

## Chinese Foreign Exchange Intervention

HAN Ping<sup>[a],\*</sup>

<sup>[a]</sup>School of Finance, Shandong Jiaotong University, Jinan, China.  
\* Corresponding Author.

Received 2 November 2013; accepted 13 January 2014.

### Abstract

This paper selects monthly data of exchange rate between RMB and USD as well as Chinese foreign exchange reserves from August 2005 to July 2013. By the use of auto-regressive distributed lag (ADL) model, it analyses whether RMB appreciation caused central bank intervention and discusses reasons for continuously balance of payment surplus.

**Key words:** Floating exchange rate system; Autoregressive distributed lag (ADL) model; Balance of payment

HAN Ping (2014). Chinese Foreign Exchange Intervention. *International Business and Management*, 8(1), 43-45. Available from: <http://www.cscanada.net/index.php/ibm/article/view/j.ibm.1923842820140801.1075>  
DOI: <http://dx.doi.org/10.3968/j.ibm.1923842820140801.1075>

### INTRODUCTION

Foreign exchange intervention is a monetary policy tool in which a central bank takes an active participatory role in influencing the monetary funds transfer rate of the national currency. Central banks, especially those in developing countries, intervene in the foreign exchange market in order to build reserves, stabilize the exchange rate and to correct misalignments. The success of foreign exchange intervention depends on how the central bank sterilizes the impact of its interventions, as well as general macroeconomic policies set by the government.

In a pegged exchange rate, a country may use foreign exchange intervention to prevent appreciation or depreciation of its currency. For example, if private supply and demand in foreign exchange market is attempting to

drive the exchange rate up, or the country's currency is tending toward depreciation, the government may sell foreign currency as well as buy domestic currency to increase demand of domestic currency in order to prevent the depreciation. On the other hand, if domestic currency is tending toward appreciation, the government may sell domestic currency and buy foreign currency to defend its pegged rate (Fatum, Rasmus & Hutchison, 2006).

On July 21st, 2005, China began to implement market-based, managed floating exchange rate with reference to a basket of currencies. Since then, RMB has appreciated slowly. From July 21st, 2005 to June 30th, 2013, exchange rate between RMB and USD decreased from 8.1100 to 6.1805.



**Figure 1**  
**Exchange Rate Between RMB and USD**

Based on traditional theory, currency appreciation will lead to government intervention in foreign exchange market if a country exerts fixed or management exchange rate. As a result of intervention, currency appreciation will be controlled (Mundell, 1968; Pugel, 2008; krugman, Obstfeld & Melitz, 2011). But it is not true in China because we have seen RMB appreciated continuously in last decade. We do not know whether Chinese government implemented some kind of foreign exchange control. If it did so, why RMB appreciation hasn't been controlled? In view of this, this paper selects monthly data of exchange rate between RMB and USD as well as Chinese foreign

exchange reserves from August 2005 to July 2013. By the use of auto-regressive distributed lag (ADL) model, it analyses whether RMB appreciation caused central bank intervention and discusses reasons for continuously balance of payment surplus.

## 1. METHOD

### 1.1 Theory Introduction

Auto-regressive Distributed Lag (ADL) was put forward by Jorgenson in 1966. Traditional time series models often suppose a model by the use of known theories, and then estimate the related parameters from sample data. This kind of method is greatly related to relative theories (Jorgenson, 1966). From 1970s, some economists represented by Hendry effectively combined theories and data. They put forward some theories and methods of dynamic econometrics. Hendry pointed that building of a model should begin with gradually simplification of an ADL model which represents data generating process (DGP). After the simplification, we can get a simple model which involves long-term relationship among variables.

This is a fundamental formula of (p, q) step ADL model,

$$y_t = \alpha + \phi_1 y_{t-1} + \phi_2 y_{t-2} + \dots + \phi_p y_{t-p} + \sum_{i=0}^{\tau_i} \beta_i x_{t-i} + \mu_t - \theta_1 \mu_{t-1} - \theta_2 \mu_{t-2} - \dots - \theta_q \mu_{t-q} \quad (1)$$

Here,  $X_{t-i}$  are  $i$  period lag exogenous variables (number of dimensions equal to that of elements), highest lag of every exogenous variables are  $\tau_i$ ,  $\beta_i$  are parameters.

### 1.2 Sampling Procedures

The purpose of this model is to analyse whether RMB appreciation caused central bank intervention. Here, I pick monthly data of exchange rate (ER) between RMB and USD as well as foreign exchange reserves (FER) of Chinese central bank, which is from August 2005 to July 2010. foreign exchange reserve is a dependent variable, exchange rate is explanatory variable. ADL model is used to analyse relationship between two variables in order to estimate whether central bank imposed intervention to prevent RMB appreciation.

Here is an ADL model of 3 steps lag of ER and 2 step lags of FER,

$$FER = c(1) + c(2)FER(-1) + c(3)FER(-2) + c(4)ER + c(5)ER(-1) + c(6)ER(-2) + c(7)ER(-3) + e \quad (2)$$

The result of this model shows that, adjusted  $R^2$  is 0.997760, F test passed. Here we use LM test because D.W test is invalid.

