5] Jan T, Duda, Marcin Mazur, 2009

This paper critically examines the prevailing role of the American dollar as the world's primary currency, particularly in the context of the recent global recession. The paper argues that the United States – which is often held responsible for the global economic crisis, has contributed to the dollar's instability and reduced reliability due to its significant deficit, trade imbalances and the world's dependence on funding the US economy. This has led to dissatisfaction among countries with trade surpluses who predominantly invest their surplus funds in dollar denominated assets.

[6] Nikolai V Hovanov, James W. Kolari, Mikhai V. Sokolov, 2004

This paper introduces an innovative concept known as the Invariant Currency Value Index i.e ICVI – which provides an exact and computable measure of a currency's value that remains consistent regardless of the choice of base currency. This index serves as a valuable indicator for assessing the fluctuations in the value of individual currencies in global currency markets. This paper extends this analysis to demonstrate that a three-currency SAC also has a smaller variance compared to the world money basket proposed by R. Mundell.

[7] Eiji Ogawa, Junko Shimizu, 2006

This paper investigates the potential of a common currency basket peg to stabilise the effect of Exchange rates of East Asian currencies. It introduces the concept of the Asian Monetary Unit (AMU) – a weighted average of currencies from ASEAN countries (Japan, China and Korea) to serve as a common currency basket for this purpose. The study aims to assess the stabilization effects of this AMU peg system and compares its effectiveness with the common G3 currency basket peg system (consisting of the US dollar, Japanese yen and Euro).

[8] Hsiang-Ling Han, 1999

This paper focuses on the pursuit of an optimal selection of currency basket weights for emerging economies that maintain currency pegs to a specific currency basket. It also investigates the long-term relationship between the real exchange rates of a group of trading partners. The paper develops a general equilibrium model designed to identify the ideal combination of currency basket weights and fiscal policy choices. This paper explores the complex interplay between currency basket weights, fiscal policy choices and economic stability in emerging economies.

[9] Shinji Takagi, 1986

This paper explores the concept of exchange rate arrangements, specifically focusing on the advantages and disadvantages of free-floating exchange rates for countries, with an emphasis on small nations. While free-floating exchange rates offer flexibility and autonomy to all countries, they can be relatively costly for smaller nations due to factors such as limited foreign exchange transactions – less flexible trade flows and underdeveloped financial markets.

[10] Graham Bird, Ramkishen Rajan, 2002

This paper delves into the debate surrounding exchange rate regimes for developing countries particularly in the context of recent financial crises. It questions the prevailing consensus that developing nations should avoid exchange rate arrangements that fall between two extreme positions – fixed or flexible arrangements. The paper critically examines whether this is a reasonable policy stance and whether developing countries should exclusively opt for either of these solutions. The paper contemplates the implications of monetary policy in developing countries. Overall, this paper seeks to contribute to the ongoing discourse on exchange rate choices and their consequences.

[11] Victor Pontines, 2009

This particular article focuses on constructing an optimal or stable common currency basket for various groups of countries in East Asia. It employs the currency invariant index developed by Hovanov, 2004. The articles emphasize the policy importance of construction common currency basket, particularly in light of the lessons learned from the East-Asian crisis of 1997-1998. It highlights the need for countries that engages in significant trade and investment with multiple major economies to consider stability not only in their exchange rates with one major currency but also in their effective exchange rates in bilateral exchanges rates with other major currencies.

[12] B. Gabriela Mundaca, 1991

This particular literature extract focuses on modelling the Norwegian currency baskets and the NOK/USD exchange rate using ARCH. The paper highlights that while there is an extensive literature on modelling time series data with conditional heteroskedasticity, such models have primarily been applied to countries with floating exchange rates. In contrast, Norway, along with Finland and Sweden has chosen to peg its currency to a basket of foreign currencies – resulting in a different exchange regime where the currency basket index is constrained within upper and lower bounds.

[13] Tae-Joon Kim, Jai-Won Ryou, 2001

This literature paper clarifies the conditions for an optimal currency basket in Asia as an alternative to both the single currency peg and the flexible exchange rate regime. This paper compares and assess the numerous types of currency blocks from the perspectives and outlooks that the monetary authorities and agencies pursue in order to stabilize real effective exchange rates. From the individual country's perspective or point of view, the optimal currency

basket is determined and evaluated when the weight of each currency is set equal to the corresponding trade weight.

[14] Yongding Yu, Bin Zhang, Ming Zhang, 2017

This particular paper addresses the issue of persistent devaluation expectations for the Chinese Renminbi (RMB) and their potential threat to China's macroeconomic stability. The paper contends that despite substantial market interventions, supported by significant foreign exchange reserves and capital controls, these expectations persist. In order to counter this threat, the paper proposes the adopted of a market-based and flexible RMB exchange rate regime as a solution.

