Empirical Analysis on the Validity of Chinese Monetary Policy under the Financial Crisis

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Abstract As the international financial crisis swept across the globe in 2008, Chinese economy has been somewhat watered down, so we have implemented the proactive fiscal policy and appropriately easy monetary policy to deal with it. Now the entire world has few studies about the empirical analysis on the validity of Chinese monetary policy under the financial crisis. In this paper, we will choose some related variables, empirically analyze our monetary policy validity between 2007 and 2009 by constructing monetary policy validity model, and conclude that: our monetary policy under the financial crisis has made some progress and brought about a striking effect, but there still exits some time delay which needs further improvement. Therefore author puts forward that improving validity of monetary policy should moderately grasp the focus of easy monetary policy and take the delay of the implementation of monetary policy into account, but it also needs coordinate monetary policies and fiscal policies This paper will actively achieve the union of theoretical science and practical operability.

Key words International financial crisis; Chinese monetary policy; Validity; Empirical analysis

1 Introduction

American subprime mortgage crisis started to display step by step at the beginning of 2007, and caused an international financial crisis till 2008. Because of the influence of financial crisis, many economies emerged negative economic growth, and our macro-economy also suffered some influence. To keep our economic development continuously and minimize the impact of financial crisis, China has implemented a series of positive measure to face, which includes using transmission mechanism of monetary policy to implement effective monetary policy effectively to get to face up to impact of financial crisis and minimize the losses, to make the society and economy in a sustainable, rapid and sound development state. However, under the international financial crisis, whether our monetary policy is effective, in this paper we will use monetary policy validity model to positively study this problem.

As all countries around the world continue to focus on monetary policy, many scholars have studied on the validity of monetary policy. (Friedman and Phelps 1969) found that the cost of monetary policy was not only increased inflation, but also accelerating inflation, and this theory was called the natural unemployment rate hypothesis, that is, monetary policy can be effective when the central bank only create inflation which is beyond people's expectations. Robert • Lucas, Tom • Sargent, (Robert • Barrow 1972-1978) used "rational expectations" concept and proved expansionary monetary policy even in the short term is also invalid[①]. Chinese economy has also been many studies on the effectiveness of monetary policy in recent years. (Li Fan, Yin Chuan Lu 2007) assumed that impact of the money supply on investment is relatively significant in the short term, showing the relative monetary policy effectiveness in the short term (Li Fan,Yin Chuanlu,2007). (Li Lei, Zheng Changde 2008) assumed that in an open economy condition, monetary policy output effect and price effects exist in the short term. Chinese monetary policies have some positive influence on the international balance of payments, but have little effect on increasing employment (Li Lei, Zheng Changde, 2008).

Now the studies about the validity of monetary policy are few all over the world under the financial crisis, so in this paper we judge whether Chinese monetary policy is effective under the financial crisis by analyzing whether the monetary policy can realize its goal, and give some suggestions.

2 Establishment of Model

2.1 Establishing monetary policy validity model

The monetary policy validity connotation is that the monetary policy promotes the economic growth and reduces the unemployment which based on maintain the price stability and the balance of

①Chen Jin. The 80th of Harvard Notes: A Brief History of Monetary Policy Thinking. The Financial web. 2009 (11) (In Chinese)

international payments. How the monetary policy's move affects the national economy movement? We may use the Phillips curve to indicate it. According to the macroeconomics principle, the nearer the Phillips curve approaches to the zero point, the more effective the monetary policy is.

To analyze the Chinese monetary policy validity under the financial crisis, this paper selects four goals of monetary policy as variables, but as the balance of international payments belongs to the category of accounting, without the index of three other similar units, balance of international payments is better in recent years, so we deposit the explanatory variable of the balance of international payments. Therefore, a simple monetary policy effectiveness model is established(Zhi Kai ping,2008):

$$Em = \mathrm{L1}\ (p) + \mathrm{L2}\ (y) + \mathrm{L3}\ (u) \quad (1)$$

2.2 Confirm the region of the virtual value of the validity model of the monetary policy

To verify the validity of the model, namely, the fitting degree with the practice country economy, we assume that, y, the growth rate of GDP is 7.1% ~ 8%, p, inflation rate is 2% ~ 3%, u, unemployment rate is 4% ~ 6%. Chinese official published that 7.1%~ 8.0% is a reasonable range for economic growth. If the economic growth rate is under7.1%, the social stability will be affected; if the economic increase rate is beyond 8.0%, the tendency of the bubble economy and inflation will emerge. In inflation, central banks of the countries are more conservative, generally require the increase rate of price must be controlled within 2% ~ 3%. From the angle of the economic efficiency, most economists thought that the unemployment rate of 4% ~6% is normal. The social economy is located in the full employment state temporality. By the analysis above we can know that the objective demand quantity which was specified by the validity model is a kind of trend, the region of its virtual value is in the closed interval of 13.1%~ 17% (such as table 1).

