

The efficiency and stability of revived Bretton Woods system during the economic crisis

by

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Abstract

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The purpose of this paper is to examine the stability of the revived Bretton Wood System(BW2). During the economic crisis, people became concerned about the stability and efficiency of the new-born system. The paper focuses on the interactions among the participating countries. During the period of crisis, the United States applied measures to resolve the crisis and keep the equilibrium of the vulnerable system. By testing whether the severe inflation in China was related to the U.S. reactions or not, the stability of the BW2 is obvious. After resolving the stationarity and cointegration analysis and data selections, the outcomes of the regression illustrated that those measures were the causes of Chinese serious inflation and execrated the inflation. Granger causality exists among Chinese inflation and American monetary and fiscal policies.

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Chapter 1

Introduction:

1.1. Purpose of study

There are several kinds of exchange rate systems in the world. Currently, the majority of countries apply the floating exchange rate system. In history, a serious economic crisis cannot only destroy the current system but start a new one, i.e. the crisis in the 1970s ended the Bretton Woods System and began the flexible exchange rate system. (Chinn, M., and Frankel, J. 2008) Based on this experience, the recent crisis may lead to a same result.

After the crisis happening, people started to suspect the existing exchange rate system, the floating rate system, and tried to find a new one that is not vulnerable and crispy as the current one. A natural system attracted the interests of experts , which was a kind of fixed exchange rate system. America and some Asian countries participated in this new one . Many experts proposed that it could be a solution of Euro issue. (it could be used to solve Euro issue)

This system seems impeccable in the regular process. However, during the period of crisis, some countries would apply unconventional measures. Are these kinds of measures a blessing to all participating countries?

This report will test the relationship between the change of monetary and fiscal policy and the economic situation of other participating countries. This discussion will show how one country's policy changing affects another country's economy, the existence of the new

system, and the performance of the new system during the crisis. It will illustrate the capacity to respond to the shocks and whether Europe can apply this system or not.

1.2. Background and introduction of the new system

The end of 2008, the influence of the subprime mortgage crisis flowed into Europe.

Several experts were trying to establish a "New System" to resolve the crisis. At the same time, there was a symposium in Renmin University of China. The attendant officials from the International Monetary System (IMF) also discussed the expectations of a new monetary system. (Heintz, J., Pollin, R. and Garrett-Peltier, H. 2009) European state leaders were also trying to find a way to resolve the crisis, and an effective method to prevent the similar crisis from taking place in the future by building a new system.

Gordon Brown, British Prime Minister, and Nicolas Sarkozy, the French president, declared that they needed an improved fixed exchange rate system. (IMF. 2009) This happened before the Group of twenty (G20) in 2009. They wanted to establish a new monetary system. This was an imperious demand for this system.

Actually, after the original Bretton Woods System collapsed, there had emerged an analogical system existing among America and many Asian countries. It was initially raised by three German economists, Dooley, Folkerts-Landau, and Garber, here after DFG. Based on their points, people do not need to worry about the stability of either the large amount of the underestimated exchange rate of Asian currencies or American current account and the trading deficit. The United States and the Asian economies had stepped into an implicit contract which they called the revived Bretton Woods system

(BW2). The system could operate sustainably for another ten or twenty years, with important net advantages to all participants. This system is a disguised fixed rate monetary policy.

Meanwhile, there was a serious inflation occurring in China. Chinese government had applied many measures, for example, tightening money supply mode, but no obvious effects appeared. As one of the participating countries, the severe inflation appearing made people hesitate to enroll in the cycle.

To explain this system, there is a cycle that is established among America and some Asian countries, such as China, Japan and Korea. Specifically, it is a dollar cycling. In this cycling, America purchased large quantity of products from Asian countries and paid with the U.S. dollar(U.S. D). The foreign reserves of Asian countries and the deficit of US became larger because of this cycling. The U.S. government had to issue more currencies and national debts to cover these deficits. On the other hand, the Asian countries tried to maintain a favorable balance of trade. Their low exchange rate made their products attractive. So these countries purchased the United States' national debt by the amount of dollar they got from the trading which led their currencies undervalue. U.S.D flowed to the United States by the national debt issuing. By the cycling, the currencies of the participating countries are valued by U.S.D indirectly. The core of this system is to underestimate the Asian currency, which compared to the U.S. dollar.

