

Empirical analysis of exchange rate influencing factors

Yacui Gao^{1, a}, Wenjuan Zhang^{1, b}

¹School of Science and Technology University, XiAn 710000, China;

^a326619664@qq.com, ^b1205294243@qq.com.

Abstract

Due to international trade and non-trade exchanges, countries need to deal with international settlement, so a country's currency, the currency of other countries, have a set exchange rate. For the development of society, exchange rate is becoming more and more important. This paper introduces the concept of exchange rate, pricing method and factors affecting exchange rate, analyzes several important factors, and puts forward countermeasures and Suggestions.

Keywords

Exchange rate; GDP; Inflation; Balance of imports and exports.

1. The theoretical basis of exchange rate influencing factors

1.1 The concept of exchange rate

Exchange rate refers to the ratio or price of one country's currency with another country's currency, or the price of another country's currency expressed in the currency of one country. Exchange rate fluctuations have a direct regulating effect on a country's import and export trade. Under certain conditions, by devaluing the domestic currency, that is, letting the exchange rate rise, it will play a role in promoting exports and restricting imports. On the contrary, the external appreciation of the domestic currency, namely the exchange rate decline, plays a role in restricting exports and increasing imports.

Foreign exchange rates are the rates, rates or prices converted from the currencies of one country into the currencies of another country. In other words, the "price" of a foreign currency expressed in its own currency. Due to the international trade and non-trade exchanges, countries need to handle international settlement, so a country's currency, the currency of other countries, have a set exchange rate, but the most important one is against the dollar and a few other countries' currency exchange rate.

1.2 Price method of exchange rate

To convert the currencies of two countries, determine which country's currency is used as the standard. Due to the different standards of determination, there are two pricing methods of foreign exchange rate.

Direct price method: using 1 unit or 100 units of foreign currency as the standard, converted into a certain amount of domestic currency, known as the direct price method. Under the direct pricing method, the amount of foreign currency is fixed and the amount of domestic currency changes with the change of the value of foreign currency or domestic currency. Most countries use direct pricing. Some countries have a lower value unit, such as the Japanese yen and the Italian lira, which are now sometimes converted to 100,000 or 10,000 units. Under the direct quotation exchange rates to rise, means the currency devaluation, unit of foreign currency to exchange more local currency, in the case of domestic prices unchanged, the unit of foreign currency can buy more goods, make commodity export competitiveness increases, exports increased. At the same time, the exchange rate rise, the decrease in the number of unit of local currency convertible into foreign currency, import need more local currency, increase the cost of imports, imports.

Indirect pricing method: 1 unit or 100 units of local currency as a standard, converted into a certain number of foreign currencies, called indirect pricing method. Under the indirect pricing method, the

amount of domestic currency is fixed and the amount of foreign currency changes with the change of the value of domestic currency or foreign currency. Britain and America are both countries that use indirect pricing. Exchange rate drops under the indirect quotation method, means that the currency appreciation, fewer units of foreign currency to exchange currency, in the case of domestic prices unchanged, units of foreign currency can buy fewer goods, reduce commodity export competitiveness, fewer exports. At the same time, the exchange rate fell, the unit of currency convertibility to increase in the number of foreign currency, import need less of their currencies, reduce the cost of imports, imports.

2. The influence factor of exchange rate

2.1 China's GDP

Generally speaking, a country's gross domestic product (GDP) represents a country's economic strength. China has now become the world's second largest economy, and it is playing a more and more powerful role in international politics and trade. Economic growth rate to the influence of exchange rate from various, China's rapid economic growth, the export trade growth and contribute a large part, but since 2007, the GDP growth rate year after year fell from 14.2% to 6.7% in 2016, the national economy development speed entered in schedule, high-speed development in the future will become the new normal, lower economic growth rate of depreciation caused the pressure.

