



# Assessing the Global Currency Market's Response to the Federal Reserve's Interest Rate Cuts: A Comparative Analysis of RMB and JPY Exchange Rate Volatility

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**Abstract:** This paper examines the impact of the US Federal Reserve's interest rate cuts on global exchange rates, with a particular focus on the impact on major currencies such as the renminbi and the yen. The analysis includes a comprehensive examination of how interest rate cuts affect exchange rate volatility and assesses the potential impact on international trade and cross-border investment. The study draws conclusions through literature review, hypothesis testing and data analysis. The results of the study indicate that although there was some volatility in the exchange rates of the currencies after the Federal Reserve's interest rate cuts, regression analyses and t-tests showed that there was no significant difference in the exchange rate changes before and after the adjustments. The study also pointed out the shortcomings in methodology and data selection, suggesting that future research could explore the different channels through which the Fed adjusts its interest rate policy and its impact on the business cycle.

**Keywords:** Interest Adjustment, Federal Reserve, VAR Model.

## 1 Introduction

On September 18th, during local hours, the U.S. Federal Reserve completed its two-day monetary policy meeting. The central bank revealed a substantial change in its strategy by reducing the target range for the federal funds rate to between 4.75% and 5%. This adjustment represents a decrease of 50 basis points, signifying the first reduction in interest rates since 2020. This move signifies a strategic pivot from the Fed's previous stance of consecutive interest rate hikes that began in March 2020, reflecting a nuanced response to the evolving economic landscape. As Wang (2024) suggested, such adjustments typically indicate the U.S. economy entering a more accommodating phase, wherein the Fed employs rate cuts as a tool for stimulating growth amidst signs of economic strain or slowdown [1]. The global interconnectedness of today's economies means that these changes reverberate beyond American borders, influencing monetary policies and currency values worldwide.

It is worth noting that previous research has focused on analysing the impact of Fed rate hikes, which leaves a significant gap in understanding how rate cuts affect global

currencies. Recognizing this imbalance, this report aims to fill that void by comprehensively investigating and analyzing the implications of the Fed's recent rate cut on international currency exchange rates. This essay will center around how this policy adjustment has affected the volatility of key currencies like the Renminbi (RMB) and Japanese Yen (JPY), and further extrapolate potential consequences for international trade dynamics and cross-border investment flows.

The report includes a literature review, hypothesis testing, data analysis and conclusions on the impact of the Fed's interest rate cuts on global currencies.

## **2 Literature Review**

### **2.1 Reasons For The Fed's Interest Rate Adjustment**

Ultimately, the primary reason is that the Fed's monetary policy adjustments will lead to an economic devaluation of the dollar. And a large number of foreign investors will have to choose between keeping their money and moving it to higher-yielding currencies or assets. The article of Kang (2023) pointed out that when the Fed raises interest rates, more and more international investors will enter the U.S. economy to invest [2]. This behaviour greatly increases the demand for the US dollar, which in turn strengthens it. Similarly, the outflow of assets will also affect the value of other countries, especially those emerging countries whose currency interest rates have a strong correlation with the U.S. dollar.

### **2.2 Purpose of The Fed's Interest Adjustment**

The Federal Reserve's purpose in adjusting the federal funds rate is multifaceted, and regulating the inflation situation is one of them. Taslimaet et al. (2024) mention that in the conventional wisdom, an increase in interest rates usually cools down the economy substantially, indirectly giving a dampening effect on inflation [3]. When the economy is overheating and prices are rising rapidly, the Fed suppresses inflation by raising interest rates. The article of Wang (2024) also noted that the Fed's interest rate hike will increase the cost of borrowing, which will reduce consumer and business spending and investment, thus reducing demand for goods and services [4]. This reduction in demand can help ease inflationary pressures and keep price increases under control. By tightening monetary policy, the Fed expects to keep inflation within its target range and ensure the long-term health of the economy. For example, in 2023 the Fed held a total of eight interest rate meetings, four of which did not adjust interest rates, while the remaining four meetings decided to raise rates. Under the monetary policy of constant interest rate hikes, there was a significant reduction in the inflation rate in the United States, which eventually stabilised at around 3.5 per cent.

Looking at interest rate movements over the years, the Fed's policy of adjusting interest rates has also been to stabilise an excellent job market environment. In the early 2020s, the New Crown Epidemic pandemic led to massive business closures and unemployment. The unemployment rate in the United States reached 14.7 percent in

April 2020, the highest since the Great Depression. In order to increase market liquidity, the Federal Reserve quickly lowered interest rates to near zero and implemented a massive monetary easing policy, including the purchase of treasury bonds and mortgage securities, to encourage consumer and business borrowing and thereby boost the economy.

