

Discussion on Moderate Size of Foreign Exchange Reserves in Our Country

Shaokang Ma^{1, a}, Yixin Liu^{2, b}

¹School of Finance and Trade, Zhuhai College of Jilin University, Zhuhai 510941, China;

²School of Finance, Jilin University of Finance and Economics, Changchun 130117, China.

^a330209592@qq.com, ^b1320308891@qq.com

Abstract. Moderate size of foreign exchange reserves is the key to quantity management. During 40 years of reform and opening-up policy, the foreign exchange reserves in our country increase by more than 3000 times. At present, it is 3 trillion dollars and accounts for 28% of foreign exchange reserves of the world, thus ranking first for a long time. Then, which is the moderate size for foreign exchange reserves in our country? How to scientifically determine moderate size of reserves? These are important and practical problems that we are faced with. Research in the Paper focuses on moderate foreign exchange reserves in our country and relevant economic theoretical models are used to consider variable factors which mainly influence foreign exchange reserves according to practical situation in our country. Therefore, we will know basic data about moderate foreign exchange reserves in our country to provide basis and reference for quantity management of foreign exchange reserves in our country.

Keywords: Foreign exchange reserves, moderate size and quantity management.

1. Introduction

There are great changes in rise and fall of foreign exchange reserves in our country: 840 million dollars in 1979, 165.574 billion dollars in 2000, 3843.018 billion dollars in 2014 and 3110.6 billion dollars in May 2018. On one hand, it is the result of macro-economic operation in our country. On the other hand, it is the reflection of loss of control in quantity management of foreign exchange reserves in our country. Then, which is the moderate size of foreign exchange reserves in our country?

2. Demands of Foreign Exchange Reserves at A Single Level

2.1 Demands of Foreign Exchange Reserves in Prudent Motivation

In the middle of last century, Tiffin, an American economist, proposed proportion analysis model which is the first standard accepted by International Monetary Fund (IMF). He thought, foreign exchange reserves of a country shall be equivalent to input amount of three to four months, namely about 30% of input amount of the whole year. The moderate and theoretical amount of foreign exchange reserves can be calculated according to 30% of import amount in the current year from 2000 to 2016. The result is that, from 2000 to 2004, the size of foreign exchange reserves and import amount increased steadily and the increase level was close to each other. Therefore, the actual amount of foreign exchange reserves is always 3 to 4 times of moderate and theoretical amount of foreign exchange reserves. In 2005, People's Bank of China announced to carry out reform in exchange rate mechanism, which started marketization of RMB exchange rate. Later on, the size of foreign exchange reserves in our country increased rapidly and it was up to 6.6 times of moderate and theoretical amount of reserves at the greatest extent. In the second half of 2014, the size of foreign exchange reserves in our country showed the trend of month-on-month decrease for the first time. However, due to decrease of import amount in the same period, the actual foreign exchange reserves were still more than 6 times of moderate and theoretical amount of foreign exchange reserves at the end of 2016.

Table 1. Demands of foreign exchange reserves in prudent motivation

year	Imports	30% of Imports	Foreign Exchange Reserves (R)
2000	2250.9	675.27	1655.74
2001	2435.5	730.65	2121.65
2002	2951.7	885.51	2864.07
2003	4127.6	1238.28	4032.51
2004	5612.3	1683.69	6099.32
2005	6599.5	1979.85	8188.72
2006	7914.6	2374.38	10663.44
2007	9561.2	2868.36	15282.49
2008	11325.7	3397.71	19460.3
2009	10059.2	3017.76	23991.52
2010	13962.4	4188.72	28473.38
2011	17434.8	5230.44	31811.48
2012	18184.1	5455.23	33115.89
2013	19499.9	5849.97	38213.15
2014	19592.3	5877.69	38430.18
2015	16819.5	5045.85	33303.62
2016	15874.8	4762.44	30105.17

Unit: hundred million US dollars

Source of data: [1] Information on: <http://www.Stats.Gov.Cn>, [2] Information on: <http://www.Safe.Gov.Cn>

