INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs.202112236
Received: 21.02.2021 | **Accepted:** 12.05.2021 | **Published Online:** 05.06.2021

-RESEARCH ARTICLE-

INTERACTIONS BETWEEN THE EXCHANGE RATE OF RMB/USD IN THE ONSHORE AND OFFSHORE MARKETS: EVIDENCE FROM THE COMPARATIVE ANALYSIS ON '8.11' EXCHANGE RATE REFORM IN CHINA

Ruijie Sun

Hanyang University, Korea,
E-mail: iamsrj@163.com
https://orcid.org/0000-0003-0917-0834

Choonwon Park

Hanyang University, Korea,
E-mail: chwonpark@hanyang.ac.kr
https://orcid.org/0000-0001-9802-8033

─Abstract─

This paper uses data pertaining to onshore and offshore markets before and after China's '8.11' exchange rate reform. The result verifies that after the exchange rate reform, the time series of RMB central parity rate (CPY), spot exchange rate and non-deliverable forward rate in Hongkong offshore market (CNH and NDF) have structural abrupt changes by Chow test from a quantitative perspective. On this basis, the co-integration test, Granger causality test, impulse response under the framework of VAR model, variance decomposition and other methods are used to further study the interaction between the above exchange rates before and after the exchange rate reform and make comparative analysis on them. The results show that the original formation mode of RMB central parity leads to long-term deviation between market transaction price and central parity, onshore price, and offshore price, thus affecting the market benchmark status and authority of the central parity rate. After the '8·11' exchange rate reform in 2015, the trend of the central parity rate, the exchange rate in the onshore market and the offshore market converged significantly, the exchange rate difference reduced significantly, and the correlation between the onshore and offshore exchange rates strengthened.

Keywords: RMB/USD Exchange Rate, Onshore and Offshore Renminbi Market, RMB Central Parity Rate (CPY), Spot Exchange Rate, Non-deliverable Forward Rate, '8.11' Exchange Rate Reform, VAR model

JEL Classification: E43 E44 F31 G15

Citation (APA): Sun, R., Park, C. (2021). Interactions Between the Exchange Rate of Rmb/Usd in the Onshore and Offshore Markets: Evidence from the Comparative Analysis on '8.11' Exchange Rate Reform in China. *International Journal of Economics and Finance Studies, 13* (1), 318-339. doi:10.34111/ijefs. 202112236

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

1. INTRODUCTION

In today's world monetary system, the international status of RMB is gradually improving. More and more international trade uses RMB as the settlement currency, and RMB also appears more in people's investment and asset allocation portfolio. In particular, the RMB officially joined the Special Drawing Rights of the International Monetary Fund on October 1, 2016, which represents an important landmark of China's economic integration into the global financial system. The Chinese government has also been deepening reform and opening up, making the process of RMB internationalization orderly (Ding, Cui, & Zhang, 2020). The exchange rate reform on August 11, 2015, has had a profound impact on the development of China's foreign exchange market, marking the further improvement of the market-oriented mechanism of RMB exchange rate and laying an important foundation for the internationalization of RMB. In recent years, the great strategy of 'One Belt and One Road' construction and the establishment of the Asian Infrastructure Investment Bank both indicate the further development of RMB internationalization and the increasing demand for RMB in the international community (Du, 2016). Therefore, the state foreign exchange and economic management departments, importers and exporters, and investors need to pay close attention to the dynamics of the RMB foreign exchange market and the trend of the RMB exchange rate (Talha, Sohail, Tariq, & Ahmad, 2021). If the exchange rate fluctuation is too large, it will not only affect the profitability of import and export enterprises, and the import consumption of individuals, but also affect the creditor's rights and debts of the country, enterprises and individuals (Lo, 2010). When RMB appreciation is expected, it will stimulate the influx of foreign hot money and the increase of dollar borrowing, which will cause the overheating of domestic economy and the formation of asset bubbles; When RMB depreciation is expected, a vicious circle of depreciation expectations will result from the withdrawal of speculative capital and the early repayment of foreign debt to mitigate the risk of exposure to previously borrowed dollar capital (Bahmani-Oskooee, Kutan, & Xi, 2015). The change of exchange rate influence of domestic enterprises and individuals at the same time, also affect the trade of the other party, in this sense, the exchange rate is not a country's internal affair, if processing is bad it can lead to trade friction and trade retaliation, or even the country being labeled as a currency manipulator, affecting normal international trade (Frankel, 2012). At present, the development of RMB onshore market is not mature enough. As a strong mechanism of support on the road to RMB internationalization, RMB offshore market has played a certain complementary and reference role for the onshore market.

At the same time, the policy effect of the onshore market will also be transmitted to the offshore market, and the coordinated development of the offshore market largely determines the smooth progress of RMB internationalization (Talha, Azeem, Sohail, Javed, & Tariq, 2020). However, the fluctuations in the RMB exchange rate market as well as a large number of studies show that the original formation mode of RMB central parity leads to the long-term deviation between market transaction price and central parity, onshore price and offshore price, thus affecting the market benchmark status and authority of the central parity rate (Colavecchio & Funke, 2008). Since the monetary authorities are unable to directly control the operation of the offshore market, to enhance the marketization degree and benchmark of the RMB/USD exchange rate parity and promote the coordinated development of the offshore market, the Central Bank of China issued the statement on 'Improving the Quotation of the RMB/USD Exchange Parity Rate' on August 11, 2015 (Talha, Sohail, & Hajji, 2020). It is pointed out that market makers should refer to the closing exchange rate of the inter-bank foreign exchange market of the last day, consider the supply and demand of foreign exchange and the exchange rate changes of major international

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

currencies to provide the central parity quotation to the China Foreign Exchange Trade Center. Therefore, it is of great significance to study the policy effect of "8.11" exchange rate reform.

We analyzed the impact of exchange rate reform on the marketability and benchmarking of the central parity rate to assess whether the exchange rate reform has achieved the goal of improving the regularity, transparency, and marketization of the exchange rate mechanism. Also, the research can test whether the exchange rate trends of the onshore market and the offshore market converge, whether the exchange rate differential is narrowed, and compare the correlation between the onshore market and the offshore market before and after the exchange rate reform. It is helpful to find the law of RMB exchange rate fluctuation to understand the changing trend of RMB exchange rate and determine the reasonable area and target area of exchange rate fluctuation and grasp the target and direction of future exchange rate reform. Researching the exchange rate reform not only lays the foundation for RMB internationalization and helps achieve a full floating exchange rate system, it is also conducive to China's macroeconomic policy formulation (Y.-W. Cheung & Rime, 2014).

2. LITERATURE REVIEW

2.1 Exchange Rate Determination Theory

International parity theory and the balance of payments theory seek to explain why RMB exchange rates in different markets have linkage effects from the perspective of capital arbitrage and trade arbitrage respectively. Cassel (1918) fully elaborates the theory of purchasing power parity (PPP), which determines the exchange rate, with the theory positing that the currency swap between two countries is essentially the exchange of purchasing power. Therefore, the exchange rate depends on the ratio of the purchasing power of the two currencies, which is the inverse of the general price level, so the exchange rate between the two countries can be expressed by the ratio of the price level of the two countries. Purchasing power parity can be divided into absolute purchasing power parity and relative purchasing power parity. Absolute purchasing power parity means that the equilibrium exchange rate of two currencies depends on the ratio of the price level of the two countries; Relative purchasing power parity refers to the change in exchange rates over a period in direct proportion to the relative change in the price level of the two countries over the same period. Keynes (J. Keyness, 1924) systematically discusses the theory of interest rate parity, which posits that the relationship between spot exchange rate and forward exchange rate between two countries was closely related to the interest rate of two countries, and the difference between forward exchange rate and spot exchange rate was equal to the difference between the interest rate of two countries. This interest rate difference is an important reason for hedging and arbitrage in transactions between countries, and therefore affects the currency parity between countries.

