

On the Increased FX Reserves and the Decreased Funds Outstanding for FX in China from 2014 to 2017

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Abstract

Objectives: This study focuses on the off-normal occurrence between the increased FX reserves and the decreased Funds Outstanding for FX in China after 8.11 exchange rate reforms, and discusses the inducement induced between the decrease of ESS of Commercial Banks and the increased FX reserves. **Methods/Statistical Analysis:** This study uses the data of HIBOR and SHIBOR, the data of Spot and NDF from 2014-2017 as independent variables, approach the correlation between ESS and the four factors above by Grainger Causality Test, and then by the VAR Modal for re-test. Discusses the reason based on the reality. **Findings:** This study finding is that the expectations for RMB exchange rate leads to the currency hedging, which is also the reason for the ESS deficit. But this result can't give an answer to the increased FX reserves for that time. **Application/Improvements:** This study explores the incentives why the banking settlement and sale transferred from surplus to deficit based on the data of banking settlement and sale, the interest rate data of SHIBOR and HIBOR, the exchange rate data of Spot onshore and NDF offshore from 2014 to 2017, and demonstrate such a statement that "the FX assets are shifted from central bank holdings to business and individuals holdings".

Keywords: Differences and Margin, ESS of Commercial Banks, FX Reserves, Grainger Causality Test and VAR

1. Introduction

Since 8.11 Reform of RMB Exchange Rate, the trend of cross-border capital flow in & out of China has become more complicated, and there have been a paradox under this complicated situation:

Firstly, From December of 2015 to January of 2016, the RMB exchange rate against the U.S. dollar fell from 6.3981 to 6.5939 *suddenly*, the depreciation rate of 3.06%. At the same time, the deficit of foreign exchange settlement and sale expanded rapidly from 466 billion to 600 million RMB yuan per month. After the first half of May 2016, the exchange rate fluctuations again, from 6.4743 at

the beginning of May to 6.6433 at the end of the month, depreciation rate of 2.6%. The deficit of foreign exchange settlement and sale in the same period was expanded rapidly from 83 billion to 200 million RMB yuan per month. Because of the two basically same depreciation did not lead to the same amount of capital flow, some articles believe that the traditional price volume relationship has weakened since the 8.11 reform. But from the beginning of November 2016, the RMB exchange rate against the dollar declined from 6.7847 to 6.9370 at the end of December, the depreciation rate of 2.3%, the deficit of the banking settlement and sale was expanded from 274 billion to 300 million RMB yuan, the price volume relation

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tends to be normal. So why the same rate of depreciation leads to different amounts of capital flow?

Secondly, In January 4 of 2017, offshore RMB (CNH) soared over 400 basis points, up to 6.7997 the next day. Onshore RMB (CNY) against the dollar rose above 6.88, the onshore price being higher than the offshore price nearly 1000 points. Large margin difference means the arbitrage space, so in a suddenly, there are a lot of cross-border difference arbitrage. There are some articles put forward that market arbitrage activities will rise again after that of 8.11 Reform under the condition of institutional isolation between offshore and onshore. The central bank introduced a

Countercyclical factor in the closing price of central parity rate is to hedge the activity for prevent excessive fluctuation of the yuan in 2017.

The third, since June of 2014, the banking settlement of sale which can reflect the judgment of firms and residents on the FX market trend and has a high reference value for judging the direction of capital flows showed a surprise deficit. The highest is \$576 billion in December of 2015; the lowest was \$50 billion in January of 2015, the basic trend in expanding. At the same time, the funds outstanding for FX also down from the annual average of 270000 RMB yuan in 2014 to 216209 RMB yuan in March of 2017, two years reduced by 53790 RMB yuan¹, in dollar terms, about 800 billion dollars.

For more than two years since the second half of 2014, 12% of the price changes have triggered an outflow of 7000-8000 dollars. In a certain way, this round of capital flow reflects that the FX assets are shifted from central bank holdings to business and individuals holdings, that is to say, possession of FX assets among the people. In other words, the reduction of the foreign exchange reserves or the deficit of banking settlement and sale is only a transformation process in which the FX assets are centralized holding by central bank become to be decentralized holding by private sector.

This brings us a new question: since this round of capital flows reflects that the FX assets are shifted from central bank holdings to business and individuals holdings, then, under the new situation after the 8.11 Reform

of RMB exchange rates, what is the basis of this change? That is to say, what is the cause of this change? This shift is the arbitrage capital flow or value preservation capital flow? If it is the arbitrage capital flows, this arbitrage capital flow based on what factors? If it is value preservation capital flow, what is the inducement motivation to induce individuals to transformation of their assets from RMB into dollars?

John Maynard Keynes was the first one to study the correlation of capital flow induced by both interest rate and exchange rate; while Professor Robert A. Mundell put forward the theory of "capital flow" based on the analysis of the affection of interest margin on cross-border capital inflow and outflow. Po Bronson believes that both exchange rate and interest rate have a decisive impact on short-term capital flows. After the collapse of the Bretton Woods System, empirical studies by foreign scholars found that interest rates were the main driving force of international capital flows in this period.