Table 2. Demands of foreign exchange reserves in preventive motivation (I)

year	short-term external debt(SD)	3 times short-term external debt	Foreign Exchange Reserves(R)
2000	130.8	392.4	1655.74
2001	837.7	2513.1	2121.65
2002	870.8	2612.4	2864.07
2003	1027.7	3083.1	4032.51
2004	1387.1	4161.3	6099.32
2005	1716.4	5149.2	8188.72
2006	1992.3	5976.9	10663.44
2007	2356.8	7070.4	15282.49
2008	2262.8	6788.4	19460.3
2009	2592.6	7777.8	23991.52
2010	3757	11271	28473.38
2011	5009	15027	31811.48
2012	5409.3	16227.9	33115.89
2013	6766.3	20298.9	38213.15
2014	6211	18633	38430.18
2015	4791.1	14811	33303.62
2016	5747.7	17243.1	30105.17

Unit: hundred million US dollars

Source of data: [1] Information on: <http://www.Stats.Gov.Cn>, [2] Information on: <http://www.Safe.Gov.Cn>

2.2 Demands of Foreign Exchange Reserves in Preventive Motivation

(I) Alan Greenspan, the 13th President of Federal Reserve Board (1987 to 2006), proposed that the demands of capital flow shall be considered for the size of foreign exchange reserves. Therefore, the proportion between foreign exchange reserves and balance of short-term foreign debt is deemed as an important symbol of a country's debt paying ability and the international warning line is 100%. The moderate and theoretical amount of foreign exchange reserves (debt crisis, inflow of hot money and other factors in economic globalization are taken into consideration) will be calculated according

to 3 times of the balance of short-term foreign debt from 2000 to 2016. From 2001, in statistic methods and dimensions about the balance of foreign debt, the balance of external financing for trade accounts in three months is added and therefore the proportion of the balance of short-term foreign debt in total balance increased from about 10% to the value above 40%. Later on, the proportion of short-term foreign debt constantly increased and reached above 70% in 2011. It can be seen that as for the balance of short-term foreign debt which reflects demands of capital flow, there are great demands of repaying principal and interest for foreign exchange reserves. The results show that since 2003, the actual amount of foreign exchange reserves greatly deviated from theoretical and moderate amount of reserves and it was nearly 2 times more than theoretical and moderate amount of reserves in 2016.

Table 3. Demands of foreign exchange reserves in preventive motivation (II)

Year	outstanding external debt (D)	40% of outstanding external debt	Foreign Exchange Reserves (R)
2000	1,457.30	582.92 of	1655.74
2001	2,033.00	813.2	2121.65
2002	2,026.30	810.52	2864.07
2003	2,193.60	877.44	4032.51
2004	2,629.90	1051.96	6099.32
2005	2,965.40	1186.16	8188.72
2006	3,385.90	1354.36	10663.44
2007	3,892.20	1556.88	15282.49
2008	3,901.60	1560.64	19460.3
2009	4,286.50	1714.6	23991.52
2010	5,489.40	2195.76	28473.38
2011	6950	2780	31811.48
2012	7369.9	2947.96	33115.89
2013	8631.7	3452.68	38213.15
2014	8955.5	3582	38430.18
2015	7462.8	2985.12	33303.62
2016	9376	3750.56	30105.17

Unit: hundred million US dollars

Source of data: Information on: <http://www.safe.gov.cn>

(II) P. uidotti, the former Finance Minister of Argentina, thought that the foreign exchange reserves of a country shall meet demands to repay foreign debt due within a year, which means the proportion of reserves in balance of external debt reflects a country's ability of paying off foreign debt. The international warning line is 30% and it is 30% to 50% in general. In case one median is determined, the moderate and theoretical amount of reserves can be calculated according to 40% of the balance of foreign debt from 2000 to 2016. The results show that the actual amount of reserves greatly deviates from theoretical and moderate amount of reserves. However, it is worth noting that since 2011, the proportion of short-term foreign debt (the term of repayment is one year) was up to the value above 70% and the customary 40% was not appropriate. Even though 70% or even 100% of the balance of foreign debt is deemed as theoretical amount of reserves, actual foreign exchange reserves are still higher than the moderate level. As of 2016, the actual foreign exchange reserves were 5 times higher than the balance of short-term foreign debt.