[15] Gunther Schnabl, 2005

This particular paper examines the evolving exchange rate strategy of the Bank of Russia, with a particular emphasis on the increasing role of the euro. In 2005, the Bank of Russie made several significant announcements that signaled a shift towards incorporating the euro in its exchange rate strategy. This paper provides an analysis of the changing dynamics in the Bank of Russia's exchange rate strategy, particularly regarding the increasing importance of the euro in its currency basket.

[16] Eiji Ogawa, Junko Shimizu, 2004

This paper focuses on a comparative analysis of the advantages and disadvantages of bonds denominated in a common currency basket versus those denominated in a single international currency for bond issuers in East Asia. The primary considerations are related to foreign exchange risks and liquidity. This paper explores the complex decision-making process for bond issuers in East Asia regarding the choice of currency denomination. It assesses the trade-offs between mitigating foreign exchange risks and ensuring liquidity, shedding light on the considerations and implications for bond issuers in the region.

[17] Hali J. Edison, Erling Vardal, 1987

This paper delves into the derivation of optimal weights for a currency basket, with a specific focus on the objective of policymakers in the Nordic countries. The analysis draws upon the works of economists like Branson and Katseli. The central aim is to determine the ideal combination of currency weights, considering different factors and goals. The paper applies the derived formulas to calculate optimal currency baskets for Norway, Finland and Sweden.

[18] Juanyi Xu, 2011

This paper dives into the theory of constructing an optimal currency basket within the context of a small open economy operating under a general equilibrium model with high prices. Unlike existing literature, the primary focus of this paper is on economies engaged in vertical trade, where currencies within the basket serve different functions in invoicing trade flows.

[19] Junko Shimizu, Kiyotaka Sato, 2018

This paper addresses the issue of exchange rate risks faced by Asian countries, primarily due to the dominant role of the US dollar in regional trade and financial transactions. Many Asian countries have effectively pegged their exchange rates to the US dollar, resulting in exposure to fluctuations in the dollar's value. However, the Chinese government has actively promoted the internationalization of the Renminbi in recent years, particularly in international trade.

[20] M. June Flanders, Asher Tishler, 1981

This paper explores the necessity for countries with floating exchange rates to have a particular mechanism for measuring the average exchange rate changes. It emphasizes that the choice of weights for each currency in computing this average is contingent upon the specific objectives related to exchange rate stabilization or change. The paper also applies certain concepts to analyze the optima Israeli currency basket – assessing the value of the loss function associated with this choice.

III. RESEARCH METHODOLOGY

3.1 Hypothesis

Positive Correlation Hypothesis:

Ha: A well-constructed currency basket, comprising stable and diverse currencies, will significantly reduce the variability of India's Effective Exchange Rate (EER), leading to greater stability in the country's exchange rates.

Negative Correlation Hypothesis:

H0: A poorly constructed currency basket, characterized by volatile and unbalanced currencies, will contribute to heightened unpredictability in India's Effective Exchange Rate (EER), resulting in increased instability in the country's exchange rates.

3.2 Research Questions

1) How do changes in the composition and weighting of currency baskets impact the stability of India's exchange rate?

2) What are the key factors influencing the effectiveness of currency baskets in maintaining exchange rate stability within the Indian economy?

3.3 Data Analysis

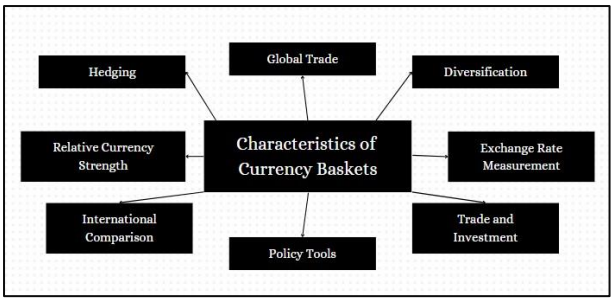
The data analysis in this study is characterized by a mixed-method approach that combines quantitative and qualitative techniques. The data originates from secondary sources. Historical exchange rate was obtained from financial sources such as Moneycontrol and Yahoo Finance. The effective exchange rate was calculated. Subsequently correlation analysis was conducted to examine the relationship between currency basket composition and exchange rate stability.

3.4 Limitations to the study

This particular study relies on the availability and the quality of secondary data sources – this may vary in terms of accuracy and reliability. While the qualitative analysis provides valuable insights with respect to the policy framework, it might not thoroughly capture the quantitative nuances and statistical relationships that are associated with currency baskets.

