The Impact of Exchange Rate Fluctuation on Trade Balance of China

Zhe Dong

School of Economics, Jinan University, China

Abstract

With the accession of RMB to SDR, the process of RMB internationalization has also experienced a milestone. But at the same time, China's development deeply depends on the international trade. With the increasing uncertainty of the world's political and economic situation, the fluctuation of RMB exchange rate is increasing. It has a profound impact on the scale of domestic and foreign trade, and has become an important factor affecting the economic development of China. This paper, taking the quarterly data of China-US trade as the sample, through the establishment of time series model, carries out an empirical analysis of the influence of the nominal exchange rate of RMB on China's foreign trade, and discusses the long-term and effective relationship between the RMB exchange rate fluctuation and the foreign trade of China since 2005. At the same time, according to the empirical test results, in view of the relationship between the current RMB exchange rate and China's trade, the suggestion is to adjust our country's money supply, stabilize the exchange rate, improve our monetary policy and fiscal policy, effectively avoid the exchange rate risk by using financial instruments, and promote the stability of the long-term economic development.

Keywords

Foreign exchange rate; Trade balance; China.

1. INTRODUCTION

Since October 1, 2016, the RMB officially joined the SDR, the internationalization process of RMB has also been deepening, and has been moving forward to the world currency. However, with the gradual deepening of RMB internationalization, the exchange rate fluctuations closely related to it are becoming more and more important. As the domestic currency price of foreign currency, exchange rate is one of the most important indicators to measure international trade. The large fluctuation of exchange rate will inevitably lead to the unbalanced development of import and export trade of a country, and then cause such practical problems as the aggravation of trade friction and the increasing pressure of currency rise and depreciation. For a long time, the international community has criticized China's imbalance of international payments on the basis of China's double balance of payments surplus and undervalued RMB exchange rate. Since the financial crisis in 2008, China's balance of payments situation has changed significantly, the current account surplus has decreased, the financial account deficit, and then the double surplus situation has been broken. Under the background of RMB internationalization gradually, China implements a managed floating exchange rate system based on market supply and demand, with reference to a basket of currencies, so as to achieve the purpose of stable currency value and economic development.

In recent three years, China's import and export scale tends to shrink, and the trade surplus has increased, especially the reduction of import value, some of which is related to the increase of depreciation pressure due to the RMB joining SDR. With the gradual recovery and recovery

of the American economy, although China has implemented a managed floating exchange rate system based on market supply and demand and a basket of currencies, the RMB still has great devaluation pressure, and the exchange rate may fluctuate violently, which leads to the unbalanced development of foreign trade income and expenditure in China. China's one belt, one road, is the key to the development of RMB. It is necessary to study the relationship between exchange rate fluctuations and trade balance, to stabilize the domestic and international political and economic structure, to accelerate the "going out" of China's real economy, and to advocate the "one belt and one road" construction.

Scholars at home and abroad have done a lot of research on the correlation between exchange rate and trade balance, and have put forward many original opinions. According to the traditional trade balance elasticity theory, when the Marshall Lerner condition is satisfied, the devaluation of RMB will stimulate exports and restrain imports, thus improving China's long-term trade surplus. However, a large number of experiences and facts are not completely consistent with this theory, and even come to completely different conclusions. Among them, there are mainly two views: one is that there is no significant correlation between RMB real exchange rate and China's trade balance; the other is that the fluctuation of RMB exchange rate has a significant impact on China's trade balance.

The first is that there is no significant correlation between RMB real exchange rate and China's trade balance. Xie (2002) through the import and export data of China from 1978 to 2000, using the co integration analysis method, pointed out that the depreciation of the real exchange rate of RMB has no obvious impact on the trade balance; Li (1991) through the relevant data from 1970 to 1983, using the elastic analysis method, concluded that there is no obvious correlation between the real exchange rate and import and export. Hu and Qiu (2006) reached a similar conclusion.

The second view is that the fluctuation of RMB exchange rate has a significant impact on China's trade balance. Liu et al (2010) used Blanchard and Quah's method of long-term constraint on the impact of structural shocks, and pointed out that the theory of trade balance of payments elasticity is basically applicable to the actual operation process of China's international trade, and the change of RMB real exchange rate has obvious but modified J-curve effect on China's trade balance Using the cointegration theory, it is also pointed out that the change of RMB real exchange rate has J-curve effect on China's trade balance. Lu and Dai (2005), Ma and Xu (2005), Yan (2017), Yang and Hu (2017) also made similar conclusions.