Table 4. Demands of foreign exchange reserves in effectiveness-oriented motivation

Year	GDP	25% of GDP	Foreign Exchange Reserves (R)
2000	12113.46	3028.366	1655.74
2001	13394.12	3348.529	2121.65
2002	14705.5	3676.374	2864.07
2003	16602.88	4150.719	4032.51
2004	19553.47	4888.369	6099.32
2005	22866.91	5716.729	8188.72
2006	27526.84	6881.711	10663.44
2007	35538.18	8884.544	15282.49
2008	46005.89	11501.47	19460.3
2009	51102.53	12775.63	23991.52
2010	61013.41	15253.35	28473.38
2011	75757.2	18939.3	31811.48
2012	85602.76	21400.69	33115.89
2013	96112.58	24028.14	38213.15
2014	104834	26208.49	38430.18
2015	110630.7	27657.66	33303.62
2016	112028.5	28007.13	30105.17

Unit: hundred million US dollars

Source of data: [1] Information on: <http://www.stats.gov.cn>, [2] Information on: <http://www.safe.gov.cn>

2.3 Demands of Foreign Exchange Reserves in Effectiveness-Oriented Motivation

Johnson (1958) thought, the proportion of a country's foreign exchange reserves in GDP can reflect demands of the reserve size for changes in economic development. The moderate size of reserves can be calculated according to 25% of GDP from 2000 to 2016. The data show that foreign exchange reserves from 2000 to 2003 in our country were less than the theoretical and moderate size. Since 2004, the amount of foreign exchange reserves in our country started to rapidly increase and the actual amount was higher than the moderate level. In 2010, the proportion between actual amount of foreign exchange reserves and GDP was up to 47% at the greatest extent. Later on, due to rapid increase of GDP, the proportion decreased but it was still higher than 25% of moderate level.

To sum up, if measured from aspect of the demand motive at a single level, the theoretical and moderate amount of foreign exchange reserves is much lower than the actual foreign exchange reserves in our country.

3. Analysis Based on Adequacy Standard of IMF Foreign Exchange Reserves

After the financial crisis in Asia in 1990s, it can be easily seen from experience and lessons that before capital account of a country was open to the public, moderate and mature financial system is an important precondition. Haruhiko Kuroda, President of Asian Development Bank, pointed out it was necessary to carry out reform for global pattern of foreign exchange reserves dominated by dollars at present so as to adapt to current economic situation better and ensure financial stability in the world. Therefore, in case the moderate size of foreign exchange reserves in a country was measured from aspect of demand motive at a single level, it is insufficient to guarantee a country's international liquidity and ability to withstand shock of external financial crisis.

In 2001, the International Monetary Fund (IMF) pointed out in the document of Guide for Management of International Reserves and emphasized the overall standard that the size of foreign exchange reserves shall be sufficient to keep international debt paying ability, maintain investors' confidence, resist financial crisis, enhance the ability to intervene foreign exchange market, stabilize the balance of international payment and resist external crisis. With further development of economy

and capital globalization, foreign exchange reserves of a country are faced with double demands, namely internal demands of enterprises and individuals in diversified allocation of assets and external demands of economic exchanges with foreign countries. For this reason, the International Monetary Fund (IMF) (2011) pointed out in the document of Specific Suggestions for Adequacy Assessment of Foreign Exchange Reserves that the weighted measurement method for risk of adequacy of foreign exchange reserves focuses on four core indexes which are respectively short-term foreign debt(D), other liabilities of securities (including medium and long-term debts and equity debt)(SD), domestic current assets (the broad money supply M2 is deemed as its approximate value) and amount of exports(EX). These are four main factors for demands of foreign exchange reserves. The specific formulas are as follows:

