

Analysis of Influencing Factors on the Fluctuation of RMB-Dollar Exchange Rate in 2022

-- Based on Micro Perspective

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Abstract: This paper explores the influencing factors of the fluctuation of the exchange rate of RMB against the US dollar in 2022. By summarizing the past research results of scholars, trying to use empirical models from the micro perspective, and analyzing the actual situation in connection with the four phases of RMB-dollar exchange rate fluctuations in 2022, the final study concludes that the fluctuations of the RMB-dollar exchange rate in 2022 are related to the events such as high-frequency interest rate hike of the Federal Reserve, the new Crown Pneumonia outbreak, and the conflict between Russia and Ukraine.

Keywords: Renminbi exchange rate, Influencing factors, Micro perspective.

1. Introduction

In an open economy, the exchange rate, on the one hand, affects a country's external balance of payments as an important foreign-related economic variable, and on the other hand, it also affects the development of the national economy as a major means of national macroeconomic regulation and economic leverage [1].

In terms of time, China's RMB exchange rate formation mechanism exists in two distinctly different stages: the first stage is from July to August 2005, in which the role of the supply and demand market gradually increases, but exchange rate fluctuations are still subject to the greater impact of central bank intervention. The second stage is the "811" exchange reform in 2015 to the present. After the "811" exchange reform, the degree of central bank intervention has been significantly reduced, making China's foreign exchange market more flexible, and the degree of marketization of the RMB exchange rate has been continuously improved, while the factors affecting the RMB exchange rate expectations have also gradually presented diversified characteristics. In fact, as the RMB exchange rate is subject to various uncertainties and market sentiment impacts, and variations occur at specific times, the Central Bank of China strengthens the management of RMB exchange rate expectations in the hope of stabilizing RMB exchange rate expectations and maintaining the stable operation of the foreign exchange market. At present, the central bank in the implementation process mostly through the intermediate price pricing mechanism to guide the exchange rate expectations, but also apply direct intervention or exchange rate communication for expectation management [2].

At the same time, it is worth noting that, with the level of wealth of China's resident sector, the growth of financial literacy, as well as the implementation of the central bank's "hide foreign exchange in the people's" policy, individual investors in China's foreign exchange market plays a more and more obvious role, the public also showed a high degree of concern for the relevant information [3]. However, investors in the capital market are usually not completely rational, investor sentiment is one of the manifestations of irrational expectations, which will affect the exchange rate through changes in investor decision-making to affect supply and demand. Therefore, investor sentiment should also be included in the consideration of RMB exchange rate influencing factors.

Since 2022, from Figure 1, the RMB-dollar exchange rate line graph, the RMB exchange rate change in 2022 can be divided into four stages, and these four stages show different characteristics. Specifically, the exchange rate of RMB against the US dollar showed stable fluctuations from early January to late April and from mid-May to early August, and rapid depreciation from late April to mid-May and from early August to early November. At present, most of the domestic studies on the fluctuation of the exchange rate of RMB against the US dollar focus on the macroeconomic level, and the studies on the factors affecting the exchange rate are mostly carried out from the aspects of the exchange rate formation mechanism and the economic cycle. In order to enrich the relevant aspects of the research, a more in-depth understanding of the impact factors of the RMB exchange rate, this paper is committed to exploring the impact factors of the exchange rate fluctuations of the RMB against the US dollar from a micro perspective.