After the China's reform and opening-up and the establishment of the RMB offshore financial market in Hongkong, the issues of capital flow and the arbitrage between onshore and offshore have become the focus of academic circles in China and foreign countries. In believes that there is a big difference between the spot and forward prices onshore and offshore, and it is easy to trigger cross-border capital flows. In² explains why the offshore spot and forward price deviate from each other which causing arbitrage space. Based on the two factors of interest and exchange rate, analyze the RMB appreciation expectation which leads the cross-border capital flows, used the cointegration and error correction model. The analyses the changes between the value of the RMB and capital flows based on the VAR model and, the capital flows in turn on the RMB exchange rate. In have studied the mutual influence of CNH and CNY and the mechanism of capital arbitrage under the condition that the fluctuation of CNH is greater than CNY.

As the time limited, the existing literature does not pay attention to this kind of capital flow about "the FX assets are shifted from central bank holdings to business and individuals holdings". Most of the papers focus on the

affection of the capital flow based on the appreciation or depreciation of the RMB against the dollar; discuss the Reward spillover and volatility spillover based on the flow of hot money. Papers widely adopted ardl model or factors augment vector regression models to discuss how RMB exchange rate adjustment virtual economy and real domestic economic imbalance. But we know that since the 8.11 Reform of RMB exchange rates, the market structure has changed and the financial variables increased greatly, however, the market segmentation between onshore and offshore make the price movements often deviate from both sides.

In order to solve the problems we raised above, this paper explore the incentives why the banking settlement and sale transferred from surplus to deficit based on the data of banking settlement and sale, the interest rate data of SHIBOR and HIBOR, the exchange rate data of Spot onshore and NDF offshore from 2014 to 2017, and demonstrate such a statement that “the FX assets are shifted from central bank holdings to business and individuals holdings”.

2. Analysis and Hypothesis

We know that the cross border capital flows are for the differences in return on investment both domestic and overseas. So we discuss the incentives that trigger cross-border capital flows firstly.

According to historical experience, there are two kinds of incentives for capital inflow and outflow: profit seeking and hedging or financial management.

2.1 Profit Seeking

In China, with the deepening of the reform of RMB exchange rate and interest rate, and the development of RMB internationalization process, especially the segmentation between mainland market and Hongkong market, two markets: offshore and onshore have formed. From that day the two markets emerged, more and more financial variables appearing in China financial markets, such as offshore CNH spot and offshore CNH forward, onshore CNY spot and onshore CNY forward, onshore

SHIBOR and offshore HIBOR, as well as overseas RMB exchange rate NDF³. At the same time, the interest rate and exchange rate of the RMB onshore and offshore markets are affected by market segmentation and monetary policy restrictions, the performance both the interest and exchange of RMB is inconsistent between onshore and offshore. Therefore, the difference or spread both sides lead the trend of the cross-border capital inflow and outflow become increasingly complex, Arbitrage opportunities are created for market participants:

1. Arbitrage based on spread. The occurrence of different interest rate due to the market segmentation between offshore and onshore, and restrictions on cross border flow of funds, the liquidity and supply and demand relationship of domestic FX markets are different from those in overseas markets which set space for arbitrage. Therefore, we give hypothesis H1: the interest margin onshore and offshore is positively related to capital flows. The greater the spread, the more capital flows across the border. Onshore interest rates are higher than offshore interest rates, capital inflows; offshore interest rates are higher than onshore interest rates, capital outflows.

2. Arbitrage based on exchange rate difference. The RMB exchange rate market consists of three markets: onshore CNY market, offshore CNH market and NDF market. The exchange rate of the CNY market is quoted by the central bank's central parity + market maker quotation in foreign exchange market⁴. But the exchange rate of the CNH market is determined by the supply and demand of RMB. NDF market means non deliverable forward market, the price of RMB on this market is decided by overseas investment institutions based on the expectation for RMB exchange rate. Among the three markets, the NDF market does not sell and buy RMB, so the arbitrage for RMB is mainly carried out in the CNY market and CHN market. For example, in January 5 of 2017, FX CNH reached the highest of 6.7997 while FX CNY was 6.88 onshore and onshore price and offshore price upside down close to 1000 points. On the same day, the foreign exchange market fluctuated sharply: If someone traded

the Hong Kong dollar for a cheaper onshore RMB, It can be converted into a higher offshore RMB in Hongkong market. So we give hypothesis H2: the price difference of RMB exchange rate positively correlated with cross border flows, and the smaller the difference is, the less capital inflows and outflow.

3. Portfolio arbitrage based on Interest margin and difference of exchange rate. This kind of arbitrage is the common arbitrage based on the interest margin and exchange difference plus RMB appreciation. According to experience, if the offshore exchange rate has a significant appreciation relative to the onshore exchange rate, the RMB onshore would outflow to HK, Convert RMB into US dollars according to the offshore exchange rate; the exchange rate arbitrage can be realized if the US dollar is exchanged for RMB at the onshore exchange rate. If the central bank buys RMB through offshore banks in Hong Kong at this time, and selling dollars to stabilize the RMB exchange rate, the RMB will lead to the overnight HK interbank rate rose sharply, So as to provide arbitrage opportunities for capital flow. But we believe that the current situation on both sides of onshore and offshore cannot provide low-cost portfolio arbitrage opportunities and channels, so we do not consider portfolio arbitrage.