The Mundal-Fleming model proposed by Flemint (Robert A.Mundell and J.Marcus in the 1960s) describes the equilibrium interest rate and equilibrium exchange rate under the condition that the product market IS, the money market LM and the foreign exchange market BP reach equilibrium at the same time, and exert an influence on the national income and international balance of payments. After 1970s, currency analysis and portfolio analysis became the mainstream. The new development of foreign exchange rate theory, including some new methods, new thinking in the study of exchange rate applications such as rational expectations, market efficiency, message impact, micro-structure analysis, economic welfare maximization, incomplete information, and the heterogeneity of participants and so on, therefore, some new models of exchange rate determination are produced, such as the random walk model, message model, the microscopic structure model, etc. Santana-Gallego and Pérez-Rodríguez (2019) study the

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

influence of various exchange rate regimes and investigate the performance of exchange rate regimes during pandemic crises.

In this research paper, the researcher presents a gravity equation at the end of the paper; for this purpose, samples have been collected from 191 different countries for bilateral trade from the period of 1970–2016 by using the set of regresses constructed from a defect to categorize the arrangements of the exchange rate. Nguyen (2013) explains the interconnection of production activities, the U.S. interest rate, and the international exchange rate between China and the U.S. as well as bank loans of different types offered by commercial banks of the U.S. and China. To investigate this interaction, monthly data has been collected from 1981 to 2012, which shows that some macroeconomic indicators related to U.S. bank loans are associated with China and U.S exchange rates (Hidayat, 2019).

The findings reveal that the low-term federal funds rate in the United States, three kinds of loans from all commercial banks in the United States, and manufacturing capacity utilization in the United States can all be considered good determinants and predictors of the whole exchange rate between currencies of China and the U.S. Bowornchockchai (2016) study the exchange rate of U.S. and China, the goal of this research was to evaluate two forecasting methodologies for the monthly exchange rate between the U.S. dollar and Chinese currency. Holt's method and Box-Jenkins' technique were the two ways used to investigates the results. The Box-Jenkins technique was the most appropriate approach for calculating the monthly exchange rate between the U.S. and China’s currencies.

Nor, Masron, and Alabdullah (2020) analyze the impacts of the macroeconomy and international commerce on the exchange rates of any country. This article aims to study the influence of macroeconomic factors on the uncontrolled exchange rates in Somalia. This study shows that Somalia's uncontrolled currency rate volatility is impacted by macroeconomic variables and shocks using the EGARCH model. By using different models, researchers make this research intriguing and a venture that warrants additional investigation. As a result, this research significantly helped inform Somalia's monetary policy and post-conflict economy's exchange rate structure (Iwayan & Anom, 2020).

Widagdo, Jihadi, BACHITAR, SAFITRI, and SINGH (2020) test and analyze the impact of macroeconomics and financial ratios on stock returns in JII (Jakarta Islamic Index). In this research paper, a quantitative descriptive approach has been utilized, and secondary data of sample has been collected from 29 companies in the list of JII. The sample data is analyzed using SEM with AMOS. The study's findings demonstrate that the investment risk can be affected by Shia's financial ratios and stock returns. These data suggest that the financial condition of the firm has a critical impact. Aside from impacting the return rate, the firm's economic health might also indicate the extent of risk that stockholders are willing to bear in the future. Therefore, a company's financial performance will improve, resulting in a favorable influence on various stakeholders and reducing investment losses. Abolhasanbeigi and Mahdavi (2020) explain the macroeconomic instability of China's exchange rate and the U.S. The primary intention of this research article is to explore the dynamic influences of macroeconomic unreliability on the connection between the trade balance and the Chinese exchange rate. By using the Markov-Switching method, the association between trade stability and the exchange rate is calculated (Perkasa, 2019). According to the findings, Chinese macroeconomic instability may be divided into two categories: low macroeconomic instability and high macroeconomic instability. In both regimes, a rise in the exchange rate causes an improvement in the trade balance (Al-Yahyaee, Mensi, Rehman, Vo, & Kang, 2020). In two regimes, macroeconomic instability has a negative

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

and substantial influence on the association of exchange rate and stability of trade. Both regimes imply that macroeconomic stability worsens the influence of the exchange rate on the stability of international finance.

2.2 Onshore Renminbi Market

The foreign exchange market can be divided into spot foreign exchange market, forward foreign exchange market, foreign exchange futures market and foreign exchange option market. The onshore RMB foreign exchange market refers to the market for RMB related foreign exchange transactions formed in the Chinese mainland. In July 2005, after nearly 10 years of RMB exchange rate against the dollar peg began to have certain floating, the RMB exchange rate fluctuations are restricted by the policy and the administration of foreign exchange, such as domestic bank regulators constantly guide regulation, compared with the offshore rate, onshore renminbi exchange rate is limited by regulation and more, making the onshore show a tendency of relative stability.

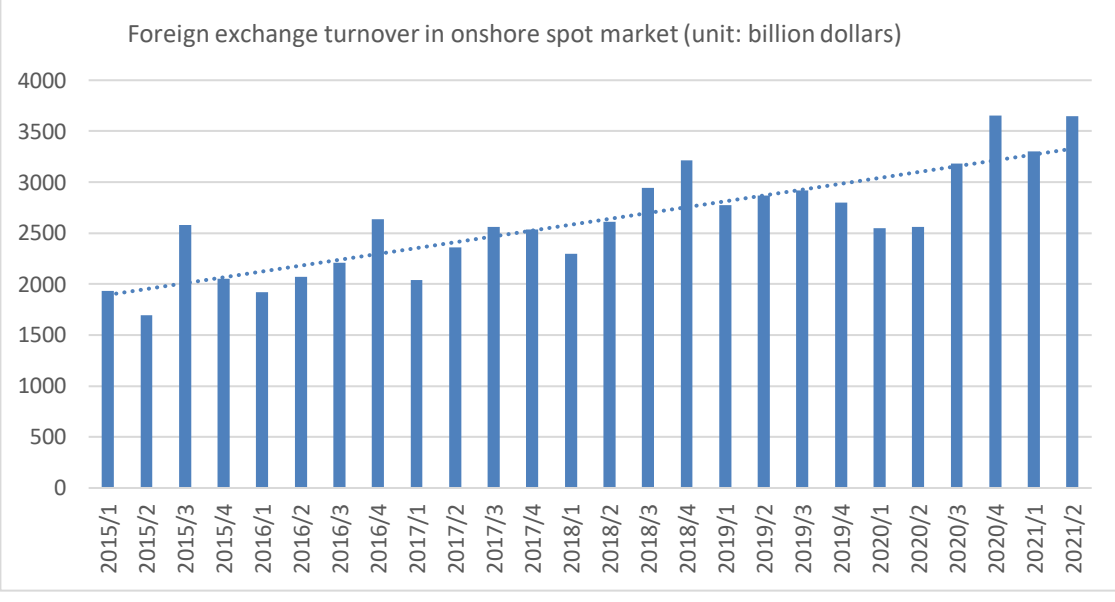


Figure1: Foreign exchange turnover in onshore spot market by quarter from 2015 to 2021
Data source：State Administration of Foreign Exchange

http://www.safe.gov.cn/safe/zgwhscjygk/index.html

Figure 1 shows the foreign exchange turnover from 2015 to 2021. The figure shows that the data of The State Administration of Foreign Exchange of China depicts that since the '8.11 exchange rate reform' in 2015, the onshore RMB foreign exchange trading volume has shown a trend of steady growth. The amount of RMB against USD and its transactions has increased from 8,260.2 billion USD in 2015 to 11,943 billion USD in 2020, with an annual interest rate close to 7.6%. In terms of transaction modes, there are two main types of onshore foreign exchange transactions, namely, bank-to-bank and bank-to-customer transactions, among which interbank foreign exchange transactions are dominant, while bank-to-customer foreign exchange transactions are relatively low. In terms of the types of transactions in the onshore RMB foreign exchange market, the types of the onshore RMB foreign exchange market continue to diversify. By 2021, the onshore RMB foreign exchange market had formed a complete foreign exchange product market

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

system including spot transaction, forward transaction, swap and option transaction (Y. W. Cheung, Hui, & Tsang, 2018).