2.2 Inflation

The level of inflation is an important factor affecting the change of RMB exchange rate. If the supply of RMB is too large and the purchasing power of currency exceeds the actual demand of commodity circulation, it will cause inflation. Inflation reduces the domestic purchasing power of money and causes the currency to depreciate internally. The essence of exchange rate is the comparison between the two countries' currency values. If the money supply is too large, the value measured in unit currency will inevitably decrease. If the value of a foreign currency remains constant, the currency of that country will be converted into a foreign currency at a greater cost than the original currency. Therefore, if the value of foreign currency remains unchanged, the internal devaluation of currency will inevitably lead to external devaluation. Inflation cannot be seen only in the consumer price index (CPI). China's CPI has been hovering at around 2.0% since 2014, hardly indicating inflation. But asset prices, particularly house prices, have risen spectacularly. Thus, inflation should take into account the rise in asset prices to be reasonable. When the money multiplier is basically stable, the inflation rate including asset prices should be calculated by the growth rate of M2, the broad money supply, less the GDP growth rate (generally calculated at constant prices). The difference has averaged 5.5% a year since 2014.

2.3 Balance of imports and exports

The balance of import and export refers to the difference between the total export amount and the total import amount of a country in a certain period, which is used to show the balance of payments of a country's foreign trade. When the total value of exports is greater than the total value of imports, there is a trade surplus, called "trade surplus" or "surplus". When the total value of imports is greater than the total value of exports, there is a trade deficit, which is called "trade deficit" or "import surplus". Normally, trade surpluses are represented as positive and trade deficits as negative.

2.4 Money supply

The broad money supply is the sum of a country's current cash plus demand deposits plus time deposits, which is generally expressed as M2. The broad money supply represents the actual and potential purchasing power. Broad money supply is the main factor determining the value and purchasing power of money. If the supply of RMB money is too much and the GDP cannot increase synchronously, the purchasing power of the currency will decline, causing the depreciation pressure of RMB. The growth rate of broad money in China has been relatively high and has been gradually falling down. At the end of 2010, broad money was 72.6 trillion yuan, with a year-on-year growth rate of 19.7%. At the end of November 2016, broad money was 155.01 trillion yuan, with a year-on-

year growth rate of 11.3%. In just six years, China's broad money supply has doubled, while the economy has entered the new normal and asset prices are still inflated, which has caused great depreciation pressure on the RMB.

2.5 The interest rate difference between China and the United States

In the short term, the level of interest rates in both countries will have a greater impact on the exchange rate. The difference in interest rates between the two countries will lead to capital arbitrage between the two countries, which will eventually lead to exchange rate fluctuations. In general, if there is a difference in interest rates between the two countries, capital will flow from countries with low interest rates to countries with high interest rates. Countries with high interest rates attract a large number of foreign arbitrage capital inflows, which is conducive to improving the international balance of payments situation, leading to abundant foreign exchange supply and currency appreciation. With the previous successive interest rate cuts in China and gradual interest rate hikes in the United States, the interest rate difference between China and the United States has gradually narrowed, from 2.5% in January 2014 to 1.0% in September 2016. The narrowing gap between us and Chinese interest rates has exacerbated cross-border capital outflows and highlighted the pressure for renminbi depreciation.

3. Model of exchange rate influencing factors

3.1 Data selection

In this paper, the growth rate of gross domestic product (GDP), the growth rate of inflation rate and the growth rate of balance of imports and exports are selected as the influencing factors of RMB exchange rate to build a multiple linear regression model. The data are as follows:

year	RMB exchange rate	The GDP growth rate	The rate of growth of inflation	Growth rate of balance of imports and exports
1998	8.28%	10%	8.31%	-26.83%
1999	8.28%	9.30%	2.80%	230.77%
2000	8.28%	7.80%	-0.80%	7.55%
2001	8.28%	7.62%	-1.40%	-32.75%
2002	8.28%	8.43%	0.40%	-17.52%
2003	8.28%	8.30%	0.70%	-6.47%
2004	8.28%	9.08%	-0.80%	34.94%
2005	8.28%	10.03%	1.20%	-16.30%
2006	8.28%	10.09%	3.90%	26.03%
2007	8.19%	11.31%	1.80%	217.76%
2008	7.97%	12.68%	1.50%	103.39%
2009	7.60%	14.16%	4.80%	26.39%
2010	6.95%	9.63%	5.90%	12.69%
2011	6.83%	9.21%	-0.69%	-33.62%
2012	6.77%	10.45%	3.30%	-6.61%
2013	6.46%	9.30%	5.40%	-15.27%
2014	6.31%	7.65%	2.61%	48.96%
2015	6.18%	7.67%	3.20%	500.00%
2016	6.14%	7.40%	1.50%	343.00%
2017	6.21%	6.90%	1.30%	-810.13%