2.2 Financial Management or Maintenance of Assets

Maintenance of Assets discussed here refers to the behavior of buying and selling foreign exchange by the residents and enterprises to avoid or eliminate the risk of exchange rate fluctuation through spot foreign exchange transactions (which means the reduction of central bank foreign exchange reserves). The purpose of enterprises to maintain assets is in order to eliminate or avoid foreign exchange risk, to minimize the losses caused by foreign exchange risk. Residents' swap means a financial behavior triggered by the devaluation of RMB expectations. The problem here is what signal caused the behavior of enterprises and residents swap? Interest rate or exchange rate? Generally speaking, investors who holding US dollars

believe that the investment in U.S. dollar financial products not only ensures the yield, but also allows investors to get the exchange rate price margin under the condition of RMB devaluation. Based on this consideration, we believe that the action of hedging or financing will be seen on the account of bank settlement and sale under the specific conditions in China: when the appreciation of RMB approaches the market expectation, enterprises and residents are bound to purchase foreign exchange before the RMB rises from devaluation, At the same time, the scale of settlement can be compressed as much as possible, this will lead to the shrinkage of the surplus of foreign exchange settlement and the expansion of the deficit scale. On the contrary, when the devaluation of the RMB approaches the market expectation, Enterprises and residents must tend to settle the foreign exchange before the RMB is depreciated, at the same time, postpone buying foreign exchange as soon as possible, This will lead to an increase in the surplus of foreign exchange settlement or the shrinking of the deficit scale. So let's assume that H4: the expectation of exchange rate changes by enterprises and residents leads to the change of the scale of foreign exchange sale; the devaluation is expected to lead to the foreign exchange deficit, and the expectation of appreciation will lead to a favorable balance of foreign exchange settlement and sale.

3. Data and Design

3.1 Data Selection and Data Sample

This paper selects the data of interbank overnight interest rates SHIBOR and HIBOR, data of FX both onshore and offshore and NDF as independent variable, and the data of banking exchange settlement and sale as dependent variable, test the correlation between the price and scale of bank with the Granger Causality:

1. Exchange Settlement and Sales (ESS): This paper selects the ESS data as a measure of capital flow, because in Chinese, whether it is business or personal, all need to purchase and sale foreign exchange through the banking system. What time and for what the foreign exchange

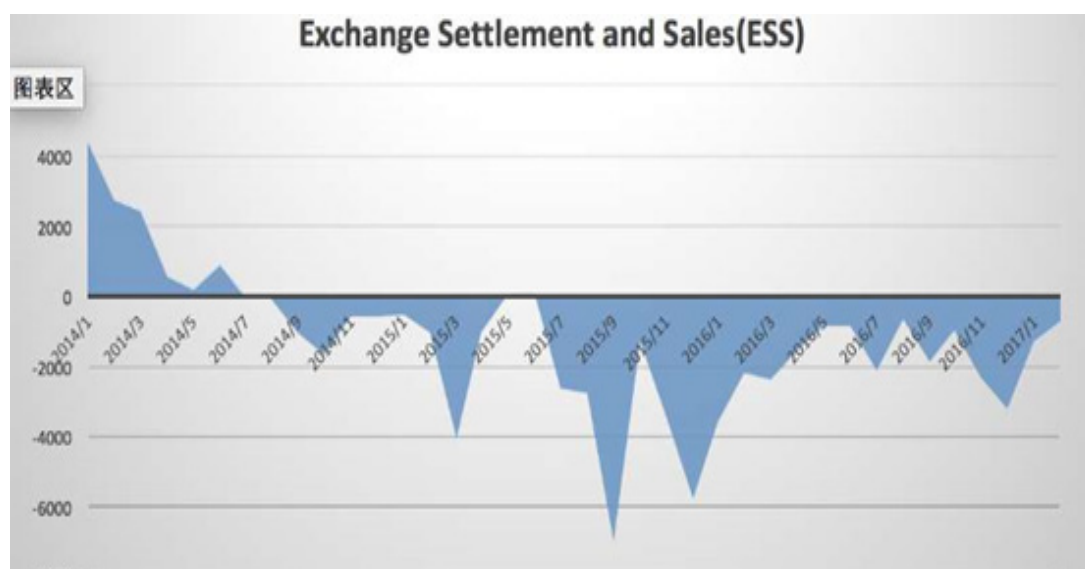


Figure 1. The fluctuation of commercial bank settlement and sale (unit: RMB million).

is sold or buy by enterprises and individuals is entirely autonomous action, so the banks and the government are difficult to directly intervene, and was little affected by the central macro-control, so the data can directly reflect the domestic enterprises and residents in the overall trend of the market judgment, can better reflect the real situation of cross-border capital inflow and outflow. At the same time, in recent years, Cross border payments for businesses and individuals have increased sharply, and the amount of cross border settlement and sale also increased sharply. Therefore, the measurement of cross border capital flows based on the balance of payments is unlikely to be applicable. The time series data selected in this paper is from July 1 of 2014 to February 28th of 2017, data comes from the State Administration of Foreign Exchange website. The fluctuation of bank settlement and sale in this time period is shown in Figure 1.