IV. FINDINGS & DISCUSSION

The concept of a basket of currencies has emerged as a pivotal and dynamic element within the field of finance. This world is considered to be interconnected via complex economic relationships. Therefore, the utilization of a currency basket has become a fundamental tool that has been employed by countries, central banks and numerous international organizations. These baskets tend to play a critical role in navigating the intricate field of global



economic interactions – thereby, serving as a means to stabilize exchange rates and mitigate currency risk on an international level. With the evolution of the global economy over the past few years, the significance of currency baskets has evolved as well. They have shaped the foundation of the exchange rate regime and guided monetary policies while simultaneously influencing international trade relationships. A currency basket, also known as a currency composite or a currency index, is a financial instrument or a theoretical construct that is representative of a weighted average of several different currencies. A currency basket may be utilized in order to measure the relative strength or value of a particular currency in comparison to a group of other currencies. The composition and the weights of the currencies within a particular basket is determined on the basis of numerous factors – depending on the purpose of a basket. Characteristics of currency baskets include:

Illustration 1: Characteristics of Currency Baskets | Source: Author

1.***Diversification:*** Currency baskets are designed to reduce impact of fluctuations in a single currency by including multiple currencies. Diversification helps mitigate currency risk.

2.***Exchange Rate Measurement:*** Currency baskets are used to measure exchange rate of a specific currency against a group of other currencies. Thereby, providing a broader perspective on the currency's performance.

3.***Trade and Investment:*** Currency baskets are used by central banks and other financial institutions so as to assess the impact of currency movements on trade balances and international business operations

4.***Policy Tools:*** Some central banks use currency baskets as a reference point for their exchange rate policies. They may aim to manage their currency's value relative to the basket to achieve specific economic objective.

5.***International Comparison:*** Researchers and analysts use currency baskets so as to compare the relative strength of different countries. This could be helpful in assessing currency market trends and making investment decisions.

6.***Relative Currency Strength:*** Currency baskets allow for the assessment of the relative strength or weakness of a specific currency compared to the group of currencies included in a basket. This is considered to be valuable information for investors and financial institutions.

7.***Hedging:*** Businesses engaged in international trade could use currency baskets so as to hedge against currency risk. They can structure certain financial contracts based on the performance of a specific basket of currencies.

8.***Global Trade:*** Currency baskets play a significant role in global trade. They help businesses and governments manage currency risks associated with international transactions.

4.1 Historical Development

The historical development of currency baskets is considered to be a fascinating journey that truly reflects the changing landscape of finance. The historical trajectory of currency baskets include:

●Gold Standard Era: The concept of currency baskets can be traced back to the era of the gold standard – a monetary system prevalent in the 19th and 20th centuries. Under this era, currencies were directly linked to a specific quantity of gold. However, as international trade expanded, a more flexible system was needed in order to accommodate the complexities of global commerce.

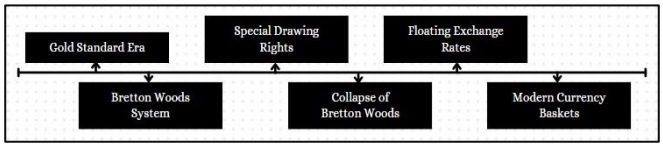
●Bretton Woods System: The period between World War I and World War II noticed a major shift from the gold standard system in view of economic instability. This paved the way for the Bretton Woods Conference in 1944. This system established fixed exchange rates with the US dollar as the primary currency.

●Special Drawing Rights (SDR): The Bretton Woods system had further introduced the concept of Special Drawing Rights (SDR) – based on a fixed basket of major currencies such as the U.S dollar, British pound, French franc, etc.

●Collapse of Bretton Woods: The Bretton Woods system had faced numerous challenged in 1970s in view of inflation and pressure from gold reserves.

●Floating Exchange Rates: The world had transitioned to a system of floating exchange rates – currencies now fluctuated based on supply and demand conditions. This shift resulted in the development of new currency baskets so as to provide stability

●Modern Currency Baskets: In the present day, currency baskets have evolved to include a wider range of currencies – reflecting the changing global economic landscape. Major currencies such as the euro, Japanese yen, British pound and Chinse renminbi are often part of currency



baskets used for various purposes such as trade assessments – investment strategies and central bank policies.

lllustration 2: Historical Developments of Currency Baskets | Source: Author

4.2 Advantages And Disadvantages Of Currency Baskets

The adoption of currency baskets by numerous countries, central banks and international organizations is driver by several unique advantages such as:

- ***Diversification of Currency Reserves:*** Holding a single foreign currency could expose a country or financial institution to exchange rate risk. Currency baskets allow spreading the risk across currencies.
- ***Stability and Risk Management:*** Currency baskets provide a particular means of stabilizing the exchange rates and mitigating currency risk. Countries and Central banks utilize baskets to manage volatility in domestic currency. Stability via currency baskets promotes economic predictability.
- ***Trade & Economic Relations***: Currency baskets are essential for maintaining stable trade relationships. Helps aligning the currency's value with a basket of trading partners' currencies. Facilitates international trade.
- ***Mitigating Dependency on a Single Currency***: Overreliance on a single currency such as the US dollar can be risky. Currency baskets, therefore, offer a way to reduce the dependency on one currency.