2.3 Offshore Renminbi Market

2.3.1 NDF Market

The offshore RMB market originated from the non-deliverable forward market, namely the NDF market, which is a financial derivative instrument in essence. With the development of China's economy, more and more capital inflows were attracted. Transnational investment companies were in urgent need of tools to avoid the risk of RMB exchange rate. At that time, there was no real forward foreign exchange market in China, so the NDF market emerged in this context. Foreign enterprises, banks and hedge funds are the main participants in the NDF market, and the main delivery currencies are RMB, Korean currency, New Taiwan Dollar, Indian rupee, Indonesian Rupee and Philippine peso.

Hong Kong and Singapore NDF markets are the most important RMB offshore forward markets in Asia. The market was initially formed in 1996, when market transactions were not active. After 2002, with the gradual reduction of the negative impact of the Southeast Asian financial crisis, the NDF markets gradually developed and became active. Coupled with the steady growth of China's economy and the continuous expansion of foreign trade, RMB has been expected to appreciate in the offshore NDF market, which reached the peak of RMB trading between 2008 and 2009, with an average daily turnover of us $10 billion. In July 2009, the pilot RMB for cross-border trade was launched, and the central government proposed the development goal of RMB internationalization. By 2011, all provinces and cities on the mainland will have set up cross-border trade settlement points. This measure promoted the internationalization of RMB, enabling cross-border trade to be settled and paid in RMB and to be levelled by clearing banks. Overseas individuals who have a demand for RMB can exchange RMB through cross-border trade settlement and payment and Hong Kong RMB clearing bank, opening domestic and overseas channels. Overseas individuals in need of RMB can exchange RMB through cross-border trade settlement and payment or Hong Kong RMB clearing bank, opening domestic and overseas channels. Due to the intercommunication of onshore and offshore market channels and the influence of the establishment of CNH market, non-deliverable RMB forward exchange is not the only option to hedge RMB foreign exchange risks. Therefore, the NDF market took a turning point with the trading activity of RMB NDF market declined. The NDF quotation, which is provided by 18 banks and published by Reuters at 11:30 a.m., is calculated to exclude three highest and three lowest quotations.

2.3.2 CNH Market

Since February 2004, RMB business can be formally handled in Hong Kong banks, that is, the spot exchange rate of RMB against US dollar was established. This was the first time that individual RMB business was handled outside mainland China, marking the beginning of CNH market. On July 19, 2010, the Central Bank of China, and the Hong Kong RMB Business Clearing Bank jointly signed the RMB business clearing agreement for Hong Kong banks, which means that banks in Hong Kong can open RMB accounts and provide RMB business services for financial institutions. Before the individuals and companies are free to pay and transfer the RMB, Overseas RMB participating banks need to go through the clearing bank to level so there is no offshore exchange rate in the real sense. After the signing of this agreement, the participating banks in overseas RMB settlement can level the balance with each other without the participation of overseas clearing banks. The initial establishment of CNH market made RMB

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

convertible in Hong Kong market, and the Hong Kong Offshore RMB exchange rate began to form gradually. On June 27, 2011, Hong Kong formally set the RMB/USD spot exchange rate fixing, which was set at 6.4753 RMB per USD on that day. The fixing rate assumes the nature of benchmark exchange rate and can be used as the reference exchange rate for pricing RMB products in the offshore market.

The fixing is based on an average of the intermediate quotations from 15 banks active in the offshore yuan market, including HSBC and Standard Chartered, which strip out the two highest and two lowest quotations. On August 1, 2016, the Hong Kong RMB spot rate fixing was no longer provided by the quoting banks but calculated by Reuters based on transactions executed between 10:54 and 11:15 Hong Kong time and published jointly by the Hong Kong Treasury Markets Association and Reuters. Since the establishment of CNH spot market in Hong Kong, CNH market has developed rapidly with the support of both the Chinese government and the Hong Kong Monetary Authority, which is reflected in the rapid increase of RMB deposits and the continuous expansion of RMB settlement scale. According to Figure 2, the total amount of RMB deposits in Hong Kong showed an overall upward trend from 2010 to 2013. In 2014, RMB deposits exceeded 1 trillion and reached a peak. Since 2014, RMB deposits have declined, however, the overall stock is still large. In recent years, the total amount of RMB deposits in Hong Kong has been steadily rising.

2.4 Interactions between Onshore and Offshore Markets

Park (2001) use the GARCH model to investigate the interrelation and information flows between the Won–Dollar spot and offshore forward, i.e., NDF markets. Y.-W. Cheung and Rime (2014) conclude that the influence of RMB offshore exchange rate on the onshore exchange rate has gradually strengthened and has had a significant predictive effect on the official RMB central parity rate. Maziad and Kang (2012) uses the binary VAR - GARCH model to study the two levels of information spillover effects between the exchange rate of onshore and offshore market, which are the yield and the volatility, and found that after the initial formation of RMB offshore market and onshore market, the two markets are closely linked showing a two-way volatility spillover effect. Moreover, the offshore market exchange rate has a time lag to the volatility spillover of the onshore market exchange rate. Figures 2 supports the focus of the paper on the impact of the reform in the Korean exchange rate systems, which occurred in December 1997 in response to the currency crisis, on the relation between the two markets. The figure shows the total RMB deposits in Hong Kong from 2010 to 2021. Therefore, the results show that there are information flows between the two markets, and the reform has changed the direction of the dynamic relation.

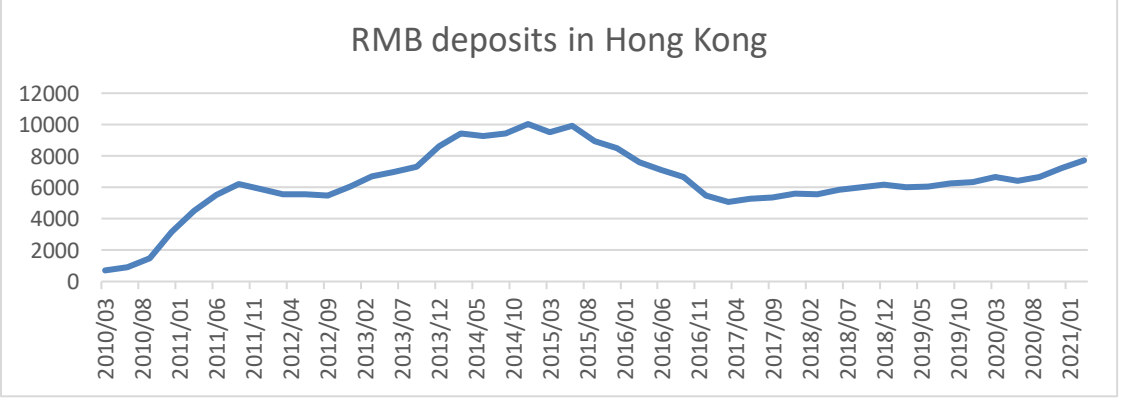


Figure 2: Total RMB deposits in Hong Kong from 2010 to 2021
Data source: Wind database

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

Song and Gao (2016) claim that the offshore market and the onshore market are more closely linked after the RMB exchange rate reform. The fluctuation of the RMB central parity rate has been relaxed, and the RMB onshore market has the pricing power of the RMB exchange rate.

Peng and Kang (2021) analyze the efficiency of China's central bank's management after '8.11' RMB exchange rate reform in 2015 in China, and find that the management improved the imbalance between supply and demand and reduced irrational procyclical expectation on RMB exchange rate. Maziad and Kang (2012) employ a bivariate GARCH model to understand the inter-linkages between onshore and offshore markets and found that, while developments in the onshore spot market exert an influence on the offshore spot market, offshore forward rates have a predictive impact on onshore forward rates. Li, Hui, and Chung (2012) found the evidence of volatility spillovers between two markets. Overtime, those spillover channels would be expected to grow as the offshore market further develops. Atabani Adi (2019) examine the volatility of RMB exchange rate return in onshore and offshore markets and claim that the exchange rate volatility was persistent in both markets. However, offshore return was more persistent while leverage effects exist in both markets.