From the Figure 1 we see, in the first half of 2014, bank settlement and sale is still positive above the zero line, this means that the capital is still inflow (means bank buy the exchange more than selling), but from the second half of 2014, the Situation changed, bank sale the exchange more than buy, so we can see the trend line changes from positive to negative. Especially in September of 2015 and

December, the foreign exchange settlement and sale deficit reached a negative peak, and in September it was about 700 billion RMB (120 billion dollars).

2. Exchange Rate Difference (ERD): The exchange rate difference is the margin between the spot and the forward (direct quotation). The spot exchange rate is the central parity of RMB against the US dollar, and the forward rate is NDF for one year, which is denoted as ERD. The time series data is from July 1 of 2014 to February 28th of 2017. For the convenience of calculation, we use the previous trading day data plus the last trading day data, and then divide the result by 2; the average number is used as holiday data to keep the data smooth. All the data comes from the website of the State Administration of Foreign Exchange and the WIND database. The trend chart of the time period data is shown in Figure 2.

As seen in Figure 2, since the middle of 2014, the gap between CNY and NDF has obviously increased, and the price of NDF has been strongly expressed devaluation trend in more than two years.

3. Interest-rate spread: interest-rate spread is SHIBOR minus HIBOR which is recorded as IRS. The time series data is from July 1 of 2014 to February 28th of

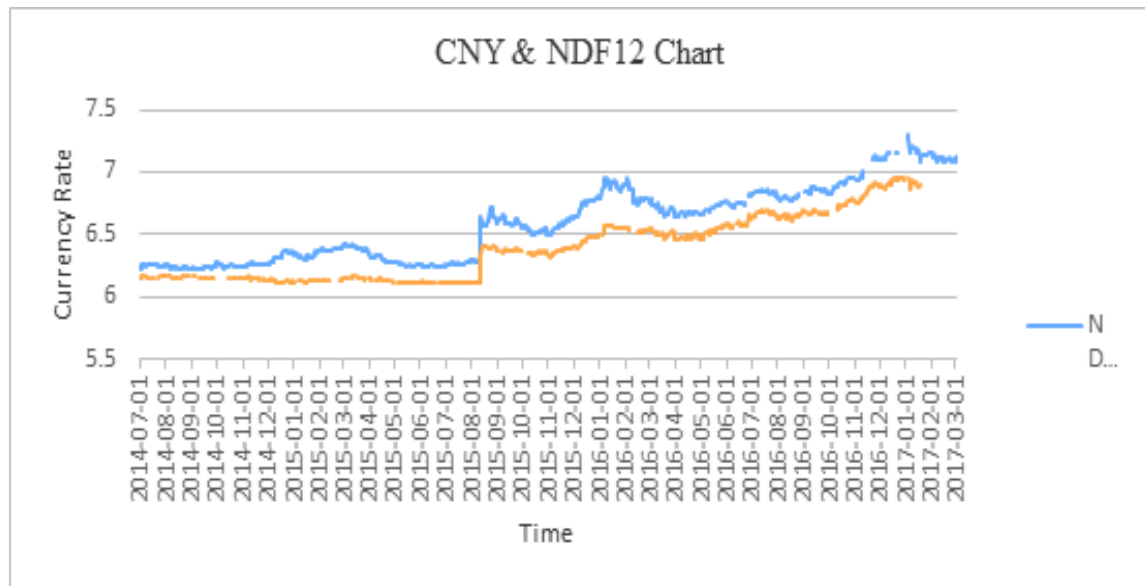


Figure 2. Tendency both domestic spot (CNY) and overseas NDF.

2017. All the data comes from East Money website. For the convenience of calculation, we use the previous trading day data plus the last trading day data, and then divide the result by 2; the average number is used as holiday data to keep the data smooth. In order to reflect the trend of capital flow, we use SHIBOR and SHIBOR to accurately reflect the short-term supply and demand relationship of

money market and even the whole financial market. The trend of SHIBOR and HIBOR is shown in Figure 3.

It can be seen from Figure 3 that The overall trend of interest rates is stable at the regional level of 1~9 from the middle of 2014 to February of 2017, but the volatility of HIBOR has always been higher than that of