The result of LM test is 0.26, its concomitant probability is 0.6113 which is larger than confidence of 0.05. Null hypotheses can be rejected; first-order

autocorrelation does not exist in residual serial. Equation (2) can be used as a general equilibrium.

According to the T test result of factors in general equilibrium, least significant factors can be rejected. A simplified equilibrium is as follow:

$$FER = c(1) + c(2)FER(-1) + c(3)ER + c(4)ER(-1) \quad (3)$$

**Table 1**  
**Simplified Result of Model**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	687.4272	1836.226	0.374370	0.7096
YE(-1)	1.002522	0.018820	53.26774	0.0000
HL	-2873.137	1075.408	-2.671672	0.0099
HL(-1)	2807.279	1102.217	2.546939	0.0137

Adjusted  $R^2$  is 0.998011; concomitant probability of F test is 0.00000. Concomitant probability of LM test is 0.3359. Equilibrium (3) can be a simplified ADL model reflecting the relationship between exchange rate and foreign exchange reserve.

**Table 2**  
**Result of LM test**

F-statistic	0.861207	Prob. F(1,54)	0.3575
Obs*R-squared	0.926178	Prob. Chi-Square (1)	0.3359

## 2. RESULTS

From the result of estimation, influence factor of exchange rate to foreign exchange intervention C(3) is 0.0099. It is a significant negative correlation. That means Chinese central bank have imposed foreign exchange intervention of buying USD and selling RMB in order to prevent RMB appreciation. Beside this, the intervention is a long-term, continuously activity because coefficient of lagging factor is significant.

## 3. DISCUSSION

Nevertheless, the central bank intervention caused by RMB appreciation has not slow down the trend of appreciation. The effect of intervention is not a significant one. Causes are as follow.

After the slap shot of sub-prime credit crisis, all the countries in the world began to impose active fiscal policy, monetary policy, and other methods to stimulate demand and industrial structure adjustment after the global contagion of financial crisis, All these policies have an active stimulation to slow down the decrease of economy and international trade began to increase at the end of 2009. Following the loosening monetary policies, enterprises released from the tight budget, people began to have confidence to the increase of world economy.

Demands of consumption and investment suspended in early days resumed significantly, which promoted the recovery growth of world economy. Financial crisis haven't change the trend of globalization, international economic organizations played active role in coordinating different economies and defending multilateral trades. Communications of all governments helped in decreasing conflicts of their interest and avoided trade protectionism; this gave guarantee to the recovery of world economy.

From 2002, U.S suffered double deficit and sub-prime credit crisis, FRS decreases interest rate and USD depreciated. Because of the depreciation, international capital began to flow out of U.S. the appreciation anticipation of RMB and long-term economic growth capacity made china become main area of capital inflow. Higher RMB interest rate and the certainty of its appreciation also gave hot money a good chance to arbitrage.

Chinese economy experienced a high increase period from 2003, annual GDP kept an increasing rate of more than double –digit which promoted the real estate market and security market. Price of many capitals increased, this gave foreign hot money chance to make profit. Although china performs control against capital account which prevents short-term capital, this cannot set back international capital inflow through all kinds of ways. Generally, we believe that short-term capital flew into china through false business, foreign direct investment and illegal private banks.

World economy began to recover from 2008, but the recovery is not equilibrium, major countries' macro-economic policy orientation differentiated. Some countries' economy grew slowly with high unemployment

and less market confidence; they must impose easy fiscal and monetary policies in short-run. Other countries like U.S have not get enough stimulation through easy monetary policies, newly increased money supply flow out to some emerging markets. While, although some major developing countries also have slow economic growth, they are suffering pressure of high inflation, tighten monetary policies are needed (Behera, Narasimhan & Murty, 2008). Hot money flew into some developing counties with high economic growth represented by china; this increased difficulty to prevent inflation and made domestic currency appreciate as well as increased asset bubbles.

---

## REFERENCES

---

- Fatum, Rasmus & Michael M. Hutchison (2006). effectiveness of official daily foreign exchange market intervention operations in Japan. *Journal of International Money and Finance*, 25, 199-299.
- Harendra Behera, Vathsala Narasimhan & K.N. Murty (2008). Relationship between Exchange Rate Volatility and Central Bank Intervention: An empirical analysis for India. *South Asia Economic Journal*, 9, 169-184. DOI: 10. 1177/139156140700900103.
- Jorgenson D. (1966). Rational distributed lag functions. *Econometrica*.
- Paul R. krugman, Maurice Obstfeld & Marc Melitz (2011). *International economics* (9<sup>th</sup> edition). New Jersey: Prentice Hall.
- Robert A. Mundell (1968). *International economics*. New York: Macmillan.
- Thomas A. Pugel (2008). *International economics* (14<sup>th</sup> edition). Boston: McGraw-Hill.