2.5 RMB Exchange Rate Reform

In January 1994, China began to implement a single, managed floating exchange rate system based on market supply and demand, A managed floating exchange rate regime with reference to a basket of currencies was introduced in July 2005. Subsequently, the fixed exchange rate peg to the US dollar was implemented in August 2008. The Central Bank restarted the exchange rate reform to increase the flexibility of the RMB exchange rate and improve its marketization degree in June 2010. Figure 3 shows that, in August 2015, the dual-anchor mechanism of 'closing rate + change of a basket of currencies' was formally established, with the central parity quotation referring to a basket of currencies

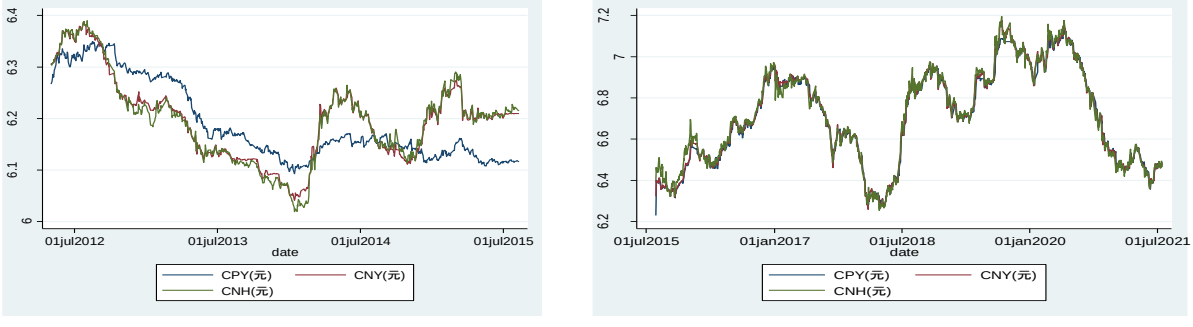


Figure-3: RMB/US Dollar exchange rate trend

Figure 4: RMB/US dollar exchange rate yield

Figure 3 and Figure 4 portraits that before the reform of the 8.11 exchange rate, there was a long-term large deviation between the central parity rate and the market exchange rate, which affected

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

the market benchmark status and authority of the central parity rate. However, after the reform, the trend of the central parity rate and the market exchange rate converged significantly, and the exchange rate gap narrowed significantly.

Therefore, it is significant to study the changes of interactions between onshore and offshore markets before and after exchange rate reform.

3. METHODOLOGY

This research has three variables: RMB onshore spot exchange rate, Hong Kong offshore RMB exchange rate and RMB non-deliverable forward exchange rate, represented by daily data of the RMB/USD central parity rate (CPY), daily closing rate of RMB/USD and daily data of three-month forward exchange rate (NDF) in Hong Kong offshore market (CNH), respectively. The sample range is from May 2, 2012, to July 21, 2021. Excluding incomplete data due to holidays and trading day mismatches between variables, 2,233 data were obtained for each market from the website of State Administration of Foreign Exchange, Hong Kong TMA, and Bloomberg database. VAR model is constructed by using Stata13.0 to study the relationship between the variable's understudies. The description of variables is mentioned in the Table 1.

Table1. Variables

Descriptions	Notations	Data	Data Sources
RMB spot exchange rate in onshore market	CPY	RMB Central Parity Rate	State Administration of Foreign Exchange
RMB spot exchange rate in Hong Kong offshore market	CNH	Daily closing rates of RMB/USD spot	Treasury Markets Association
RMB Non-deliverable Forward rate in Hong Kong offshore Market	NDF	Daily closing rates of RMB/USD forward contracts	Bloomberg Database

Table 1 shows the description of the variables, along with notations, data series, and data sources. The data was collected from the RMB Spot Exchange rate in onshore market, Hong Kong offshore market, and RMB non-deliverable forward rate in Hong Kong offshore market.

3.1 Descriptive Statistics Analysis

VAR model takes each endogenous variable in the system as a function of the lag value of all endogenous variables to build the model to study the dynamic relationship between variables understudy, so it can be used to investigate the spillover effect between RMB exchange rates in different markets. RCPY is the rate of return in the onshore spot market, RCNH is the rate of return in the offshore spot market, and RNDF is the forward rate of return in the NDF market. In the equations, p is the lag order; α, β, γ represent the price spillover effect between the two markets, and ε represents the stochastic error term of the equation.

4. RESULTS AND DESCRIPTIONS

4.1 Chow Test

According to Figure 1 and Figure 2, it can be seen qualitatively that after the '8.11' exchange rate reform, the central parity rate, and the spot and forward exchange rates of RMB/USD in the offshore market immediately rose sharply. Therefore, Chow test is used in this paper to

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

quantitatively verify whether the "8·11" exchange rate reform has caused structural changes in the above exchange rate data.

4.2 Granger Causality Tests

To study the interaction between the above exchange rates, Granger causality test is conducted on the exchange rate series before and after the exchange rate reform, and the results are shown in Table 4. RCNH and RNDF are Granger causes for each other before the '8.11' exchange rate reform, indicating that there is a two-way guiding relationship between them. Meanwhile, both RCNH and RNDF are the one-way Granger cause of RCPY, while RCPY is not the Granger cause of RCNH and RNDF. This means that before the '8.11' exchange rate reform, the offshore spot and forward exchange rates has an interaction, while the onshore exchange rate does not have an interaction with the offshore exchange rate.

4.3 Vector Auto-Regression Estimates

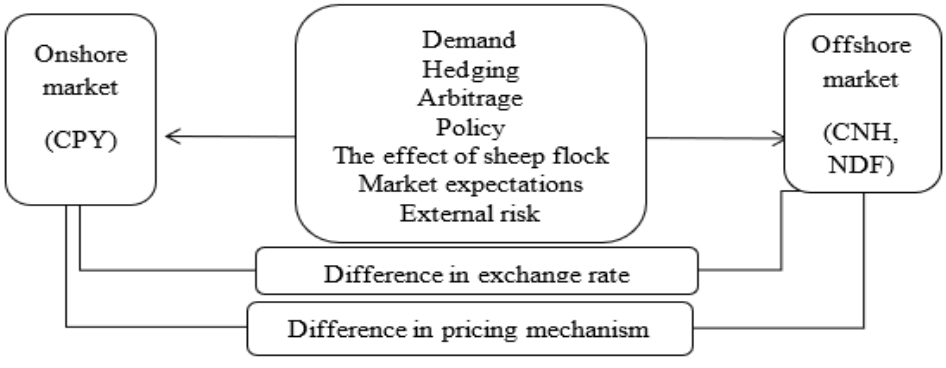
To further study the interaction between onshore exchange rate, offshore spot exchange rate and forward exchange rate and the degree of mutual influence, VAR model should be established and then the impulse response and variance decomposition method should be used to analyze the results.

Table 2: Descriptive Statistics

Variables	Obs		Mean		Std. Dev		Min		Max	
	Before	after	before	After	before	After	before	After	before	after
CPY	787	1447	6.1911	6.70997	0.07745	0.229527	6.093	6.2298	6.3495	7.1316
CNH	787	1447	6.1979	6.71891	0.083979	0.230538	6.0194	6.25425	6.3901	7.1947
NDF	787	1447	6.2160	6.75646	0.076445	0.224318	6.089	6.2967	6.386	7.2041

Taking August 11, 2015, as the time node, descriptive statistical analysis is conducted on the data of onshore and offshore market exchange rates from May 2, 2012, to July 21, 2021. The results are shown in Table 2. Table 2 shows the data summary. The table shows the summary data from 2012 (before), and 2021 (after). The descriptive analysis showed the data of onshore and offshore market rates. There were 787 observations in 2012, and 1447 observations in 2021. The mean, std. deviation, minimum and maximum values of CPY. CNH, and NDF are given in Table 2.