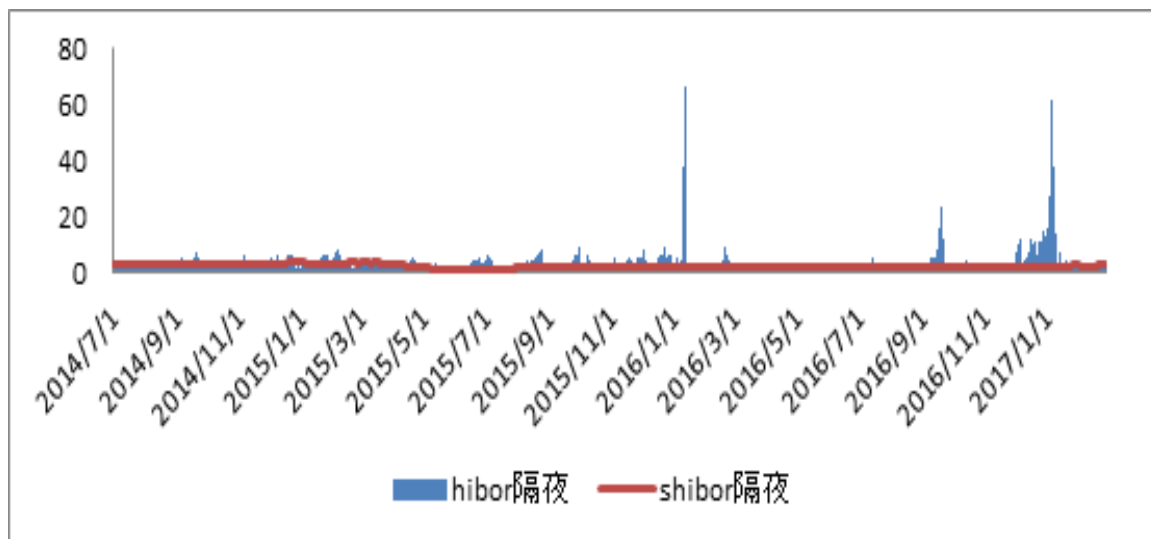


Figure 3. Tendency both HIBOR and SHIBOR.

SHIBOR. Throughout the period of time, HIBOR surged three times: January 2015, December 2016 and January 2017. The Hong Kong interbank offered rate, or HIBOR, jumped on the three periods coincided with the capital flow of the three periods of the real economy.

3.2 Design and Methods

Based on Grainger causality and VAR test model, this paper explores the correlation between the changes of various financial variables both onshore & offshore, and the changes of banking settlement and sale. Firstly, we consider the stationary process of the data, have carried on the stationarity inspection of the data based on the ESS and IRS; secondly, we use Eviews statistical software to determine the optimal lag order by using AIC and other information criteria. Then, we have to do Grainger causality test on the correlation between ESS & IRS and bank settlement and sale in order to determine the relationship

of the grainger causality both two; finally using vector error correction model and impulse response analysis and variance decomposition to determine the effect of ESS and IRS on the banking settlement and sale, thus to determine what variables lead to cross-border capital flows.

4. Test and Analysis

4.1 Descriptive Statistics, Stability Test and Cointegration

1. Descriptive statistics. This paper uses Eviews7.0 for descriptive statistics of each variable, the sample size of 105, the statistical results shown in Table 1.

2. Stationarity test. In this paper, the ADF test method is used to test the stationarity. Firstly, the trend

Table 1. Descriptive statistics of each variable

Variable	Obs	Mean	Median	Maximum	Minimum	Std. Dev.
ESS	105	-12.16141	10.10425	884.1537	-1172.792	478.0895
FER	105	0.565694	0.254722	6.336948	-2.843069	1.694357
ISR	105	1.368727	1.972485	6.592123	-3.753372	2.134207

Table 2. Stationarity test results of each variable

variable	Level test			First order difference test			I(n)
	ADF	1% significant level	P	ADF	1% significant level	P	
ESS	-3.4957	-3.4957	0.0609	-12.1841	-3.4957	0.0000	I(1)
FER	-3.2405	-4.0496	0.0824	-8.4396	-4.0496	0.0000	I(1)
ISR	-1.2984	-4.0515	0.8827	-8.4735	-4.0515	0.0000	I(1)

Table 3. Cointegration test results of all variables

Null hypothesis	Proper value	Trace Statistics	5%critical value	P
None *	0.15456	34.53948	29.79707	0.0132
At most 1 *	0.113341	17.41387	15.49471	0.0254
At most 2 *	0.049179	5.143794	3.841466	0.0233

and intercept are determined according to the trend chart. Secondly, the maximum lag period is determined according to the AIC principle. The test results are shown in Table 2.

It can be seen from Table 2 that the ADF value of ESS, ISR and FER is greater than the critical value at the level of 1%, and the time series contains unit root, which is non-stationary. Furthermore, the first order difference of the sequence, the ADF values of ESS, ISR and FER are less than the critical value, and the P value is significantly less than 1%. Therefore, the three sets of sequences are all single order single complete sequences.

3. Cointegration test. In order to study the equilibrium relationship between the three variables, the Johansen cointegration test, the equilibrium relationship between the foreign exchange settlement and the difference between the interest rate and the exchange rate is tested. According to the principles of AIC, SC and LR, the optimal lag period is 2, and the test results are shown in Table 3.

Table 3 shows the results of co integration test, foreign exchange and interest rate and the exchange difference of three groups of time series data there are 3 long-term cointegration relationship in the 5% level of significance, the next step can be obtained through the Grainger causality test to determine the sequence between the guide.

4.2 Grainger Causality Test

We have been through the cointegration relationship

to determine the long-term equilibrium relationship between each sequence data, in order to better judge between foreign exchange fluctuation and the interest rate and the exchange difference guidance relationship, we use vector autoregressive (VAR) Grainger causality test on these three variables, the test results are shown in Table 4.

From the test results, we have the following conclusions:

1. The foreign exchange difference in China is the Grainger cause of the change of foreign exchange settlement, and has a significant impact on the foreign exchange settlement in the 1 and 2 periods, which indicates that the change of exchange rate expectation in the short term can guide the flow of capital. Foreign exchange settlement is not the reason of Grainger's foreign exchange difference.

2. Domestic and foreign spread is the Grainger cause of foreign exchange settlement, and it has the greatest influence in the 2 stage of lag period. F statistic shows that the original hypothesis can be rejected at the 10% significance level. However, the spread has little effect on the change of foreign exchange settlement. On the contrary, changes in foreign exchange can significantly affect the spread. The P value was significantly less than 0.05 in the lag 2-5 stage.