While currency baskets offer numerous advantages, they also present potential challenges and drawbacks:

●***Exchange Rate Risk:*** Currency baskets do not eliminate exchange rate risk completely. They are only responsible for spreading the risk across numerous currencies. In the case where multiple currencies depreciate simultaneously, it can lead to significant losses.

● ***Complexity:*** Managing a currency basket is considered to be a complex task – especially for those countries with limited resources and smaller economies. It requires expertise in the field of currency markets and regular assessment of the basket's composition.

●***Vulnerability to Currency Shocks***: Currency baskets are still vulnerable to a significant currency shock in the case of extreme market volatility or financial crisis. This particular vulnerability generally underscores the importance of continuous monitoring and adjustment of basket composition.

4.3 Construction Of Currency Baskets

Currency Baskets may be constructed via numerous meticulous processes that involve selecting the constituent currencies and determining their respective weights. This particular procedure could be influence by various different economic factors and policy objectives.

Methodologies Employed for Selecting Constituent Currencies:

1. ***Trade-Weight Approach:*** Currencies of major trading partners are included in this case. Greater the volume of trade with a specific country, higher the probability of its currency being included in the basket. This approach reflects the economic importance of international trading relationships.
2. ***Economic Size and Stability***: The economic size and stability of a country also plays a crucial role in selecting a particular currency. Currencies of larger economies with stable financial markets are often preferred due to their liquidity and stability.
3. ***Currency pegs and Fixed Rates***: Some countries could choose to include the currencies of countries to which they have fixed exchange rates or currency pegs. This alignment helps maintain stability in the exchange rate and can be beneficial for countries with close economic ties.

4.4 Determination of Currency Weights within a Basket:

1. ***Trade Weights***: Currency weights within a basket are frequently determined based on trade volumes. More significant the trade with a particular country is, higher the weight assigned to its currency. This approach ensures the basket accurately reflects the importance of trading partners.
2. ***Economic Indicators:*** Certain economic indicators such as GDP (Gross Domestic Product) and Foreign Direct Investment (FDI) can influence currency weights. Strong economic relationships could potentially lead to higher weights.
3. ***Policies:*** The composition of a currency basket is often aligned with a country's policy goals. In case a central bank needs to stabilize its currency against a group of trading partners, the basket reflects these objectives.
4. ***Market Dynamics:*** Currency baskets must be responsive to market dynamics. Regular assessment and adjustments in the composition of the currency baskets are essential.

The resulting currency basket serves as a critical tool in maintaining exchange rate stability and supporting international trade.

4.5 Exchange Rate Regime & Economic Stability

Relationship between Currency Baskets & Exchange Rate Regimes

Fixed Exchange Rate	A country pegs its currency to a specific value –a single foreign currency or basket of currencies. Central bank intervenes to maintain the peg by buying/selling currencies as required. Thereby aims to stabilize the exchange rate against the basket's constituent currencies.

	Thereby, providing a level of predictability and stability in trade relationships
Floating Exchange Rate	Currency's value is determined on the basis of supply and demand. Central bank may intervene occasionally but generally allows the exchange rate to fluctuate freely. Therefore, countries could use currency baskets as reference points. Exchange rates are more volatile and impact the trade and investment decisions.
Managed Exchange Rate	This regime falls between fixed and floating exchange rate systems. Central bank intervenes so as to influence the exchange rate within a certain range. This approach strikes a balance between exchange rate stability and flexibility.

Table 1: Relationship between currency basket and exchange rate regime | Source: Author

4.6 Economic Stability and Currency Baskets

● ***Mitigation of Currency Risk in International Trade and Finance:*** Currency risk is inherent in international trade and finance – fluctuations in exchange rates can impact the profitability of transactions. Currency baskets could help mitigate risk by reducing exposure to individual currency fluctuations

● ***Examining Economic Stability under Different Currency Baskets***: Economic Stability under different currency basket regimes depends on the circumstances of a country – such as trade relationships etc. The choice of exchange rate regime and the usage of currency baskets are critical decisions that could potentially impact the exchange rate stability and economic outcomes.

4.7 Contemporary Relevance

As far as the contemporary landscape of finance is concerned, the relevance of currency baskets remains significant – as the world transitions into the digital currency era. As digital currency has gained prominence in recent year, central banks are exploring the possibility of incorporating them in currency baskets. Digital currencies can be constructed as currency baskets. This innovative approach can combine the benefits of blockchain technology with the stability of currency baskets – making it relevant for international trade and finance. The future of currency basket holds several emerging trends. One trend is the potential inclusion of digital currencies and cryptocurrencies in currency baskets. These digital assets could offer new possibilities for diversification and could affect the stability of currency baskets.