Theoretical Model



Theoretical Framework

Econometric Model

Rate of Return

$$RCPY_t = 100 \times (\ln CPY_t - \ln CPY_{t-1}) \quad (1)$$

$$RCNH_t = 100 \times (\ln CNH_t - \ln CNH_{t-1}) \quad (2)$$

$$RNDF_t = 100 \times (\ln NDF_t - \ln NDF_{t-1}) \quad (3)$$

VAR（p)

$$RCPY_t = \alpha_{31}RCPY_{t-1} + \ldots + \alpha_{3p}RCPY_{t-p} + \beta_{31}RCNH_{t-1} + \ldots + \beta_{3p}RCNH_{t-p} + \gamma_{31}RNDF_{t-1} + \ldots + \gamma_{3p}RNDF_{t-p} + \varepsilon_{3t} \quad (4)$$

$$RCNH_t = \alpha_{21}RCNH_{t-1} + \ldots + \alpha_{2p}RCNH_{t-p} + \beta_{21}RCPY_{t-1} + \ldots + \beta_{2p}RCPY_{t-p} + \gamma_{21}RNDF_{t-1} + \ldots + \gamma_{2p}RNDF_{t-p} + \varepsilon_{2t} \quad (5)$$

$$RNDF_t = \alpha_{31}RNDF_{t-1} + \ldots + \alpha_{3p}RNDF_{t-p} + \beta_{31}RCPY_{t-1} + \ldots + \beta_{3p}RCPY_{t-p} + \gamma_{31}RCNH_{t-1} + \ldots + \gamma_{3p}RCNH_{t-p} + \varepsilon_{3t} \quad (6)$$

Table3 (Note: The Structural Change Point is Set on August 11, 2015; The Probability Values Are in Parentheses)

Null hypothesis	Dependent variable	F-statistic	Loglikelihood
no structural change	lnCPY	453.2817(0.0000)	1064.2872(0.0000)
	lnCNH	933.44(0.0000)	1251.2729(0.0000)
	lnNDF	4740.98(0.0000)	999.3929(0.0000)

Table 3 shows the Structural Change Point in Set August 11, 2015. The table shows the F-Statistics value and Loglikelihood values. The F-Statistics for lnCPY is 453.2817 (0.0000), for lnCNH is 933.44 (.000), and lnNDF is 4740.98 (0.0000). Whereas, the value of Loglikelihood for lnCPY is 1064.2872 (0.0000), lnCNH is 1251.2729 (0.0000), and for lnNDF is 999.3929 (0.0000).

Table 4

Null hypothesis	F-statistic	Prob.	Result
Before the ’8.11’ exchange rate reform			
RCPY does not Granger Cause RCNH	7.0935	0.131	Not reject the null hypothesis
RCNH does not Granger Cause RCPY	144.95	0.000	Reject the null hypothesis
RCPY does not Granger Cause RNDF	7.2464	0.123	Not reject the null hypothesis
RNDF does not Granger Cause RCPY	39.283	0.000	Reject the null hypothesis
RCNH does not Granger Cause RCNDF	112.13	0.000	Reject the null hypothesis
RNDF does not Granger Cause RCNH	17.742	0.000	Reject the null hypothesis
After the ’8.11’ exchange rate reform			
RCPY does not Granger Cause RCNH	129.64	0.000	Reject the null hypothesis
RCNH does not Granger Cause RCPY	28.342	0.000	Reject the null hypothesis
RCPY does not Granger Cause RNDF	17.776	0.000	Reject the null hypothesis
RNDF does not Granger Cause RCPY	16.705	0.001	Reject the null hypothesis
RCNH does not Granger Cause RCNDF	78.119	0.000	Reject the null hypothesis
RNDF does not Granger Cause RCNH	1751.6	0.000	Reject the null hypothesis

INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

Table 4 shows the summary of hypothesis. The table showed that the null hypothesis "RCPY does not Granger Cause RCNH" had F-Stats value of 7.0935 with probability of 0.131, which means that the results does not rejects the null hypothesis. The null hypothesis "RCNH does not Granger Cause RCPY" has F-Statistics value of 144.95, but it was significant, therefore, the hypothesis was rejected. Other than that, "RCPY does not Granger Cause RNDF", "RNDF does not Granger Cause RCPY", "RCNH does not Granger Cause RCNDF", "RNDF does not Granger Cause RCNH", "RCPY does not Granger Cause RCNH", "RCNH does not Granger Cause RCPY", "RCPY does not Granger Cause RNDF", "RNDF does not Granger Cause RCPY", "RCNH does not Granger Cause RCNDF", and "RNDF does not Granger Cause RCNH" are the rejected null hypothesis because all these were had significant results.

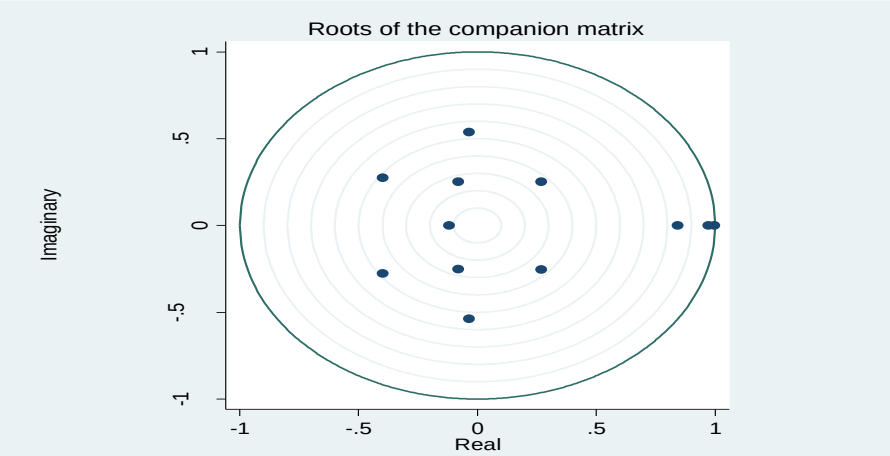
Table 5

Variables	**RCPY**		**RCNH**		**RNDF**	
	Before 8.11	After 8.11	Before 8.11	After 8.11	Before 8.11	After 8.11
RCPY (-1)	0.7227965(***)	0.2594684(***)	-0.1067711(*)	-0.4821716(***)	-0.0316551	-0.2536323(***)
RCPY (-2)	0.3738519(***)	0.275084(***)	0.1228909	0.2198028(***)	0.1771746(***)	0.145063(**)
RCPY (-3)	-0.0576726	0.1376632(***)	-0.080523	0.1033367(**)	-0.0805051	0.0717508
RCPY (-4)	-0.0555615		0.0350981		-0.056828	
RCNH (-1)	-0.4960607(***)	0.0348763(*)	0.4492161(***)	0.0578456(*)	-0.439272(***)	-0.3625356(***)
RCNH (-2)	0.1518219(***)	-0.08675(***)	0.0595874	0.483484(***)	0.0727326	0.0518745
RCNH (-3)	0.0651746	-0.0042028	0.0212738	0.2565132(***)	-0.0679696	0.1508505(***)
RCNH (-4)	0.1355072(***)		0.1844125(***)		0.2558296(***)	
RNDF (-1)	0.3350135(***)	0.0571736(***)	0.2326529(***)	0.8715058(***)	1.021517(***)	0.9913321(***)
RNDF (-2)	-0.391687(***)	-0.0428758(**)	-0.2339737(***)	-0.4896575(***)	-0.1823703(**)	-0.0530595
RNDF (-3)	0.0903957	-0.0083263	0.1841553(**)	-0.3400544(***)	0.2493868(***)	-0.0253595
RNDF (-4)	-0.0319753		-0.1731178(**)		-0.1208675(*)	
Constant	-0.0000597	-0.0001902	-0.0001065	-0.0002178(*)	0.0000523	0.0006319(***)
	787	1447	787	1447	787	1447
*** p<0.01, ** p<0.05, * p<0.1						