3. The reason of Grainger's foreign exchange difference is the difference of interest rate. And the expansion of interest rate will affect the RMB forward exchange rate

Table 4. Results of Grainger causality test for each variable

Null hypothesis		Lag					result
		1	2	3	4	5	
FER is not grainger's reason for ESS	F	7.6805	3.5075	2.5905	1.8822	1.9024	refused
	P	0.0066**	0.0338**	0.0573	0.1202	0.1018	
ESS is not Grainger's reason for FER	F	1.2491	1.0042	0.6609	0.5545	0.3994	accept
	P	0.2664	0.3701	0.5781	0.6962	0.8481	
ISR is not grainer's reason for ESS	F	1.3390	2.4419	1.2035	1.1289	0.9933	refused
	P	0.2499	0.0923*	0.3128	0.3478	0.4265	
ESS is not grainger's reason for ISR	F	0.2472	3.8795	3.4129	3.1642	3.0759	refused
	P	0.6201	0.0239**	0.0206**	0.0175**	0.0131**	
ISR is not grainer's reason for FER	F	8.1695	5.0934	2.9595	2.6072	2.1054	refused
	P	0.0052*	0.0079**	0.0362**	0.0407**	0.0720	
FER is not grainer's reason for ISR	F	0.1035	1.7835	1.7974	1.9522	2.2222	accept
	P	0.7483	0.1735	0.1529	0.1084	0.0589	

Note: ** and * respectively indicated significant P values at the significant level of 5% and 10%

premium in the short term. The P value was significantly less than 0.05 in the 1-4 lag phases. On the contrary, the expectation of RMB rise and depreciation has no significant impact on the Sino US interest margin.

4.3 Vector Error Correction Model

We establish the vector error correction model, and then derive the error correction model by the autoregressive distributed lag model. We first establish the VEC model for the foreign exchange sale and the interest margin and the sink difference sequence:

$$ECM_t = ESS_t - 329.248HC - 166.885LC + 430.969$$

(1)

From the test results, we have the following conclusions:

Domestic foreign exchange difference is the Grainger cause of foreign exchange settlement, and has a significant impact on foreign exchange settlement in the period of 1 and 2 lag, which indicates that the change of exchange rate expectation in the short term can guide capital flow.

And Grainger exchange difference in exchange changes not.

Equation (1) reflects the long-term equilibrium relationship between the fluctuation of foreign exchange settlement and the difference between interest margin and exchange rate. That is to say, when the RMB appreciation is expected to increase by 1%, the foreign exchange sale will increase by 32 billion 924 million 800 thousand dollars; when the domestic and foreign spreads increase by 1%, the foreign exchange sale will increase by 16 billion 688 million 500 thousand US dollars. Vice versa.

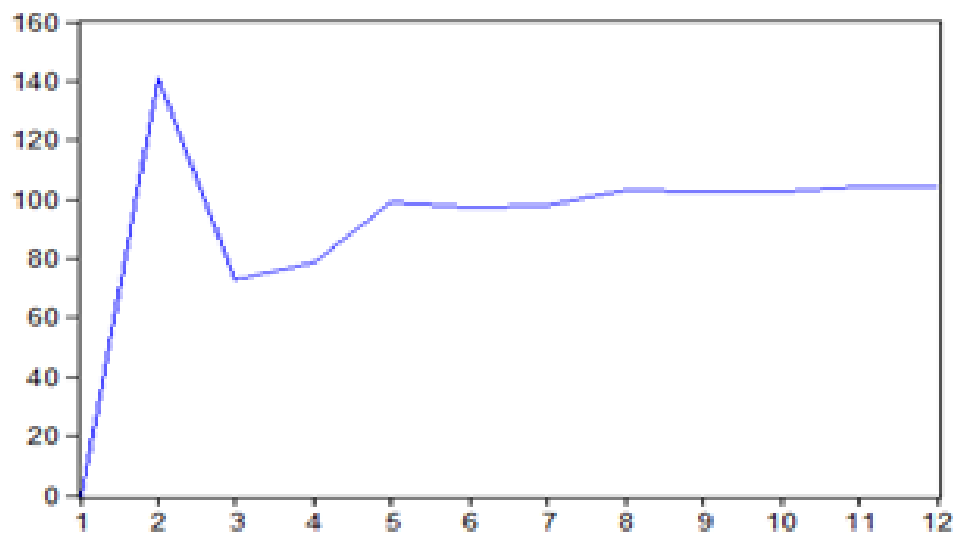
According to the AIC and SC criteria, we establish two order vector autoregressive model, and the error correction term vector auto regression model to establish the vector error correction model is introduced, and the analysis between foreign exchange movements and the short-term interest rate and the exchange difference between guide. Through the Eviews modeling, VEC model is obtained as follows:

$$\begin{aligned} \Delta ESS = & -0.278ECM_{t-1} - 0.421\Delta ESS_{t-1} - 0.292ESS_{t-2} + \\ & 167\Delta HC_{t-1} - 51\Delta HC_{t-2} + 3.857\Delta LC_{t-1} - 104LC_{t-2} + 3.055 \end{aligned} \quad (2)$$

The ESS T statistic of the lag were -3.29 and -2.79, significant at the 1% level; HC T statistic for a lag of -2.23, significant at the significance level of 5%; the LC T statistic for two lags behind -1.68, significant at the significance level of 10%. In addition, ESS error correction coefficient (adjusted coefficient) is -0.278, so the adjustment mechanism can be interpreted as, in T-1, if $ECM_{t-1} > 0$, the foreign exchange fluctuation is greater than the size of its long-term equilibrium scale, corresponding to the T stage, the adjustment coefficient is negative, the settlement will be reduced to the long-term scale of change in order to restore the equilibrium state, the adjustment speed is 0.278, and vice versa.