Emerging market countries of fixed exchange rate system:

$$Rf = 30\% D + 15\% SD + 10\% M2 + 10\% EX$$

Emerging market countries of floating exchange rate system:

$$Rm = 30\% D + 10\% SD + 5\% M2 + 5\% EX$$

At present, our country is a country with managed floating exchange rate system and the coverage range of adequacy of foreign exchange reserves from 2000 to 2016 can be calculated according to adequacy standard of IMF foreign exchange reserves. The results show that compared with actual amount of foreign exchange reserves in our country, the actual size of foreign exchange reserves from 2000 to 2001 in our country was within coverage range of adequacy and it was higher than upper limit of adequacy in other years, which means it was higher than moderate size of foreign exchange reserves. In view that the capital account regulation was gradually slack in our country, IMF (2015) thought in case the capital regulation was slack in a country, the risk of capital outflow would greatly increase and the weight of M2 shall be increased but it is not allowed to exceed 10%. On the basis of this, the adequacy standard can be up to 2.8 trillion yuan. As of the end of 2016, the actual foreign exchange reserves in our country were still higher than this adequacy standard.

Table 5. Adequacy standard of IMF foreign exchange reserves

Year	Lower limit of Adequacy standard (100%)	Upper limit of Adequacy standard (150%)	Foreign Exchange Reserves (R)
2000	1300.435	1950.653	1655.74
2001	1652.98	2479.47	2121.65
2002	1877.765	2816.648	2864.07
2003	2257.795	3386.693	4032.51
2004	2730.935	4096.403	6099.32
2005	3287.745	4931.618	8188.72
2006	3943.215	5914.823	10663.44
2007	4810.24	7215.36	15282.49
2008	5776.225	8664.338	19460.3
2009	6700.06	10050.09	23991.52
2010	8325.9	12488.85	28473.38
2011	10284.72	15427.07	31811.48
2012	11681.62	17522.43	33115.89
2013	13452.09	20178.13	38213.15
2014	14926.64	22389.95	38430.18
2015	15676.3	23514.45	33303.62
2016	16301.1	24451.58	30105.17

Unit: hundred million US dollars

Source of data: [1] Information on: <http://www.stats.gov.cn> [2] Information on: <http://www.safe.gov.cn>

4. Conclusions

It can be seen that existing foreign exchange reserves in our country are still sufficient and in leading position throughout the world. Therefore, on the premise of meeting demand motives at all levels of foreign exchange reserves in our country, it is necessary to further focus on the following aspects: firstly, ensure the size of foreign exchange reserves in our country steadily increases and reach the range of moderate size which meets demands and consider inevitable short-term and moderate fluctuation of reserves from a rational aspect. Secondly, enhance diversified allocation of foreign exchange reserves and then innovate and support the national strategy for construction of “the Belt and Road”. Thirdly, maintain financial stability, normalize management of international capital flow, continue to suppress “hot money” and malicious interest arbitrage and prevent the risk of cross-border capital flow. Fourthly, when the exchange rate is nearly marketized, the “bi-directional fluctuation” in which the exchange rate focuses on balance level of RMB is common in the market. Therefore, it is essential to increase the market acceptability of fluctuation range and reasonably guide market expectation.

References

- [1]. Guangyou Zhou, Sumei Luo, Multi-level optimal allocation of foreign exchange reserve assets -based on the analysis framework of transactional demand, *Journal of Financial Research*, 2014(9):18-33.
- [2]. Gulping Hemet al. The optimal scale of international reserves in the process of currency internationalization, *Studies of International Finance*, 2014(3): 21-31.
- [3]. Sumer Luo, et al. The multi-level optimal allocation of monetary foreign exchange reserve assets, *The Journal of Quantitative & Technical Economics*, 2013(6): 19-35.
- [4]. Young Chen, et.al. Forecasting and Analysis of Foreign Exchange Reserves Based on Multi-factor VAR Model, *Statistics & Decision*, 2013(13): 148-149.
- [5]. Yeti Ma. The Macroeconomic Effect of China's Foreign Exchange Reserve Growth: Based on Time-Variable Parameter State Space Model, *Journal of Northeast Normal University (Philosophy and Social Sciences)*, and 2014(3): 105-111.
- [6]. *Assessing Reserve Adequacy—Specific Proposals*, 2015 (4).
- [7]. Information on: <http://www.imf.org/external/np/pp/eng/2014/121914.pdf>.