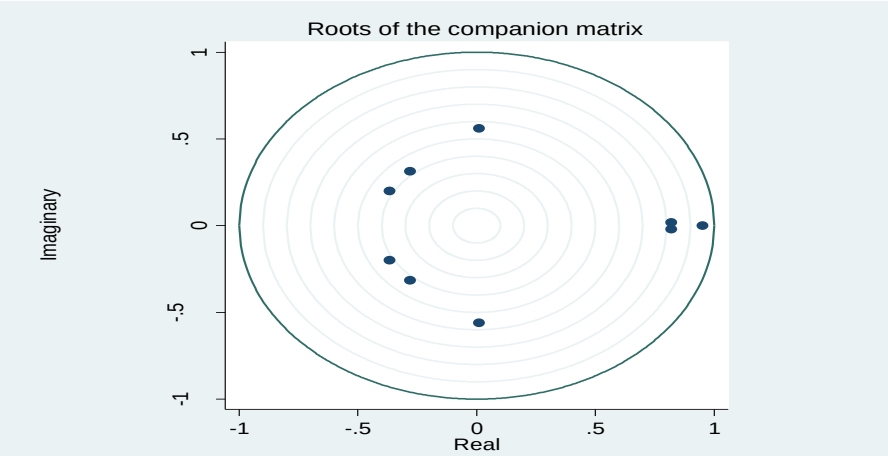
Table 5 shows the correlation between variables, where RCPY (-3), RCPY (-4), RCNH (-1), RCDF (-2), and RCDF (-4) is negatively correlated with RCPY in before 8.11. However, after 8.11, RCNH (-2), RCNH (-3), RNDF (-2), RNDF (-3), and RNDF (-4) is negatively associated with RCPY. Similarly, RCPY (-1), RCPY (-3), RNDF (-2), and RNDF (-4) are negatively correlated with RCNH (before 8.11). After 8.11, RCPY (-1), RCDF (-1), and RCDF (-2) is negatively correlated with RCNH. Furthermore, in before 8.11, RCPY (-1), RCPY (-3), RCPY (-4), RCNH (-1), RNDF (-2), and RNDF (-4) is negatively associated with RNDF, and after 8.11, RCPY (-1), RCNH (-1), RNDF (-1), and RNDF (-4) is negatively correlated with RNDF.

INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

Figure 5. Unit Root Test



Before 8.11

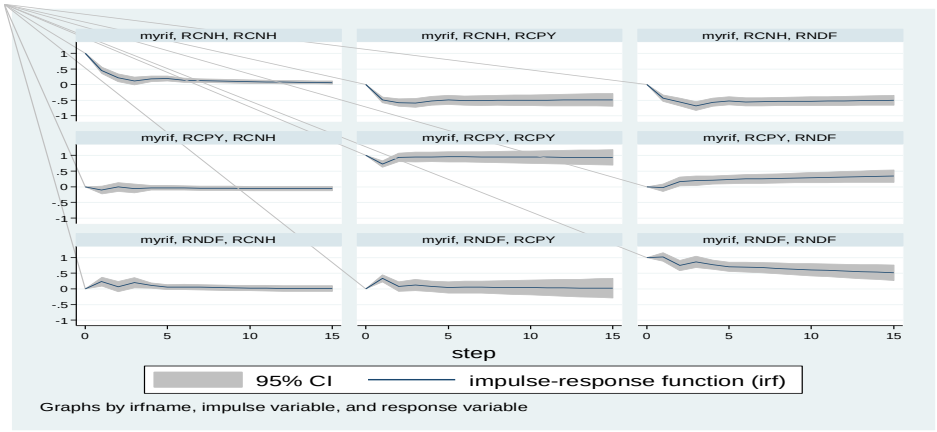


After 8.11

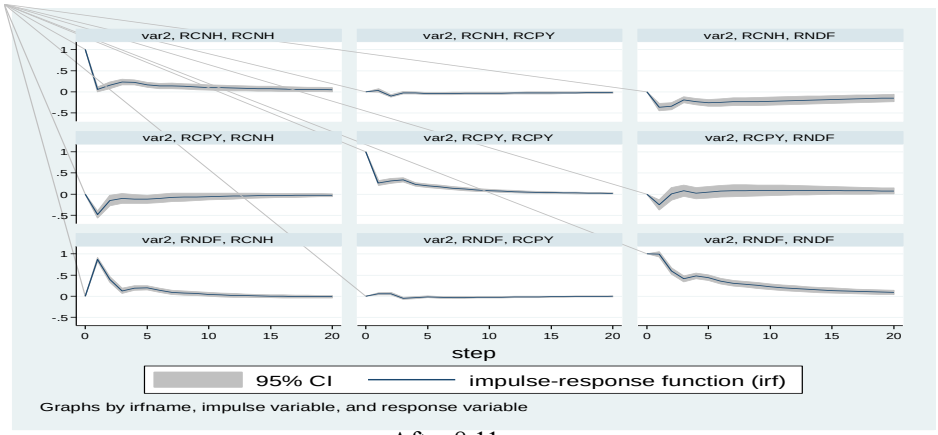
Figure 5 shows the root of the companion matrix extracted from Unit root test. The figure shows the results regardless of whether before or after the '8.11' exchange rate reform, all the eigenvalues are inside the unit circle, so the VAR models are stable. The below figure presents the vector auto-regressive results. It shows that RCPY was mainly affected by the exchange rate lagging one or two periods before the exchange rate reform; after the exchange rate reform, the central parity rate is still mainly influenced by itself, but the influence value is significantly reduced. Meanwhile, before the exchange rate reform, the influence of RCPY on RCNH and RNDF was small, but after the exchange rate reform, the influence of the RCPY on the offshore market exchange rate change increased significantly. In addition, RCNH is influenced by RNDF. Figure 6 shows the results of impulse response analysis.

INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

Figure 6. Impulse Responses Analysis



Before 8.11



After 8.11

Table 6.

Impulse variable	**Response variable**	**Impulse response value**	
		Before 8.11	After 8.11
RCPY	RCPY	The impulse response value is always large, indicating that it is mainly affected by itself	The impulse response value decreases rapidly, and the long-term response value tends to 0
	RCNH	The impulse response value is always small.	The impulse response value increases rapidly in the short term and tends to 0 in the long term
	RNDF	The short-term response increased rapidly while the long-term response increased slowly	The short-term response increased rapidly, but the long-term response was small
RCNH	RCPY	The short-term response slowly increases	The short-term response increases and then decreases, and the long-term response approaches zero
	RCNH	The short - term response decreases slowly and the long - term reaction approaches	The short-term response decreases rapidly and the long-term response approaches zero
	RNDF	The short-term response slowly increases	The short-term response firstly increases rapidly and then decreases rapidly, while the long-term response decreases slowly
RNDF	RCPY	The short-term response increases rapidly and the long-term response approaches zero	The impulse response is always small
	RCNH	The short-term response is small, and the long-term response tends to zero	The short-term response increased rapidly and then decreased rapidly, and the long-term response tended to 0

INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

	RNDF	The short-term response decreases rapidly, and the long-term response decreases slowly	The short-term response decreases rapidly, and the long-term response decreases slowly

Table 6 shows the impulse response value of the variables after 8.11 and before 8.11. For example, the Impulse variable (RCPY) shows a larger response value, indicating that the variable mainly affects itself, and after 8.11 the impulse response decreases and long-term response value trend to 0. In between Impulse variable (RCNH) and Response Variable (RCPY), after 8.11, the short-term response increases and then decreases. The long-term response approaches zero. Other responses are mentioned in table 6. Impulse response can be used to study the impulse impact of a certain exchange rate variable in VAR model on other exchange rate variables including itself, that is, the impact on the current and future values of other exchange rate variables after a unit shock is applied to the random error term. The results of impulse response analysis are summarized in Table 6. The results show that before the '8.11' exchange rate reform, the impact of the onshore market exchange rate fluctuations on the offshore market exchange rate fluctuations is relatively greater, while the response value of the exchange rate central parity to the offshore spot and forward exchange rate shocks is small. After the "8·11" exchange rate reform, the central parity rate is still mainly affected by its own impact, but the response value to the impact of offshore spot and offshore forward exchange rate has slightly increased.

