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Analysis of Impact on Chinese Money Supply Caused by Funds Outstanding for Foreign Exchange

Li Tan[*1], Hua Deng[2]

[*1]Hunan University of Humanities, Science and Technology, Department of Mathematics and Finance, Hunan, China
[2]Hunan University of Humanities, Science and Technology, Department of Mathematics and Finance, Hunan, China

Abstract:

This paper did an empirical research on the impact of foreign exchange on the money supply, using Johansen co-integration test and getting a conclusion that the actions are in the same direction.

Keywords: Funds Outstanding for Foreign Exchange, Money Supply, Impact, and Co-Integration Test.

1. Introduction

Funds outstanding for foreign refers to the national currency served to acquire foreign assets. China's foreign exchange and money supply are rising in recent years, and the growth rate of the money supply is greater than the growth rate of foreign exchange, research of Impact on Chinese money supply caused by funds outstanding for foreign exchange has great significance.

2. Sample Selection and Data Processing

In this paper, time series data were used, econometric model was established, and software Eviews 5.0 was chosen. In this paper, monthly data from 2008 to March 2012 were chosen, and selected the broad money supply (lnM2) as the dependent variable, funds outstanding for foreign exchange (lnPFP) as the independent variable. In order to avoid fluctuations in the data and reduce errors, the M2, PFP two time series were logarithmic.

3. Research Methods

3.1 Unit Root Test

Since most of the relevant financial variables were non-stationary time series, stability of variables must be confirmed before making co-integration test, namely unit root test. ADF (Augmented Dickey-Fuller) test is the most common unit root test method, whose regression equation is as followed.

$$\Delta Y_t = \alpha + \delta_t + \gamma Y_{t-1} + \sum_{i=1}^{p-1} \beta_i \Delta Y_{t-i} + \varepsilon_t \quad (1)$$

Yt refered to funds outstanding for foreign exchange or money supply of the first t month. The null hypothesis of ADF test is H0: $\beta = 0$; alternative hypothesis is H1: $\gamma < 0$. If accept H0, indicating that the series is non-stationary sequence, if reject H0, indicating that the series is stationary.

3.2 Co-integration Test

In this paper, Johansen "maximum likelihood estimation" was chosen to test the co-integrating relations between funds outstanding for foreign exchange and money supply.

3.3 Granger Causality Test

Using Granger causality test, we can found the leading and backward relationships between variables. Causality model between funds outstanding for foreign exchange and money supply can be expressed as followed.

$$\ln M2_t = \sum_{i=1}^{p} \alpha_{1i} \ln M2_{t-i} + \sum_{j=1}^{p} \beta_{1j} \ln PFP_{t-j} + \varepsilon_{1t} \quad (2)$$

$$\ln PFP_t = \sum_{i=1}^{p} \alpha_{2i} \ln M2_{t-i} + \sum_{j=1}^{p} \beta_{2j} \ln PFP_{t-j} + \varepsilon_{2t} \quad (3)$$

3.4 Error Correction Model

If there are long-term equilibrium relationships between the two markets, you can analyze the relationship between them using error correction model. The relationship can be expressed as follows error correction model.

$$\Delta \ln M2 = \omega_1 + d_1 ECM_{t-1} + \sum_{i=1}^{p} \alpha_{11}(i) \Delta \ln M2_{t-i} + \sum_{i=1}^{p} \alpha_{12}(i) \Delta \ln PFP_{t-i} + \varepsilon_{1t} \quad (4)$$

$$\Delta \ln PFP = \omega_2 + d_2 ECM_{t-1} + \sum_{i=1}^{p} \alpha_{21}(i) \Delta \ln M2_{t-i} + \sum_{i=1}^{p} \alpha_{22}(i) \Delta \ln PFP_{t-i} + \varepsilon_{2t} \quad (5)$$

4. Empirical Results and Analysis

4.1 Unit Root Test

If you are using *Word*, use either the Microsoft Equation Editor From Table 1 we can see that the level value of lnM2 and lnPFP, and at 1% confidence level the null hypothesis is accepted, and at the 5% confidence level to reject the null

hypothesis based on the first-order differential value. At the 5% confidence level lnM2 and lnPFP all contains a unit root, in line with a single integration process and in line with a single integration process. So we can do co-integration test next.

Table 1: Results of ADF Test

	Level Value Test Results		First Difference Test Results	
	ADF Value	P Value	ADF Value	P Value
lnM2	-0.707670	0.8355	-6.697228	0.0000**
lnPFP	-2.342963	0.1630	-2.944391	0.0476*

Note: * (**) indicates significantly at 5% (1%) confidence level, critical values were -2.9212 and -3.5683.