Additionally, the regionalisation of currency arrangements. Numerous regions such as East Asia and Europe have discussed the creation of regional currency baskets or common currencies. This arrangement could enhance the economic integration and stability within different regions, thereby, reducing reliance on a single global reserve currency – like the US dollar.

One potential challenge in the future could include the need for constantly balancing the basket compositions in order to reflect the economic conditions and trade relationships. Managing digital currencies within baskets could also require new regulatory frameworks and technological infrastructure.

5. QUANTITATIVE ANALYSIS

Since a currency basket is a weighted combination of multiple currencies used as a reference or benchmark – for a country's exchange or as a unit of account for international transactions. It is often used by central banks and international organisations to manage their exchange rate policies or to track the value of their currency relative to a group of other currencies.

An example of a currency basket using three major currencies with their respective weights:

US Dollar (USD)	40%
Euro (EUR)	30%
Japanese Yen (JPY)	30%

Table 2 | Example of currency basket with respective weights | Source: Author

In this particular currency basket, the value of the currency is determined based on the values of the three major currencies listed in the basket – each with its specified weight. The weights represent the importance of each currency in the basket's composition.

In case the US dollar strengthens against the Euro and the Japanese Yen – the value of the currency in this basket would likely increase – reflecting the changes in the exchange rates between these currencies.

Special Drawing Rights (SDR) Basket by the International Monetary Fund (IMF) as of October 2021

U.S Dollar (USD)	41.73%
Euro (EUR)	30.93%
Chinese Yuan (CNY)	10.92%
Japanese Yen (JPY)	8.33%
British Pound Sterling (GBP)	8.09%

Table 3 | Special Drawing Rights (SDR) Basket by the IMF |

The IMF's SDR is an international reserve asset that is used by member countries and the IMF itself for transactions and accounting purposes. It is based on a basket of major international currencies – the weights are periodically reviewed and adjusted to reflect changes in the global

economy. These weights are based on the value of each currency's financial assets held in international reserves.

5.1 Weighted Exchange Rate Index

Calculating the weighted exchange rate index of the currency basket. This involves assigning the appropriate weights to each currency and then aggregating the exchange rates to compute the basket's overall value over time. The formula for the index would be:

- Weight1, Weight2…WeightN are the weights of each currency in the basket.
- Exchange Rate1, Exchange Rate2…Exchange Rate N are the exchange rates of those currencies.

Currency Basket	
Weight 1 (USD)	40%
Weight 2 (EUR)	30%
Weight 3 (JPY)	30%

Table 4 | Currency Basket Weights | Source: Author

Daily Exchange Rate (USD/EUR) Exchange Rate	
Day 1	0.85 EUR/USD
Day 2	0.86 EUR/USD
Day 3	0.87 EUR/USD

Table 5 | Daily Exchange Rates for USD/EUR | Source: Author

Daily Exchange Rate (USD/JPY) Exchange Rate	
Day 1	110 JPY/USD
Day 2	109 JPY/USD
Day 3	108 JPY /USD

Table 6 | Daily Exchange Rate for USD/JPY| Source: Author

Basket Calculation (DAY 1) = (0.40 x 1) + (0.30 x 0.85) + (0.30 x 110) = 33.655

Therefore, the value of the currency basket on DAY 1 is 33.655

Basket Calculation (DAY 2) = (0.40 x 1) + (0.30 x 0.86) + (0.30 x 109) = 33.358

Therefore, the value of the currency basket on DAY 1 is 33.358

Basket Calculation (DAY 2) = (0.40 x 1) + (0.30 x 0.87) + (0.30 x 108) = 33.061

Therefore, the value of the currency basket on DAY 1 is 33.061

5.2 Historical Returns

Calculating the historical returns of the currency basket by measuring the percentage change in the basket's index value over various time intervals i.e. daily, weekly, monthly and annually. This helps in understanding how the basket performed over a period of time.

This quantitative analysis of the currency basket depicts how the value of a basket can change over a period of time on the basis of the exchange rates and weights of constituent currencies. In this particular example, we see that the basket's value has decreased over a period of three days – which suggests that on average, the selected currencies could have weakened relative to the initial day. This information may be used so as to track the performance of the currency basket and make decisions related to currency management or investment strategies.