4.4 Pulse Response Function

We then use impulse response function analysis to observe the current and late changes in foreign exchange sale after the spread and the difference of exchange rate shocks. Seen from the impulse response graph can initially have positive standard 1 units of poor appreciation of the RMB is expected to impact the settlement began to increase in second reached the maximum value, then the influence degree began to decline, but the impact of a long time. After the impact of the spread



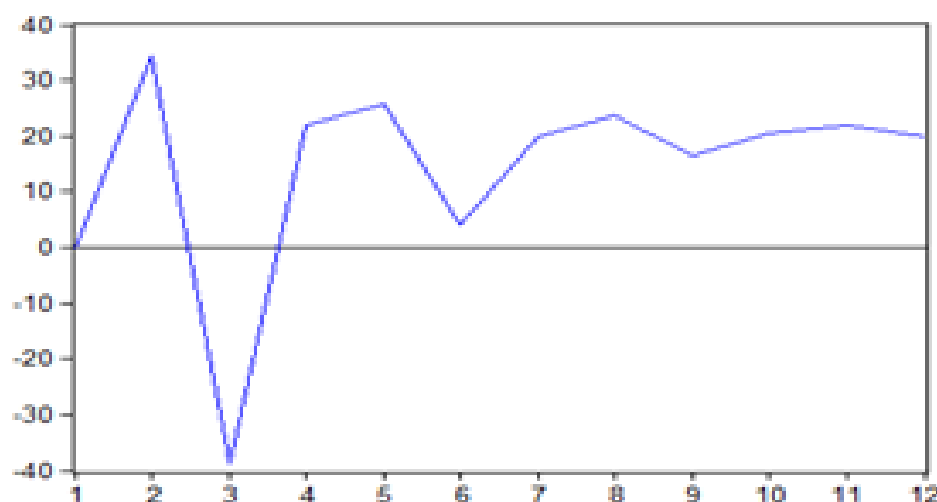


Figure 4. Pulse response function diagram of ESS to HC and L.

of the 1 unit forward standard deviation, the foreign exchange sale began to increase, reached the maximum in the second period, then showed the negative growth state of foreign exchange sale, and reached the maximum negative impact in the third phase as shown in Figure 4.

4.5 Variance Decomposition

We use variance decomposition to further clarify the relative importance information of interest margin and sink difference due to changes in foreign exchange settlement. The results of variance decomposition show that about 22.73% of the fluctuation can be explained by the foreign exchange difference within the first 24 periods, while the contribution of interest rate to the fluctuation of foreign exchange settlement is only about 1.08%.

5. Conclusions and Analysis

The purpose of this study is to analyze the causes of the fluctuation of bank settlement and exchange in the last two years under the new situation after the 811 exchange rate reform, and to confirm the nature of the current capital flow, that is, arbitrage or hedging. The end of February 2017 HIBOR and SHIBOR time series data spreads to the

middle of 2014, the time of the domestic spot exchange rate and exchange rate do overseas NDF exchange differences, the time of occurrence of commercial bank foreign exchange based on (since then + generation connection) analysis of VAR regression of Grainger causality test and vector data. The results of our analysis are:

1. Fluctuation of domestic foreign exchange and fluctuation of bank settlement and sale. According to the empirical analysis, the domestic foreign exchange difference is the Grainger reason for the change of bank settlement and sale, and has a significant impact on the foreign exchange settlement in the 1 and 2 periods. The results show that the changes in the exchange rate expectations of enterprises and individuals in the short term can guide the flow of capital (represented by the surplus and deficit of bank settlement and sale).

This result is also a manifestation of China's current capital market isolation. In the real economy, the 8.11 Exchange changed the market decision scope of the RMB exchange rate, but did not completely open the capital market. For example, in the trend of RMB devaluation, the Chinese bank overseas branch to sell dollars and buy RMB this direct intervention to boost the Yuan (to NDF); such as tightening the offshore RMB liquidity, thus affecting the offshore RMB lending costs (impact to HIBOR),

and then on the offshore RMB exchange rate adjustment. Although these practices will suppress arbitrage activities to a great extent, but also make the price tends to balance is broken, the inside and outside the RMB exchange rate has long spread, which affects the bias of investors held wishes of the Yuan, the bank foreign exchange fluctuation. Seen from the impulse response function can also, if 1 unit by positive standard deviation of the RMB appreciation impact, settlement began to increase; the variance decomposition results show that in the first 24 period of foreign exchange fluctuations, about 22.73% RMB by domestic foreign exchange fluctuations can explain the difference.