Even when the economy is not yet characterised by pronounced ups and downs, the Fed will take precautionary interest rate cuts to prevent the economy from slipping into deflation once it appears that there is a possibility of downside risks, such as an expected decline in production and consumption. Deflation generally leads to a sustained decline in the prices of goods and services, causing consumers to postpone consumption and businesses to reduce investment, ultimately triggering a recession.

### 2.3 Degree of Impact

The Fed's interest rate adjustment will have a significant impact on a number of industries and sectors, including semiconductors, banking, automobiles, finance, oil, currency exchange rate.

**Semiconductors** Fluctuations in interest rates predominantly influence the semiconductor sector via capital expenses. Increased interest rates can result in elevated borrowing costs for firms seeking to invest in innovative technologies or enhance their production capabilities. This dynamic can subsequently impede growth and development within the industry. This could slow innovation and growth in an industry that is critical to a wide range of consumer electronics and industrial applications. In addition, as borrowing costs rise, demand for new equipment may decrease, indirectly affecting the sales and revenues of semiconductor manufacturers. Sun (2023) made it clear that after the Fed announced its decision to raise interest rates, the strengthening of the U.S. dollar led to a reduction in operating income for companies with operations in other countries, including TSMC. This decision had a negative impact on TSMC [5].

**Banking** Adjustments to interest rates significantly influence the banking sector. Generally, rising interest rates lead to increased net interest margins for financial institutions, enhancing their profitability. This occurs because banks can charge higher rates on loans compared to the interest they pay on deposits, impacting both the U.S. and global banking markets. However, if interest rates rise too quickly, this may discourage borrowing because of the increased cost of lending, which may lead to slower loan growth. Banks in other countries have also been greatly affected by the impact. Zhang (2024) pointed out that the Fed's interest rate hike will cause the share of banks in different countries to fall sharply, resulting in the emergence of borrowing costs become higher, the demand for credit becomes less. And this change will lead to the banks to raise interest rates in order to balance or reduce losses [6].

**Imports and Exports** The value of the dollar is frequently affected by fluctuations in interest rates, which are crucial in determining international trade dynamics. Elevated interest rates can draw foreign investment, resulting in a stronger dollar and making U.S. exports costlier for international purchasers. By contrast, this can lead to reduced demand for U.S. goods, lower consumer confidence, higher loan costs, and slower economic growth. Taking the U.S. exporter China as an example, it is well known that

China is a country heavily dependent on the export market. Jin (2022) pointed out that the Fed's interest rate hike has led to weakening demand for commodities, which will force China's manufacturing industry and export trade to adopt constructional policies [7]. Agriculture and manufacturing industries that are secondarily dependent on export markets may face reduced demand, while import-dependent industries may benefit from lower raw material prices.

**Automobiles** The automotive industry is very sensitive to changes in interest rates due to the prevalence of financing car purchases. A rise in interest rates relative to consumers will result in higher monthly payments for car loans, making it more expensive for consumers to purchase new cars. This could dampen demand for both new and used cars. Conversely, lower interest rates will make financing more affordable for consumers, which will stimulate purchases and potentially boost sales. Changes in interest rates will impact car companies in several ways, including the prices of imported consumer goods, raw materials, and their stock prices. Jin (2022) suggested that the Fed's interest rate hike would lead to a significant amount of money flowing into the bond and stock markets. This influx of capital would cause the stock prices of companies that use the U.S. dollar for valuation and financial statements to soar, resulting in substantial gains [7]. Ranbo Ma (2022) also suggested that as the Fed's interest rate hike will make the US dollar in short supply in the international market, resulting in much higher market liquidity, it will have a short-term negative impact on Tesla's share price [8].

**Bulk Commodities** Commodities, such as oil, metals, housing and agricultural products, are significantly affected by interest rate adjustments, mainly through their impact on global economic activity. An increase in interest rates slows down economic growth and leads to a reduction in industrial activity, which in turn reduces demand for commodities. Bakulina et al. (2024) said that when the Federal Reserve raises interest rates, the dollar strengthens at the same time, a move that in turn makes dollar-denominated commodities significantly less expensive [9]. Liu (2024) believed that the Fed's interest rate hike will prompt consumers to reduce their ability to buy commodities. It will cut down on demand and puts downward pressure on commodities in the market, which is ultimately able to reduce price levels [10]. In addition, a stronger U.S. dollar usually makes commodities denominated in U.S. dollars more expensive for foreign buyers, which may reduce global demand and commodity prices. In contrast, reduced interest rates may enhance economic activity, boost demand for energy and raw materials, and elevate prices in those markets.