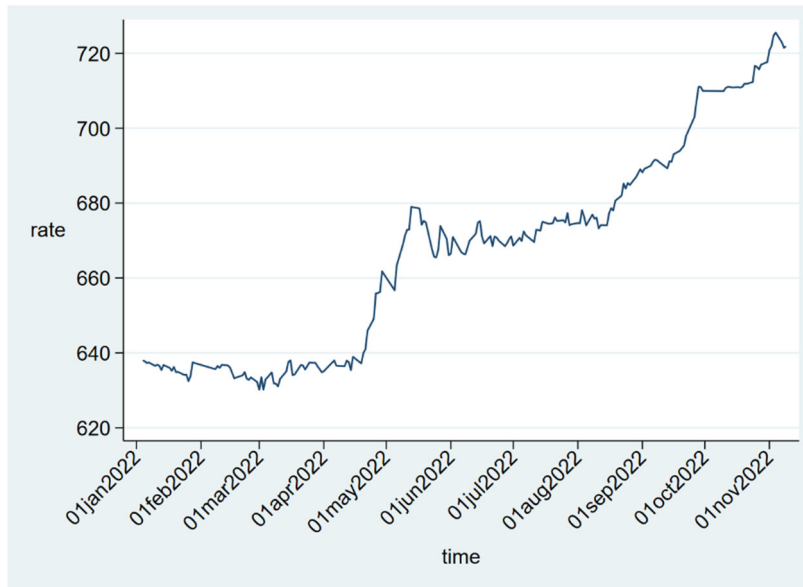


Figure 1. Line graph of RMB-dollar exchange rate in 2022
Data source: China Foreign Exchange Trading Center

2. Literature Review

Research scholars have put forward different insights on the issue of RMB exchange rate volatility influencing factors.

Gao Gaomei et al [4], based on the theory of flexible price money and the micro-structural model of exchange rate generation, analyzed that the interest rate, money supply, real income and the central bank's foreign exchange intervention will have a significant impact on exchange rate volatility, but the degree of influence is different.

Si Dengkui et al [5] study that China's central bank foreign exchange intervention has a significant effect in curbing the depreciation of the RMB exchange rate, but the effect of curbing the appreciation of the RMB exchange rate has a certain lag.

Li Yanli and Li Chenyang [6] found that the central bank foreign exchange intervention on the exchange rate of the degree of influence is not large, and in part of the period did not prompt the RMB exchange rate equilibrium.

Wang Xuan et al [7] analyzed the influencing factors of RMB exchange rate volatility through the guiding principle of TEI@I methodology, which mainly includes fundamental economic factors, market concern, investor sentiment, as well as long-term economic development trend and long-term foreign exchange policy.

Zhu Mengnan et al [8] studied the impact of Sino-US economic news on the onshore and offshore RMB exchange rate and found that the RMB exchange rate is mainly affected by economic news variables related to China's monetary factors.

Xiao Lisheng et al [9] used a stochastic volatility time-varying coefficient vector autoregression model to find that the impact of China's macroeconomic fundamentals on exchange rate expectations is relatively limited, while the central bank intervention shocks are longer in duration and will significantly strengthen exchange rate expectations.

Wang Aijian et al [10] found that compared with external geopolitical risks, changes in exchange rate expectation uncertainty originate more from the spillover of internal economic policy uncertainty.

3. Related Theories

(i) Rational Expectations Theory

The theory of exchange rate determination of rational expectation model is based on the market efficient and rational expectation, the theory is not from the fundamental factors that determine the exchange rate, but the people's reaction to the information that appears in the financial market at any time - news news as an entry point, the use of statistics and econometrics to study the spot exchange rate changes in the law of the spot exchange rate.

(ii) Public Information Model

On the basis of the macro-structural model of the asset market, the news model is established by combining the ideal expectation hypothesis, which is mainly designed to solve the error problem of rational expectation theory in the process of exchange rate forecasting. The model refers to unanticipated information that causes investors to modify their behavior towards the exchange rate as news, and explores the specific ways in which exchange rate movements are affected by "news". The model suggests that news can affect spot or forward exchange rates by influencing traders' expectations in the foreign exchange market. However, the news model does not provide a specific definition of the concept of "news", but also does not point out the specific content of the news, in practice, it is difficult to accurately quantify [11].

(iii) Microstructure Analysis Method

Microstructure analysis method is based on the different information investors have and the existence of information understanding bias. Some scholars attribute the direct cause of exchange rate fluctuations to the different information held by investors, at the same time, they believe that the bias in the understanding of information will cause foreign exchange traders to game each other in a certain trading system. Therefore, in the microstructure approach, macro factors are not studied, but exchange rate volatility is studied from a micro perspective. The main factors of this theory are private information, heterogeneity of market participants and differences in trading mechanisms, and is in the process of continuous improvement.

(iv) Chaos Analysis Method

Chaos modeling is a breakthrough non-linear perspective to study the exchange rate decision problem, and introduces the method of natural science. The theory is to consider the heterogeneity of market participants, through the use of chaos theory to build a model, so as to simulate the movement of the exchange rate.