At the same time, we do not think that the foreign exchange settlement caused by the difference is arbitrage capital flow. The general logic is that due to arbitrage offshore off shore market regulation is less, the RMB exchange rate fluctuations is expected exchange rate changes directly reflected by the offshore market, arbitrage traders will determine the trend of the RMB exchange rate according to the trend of NDF, and take the corresponding transaction. For example, on the offshore side, the trend of depreciated (rising) value of the exchange rate is to sell (buy) RMB on the shore, while offshore (RMB) is purchased (sold). The pressure will have an impact in the arbitrage of bank foreign exchange market, causing sharp fluctuations in RMB exchange rate. On the other hand, if the appreciation of the RMB is expected to be strong, the offshore market participants will borrow dollars to buy the RMB at sight, and sell the forward RMB and buy the dollar. This arbitrage activity may cause sharp fluctuations in RMB spot market demand.

The key here is that although the capital markets on the mainland are slowly open, but not all projects and key projects, open all limit. The arbitrage logic can only in cooperation with domestic underground is possible, so we determine the banking exchange deficit is not arbitrage of capital flows, but the value of the behavior of enterprises and individuals in the domestic and foreign spreads under the influence.

2. Domestic and foreign spreads and fluctuations in bank settlement and sale. Perhaps the time differ-

ence data, results of the empirical analysis in this paper is spread abroad while barely showing Grainger reasons for foreign exchange movements, but spreads effect on foreign exchange will not change significantly. From the cointegration test results, spreads and settlement of non-stationary time series data with first-order long-term equilibrium relationship, Grainger causality test and vector error correction model are verified though the spread of positive relationship between changes in foreign exchange, but the exchange differences influence on the settlement significantly greater than the interest rate. Therefore, it is difficult to believe that the domestic and foreign spreads triggered the current round of capital flows.

As we know, the formation mechanism of RMB interest rate and domestic different domestic interest rates is mainly affected by the domestic market demand for funds and central bank policy, and the offshore RMB interest rate is mainly affected by supply and demand factors of offshore RMB. In the data period of time, although the domestic SHIBOR has been relatively stable, but foreign HIBOR has jumped three times. Although the overseas market participants, in 2015 and 2016 the dollar rate hike is expected to increase, offshore market exchange supply than demand, the offshore RMB exchange rate downward pressure increases under the condition of increasing the current lending amount of offshore RMB, to obtain arbitrage gains. And theoretically, this behavior will cause RMB liquidity in the offshore market to be tense, and thus the HIBOR will rise. However, the inflow of RMB before SHIBOR will continue to decline, thereby increasing cross-strait interest margins. If the openness or regulation of cross-strait markets is the same, according to economic theory, the decline in interest rates will lure more arbitrage funds into the offshore market to seek high returns, and eventually make the prices of the two markets converge. Obviously, the two markets in China and abroad do not have this condition. So there is a widening spread immediately wind sways grass on both sides.

In contrast, domestic and foreign spreads do not show the impact on the exchange of foreign exchange, so we turn to analyze the SHIBOR market. From the business

perspective, SHIBOR is composed of 18 state-owned commercial banks and policy banks and foreign banks offer group quoted interbank lending funds offer, the fund is reflected in the behavior of the supply side, but not the specific transaction price. SHIBOR if the change reaction is the financial side that large state-owned commercial bank capital supply changes, changes in the money market of domestic banks and policy banks, such as SHIBOR rose, just means the domestic bank currency funds, is not directly associated with cross-border arbitrage. The correlation between SHIBOR and foreign exchange market is reflected in the exchange rate intervention by the central bank. When the central bank intervened in the exchange rate and sold the dollar back into the open market, it would reduce the willingness of the big banks to melt their money. The willingness of big banks to weaken will lead to the tightening of funds and the rise of SHIBOR. From this point of view, the devaluation of the RMB is expected to rise; leading to the intervention of the central bank is the cause of fluctuations in the market funds and the reasons for the rise of SHIBOR.

3. The balance of foreign exchange settlement and sale and the collection of money to the people. The relationship between the foreign exchange settlement and foreign exchange settlement and the relationship between the people and the people needs to be analyzed by three sets of data. First of all, the foreign exchange auction began to decline in July 2014, turned into a deficit (5 billion RMB) in August, and expanded to 100 billion 500 million RMB in September, and has been declining until 2017. Among them, the settlement data did not change substantially, every month in 900 billion to about 1 trillion smooth swing, but sales increased significantly, the

average monthly sales in 2014 800 billion, 2015 years were 900 billion and 2016 years were 1 trillion, enterprises and individuals in the same period by a total amount of \$209 billion 600 million in the bank's foreign exchange deposit. Since the settlement of foreign exchange has not decreased, we have judged that the increment of foreign exchange deposits of banks at the same time belongs to the individual deposit of residents. Over the same period, China's foreign exchange reserves fell from 39932 US dollars to 29982 US dollars, reducing about 1 trillion dollars during the period. If the reduction of foreign exchange reserves increase, non official = overseas assets, corresponding in the international balance of capital and financial account, non reserve financial under the securities outflows totaling \$128 billion 700 million, out of a total of 10163 other billion dollars, the total outflow of 11450 billion dollars.

This should be corporate behavior. Overall, the impact of devaluation expectations, corporate behavior is greater than the individual behavior of residents.

6. References

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