3.2 Software regression

Regression output results with Eviews software are as follows:

Dependent Variable: HUILV
 Method: Least Squares
 Date: 01/14/18 Time: 15:40
 Sample: 1996 2015
 Included observations: 20

Variable	Coefficien...	Std. Error	t-Statistic	Prob.
GDP	0.219787	0.117066	1.877462	0.0788
JINCHUKOU	7.81E-05	0.000822	0.095053	0.9255
TONGHUO	-0.130764	0.084166	-1.553634	0.1398
C	0.057438	0.010559	5.439597	0.0001
R-squared	0.219020	Mean dependent var		0.075070
Adjusted R-squared	0.072586	S.D. dependent var		0.008942
S.E. of regression	0.008612	Akaike info criterion		-6.494539
Sum squared resid	0.001187	Schwarz criterion		-6.295392
Log likelihood	68.94539	Hannan-Quinn criter.		-6.455663
F-statistic	1.495692	Durbin-Watson stat		0.224141
Prob(F-statistic)	0.253664			

3.3 The results of the analysis

The regression model can be expressed as follows:

$$Y = 0.219786706601 * X1 + 7.81025291341e-05 * X2 - 0.130763752369 * X3 + 0.0574381412624$$

Y ----- stands for exchange rate

X1 ----- represents the growth rate of GDP

X2 ----- represents the growth rate of import and export balance

X3 ----- represents the rate of growth of inflation

The coefficient of X1 is 0.219786706601. The growth rate of surface GDP is positively correlated with the exchange rate, but it has little influence on the change of exchange rate. The results show that under other conditions unchanged, when the economic growth rate increases by 1%, the numerical performance of RMB exchange rate decreases by 0.21 units, that is, the appreciation by 0.21%, and vice versa.

The coefficient of X2 is 7.81025291341e-05, and the exchange rate of balance of import and export growth is positively correlated. This shows that the change of sino-us trade balance growth rate has a great impact on the change of RMB exchange rate. When the growth rate of sino-us trade balance rises, RMB appreciates.

The coefficient of X3 is -0.130763752369, indicating that the exchange rate under the indirect pricing method is inversely proportional to the level of inflation. The higher the level of inflation, the lower the exchange rate under the indirect pricing method, the more depreciation of the RMB. If the inflation rate increases by 1% and other conditions remain unchanged, the 100 RMB will be reduced by 0.130763752369 1=-0.130763752369 usd.

4. Countermeasures and Suggestions

4.1 We will strengthen international policy coordination and stabilize global financial markets

The historical experience of intervention in the exchange rate market shows that the joint intervention of many countries is more effective than the intervention of individual countries. The most typical are the plaza accord and the anti-plaza accord. On September 22, 1985, the United States, Britain, France, Germany and Japan five countries finance ministers and central bank governors meeting in New York plaza hotel to discuss foreign exchange intervention, on the same day issued a joint

statement, the five countries finance ministers and central bankers agreed to "non-dollar currencies against the U.S. dollar exchange rate should be further strengthened, and stressed that" will further cooperation when necessary, to intervene ".The plaza accord had immediate effects, and its impact lasted for many years. In 1995, in order to avoid the outbreak of the Japanese economic crisis, the United States, Japan and Germany signed the so-called "anti-plaza agreement", which allowed the devaluation of the Japanese yen and German mark and the appreciation of the U.S. dollar. The manufacturing industry in Japan and Germany recovered, while the American industry suffered a certain impact. At present, the three aspects of international policy coordination should be strengthened. One is to call on the United States to stabilize the value of the dollar. Stress that a strong dollar is not conducive to global economic recovery and financial market stability. In fact, the current us commodity exports continue to decline, manufacturing and service sector growth is weak, the economic fundamentals do not support the continued appreciation of the dollar. The second is to call on Europe and Japan to stop pursuing beggar-thy-neighbor policies of negative interest rates and quantitative easing. Third, we call on all countries to speed up domestic economic restructuring and avoid competitive devaluation.