4.2 Co-integration Test

Here we use Johansen's "maximum likelihood estimation" to conduct co-integration test between lnM2 and lnPFP. From Table 1 we can see that at the 5% confidence level both the null hypothesis are significant, indicating that there are at least two co-integrating vectors of lnM2 and lnPFP, proving that there is a co-integration relationship between them. Therefore, we can further analyze the causal relationship between lnM2 and lnPFP.

Table 2(a): Results of Co-integration Test

Number of Co-integration Vector Supposed	***Eigenvalues***	***t statistic***	
		λtrace	***λmax***
None	**0.27113**	**19.04555***	**15.18046***
At most 1	**0.07737**	**3.86508***	**3.86508***

Note: * (**) indicates significantly at 5% (1%) confidence level.

4.3 Granger Causality Test

Granger pointed out that if there is a co-integration vector between the variables, then there is at least a one-way causal relationship between them. Table 3 shows that, at the 10% confidence level, we can reject null hypothesis of "lnPFP is not the cause of lnM2" and accept the null hypothesis of "lnM2 is not the cause of lnPFP". The results referred that there is a one-way causal relationship between lnM2 and inPFP, means that changes of funds outstanding for foreign exchange impact the changes of broad money supply in China.

Table 3: Results of Granger Causality Test

Null hypothesis	***F statistic***	***P Value***
lnPFP is not the cause of lnM2	1.97980*	0.09697
lnM2 is not the cause of lnPFP	1.08089	0.39389

Note: * indicates significantly at 10% confidence level.

4.4 Error Correction Model

By the foregoing test results we can get the following equation.

$$lnM2 = -0.975418 + 1.174531 * lnPFP$$
$$(-2.751518) \quad (40.37068) \qquad (6)$$

From the above equation we can see that there is a stable long-run equilibrium relationship between money supply and funds outstanding for foreign exchange in China. 1 point change in funds outstanding for foreign exchange lead money supply change 1.174531 point in the same direction.

In order to analyze the short-term relationship between M2 and PFP we can use error correction model. Relationship between two variables after error correction equilibrium is as follows.

$$\Delta lnM2_t = -0.038513 * ECM_{t-1} + 0.011661 * \Delta lnM2_{t-1} + 0.178474 * \Delta lnM2_{t-2}$$
$$(-0.92258) \qquad (0.07314) \qquad (1.09318)$$
$$+ 0.08757 * \Delta lnPFP_{t-1} - 0.028316 * \Delta lnPFP_{t-2} + 0.011587$$
$$(0.29873) \qquad (-0.11434) \qquad (1.9168) \qquad (7)$$

Note: the error correction term is ECMt-1 = lnM2t-1-1.365931 * lnPFPt-1+3.313407, Δ represents the first difference.

When the equilibrium relationship between deviation lnM2 and lnPFP deviates from long-term equilibrium, error correction will be adjusted in the opposite direction by

3.8513 percentages. In addition, a lag factor of funds outstanding for foreign exchange is higher than that of money supply, thus, in the short term, the impact of funds outstanding for funds outstanding for foreign exchange on the money supply is strong.

5. Conclusion

By co-test results we can conclude that there is a significant long-run equilibrium relationship between money supply and funds outstanding for foreign exchange. One point change in funds outstanding for foreign exchange lead money supply change 1.174531 point in the same direction. When the equilibrium relationship between deviation lnM2 and lnPFP deviates from long-term equilibrium, error correction will be adjusted in the opposite direction by 3.8513 percentages. Thus, in the short term, the impact of funds outstanding for funds outstanding for foreign exchange on the money supply is strong.

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References

[1] Wujun Huang,Ligao Chen, “Foreign Exchange Assets and Base Money Supply—Based on Central Bank Balance Sheet Analysis, ” Journal of Finance and Economics, 2010 (01), pp. 66-76, 2010.
[2] Tao Deng,Yongjian E, “An Empirical Analysis of the Impact of Foreign Exchange in the Money supply,” New Finance, 2010 (01), pp. 27-29, 2010.
[3] Xiaojun Ma, “Discussion on Management of Foreign Exchange Under the Open Economy,” Nankai Economic Studies, 2000 (06), pp. 60-64, 2000.
[4] Ge Wu, Bin Li, “Deal with Money Creation Channels of Monetary Policy Changes,” Studies of International Finance, 2012 (10), pp. 4-10, 2012.
[5] Wei Huang, Jingye Li, Junwen Duan, “Research on the Money Trap of Money Supply,” Finance & Trade Economics, 2007 (10), pp. 27-30, 2007.
[6] Hui Li, “Foreign Exchange Reserves and Money Supply,” Journal of Zhongnan University of Finance and Economics, 1997 (03), pp. 79-82, 1997.

Author Profile

Li Tan received the B.S. and M.S. degrees in Finance from Hunan University in 2011 and 2014, respectively. She is an assistant in department of mathematics and finance of human university of humanities, science and technology. Shi is interested in economic theory and practice.