**Currency Exchange Rate** Fluctuations in interest rates directly affect capital movements. Typically, elevated interest rates attract foreign capital inflows into the United States, particularly within the bond and equity investment sectors. Such capital inflows can push up the exchange rate of the United States dollar. Conversely, low interest rates can lead to capital outflows and exert depreciating pressure on the dollar. Li (2024) analyzed the Fed's interest rate changes on emerging market economies and points out that when the U.S. raises the yields on its treasury bonds, a large amount of capital will flow to the U.S. market, resulting in a short-term loss of much capital in emerging markets over time [11]. These capital outflows will lead to currency

depreciation in these emerging countries, affecting the economic growth of these countries in disguise.

### 3 Hypothesis Testing

H0 (original hypothesis): There is no significant difference in exchange rate changes before and after interest rate cuts.

H1 (Alternative hypothesis): There is a significant difference in exchange rate changes before and after interest rate cuts.

The hypothetical countries are Japan and China, and their currencies are the Japanese Yen and the Chinese Yuan, respectively.

### 4 Data Analysis

#### 4.1 Analysis Process

The exchange rate of USD/JPY and USD/CNY before and after the Fed's rate cut on September 18, 2024 is available through yahoo financial, which can be used in the formula below to calculate the nominal rate of return (X)

$$X = \frac{\text{Closing rate for the day} - \text{Previous day's closing rate}}{\text{Previous day's closing rate}} \quad (1)$$

Using the Trading Economics website, the inflation rate for Japan in September 2024 can be obtained as 3.5 percent. Substituting the inflation rate for Japan in September 2024 with the nominal rate of return into the following equation, the real rate of return(Y) is calculated:

$$Y = \frac{X + 1}{\text{inflation rate} + 1} - 1 \quad (2)$$

Next it need to calculate the market rate of return (Z), using the dollar index obtained from Investing.com and substituting it into the formula below:

$$Z = \frac{\text{Current day's dollar index} - \text{previous day's dollar index}}{\text{previous day's dollar index}} \quad (3)$$

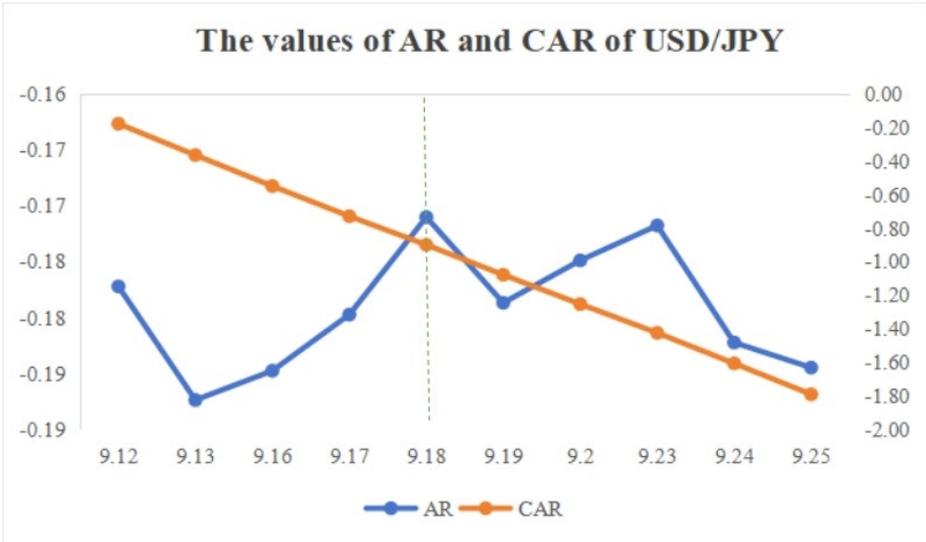
After deriving the market rate of return, a linear regression analysis of the nominal rate of return and the market rate of return is performed to derive  $\alpha$  and  $\beta$ :