4. Model Construction and Empirical Analysis

Due to the author's insufficient level, it is difficult to independently construct the exchange rate model and successfully obtain the relevant data, hereby accepting the exchange rate dynamic adjustment model including central bank foreign exchange intervention and investor sentiment constructed by Sidenkui et al. under the open conditions, and the model is briefly introduced below.

After a series of reasoning, Sidenkui et al. derive a dynamic system among exchange rate, central bank's foreign exchange intervention and stock price (investor sentiment is endogenous to stock price):

$$\Delta ISI_{t+1} = x (\Delta S_{t+1}) + \delta(p_t) + h(t_{vt})$$

$$\Delta S_{t+1} = \rho(ISI_{t+1}) + k(S_t - F^S) + \gamma(t_{vt})$$

where $x(\cdot)$ 、 $\delta(\cdot)$ 、 $h(\cdot)$ 、 $\rho(\cdot)$ 、 $k(\cdot)$ and $\gamma(\cdot)$ denote

the mapping conditions; ΔISI_{t+1} is the investor's sentiment, ΔS_{t+1} is the exchange rate change, t_{vt} is the central bank's foreign exchange intervention, p_t denotes the market value at time t, and F^S is the fundamental value of the stock price.

Through empirical analysis, the study of Sidenkui, Li Xiaolin and Jiang Chun examined the linkage mechanism between central bank foreign exchange intervention, investor sentiment and exchange rate from the theoretical level, and found that there is a non-linear linkage effect between central bank foreign exchange intervention, investor sentiment and exchange rate changes. They concluded that in the short term, foreign exchange intervention can exacerbate investor sentiment volatility and thus trigger exchange rate volatility. Therefore, for ordinary individual investors, communication news is more by affecting investor sentiment and then affect the exchange rate expectations. In addition, such as the purchase and sale of foreign exchange and other central bank direct intervention in the foreign exchange market behavior, will also get the attention of ordinary individual investors, thus changing the expectations of investors for the exchange rate [12].

5. Utilization Test



Figure 2. Stage-by-Stage Line Chart of RMB-Dollar Exchange Rate in 2022

Data source: China Foreign Exchange Trading Center

In this chapter, the author will take into account the actual situation of the fluctuation of the RMB/USD exchange rate and related events in 2022 to investigate whether "central bank intervention" and "investor sentiment" can reasonably explain the reality.

(i) Phase 1-Early January to late April 2022

In terms of the volatility of the RMB/USD exchange rate, the performance from early January to the end of April 2022 was relatively stable.

In fact, China's import and export growth remained high from January to February 2022, with a trade surplus of \$116 billion, the highest level since 2016, the domestic foreign trade trend is favorable, and the relative balance of foreign exchange supply and demand is one of the reasons for the smooth operation of the foreign exchange market in this phase [13]. Because of this, since January 2022, there has been a small appreciation of the RMB against the US dollar.

In March, the Federal Reserve initiated an interest rate hike, a move that led to turbulence in the U.S. economy and

financial markets, and in turn triggered increased volatility in global markets. With the shift in the Fed's monetary policy, global market volatility intensified, and the dollar index hit a nearly four-year high at the end of March, which will put pressure on the RMB exchange rate.

Since mid-April, the appreciation of the RMB against the USD has slowed down. In this period, due to the Fed's monetary policy shift to make the dollar stronger, the scale of China's foreign reserves continue to rise, the yuan against the dollar exchange rate generally showed a steady rise. In this stage there are also two important changes worth paying attention to: First, the domestic economy is recovering more satisfactory, industrial production and consumption have rebounded significantly; Second, the domestic inflationary pressures have eased, the market has a strong expectation of central bank tightening policy.

(ii) Second stage - late April to mid-May 2022

During this phase, the exchange rate of the RMB against the US dollar went all the way up and the RMB showed rapid

depreciation. At this stage, Guan Tao, global chief economist of BOC International Securities, believes that there is triple pressure on the domestic economy: supply shocks, shrinking demand, and weakening expectations.