Many foreign scholars, such as Sercu and Vanhulle (1992), Gagnon (1993) and De Grauwe (1998), have done a lot of research on the relationship between exchange rate fluctuations and trade balance. However, there are few studies on RMB exchange rate fluctuations based on the collapse of the Bretton Woods system. Among them, Pan (2007) used the standard deviation of exchange rate yield as the proxy variable of exchange rate fluctuation to test the impact of exchange rate fluctuation on the export of China's major trading partners, and proposed that China's exports to the United States and the European Union had a significant negative correlation with the real exchange rate volatility, while the export to Japan was not related to the real exchange rate fluctuation; Yu (2005), based on the relevant data of China's major trading partners from 2000 to 2003 and using the fixed effect estimation method, pointed out that there was no statistical correlation between exchange rate fluctuation and export volume; Zhang Yan (2017) and Zhang Yang (2017) studied the impact of RMB exchange rate fluctuation on China's international trade.

Based on the study of the impact of exchange rate fluctuation on trade balance, this paper analyzes the relationship between RMB devaluation pressure and trade balance scale reduction, as well as the importance of currency stability and economic operation in China, and analyzes the important influence of RMB real exchange rate on China's trade balance and economic

operation. China's "one belt, one road" construction is optimized through stabilizing the RMB exchange rate, adjusting the foreign trade balance sheet, optimizing China's economic operation structure, and promoting China's "one belt and one road" construction, so as to balance the domestic and international economic environment and make the domestic and international economic environment healthy and sustainable development.

Sector 1 introduces the background and significance of the research. Sector 2 analyzes the current situation of RMB exchange rate fluctuation and trade balance. Sector 3 is the empirical analysis of the impact of RMB exchange rate changes on China's trade balance. Sector 4 summarizes the empirical analysis conclusion of the model, and puts forward countermeasures and suggestions for the current situation of China's foreign trade and exchange rate system.

2. DATA

Since July 2005, China has implemented the exchange rate system reform, adopting a managed floating exchange rate system based on market supply and demand and adjusting with reference to a basket of currencies. Therefore, the relevant data after this period is more representative. This paper selects the data from the first quarter of 2006 to the third quarter of 2017, takes the United States as the trading partner country, collects and sorts out the quarterly GDP of China and the United States, the amount of import and export trade in each quarter of China, and the nominal exchange rate of RMB to the United States dollar. The data are from the Chinese National Bureau of statistics and the Statistics Bureau of the United States Department of Commerce.

3. ECONOMETRIC METHODOLOGY

Generally speaking, the size of a country's import and export mainly depends on the substitution effect and income effect. For the import amount of a country, the substitution effect depends on the exchange rate of the local currency to the trading country, and the income effect depends on the income level of the country; similarly, the substitution effect of the export amount of a country is determined by the exchange rate of the local currency to the trading country, and the income effect is determined by the income level of the trading country. Considering that there are many factors affecting the scale of import and export, the first-order lag term of the explained variable is introduced:

$$lnIM_t = \alpha_0 + \alpha_1 lnGDP1_t + \alpha_2 lne_t + \alpha_3 lnIM_{t-1} + \varepsilon_{IM_t}$$

$$lnEX_t = \beta_0 + \beta_1 lnGDP2_t + \beta_2 lne_t + \beta_3 lnEX_{t-1} + \varepsilon_{EX_t}$$

In this formula, IM_t and EX_t represent China's import amount and export amount in t period, $GDP1_t$ and $GDP2_t$ represent China's domestic GDP and trade country's GDP respectively in period t, e_t represents China's nominal exchange rate of currency to trading countries in period t, and IM_{t-1} and EX_{t-1} are first-order lag terms, representing China's import and export amount in t-1 period. Considering the specific economic significance in the model, α and β can be expressed as constant terms, α_0 and β_0 as import income elasticity and export income elasticity, α_2 and β_2 as import exchange rate elasticity and export exchange rate elasticity, and α_3 and β_3 as import and export first-order lag coefficient, reflecting other factors not involved in the formula for import and export scale. ε_{IM_t} and ε_{EX_t} are the random error terms of the above two formulas respectively.