(Dooley, M., Folkerts-Landau, Garber, 2009)

1.3 Statement of Problems

This paper aims to research on the stability of BW2. The United States played the main role in this system, and China was a significant trading partner of it. During the economic crisis, the BW2 was affected apparently. American government should response to these affections to maintain the deficit and the flow of U.S.D. Some financial tools and monetary policies were applied, and it is well known that there was a serious inflation occurring in China after the crisis beginning. People who suspected the BW2 were worried about the excessively expansionary economic policy in the U.S. and the lack of convincing to anti-inflationary commitment. So this paper will apply the level of inflation as the standard of economic situations.

This paper will analyze the data by using quantitative analysis as main method and combination qualitative analysis, on the basis of the data and simulation constructed selected, to demonstrate whether the reactions of the U.S. government are the reasons to cause Chinese inflation. If the U.S. reactions to the crisis are highly related to the Chinese Consumer Price Index(CPI) rocketing, the equilibrium of the BW2 could not be satisfied with the participating countries. In this paper, Granger causality tests will show the relationships among the variables. Mealwhile, some specific skills will be used, such as difference of variables and lag data, to avoid multicolliearity and autocorrelations. The Stationarity and cointegration problems data are possible (for time series). So the paper will use the Dickey-Fuller (DF) unit root test to identify the problems. Because least squares regression model(LSR method) cannot produce an unbiased estimate from a autocorrelation model, therefore the maximum likelihood method is much more adequate for the present model analysis.

Chapter Two is the section of literature review. The original Bretton Woods System will be introduced. The previous work of the BW2 raising and demonstration will also be issued. Additionally, the details of the BW2 improvement comparing with BW1 and the differences between the BW2 and floating exchange rate system are included in this chapter. Chapter Three will introduce the model choice and the data selection in this report, as well as the Granger causality tests and hypothesis test. The sample data can be adjusted and regressed by using the statistic software, such as Stata 12.0. Chapter Four will analyze outcomes of the regression. From the results of the regression, it will show the relationship between the United States' regulation measures and the Chinese economic conditions. Chapter Five is the conclusion of this paper.

Chapter 2

Literature Review:

2.1 The introduction of the Bretton Woods System and the distinguish between BW1 and BW2

The paper, "People, development and international financial institutions: an interpretation of the Bretton Woods system", illustrates the background of the BW1. In the period of two decades between the two world wars, the international monetary market was separated into several competing currency factions, which raced to devalue. To resolve these volatilities, the Bretton Woods System was founded.

This paper will also present the main content of BW1. The Bretton Woods System is a financial exchange standard system which is based on the U.S.D and gold. Its essential property is to establish a dollar-centered international monetary system, including:

(1) U.S.D linked with gold directly. (2) Other currencies were evaluated by U.S.D. (3) Implement an adjustable fixed exchange. (4) The money trading, as well as international payment and settlement applied the free exchange principle. (5) The principle of currency parity in the Bretton Woods agreement made U.S.D. own an equivalent position in gold. Moreover, U.S.D. has become the main international reserve currency. (6) When member States' international balance of payments appears in deficit, they can purchase a large amount of foreign currency by using their domestic currencies from IMF, and can repay the debt by counter-purchase their domestic currencies, which achieve the purpose of the international payment balancing.

In the BW2, the U.S. dollar plays an important role as well. Most of countries applied the U.S.D as their foreign currency reserve. By 2009, the BW2 participating countries held more reserves than other countries, and they selected the U.S.D as their foreign exchange currency. Although there were some fluctuations of Asian countries' exchange rate, their real exchange rate was stable that compared to American exchange rate. Because of the trading relationship, the United States imported large amount of products from Asian countries, so deficit cannot occur in Asian countries.

The core of BW1 is America. Two economists, Tamim Bayoumi and Barry Eichengreen, used the time-serious method to estimate an aggregate-supply-aggregate-demand model. They wanted to analyze the performance of the BW1. Their hypotheses of tests were the requirements of the U.S.. These ideas were presented in their paper in 1992. If this system was expected to run smoothly for a long term, U.S. government must have strong economic muscle and sufficient gold reserves. To maintain the function of Bretton Woods system, there are three significant conditions: (1) balance of payment in U.S. needs to be kept in surplus and the value of U.S. dollar must be stable to external currencies. If serious inflation and balance of payment deficit occurs in other countries, the domestic currency of this country could devalue and reinstitute the connection with U.S.D. (2) The gold reserve of the United States must be large. Based on the Bretton Woods system, U.S.D was linked to gold. Foreign government and central bank can convert their dollar to gold that was from the U.S.. (3) The price of gold should be maintained on the level of official price. After the World War II, the United States reserve was suitable. If the market price fluctuates, the United States can maintain it by selling or purchasing gold.

In the BW2, America is also the core of the system, but there are not so many requirements. The United States applies the fiscal deficit policy, which is a curse to the BW1. However, BW2 applies an adequate way to adopt the new issuing money and there is no need to link with gold.