From the external situation, the Fed's tightening or tightening expectations make the dollar continue to rise. From the internal situation, at this point in time, the multi-point spread of domestic epidemics, hindering the economic recovery, and produced a variety of associated negative impacts, such as the uncertainty of the prospects for foreign trade. The global industrial chain is also similarly affected by the continued impact of the new crown epidemic, China's foreign trade enterprises face raw materials, parts and components, such as imported hard to find and exchange rate depreciation double pressure. At this stage, the exchange rate of RMB against the US dollar fell rapidly, and the exchange rate of RMB against the euro continued to reach record highs. The prices of the main raw materials and energy products imported by China have risen sharply during the epidemic. This had a significant impact on the domestic economy. As the epidemic prevention and control required China to increase domestic infrastructure construction, resulting in a surge in demand for energy and raw material products.

(iii) Phase 3 - mid-May to early August 2022

The exchange rate of the RMB against the US dollar fluctuated smoothly during this phase. In fact, the downward pressure on China's economy is the fundamental reason for the lower RMB exchange rate. Repeated epidemics superimposed on a complex and severe international political environment have led to huge economic downward pressure in China. However, with the People's Bank of China, the Foreign Exchange Bureau and other departments introducing a series of policy measures to stabilize the exchange rate and maintain the smooth operation of the foreign exchange market, the exchange rate of the RMB against the US dollar remained relatively stable from mid-May 2022 to early August. For example, at the 429 Politburo meeting, the central government adopted a variety of measures to stabilize the economy, which led to the improvement of economic data in June, which was also an important reason for the RMB/USD exchange rate to remain relatively stable in July.

(iv) Phase 4 - Early August to Early November 2022

The RMB/USD exchange rate depreciated in general during this phase, mainly due to the depreciation of the RMB exchange rate as a result of rising inflation in the United States and interest rate hikes by the Federal Reserve.

There are two main factors affecting the exchange rate trend in the fourth stage: the first is China's economic performance. In the first half of 2022, China's economic growth came under pressure due to the epidemic and the international situation, with exports falling more and consumer spending falling back. Meanwhile, affected by the ongoing conflict between Russia and Ukraine, energy prices rose and CPI levels rose further. Secondly, the trend of international market changes. 2022 at the beginning of July, the Federal Reserve announced an interest rate hike of 25 basis points to a level of about 2%; 2022 at the beginning of August, the Russian-Ukrainian conflict entered a new phase, and the Russian-Ukrainian war broke out. And in early August the U.S. announced a new round of economic stimulus packages, Russia's negotiations with the EU are progressing well. In September, Fed Chairman Powell announced in his speech at the Fed's annual Jackson Hole global central bank meeting that interest rates would be raised

by 50 basis points, and China also began to raise interest rates in mid-August. On September 19th, Russian President Vladimir Putin signed the Russia-Ukraine cease-fire agreement, which included the establishment of the "The situation in eastern Ukraine deteriorated further after Russian President Vladimir Putin signed a ceasefire agreement on September 19, which included significant progress on the establishment of the Nord Stream-2 gas pipeline project. At the G20 Leaders' Summit held from October 15 to October 21, the leaders of the United States and China announced that the normalization of bilateral trade relations would be an important issue and that positive progress had been made. At the G20 Finance Summit held on November 11-12, China put forward five major proposals to strengthen the reform of the international monetary system, safeguard the multilateral monetary system, and enhance the momentum of global economic recovery.

6. Conclusion

This paper has explored the influencing factors of the fluctuation of the exchange rate of RMB against the US dollar. First of all, this paper combed through the past research results of scholars at home and abroad, and analyzed the theoretical model in relation to the actual situation of the four stages of RMB-dollar exchange rate fluctuations in 2022 based on the acceptance of Szeteng Kui's empirical model.

Overall, the RMB-dollar exchange rate in 2022 was mainly affected by the Fed's high-frequency interest rate hike, the new Crown pneumonia epidemic, and the Russian-Ukrainian conflict, which proved that there is a linkage between the central bank's foreign exchange intervention, investor sentiment and exchange rate movements. For example, the U.S. and the Chinese government's intervention in foreign exchange at different times have affected exchange rate movements to varying degrees, while individual investors are affected by different news information to influence their emotions, thus changing their expectations of the exchange rate and thus reflected in exchange rate fluctuations.

Due to its limited strength, this paper has many deficiencies. For example, when analyzing the exchange rate change of RMB against the US dollar, it is not enough to think about the game between the Chinese and American governments, China's policies related to boosting domestic demand and other issues. Although these aspects are difficult to quantify, they are of some significance for thinking about the factors affecting exchange rate fluctuations, which need to be followed up by further analysis and research.

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