4. RESULTS

The short-term correlation between the variables was analyzed by the regression of ordinary least square method:

$$lnIM_t = 9.6176 + 0.2038lnGDP1_t - 0.5063lne_t + 0.5588lnIM_{t-1} + \varepsilon_{IM_t}$$
$$R^2 = 0.910429 \quad \overline{R^2} = 0.904180 \quad F = 145.6890 \quad DW = 1.401572$$

It can be seen from the above that R^2 is 0.91, F statistic is 145.69, DW statistic is 1.40. It shows that if other conditions remain unchanged, the import volume will increase by 0.20% for every 1% increase of domestic income level; when the RMB exchange rate increases by 1%, that is, the RMB devalues by 1%, the import amount in the same period will decrease by 0.51%; when the import amount in the previous period increases by 1%, the import amount in the next period will increase by 0.56%, which is generally consistent with the theory.

For the export demand function, the regression results are as follows:

$$lnEX_t = 17.1733 + 1.2615lnGDP2_t - 1.5136lne_t + 0.2184lnEX_{t-1} + \varepsilon_{EX_t}$$
$$R^2 = 0.892786 \quad \overline{R^2} = 0.885306 \quad F = 119.3552 \quad DW = 1.793719$$

It can be seen from the above that R^2 is 0.89, F statistic is 119.36, DW statistic is 1.79. It shows that under the same other conditions, when the income level of trading countries increases by 1%, the export volume will increase by 1.26%; when the exchange rate of RMB increases by 1%, that is, the devaluation of RMB, the export value in the same period will decrease by 1.51%; when the export volume in the previous period increases by 1%, the export value in the next period will increase by 0.22%, among which, the change direction of exchange rate is not in line with the actual expectation.

According to the regression results, in the short term, there is a certain correlation between the balance of international trade and the fluctuation of exchange rate and a country's GDP.

Above all, the income elasticity of China's foreign trade import is 0.20, which means that every 1% growth of China's GDP will increase China's import amount by 0.20%; while the exchange rate elasticity of import demand is - 0.51, which means that every 1% depreciation of RMB exchange rate will reduce China's import volume by 0.51%. In terms of the symbolic direction of variables, the empirical results are consistent with the theoretical expectations, and the import scale is greatly affected by the exchange rate.

In the short term, the income elasticity of China's foreign trade export is 1.26, which means that every 1% increase in GDP of trading countries will increase China's export volume by 1.26%; while the exchange rate elasticity of export demand is - 1.51, which means that every 1% depreciation of RMB exchange rate will reduce China's export volume by 1.51%. In the sign direction of variables, exchange rate elasticity is negative, which is inconsistent with the traditional theory. The reason is that the increase of export volume caused by RMB devaluation is less than that caused by other factors. Among them, one of the most important factors is the economic policies implemented by our country in the past ten years. Although China has been implementing the reform and opening up policy for nearly 30 years, in order to maintain the stable and healthy development of the market, the degree of opening up in foreign trade, especially in export, has not reached a high degree of marketization. To a large extent, the export trade still needs the government to carry out macro-control, which leads to the empirical results inconsistent with the theoretical expectations.

5. CONCLUSION

With the formal entry of RMB into SDR, the internationalization process of RMB is also experiencing a milestone development, and is constantly moving forward to the world currency. At the same time, the dependence of China's economic development on international trade import and export is also deepening. With the increasing uncertainty of political and economic relations in the world, the RMB exchange rate also has the pressure of appreciation and devaluation, and the fluctuation range is also increasing, which greatly affects China's domestic

and international trade balance and becomes the influencing factor of China's economic development.

First of all, by comparing the exchange rate fluctuations of the world's major currencies in the past seven years, we can see that the RMB volatility is large in recent years, and there is a certain exchange rate risk. At the same time, through the analysis of China's foreign trade balance, we can see that for a long time, China's balance of payments has been in the pattern of double surplus, foreign exchange reserves continue to increase, and monetary funds are passively put in. Among them, China's trade surplus increased sharply from 2013 to 2015, mainly due to the gradual warming of the world economy and the improvement of China's trade import and export and reserve assets.

Secondly, this paper takes the quarterly data of China and US GDP, China's import and export trade volume and RMB exchange rate against the US dollar from 2006 to 2017 as samples, and takes the United States as the trading country to conduct an empirical analysis on the impact of RMB nominal exchange rate on China's foreign trade balance by establishing a time series model, proving that since the reform of exchange rate system was carried out in July 2005, that is, the floating exchange rate system based on market supply and demand and adjusted by reference to a basket of currencies, there is a long-term effective relationship between RMB exchange rate fluctuation and China's foreign import and export trade, and the scale of China's import and export trade is affected by exchange rate fluctuation to a certain extent.

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