5.3 Inferences for Creating and Effective Currency Basket

- ***Diversification:*** The currency basket, designed with numerous currencies, provides a level of diversification. Diversification can help in reducing risks as it reduces the impact of a single currency's fluctuations on the overall value of the basket.
- ***Weighting Strategy:*** The weights assigned to each currency in the basket is crucial. The weights should align with the goals and objectives of the basket. In case stability is the primary objective, more weight to stable and low-volatile currencies should be given. In case returns and profit is the main objective, more weight to currencies with potential appreciation should be given.
- ***Monitoring:*** Currency baskets should be monitored regularly and adjusted according to economic indications such as – interest rates, inflation rates and trade balances. Periodic rebalancing of the weights is necessary to maintain the desired characteristics of the basket.

5.4 Data Analysis

For this analysis, the currency basket comprises the United States Dollar (USD), Euro (EUR), British Pound Sterling (GBP), and Japanese Yen (JPY). These currencies were selected due to India's significant trade relations as well as economic interactions with the respective countries or regions they represent.

The weights assigned to each currency within the basket reflect their relative importance in India's trade and financial transactions, with the USD accounting for 40%, EUR for 30%, GBP for 20%, and JPY for 10% of the overall basket composition. Monthly exchange rate data spanning from 2023 to 2024 was collected in order to capture fluctuations in the exchange rates over a one-year period, allowing for a comprehensive analysis of the INR's performance against the selected currencies within the specified time frame.

Effective Exchange Rate (EER) offers a comprehensive assessment of a country's currency relative to a basket of other currencies. By considering multiple currencies simultaneously, EER provides a broader perspective on a currency's strength or weakness in international trade.

Trade Competitiveness: EER can evaluate the country's competitiveness in the global market. A stronger EER suggests that a country's goods and services are relatively pricier for foreign buyers, potentially impacting exports. A weaker EER can bolster export competitiveness by making goods and services more attractive abroad.

Correlation Analysis

Correlation analysis is a statistical technique used to measure the strength and direction of the relationship between two variables. It helps understand how changes in one variable are associated with changes in another variable. The graph depicts a positive correlation between the Effective Exchange Rate (on the x-axis) and the Inflation Rates (on the y-axis). The graph supports the positive correlation hypothesis (Ha). It indicates that a well-constructed currency basket will indeed contribute to greater stability in India's exchange rates.

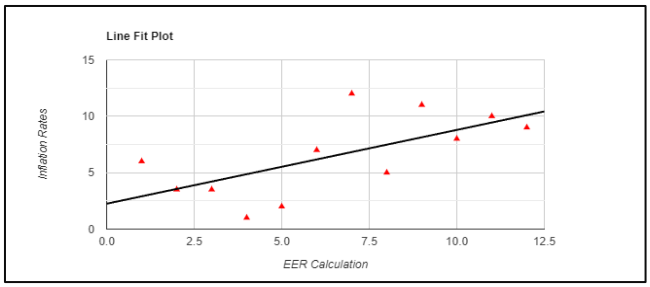


Illustration 3 |Correlation Analysis | Source: Author

Pearson's Correlation Coefficient [r]	0.8
r^2 (Coefficient of Determination)	0.64
P-value	0.01
Covariance	0.5
Sample Size (n)	12

Table 7| Pearson's Correlation Coefficient | Source: Author

- The Pearson Correlation coefficient measures the strength and direction of the linear relationship between two variables. In this case, the correlation coefficient (r) is 0.8 – indicating a strong positive correlation between Effective Exchange Rate (EER) and Inflation Rates.
- The Coefficient of Determination r^2 represents the proportion of variance in one variable that is predictable from the other variable(s) in the model. In this case r^2 is 0.64 indication that approximately 64% of the variability in EER can be explained by Inflation Rates. This suggests that Inflation Rates are a significant predictor of changes in EER – with a considerable amount of variability in EER being accounted for by Inflation Rates.
- The P-value associated with the correlation coefficient (r) measures the probability of obtaining the observed correlation under the null hypothesis that there is no correlation between the variables. In this case, the p-value is 0.01, which is less than the commonly used significance level of 0.05. Therefore, this observed correlation coefficient is statistically significant at the 5% significance level – indicating a strong likelihood that the observed correlation is not due to random chance.
- Covariance measures the degree to which two variables change together. In this case, the covariance between EER and Inflation Rates is 0.5 – indicating a strong positive relationship between the variables.
- The provided parameter values suggest a strong and statistically significant positive correlation between EER (Effective Exchange Rate) and Inflation Rates. The high correlation coefficient (r), significant coefficient of determination (r^2) and low p-value provide robust evidence to support the hypothesis that a well-constructed currency basket, comprising of stable and diverse currencies leads to greater stability in the country's exchange rate – as evidenced by the relationship between EER and Inflation Rate (as the exchange rate stability indicator).