Table 1 The Region of the Virtual Value and the Region Hypothesis of the Chinese Monetary Policy

	Virtual Values of the Monetary Policy
Price Stabilization	2% ~3%
Economic Increase	7.1%~8%
Fill Employment	4%~6%
Synthesis of the Region of the Virtual Value	13.1%~17%

3 Model Test

3.1 Validation of the virtual value region of the model and the fitting degree of the practical money supply

Model test is designed to judge the region of the virtual value of the model and the fitting degree of the practice money supply.if the fitting degree is higher, that is to say that the Chinese practice monetary require has a great influence between the other three variations, and the enactment of model is reasonable. Next, quarterly Chinese CPI, GDP and unemployment state under the financial crisis are listed (such as the Table 2).

Table 2 Chinese CPI, GDP and Unemployment Data Quarterly in 2007 ~ 2009 Unit: %

Year-Quarter	Inflation Rate (p)	GDP Increase Rate (y)	The Registered Urban Unemployment Rate (u)	p+y+u
2007 Q1	2.7	11.1	4.1	17.9
2007 Q2	3.2	11.9	4.1	19.2
2007 Q3	4.1	11.5	4.0	20.6
2007 Q4	4.8	11.2	4.0	20.0
2008 Q1	8.0	10.6	4.0	22.6
2008 Q2	7.9	10.4	4.0	22.3
2008 Q3	7.0	9.9	4.0	20.9
2008 Q4	5.9	9.0	4.2	20.1
2009 Q1	-0.6	6.1	4.3	9.8
2009 Q2	-1.1	7.1	4.3	10.3
2009 Q3	-1.1	7.7	4.3	10.9
2009 Q4	-0.7	8.7	4.3	12.3

Source: The Website of the Statistics Bureau of the People's Republic of China

From the data in the table, we can know that the increase situation of Chinese practice money demand can be divided into two categories under the financial crisis:

First, the practical money demand is higher than the region of the virtual value of the virtual value theoretical model occurred in 2007 and 2008. In early 2007, American subprime mortgage crisis began to appear, but had very little influence on China. In the second half of 2007, the financial storm of the developed economies group caused by the U.S. subprime mortgage crisis began to produce disadvantage effect on Chinese economy. The increase of inflation rate, the decrease of GDP increase rate, finally caused worldwide financial crisis in 2008. At the same time, Chinese inflation rate was growing rapidly, the highest state attained to 8%, GDP increase rate descend sharply, the minimum of the first quarter of 2009 attained to 6.1%. In order to control the inflation, the central bank of China adopted moderately tight monetary policy in early 2007 and then started to implement the tighter monetary policy in the last quarter of 2007, even changed the deposit reserve ratio 20 times in two years. These measures played a significant role to stimulate economic increase and control price arise and inflation.

Second, the practical money demand less than the region of the virtual value of the virtual value theoretical model occurred in 2009. China finally ended inflation after the central bank of China started to implement the tight monetary policy and improved the deposit reserve ratio and a series of monetary policy to control the inflation. And the inflation rate reached negative and into a contraction phase of practice money demand. At the end of 2008, the standing committee of the state council assured 10 measures to further expanding domestic demand and promote economic increase and in the next two years would arrange 4 trillion Yuan RMB capital to strongly startup domestic demand, promote the stable growth of economy, and also proposed to implement positive fiscal policy and appropriate easy monetary policy, This kind of change is a wise move to deal with the economic impact that come with the international economic environment changes; this kind of change is a important behave to promote domestic demand effectively, to accelerate the project of the people's livelihood, to accelerate the infrastructure and to accelerate the construction of ecological environment; this kind of change is a important behave to improve the income level of the urban and rural residents, especially the low-income people colony; this kind of change is a important behave to bring into the sufficient role play that the financial support the entity economy; this kind of change is a powerful guarantee to prevent economy decline and to ensure the persistent and stable increase of the economy.

Anyhow, seen from the overall situation, under the influence of financial crisis, Chinese economic increase was slow, inflation and deflation coexist, and the operation of monetary policy was in a passive adaptation state.