4.2 We will strengthen communication and actively guide market expectations

First, actively publicize China's economic policies and development prospects, and guide all sectors to correctly understand the relationship between China's economy and world economic growth rate, correctly understand the new normal of China's economy, and accurately grasp the changing trend of the world economic pattern. The second is to clarify China's exchange rate policy. On the one hand, the introduction of policies should take the initiative to publicize, so that the market correctly grasp the policy intention; On the other hand, misinterpretation and untrue rumors should be clarified in the first time to reduce unnecessary market panic. Third, in the event of violent market turbulence or financial oligarchs deliberately disrupting the foreign exchange market, it should be emphasized that the state will actively intervene and make plans. It is an international practice for the state to intervene in the foreign exchange market. When there is a crisis in the foreign exchange market, even countries with a high degree of market economy will take rescue actions without exception.

4.3 Follow market rules and increase the tolerance of exchange rate fluctuations

Foreign exchange markets have their own rules, and excessive intervention can backfire. In recent years, the experience and lessons of Russia's intervention in ruble devaluation are very meaningful. Russia began intervening in the market with its foreign exchange reserves in 2013 and repeatedly raised interest rates in 2014, but the ruble fell from 31:1 to 67:1 against the dollar. The central bank last sold \$2bn of reserves in January 2015, but the rouble continued to slide. After Russia's central bank stopped intervening in the markets, the rouble turned around, rising to around 50:1 in May. Another country to learn from is India. Between 2012 and 2013, the Indian rupee depreciated by over 40%, which did not stimulate exports but reduced the trade deficit and inflation. In 2014 Mr Modi's government pushed through reforms, the economy showed signs of improvement and the rupee was once again on the rise. Drawing on the experience of India and Russia, we should follow market rules, give full play to the role of the market and improve the ability to withstand exchange rate fluctuations without malicious speculators disrupting the market.

4.4 Cultivate international foreign exchange investment research team, enhance the initiative of market intervention

First, train a high-level research team. While accurately grasping the medium - and long-term trends of macroeconomic and exchange rate changes, exploring the rules of foreign exchange market changes, making forward-looking studies and making preparations for a rainy day, scholars should play the role of public opinion guidance and actively guide market expectations. The second is to cultivate a monitoring and data analysis team at the micro level. We should not only closely monitor the foreign exchange market by means of modern information technology, but also dig into the market information through modern statistical and econometric methods to judge the exchange rate trend from the perspective of the market. Third, foreign exchange trading teams should be trained in a

targeted way so as to improve the efficiency of market intervention in case of severe market turbulence. India's experience suggests that in addition to the central bank's direct intervention in the market, state-owned Banks can be active participants. The above three teams can be further strengthened on the basis of the existing professional and technical teams.

4.5 We will consolidate the foundation for economic development and improve our ability to withstand risks

Experience has shown that currency intervention tends to be effective in the short term, but largely ineffective in the medium to long term, even in the us, when economic trends are unchanged. On November 1, 1978, President carter declared that the us dollar was too low. The us Treasury Department and the central bank took a series of direct interventions. In 1992, the United States once again wanted the dollar to appreciate. On July 20 and August 11 of that year, the two large-scale interventions in the foreign exchange market failed due to the lack of foundation for economic recovery. In the long run, the key to stabilizing the RMB exchange rate lies in consolidating the foundation of economic development. Under the background of a basically sound economy, the fluctuations in the capital and foreign exchange markets are both temporary and there is no need for large-scale intervention.

References

- [1] Li Yantong. Research on influencing factors of RMB exchange rate volatility [J]. Contemporary economics,2017(11):4-11.
- [2] Guo Yingying. Comparative analysis of long-term and short-term influencing factors of RMB exchange rate and definition of leading factors of exchange rate fluctuation [J]. Scientific decision-making,2015(03):60-71.
- [3] Li Yanfeng. Analysis of influencing factors of RMB exchange rate fluctuations -- from the perspective of exchange rate overshoot model [J]. Journal of theory,2017(01):122-128.
- [4] Li Lei. Empirical study on factors influencing RMB exchange rate [D]. Shandong university of finance and economics,2014.
- [5] Lei Yinghui. Statistical analysis of influencing factors of RMB exchange rate [J]. Economic research guide,2013(15):125-126.
- [6] Liu Jie. Research on the influencing factors of China's RMB exchange rate [D]. Capital university of economics and business,2012.