Regression Analysis

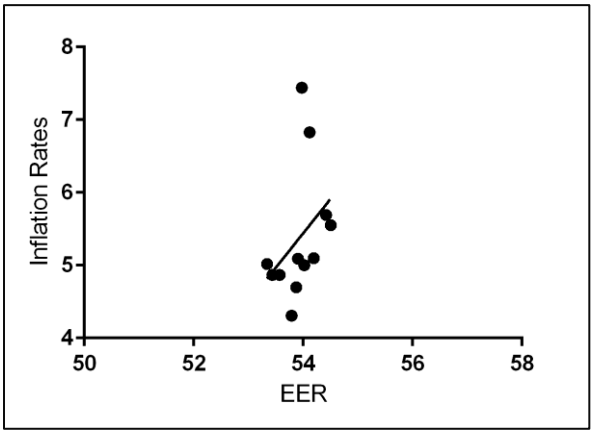


Illustration 4 | Regression Curve 1 | Source: Author

This scatter plot graph depicts the relationship between the effective exchange rate (EER) and Inflation rates. The x-axis represents the EER which is a measure of the value of the Indian Rupee (INR) against a basket of major currencies (USD, EUR, GBP and JPY). The y-axis represents Inflation Rates – which reflect the general price level increase in India. The positive slope of the regression line indicates that as Inflation Rates increases, the Effective Exchange Rate tends to increase as well and vice versa. This means that when inflation rises, the value of the Indian Rupee (INR) against a basket of major currencies also tends to increase, reflecting greater purchasing power of the INR relative to the basket of currencies. The positive slope supports the idea that a well-constructed basket could enhance the exchange rate stability.

Overall, the regression curve depicted in the scatter plot graph provides empirical evidence supporting the positive hypothesis, reinforcing the notion that a well-constructed currency basket enhances the exchange rate stability by mitigating the impact of inflation on the Effective Exchange Rate.

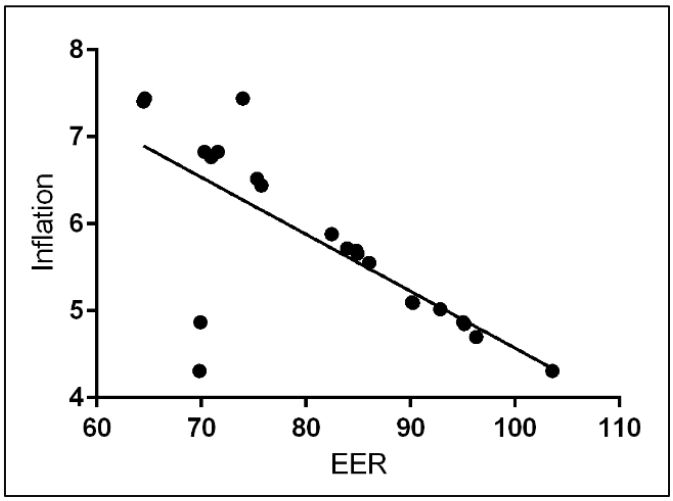


Illustration 5 | Regression Curve 2 | Source: Author

This scatter plot graph depicts the relationship between the effective exchange rate (EER) and Inflation rates. The x-axis represents the EER which is a measure of the value of the Indian Rupee (INR) against a basket of volatile currencies. The y-axis represents Inflation Rates – which reflect the general price level increase in India. The downward-sloping regression line suggests when the currency basket contains volatile currencies, a stronger INR (higher EER) is associated with lower inflation. Therefore, the downward trend in the scatter plot graph and the negative regression line provide evidence regarding the relationship that a poorly constructed currency basket, containing volatile currencies, exacerbates unpredictability in India's exchange rate dynamics – leading to fluctuations in inflation rates. This aligns with the hypothesis that a poorly constructed currency basket contributes to heightened unpredictability in India's exchange rate.

Overall, the regression curve depicted in the scatter plot graph reinforces the notion that currency basket composition plays a crucial role in determining exchange rate stability. A poorly constructed currency basket, with volatile currencies, contributes to unpredictability in India's exchange rate.

6. CONCLUSION

In conclusion, this research has provided valuable insights into the impact of currency baskets on exchange rate stability in the context of India's economy. Through comprehensive analysis and empirical investigation, we have demonstrated that a well-constructed currency basket, comprising stable and diverse currencies, can indeed lead to greater stability in India's exchange rates. By examining the relationship between currency basket composition and exchange rate dynamics, we have identified key factors influencing exchange rate stability and highlighted the importance of effective currency basket management strategies. These findings underscore the significance of policy interventions, risk management practices and marketing mechanisms in promoting exchange rate stability while mitigating a currency risk. Moving forward, it is imperative for policy makers, businesses, investors and other stakeholders to heed the implication of this research and adopt proactive measures to strengthen exchange rate stability, foster economic resilience and promote sustainable growth through concentrated efforts and informed decision-making in navigating complexities around exchange rate dynamics and contribute to a more stable and prosperous economic future for India and beyond.