Table 7. Variance Decomposition Analysis

Table 7 shows the variance decomposition analysis of the data. The table shows the data after 8.11 regime reforms, and after 8.11 regime reform. Table 7 presents the results of variance decomposition of the above three exchange rates before and after exchange rate reform. Variance decomposition is the process of evaluating the importance of different structural shocks by analyzing the contribution of each structural shock to the change of endogenous variables, and to reflect the mutual importance of variables.

Before the reform, the impact of offshore spot exchange rate on the onshore exchange rate central parity is observed to be greater than the impact of the onshore exchange rate central parity on the offshore spot exchange rate, and the influence of the offshore spot exchange rate on the offshore forward exchange rate is greater than that of the offshore forward exchange rate on the offshore spot exchange rate. However, the result was reversed after the exchange rate reform.

Before "8.11" Regime Reform												
Sr. No	RCPY				RCNH				RNDF			
	Std.Err	RCPY	RCNH	RNDF	Std.Err	RCPY	RCNH	RNDF	Std.Err	RCPY	RCNH	RNDF
1	0.001052	100	0	0	0.001258	19.06052	80.93948	0	0.001219	50.10364	22.85880	27.03756
2	0.001375	90.52042	7.094451	2.385132	0.00146	19.42165	79.5582	1.020149	0.001511	48.73597	15.29845	35.96558
3	0.001675	80.36168	17.94612	1.692201	0.001497	19.73814	79.19789	1.06397	0.001677	49.04264	13.77545	37.18190
4	0.001943	75.83619	22.74879	1.415022	0.001533	20.15484	78.15658	1.688585	0.001877	48.56410	13.10826	38.32764
5	0.002167	74.16632	24.63645	1.197233	0.001566	20.30198	77.87996	1.818058	0.002032	49.46408	12.06109	38.47483
6	0.002362	73.21115	25.76546	1.023393	0.00159	20.21411	77.97574	1.810151	0.002164	50.49084	11.31415	38.195
7	0.002545	72.2295	26.86958	0.900916	0.001604	20.1573	78.00517	1.83752	0.002289	51.08121	11.06698	37.85181
8	0.002714	71.46951	27.72071	0.809785	0.001614	20.04528	78.09426	1.860461	0.002404	51.5417	10.92845	37.52985
9	0.002871	70.91222	28.3519	0.735879	0.001622	19.9158	78.21541	1.868793	0.002512	52.01216	10.84635	37.14149
10	0.00302	70.43561	28.89054	0.67385	0.001628	19.79768	78.33233	1.869993	0.002612	52.4475	10.8583	36.6942
After "8.11" Regime Reform												
Sr. No	RCPY				RCNH				RNDF			

INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

	Std.Err	RCPY	RCNH	RNDF	Std.Err	RCPY	RCNH	RNDF	Std.Err	RCPY	RCNH	RNDF
1	0.001570	100	0	0	0.002314	16.71950	83.28050	0	0.003361	10.53048	17.35046	72.11906
2	0.001664	98.18452	0.853325	0.962150	0.003661	7.137169	46.70088	46.16195	0.004451	6.589991	11.85181	81.55820
3	0.001739	96.91583	1.264644	1.819524	0.003947	6.868660	45.16636	47.96498	0.004782	6.210392	10.33770	83.45191
4	0.001807	96.18037	1.575567	2.244061	0.004023	6.835558	46.19943	46.96501	0.004942	6.442829	9.808322	83.74885
5	0.001836	95.74330	1.830070	2.426632	0.004133	6.790497	46.94782	46.26168	0.005144	6.372167	9.183071	84.44476
6	0.001857	95.45320	2.127956	2.418846	0.004223	6.688574	47.19065	46.12078	0.005306	6.317067	8.648511	85.03442
7	0.001873	94.92590	2.513567	2.560538	0.004273	6.623311	47.42430	45.95239	0.005408	6.310445	8.327771	85.36178
8	0.001885	94.34196	2.902269	2.755769	0.004303	6.596884	47.73328	45.66983	0.005484	6.326702	8.112108	85.56119
9	0.001894	93.84218	3.234487	2.923329	0.004326	6.570813	47.99519	45.43400	0.005548	6.337578	7.953514	85.70891
10	0.001901	93.41442	3.532146	3.053435	0.004343	6.547119	48.19968	45.25320	0.005600	6.342034	7.856721	85.80125

5. DISCUSSIONS

The reform of RMB exchange rate formation mechanism has a significant impact on the exchange rate fluctuations of offshore and onshore markets. On August 11, 2015, after the Chinese monetary authorities announced the abolition of direct management of the central parity rate, the fluctuation range of RMB increased and the market scale decreased, resulting in large fluctuations in the onshore market. This paper use the empirical analysis method and the contrast analysis method to study the exchange rate fluctuations and exchange differential fluctuations of RMB in the onshore and offshore markets before and after the '8.11' exchange rate reform, In-depth analysis of the linkage risks of the onshore and offshore markets will provide a theoretical and empirical basis for the formulation of exchange rate policies, the development of RMB offshore market and the identification of defensive systemic risks.

6. CONCLUSION

The '8.11' exchange rate reform has had an important impact on the onshore and offshore exchange rates, that is, the '8.11' exchange rate reform has caused structural changes in the data pertaining to onshore and offshore exchange rates of RMB/USD.

Before the '8.11' exchange rate reform, there was a co-integration relationship between spot exchange rate and forward exchange rate in the offshore market. There is no co-integration relationship between onshore market and offshore market. However, after the exchange rate reform, co-integration relationship was formed between the variables. Before the exchange rate reform, spot and forward exchange rates in the offshore market were Granger causes for each other, but both spot and forward exchange rates in the offshore market are one-way Granger causes of the central parity in the onshore market respectively. After the exchange rate reform, there is a bidirectional Granger causality between the onshore central parity rate and the offshore spot and forward exchange rates. This change reflects that the central parity rate has guided the market exchange rate to a certain extent. Prior to the reform, the exchange rate central parity was mainly affected by itself, and the influence of the central parity rate on the offshore market spot exchange rate and forward exchange rate was nominal. After the reform, the exchange rate central parity was still mainly affected by itself, but the influence value decreased significantly. Moreover, the influence of the central parity rate on the offshore market exchange rate change increased significantly. In addition, compared with the offshore spot rate before the exchange rate reform, the influence of the offshore forward rate is significantly reduced. Before the reform, the impact of the onshore market exchange rate fluctuations on the offshore market exchange rate fluctuations is relatively greater, while the response value of the exchange rate central parity to the offshore spot and forward exchange rate shocks is small. After the reform, the central parity rate is still predominantly affected by its own impact, but the response value to the impact of offshore spot and offshore forward exchange rate has slightly increased. The offshore market plays its role only when the market itself develops. The NDF market was in its heyday from 2008 to 2009 before the establishment of CNH market.

Vol: 13 **No:** 1 **Year:** 2021 **ISSN**: 1309-8055 (Online) (**pp.** 318-339) **Doi:** 10.34109/ijefs. 202112236

Offshore markets work only if the market itself develops, and the NDF market was at its peak in September 2008, with a daily turnover of $10bn before the establishment of the CNH market. After the establishment and gradual development of the CNH market, the NDF market showed a shrinking state, and its daily trading volume dropped to $800 million in 2015.Therefore, among the three markets, NDF plays the weakest role, while CNH market is developing well. At the end of February 2019, the RMB trade settlement volume in Hong Kong reached 746.8 billion yuan. The impact of offshore market on onshore market increases, which is inseparable from the vigorous development of offshore market. The marketization of RMB pricing is an inevitable choice for China to coordinate domestic and foreign economic and financial policies. Based on empirical analysis, this paper puts forward three policy suggestions:

1. Promote the offshore and onshore markets develop in a coordinated way.

As the capital account is not fully opened, the development of the offshore market provides a buffer for the gradual opening of China's capital account and provides a docking point for the cross-border RMB settlement business in the onshore market. The excessive development of offshore markets may also affect domestic monetary policies and transmit international capital shocks to domestic financial markets Leung and Fu (2014). To grasp the dynamic relationship between the two markets, the onshore market needs to consider the market expectations presented by the offshore market, and the offshore market also needs to consider the policy orientation of the onshore market. The central bank should increase policy transparency, improve market-based exchange rate intervention mechanism, increase the tolerance of market subjects to exchange rate fluctuations, appropriately crack down on speculation, and maintain market order.