The practical money supplies test of the validity theoretical model of the Chinese monetary policy under the financial crisis

We can analyze the validity of monetary policy by analyzing statistically the money supply quantities and the other three economic variables: GDP increase rate, inflation rate, and deposit reserve ratio. We put money supply quantities as the dependent variable, GDP, CPI, R as independent variables. Chinese practical interest rate supply and the deposit reserve ratio situation are listed in Tables 3,4 (such as Table 3 and Table 4).

Table 3 The Increase Situation of Chinese Quarterly Money Supply in 2007 ~ 2009 Unit:%

Year-Quarter	M2 Increase Rate
2007 Q1	17.30
2007 Q2	17.10
2007 Q3	18.50
2007 Q4	16.72
2008 Q1	16.30
2008 Q2	17.37
2008 Q3	15.30
2008 Q4	17.82
2009 Q1	25.50
2009 Q2	28.50
2009 Q3	29.30
2009 Q4	27.68

Data Source: Website of the Bank of China

Table 4 The Deposit Reserve Rate Situation of China Quarterly in 2007 ~ 2009 Unit:%

Year-Quarter	Deposit Reserve Rate
2007 Q1	9．333 333
2007 Q2	10．500 000
2007 Q3	11．500 000
2007 Q4	13．000 000
2008 Q1	14．666 667
2008 Q2	16．083 333
2008 Q3	17．166 667
2008 Q4	16．500 000
2009 Q1	15．000 000
2009 Q2	15．000 000
2009 Q3	15．000 000
2009 Q4	15．000 000

Data Source: Chinese Monetary Policy Implementation Report after the Author Calculated and Reorganization.

Input the above data into the statistics software Eviews6.0 and carry on the regression analysis, the result of the regression analysis is as follows:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	-1.535122	0.320535	-4.789253	0.0014
GDP	0.214449	0.720183	0.297771	0.7735
R	89.56777	42.26854	2.119017	0.0669
C	11.09152	11.51589	0.963149	0.3637

We may obtain the result from the above analysis:

$$M2 = -1.535121526*CPI + 0.2144492773*GDP + 89.56776731*R + 11.09151743 \quad (2)$$

$$t = (-4.789253)\ (0.297771)\ (2.119017)\ (0.963149)$$

The operation result shows: GDP coefficient is positive, i.e. when GDP increases, the money supply inevitably increases; the CPI coefficient is negative, namely, when price rises, money supply is reduced to suppress inflation; if the bank reserve deposits coefficient is positive, it means that the Central Bank of China is always in the passive position and lags the economic situation changing when it uses the bank reserve deposits to make the adjustment.

4 Conclusions and Recommendations

The realization degree of the goals of monetary policy is a measure of the validity of monetary policy. According to empirical test results of monetary policy validity model theory Em=L1 (p) + L2 (y) + L3 (u), we can draw a conclusion: under the financial crisis, Chinese implementation of monetary policies have had certain effect and been relatively significant. By regression analysis we may see: GDP, CPI and deposit reserve rate all influence the growth rate of M2, deposit reserve rate in particular has great influence on the growth rate. But this method has a certain disadvantage and its validity is limited. When GDP grows, money supply will also grow, which is in accordance with Chinese actual situation in the recent three years. However, the monetary policy tool the central bank used to adjust actual economy has the feature of delay, so the effect is a little slow. But on the whole, Chinese monetary policy transmission channel is expedited, and under the financial crisis China implemented positive fiscal policy and appropriate monetary policy is effective to some extent.

But the actual changing problems limit its validity, so we should make adjustment and improve continuously. Firstly, we must grasp the focus of the moderately loose monetary policy. Based on actual changes, we should timely adjust monetary policy to make money supply growth reasonable and ensure the financial support to economic growth, and to promote economic stable and rapid growth. Secondly, we should take full account of the delay of monetary policy implementation. Monetary policies have the feature of delay, so for the adjustment of short-term fluctuations of the economy, we should maintain macroeconomic growth steadily and adjust monetary policy timely and smartly according to the changing domestic and international macroeconomic situation. Finally, the coordination of monetary

policy and fiscal policy is acquired. The fiscal policy and monetary policy is the most important policy tools the government can use to regulate macro economy. Only the two complements each other to achieve the synergistic effect, can we push internal demand and stimulate economic growth.①

As the crisis is not over, the information and data in this article are only up to the end of 2009, and their integrity also has certain deficiencies and needs further in-depth and comprehensive research.

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