7. FIGURES AND TABLES

Illustrations		
	Characteristics of Currency Baskets	*Source: Author*
	Historical Developments of Currency Baskets	*Source: Author*
	Correlation Analysis	*Source: Author*
	Regression Curve 1	*Source: Author*
	Regression Curve 2	*Source: Author*
Tables		
	Relationship between currency basket and exchange rate regime	*Source: Author*
	Example of currency basket with respective weights	*Source: Author*
	Special Drawing Rights (SDR) Basket by the IMF	
	Currency Basket Weights	*Source: Author*
	Daily Exchange Rates for USD/EUR	*Source: Author*
	Daily Exchange Rate for USD/JPY	*Source: Author*
	Pearson's Correlation Coefficient	*Source: Author*

8. REFERENCES

[1] Aloosh, A., & Bekaert, G. (2021). *Currency Factors* . Kay Giesecke, Finance.

[2] Bird, G., & Rajan, R. (2002). *OPTIMAL CURRENCY BASKETS AND THE THIRD CURRENCY PHENOMENON:* Exchange Rate Policy in Southeast Asia. Journal of International Development, 1053-1073.

[3] Duda, J. T., & Mazur, M. (2009). *A CONCEPT FOR CONSTRUCTION NEW CURRENCY BASKETS BASED ON STATISTICAL CRITERIA*. American Economic Review.

[4] Edison, H. J., & Vardal, E. (1987). *OPTIMAL CURRENCY BASKET IN A WORLD OF GENERALIZED FLOATING*: An Application to the Nordic Countries. International Journal of Forecasting, 81-96.

[5] Eiji, O. (2003). *Possibility of Creating a Common Currency Basket for East Asia.* China's Economic Development and Structural Change in East Asia, 142-204.

[6] Flanders, J. M., & Tishler, A. (1981). *THE ROLE OF ELASTICITY OPTIMISM IN CHOOSING AN OPTIMAL CURRENCY BASKET WITH APPLICATIONS TO ISRAEL*. Journal of International Economics 11, 395-406.

[7] Han, H.-L. (1999). *Choice of currency basket weights and its implications on trade balance.* International Review of Economics and Finance, 323-350.

[8] Hovanov, N. V., Kolari, J. W., & Sokolov, M. V. (2004). *Computing currency invariant indices with an application to minimum variance currency baskets*. Journal of Economic Dynamics & Control 28, 1481-1504.

[9] Kim, T.-J., & Ryou, J.-W. (2001). *The Optimal Currency Basket and the Currency Bloc in Asia.* Economic Papers.

[10] Mundaca, G. B. (1991). *The Volatility of the Norwegian Currency Basket*. The Scandinavian Journal of Economics, 53-73.

[11] Ogawa, E., & Shimizu, J. (2004). *Bond issuers' trade-off for common currency basket denominated bonds in East Asia*. Journal of Asian Economics 15, 719-738.

[12] Ogawa, E., & Shimizu, J. (2006). *Stabilization of effective exchange rates under common currency basket systems*. The Japanese and International Economies, 590-611.

[13] Pontines, V. (2009). *Optimal Common Currency Basket in East Asia*. Applied Economics Letters, 1139-1141.

[14] Schnabl, G. (2005). The Russian Currency Basket: *The Rising Role of the Euro for Russia's Exchange Rate Policies*. University of Leipzig - Institute for Economic Policy, 12.

[15] Shimizu, J., & Sato, K. (2018). *A currency basket and future exchange rate arranagements in Asia.* Economic and Political Studies, 53-68.

[16] Takagi, S. (1986). *Pegging to a Currency Basket*. Finance & Development.

[17] Turnovsky, S. J. (1982). *A Determination of the Optimal Currency Basket*. Journal of International Economics 12, 333-354.

[18] Williamson, J. (2005). *A currency basket for East Asia, Not just China* . Peterson Institute for International Economics.

[19] Xu, J. (2011). *The optimal currency basket under vertical trade*. Journal of International Money and Finance, 1323-1340.

[20] Yu, Y., Zhang, B., & Zhang, M. (2017). *Renminbi Exchange Rate: Peg to a wide band currency basket*. China & World Economy, 58-70.

[21] Wang, P., & Wang, P. (2020). *Assessment on estimations of currency basket weights—With coefficient correction for common factor dominance*.

[22] Luo, P. (2018). *Diversifying reference currency basket and decreasing degree of flexibility in exchange policy of China*.

[23] Hong, Y. (2020). *Arbitrage Bounds on Currency Basket Options*.

[24] Zhang, Z., Shi, N., & Zhang, X. (2011). *China's new exchange rate regime, optimal basket currency and currency diversification*.