2. Open the onshore market step by step.

Onshore traders should be encouraged to actively participate in the offshore market trading activities, the promotion of offshore and onshore market information flows and linkage effect, gradually let go of the onshore capital market regulation and reduce currency intervention. While maintaining stability, we will continue to enhance exchange rate flexibility and make the exchange rate more flexible to strengthen pricing power in the onshore market effectively to avoid risks caused by exchange rate fluctuations and abnormal international capital flows.

3. Improve the construction of the offshore market.

There are more than 200 platforms in Hong Kong's offshore market that can use yuan for clearing, however, that's still a small share of the market compared to stronger currencies such as the dollar, euro, and pound. We should further expand the types of transactions in the offshore market, increase the inflow and outflow channels and scale of RMB, enhance the liquidity of the offshore market through multiple channels, enhance the depth of the market, activate RMB transactions in both the offshore market and the onshore market, and give better play to the role of the offshore market (He & McCauley, 2010).

REFERENCES

Abolhasanbeigi, H., & Mahdavi, A. (2020). The Effect of Exchange Rate on Iranian Trade Balance under Uncertainty. *Journal of Applied Economics Studies in Iran, 8*(32), 1-17.

Al-Yahyaee, K. H., Mensi, W., Rehman, M. U., Vo, X. V., & Kang, S. H. (2020). Do Islamic stocks outperform conventional stock sectors during normal and crisis periods? Extreme co-movements and portfolio management analysis. *Pacific-Basin Finance Journal, 62*, 101385. doi:https://doi.org/10.1016/j.pacfin.2020.101385

Atabani Adi, A. (2019). Modeling exchange rate return volatility of RMB/USD using GARCH family models. *Journal of Chinese Economic and Business Studies, 17*(2), 169-187. doi:https://doi.org/10.1080/14765284.2019.1600933

Bahmani-Oskooee, M., Kutan, A. M., & Xi, D. (2015). Does exchange rate volatility hurt domestic consumption? Evidence from emerging economies. *International Economics, 144*, 53-65. doi:https://doi.org/10.1016/j.inteco.2015.05.002

Bowornchockchai, K. (2016). Forecasting Exchange Rate between Thai Baht and the US Dollar Using Time Series Analysis. *International Journal of Mathematical and Computational Sciences, 8*(8), 1186-1191. doi:https://doi.org/10.5281/zenodo.1111843

Cheung, Y.-W., & Rime, D. (2014). The offshore renminbi exchange rate: Microstructure and links to the onshore market. *Journal of International Money and Finance, 49*(Part A), 170-189. doi:https://doi.org/10.1016/j.jimonfin.2014.05.012

Cheung, Y. W., Hui, C. H., & Tsang, A. (2018). Renminbi central parity: an empirical investigation. *Pacific Economic Review, 23*(2), 164-183. doi:https://doi.org/10.1111/1468-0106.12267

Colavecchio, R., & Funke, M. (2008). Volatility transmissions between renminbi and Asia-Pacific on-shore and off-shore US dollar futures. *China Economic Review, 19*(4), 635-648. doi:https://doi.org/10.1016/j.chieco.2008.05.003

Ding, S., Cui, T., & Zhang, Y. (2020). Incorporating the RMB internationalization effect into its exchange rate volatility forecasting. *The North American Journal of Economics and Finance, 54*, 101103. doi:https://doi.org/10.1016/j.najef.2019.101103

Du, M. M. (2016). China's "One Belt, One Road" initiative: Context, focus, institutions, and implications. *The Chinese Journal of Global Governance, 2*(1), 30-43.

Frankel, J. (2012). Internationalization of the RMB and Historical Precedents. *Journal of Economic Integration, 27*(3), 329-365. doi:https://www.jstor.org/stable/23317238

He, D., & McCauley, R. N. (2010). Offshore Markets for the Domestic Currency: Monetary and Financial Stability Issues (BIS Working Paper No. 320). *Available at SSRN 1699740,*

BIS Working Papers No 320, 32.

Hidayat, R. R. (2019). The Effect of Macroeconomics and Financial Performance on Systematic Risk and Stock Return (Study on Basic Industrial Companies and Chemical Listed on the Indonesia Stock Exchange, Period 2011-2015).

Iwayan, J., & Anom, P. I. B. (2020). The effect of financial performance on stock return at manufacturing company of Indonesia stock exchange. *Russian Journal of Agricultural and Socio-Economic Sciences, 97*(1), 11-19. doi:https://doi.org/10.18551/rjoas.2020-01.02

Leung, D., & Fu, J. (2014). Interactions between CNY and CNH money and forward exchange markets. *HKIMR Working Paper No.13*.

Li, K.-F., Hui, C.-H., & Chung, T.-K. (2012). Determinants and dynamics of price disparity in onshore and offshore renminbi forward exchange rate markets. *HKIMR Working Paper No.24*, 25. doi:https://dx.doi.org/10.2139/ssrn.2169816

Lo, C. (2010). The myth of the internationalization of the Chinese Yuan. *The International Economy*, *24*(4), 30.

Maziad, S., & Kang, M. J. (2012). *RMB Internationalization: O+ L5022nshore/Offshore Links* (Vol. 12): International Monetary Fund.

Nguyen, V. H. (2013). How China to US Foreign Exchange Rate Relates to US Interest Rate and Bank Loans. *Global Journal of Business Research, 7*(4), 101-108.

Nor, M. I., Masron, T. A., & Alabdullah, T. T. Y. (2020). Macroeconomic fundamentals and the exchange rate volatility: empirical evidence from Somalia. *SAGE Open, 10*(1), 2158244019898841. doi:https://doi.org/10.1177%2F2158244019898841

Park, J. (2001). Information flows between non-deliverable forward (NDF) and spot markets: Evidence from Korean currency. *Pacific-Basin Finance Journal, 9*(4), 363-377. doi:https://doi.org/10.1016/S0927-538X(01)00012-9

Peng, Y., & Kang, W. (2021). RMB currency risk management after China's '8.11'exchange rate reform. *Applied Economics Letters, 28*(9), 727-730. doi:https://doi.org/10.1080/13504851.2020.1772956

Perkasa, R. S. (2019). The Effect of Macroeconomic Variables (Inflation, Interest Rate, Exchange, GDP, and Amount of Currency) on Shares Return of Panin Dubai Syariah Through ROA as Intervening Variables For 2010-2018. *IAIN SALTING*.

Santana-Gallego, M., & Pérez-Rodríguez, J. V. (2019). International trade, exchange rate regimes, and financial crises. *The North American Journal of Economics and Finance, 47*, 85-95. doi:https://doi.org/10.1016/j.najef.2018.11.009

Song, X., & Gao, Y. (2016). *The Price Leading Effects among Offshore and Onshore RMB Exchange Rate Markets---An empirical analysis based on the two stage comparison.* Paper presented at the 2016 4th International Education, Economics, Social Science, Arts, Sports and Management Engineering Conference (IEESASM 2016).

Talha, M., Azeem, S., Sohail, M., Javed, A., & Tariq, R. (2020). Mediating effects of reflexivity of top management team between team processes and decision performance. *Azerbaijan Journal of Educational Studies, 690*.

Talha, M., Sohail, M., & Hajji, H. (2020). Analysis of research on amazon AWS cloud computing seller data security. *International Journal of Research in Engineering Innovation, 4*(3), 131-136.

Talha, M., Sohail, M., Tariq, R., & Ahmad, M. T. (2021). Impact of Oil Prices, Energy Consumption and Economic Growth on the Inflation Rate in Malaysia. *Cuadernos de Economía, 44*(124), 26-32.

Widagdo, B., Jihadi, M., BACHITAR, Y., SAFITRI, O. E., & SINGH, S. K. (2020). Financial Ratio, Macro Economy, and Investment Risk on Sharia Stock Return. *The Journal of Asian Finance, Economics, and Business, 7*(12), 919-926.