$$\text{Expected rate of return} = \alpha * X + \beta \quad (4)$$

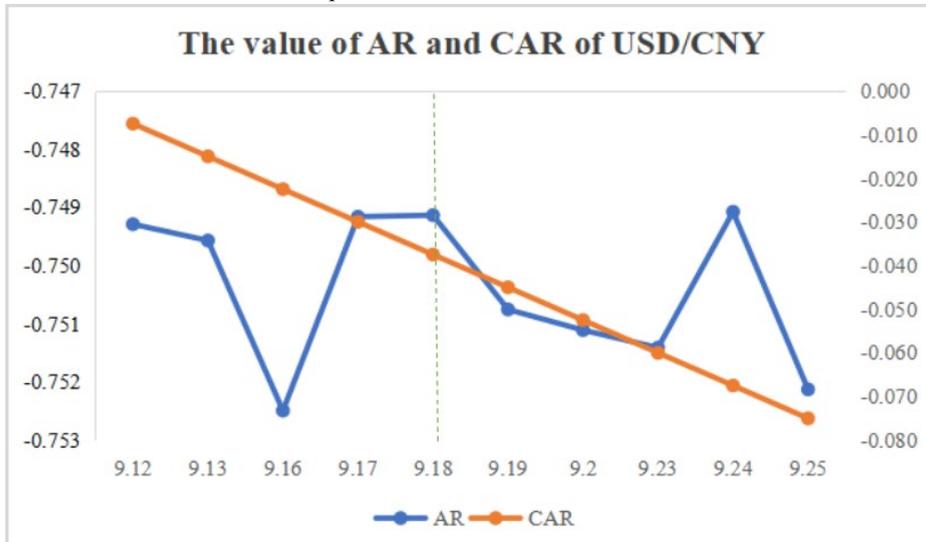
Finally, the difference between the nominal rate of return and the expected rate of return gives the abnormal rate of return:

$$\text{Abnormal rate of return} = X - Y \quad (5)$$

After substituting the data, the abnormal returns and cumulative abnormal returns of USD/JPY and USD/CNY are obtained.



**Fig. 1.** Abnormal Returns and Cumulative Abnormal Returns of the USD/JPY Exchange Rate in the Week Before and After the September 18, 2024 Fed Rate Cut Announcement.



**Fig. 2.** Abnormal Returns and Cumulative Abnormal Returns of the USD/CNY Exchange Rate in the Week Before and After the September 18, 2024 Fed Rate Cut Announcement.

In Figures 1 and 2, the green dashed line indicates the date the Fed announced the rate cut, while the primary and secondary vertical axes are used in both graphs because of the large difference between the AR and CAR values.

Through t-test, it can be calculated that the p-value of USDJPY and USDCNY are 0.299812 and 0.305192 respectively, which are greater than 0.05. By comparing the data, the original hypothesis is valid and the alternative hypothesis is rejected, and there is no significant difference in exchange rate changes before and after the interest rate cut.

## 4.2 Analyzing The Causes

**Interest rate differentials** Fed rate cuts usually result in lower interest rates for the dollar, but if the market expects other countries (e.g., Japan and China) to follow suit or keep interest rates low, the dollar becomes relatively more attractive. Investors may turn to dollar-denominated assets, leading to an appreciation of the dollar.

**Capital flows** Interest rate cuts may prompt investors to look for higher yielding investment opportunities. If the market believes that interest rates for the yen and renminbi will rise, this may lead to capital outflows, further increasing the demand for the US dollar, which could lead to a depreciation of the Japanese Yen and the Chinese Yuan.

**Market expectations** Market expectations of future economic conditions can also affect exchange rates. If a rate cut is interpreted as a sign of an economic slowdown, investors may become concerned about the outlook for the Japanese and Chinese economies, leading to a reduction in demand for the JPY and CNY.

**Inflation expectations** A rate cut may raise inflation expectations, making the risk of currency depreciation higher. Investors may consequently have less confidence in the Japanese Yen and the Chinese Yuan, further driving depreciation.

## 5 Conclusion

This essay examines the Federal Reserve's unusual interest rate cut on September 18, 2024, highlighting the minor fluctuations observed in the exchange rates of various foreign currencies. Utilizing regression analysis and t-tests, the study analyzes abnormal returns and cumulative abnormal returns associated with exchange rate changes. The findings indicate no significant relationship between the Fed's interest rate adjustments and fluctuations in exchange rates. However, the paper has notable limitations. Firstly, the methodology employed is relatively simplistic and lacks depth. Secondly, the selected data period includes two weekends during which the central bank did not release any exchange rate data, resulting in gaps in the analysis. Future research could explore how the Federal Reserve's interest rate policy adjustments impact the real economy through various channels, such as credit markets and capital markets. This approach may provide a more comprehensive understanding of the broader economic implications of monetary policy changes.

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