Barry Eichengreen expounded the causes of BW1's failing by a thesis, "Global Imbalances and the Lessons of Bretton Woods", in 2004. There are two reasons of the BW1 collapse.

(1) The Basic Reason

The essential cause of the dollar-centered international monetary system crumble is the Bretton Woods itself. This is an impossible solving puzzle. Based on this system, U.S.D acted as the method of international payment reserves, and the function of the world's currency. On the one side, as the means of international payment and reserves, U.S.D is sustainable. Other countries hold the U.S. dollar. To maintain the stability of U.S.D, the U.S. should have enough gold reserve and the balance of payments must be in surplus, so that gold could continue to flow into the United States and its gold reserve was increased. Otherwise, people will not accept U.S.D in the international payments. On the other side, if the whole world obtained sufficient foreign exchange reserves, the U.S. balance of payment would require a large trade deficit. Otherwise, the world will face a shortage of foreign exchange reserves, and international distribution channels will show a shortage of international payment means. With the increasing of the U.S. deficit, U.S.D gold guarantee declined steadily and depreciated continuously. The shortage to the flooding of U.S.D after World War II was an inevitable result of this contradiction.

(2) Direct Causes

The U.S.D crisis and the frequently outbreak of economic crisis is the direct cause of the BW1 collapse.

A. American gold reserve reducing, huge overseas military spending, the balance of payments deficit persistent and the outflow of gold reserves.

American gold reserve (10.21 billion U.S. dollars) in 1971, was 15.05% of the external current liabilities (\$ 67.8 billion). The United States had completely lost the ability to use U.S. D to exchange for gold.

B. The U.S. inflation.

The United States engaged in the invasion of Vietnam War which due to a serious inflation. American government dealt with the huge budget deficit by issuing currency, but this action aggravated the inflation. During the two oil crises, government spending was increased by the oil price, and, due to the increase in unemployment benefits, labor productivity declined. These two resulted in an obvious rising in government spending.

C. The American balance of payments' deficit continued.

After the Second World War, the United States aggressively exported products to Western Europe, Japan and many other parts of the world which made American balance of payments continuing surplus and the gold reserve of other countries inflow to the United States. Otherwise, States generally confronted the "dollar shortage". With the European economic accelerating and the volume of trade enlarging, European countries' balance of trade converted from deficit to surplus. Due to external expansion and invasion,

the United States' balance of payments became deficit. The U.S capital was outflow dramatically which contributed the "dollar surplus" (Dollar Gult). This put the U.S.D under enormous impact and pressure, and descended continuously.

The BW2 has improved these drawbacks. The labour-intensive industry in Asia supports the American industry. The majority of Asian countries, such as China, did not increase their trading position comparing to America in the following years. The global environment was stable at that time. There would nothing to have an adverse impact on American economy. If the inflation increased in the U.S., the inflation rate in the Asian countries from BW2 would also climb. The relative exchange rate was not changed.

2.2 The revived Bretton Woods System rose.

In the article "AN ESSAY ON THE REVIVED BRETTON WOODS SYSTEM" (refer as the essay), three economists, Dooley, Folkerts-Landau and Garber (DFG), from Deutsche Bank, represented the evolution of the BW1, and the different characteristics and impacts between various currency unions. Their predictions of the system are "the Bretton Woods revival".

In the essay, the main content of DFG's research was concentrated on the core framework of the BW1 - central countries and peripheral countries, as well as the interaction between these countries. Recalling the history of the BW1, from the 1950s to 1960s, the United States was basically an uncontrolled area of capital and commodity markets, and because of its powerful economic and strong capital strength, America occupied the core position of the system. The losses suffered by Europe and Japan in World War II were much larger than it in the United States; their capital had been damaged severely, therefore

these countries constituted new outlying areas. Under their export-oriented economic development strategy, Europe and Japan must ensure that their goods in the American market were competitive. To keep their competitiveness, European and Japanese governments purchased large amounts of American dollars in order to devalue their domestic currencies. Moreover, they controlled the capital flows and trade, accumulated foreign exchange reserves, financed by intermediary in the central region and developed their national economy. In this period, the BW1 actually built a relationship among the America and the periphery countries so that each takes what he needs: The peripheral countries have made the start-up capital needed for the development of a national economy. The United States, a system and rules maker, were certainly benefit from it. One of the most obvious benefits was tremendous of the currency seigniorage, but this is not all. The U.S. D could drive the global economy at that time. In fact, through an overview of the historical experience of BW1, DFG built a realistic model of the BW1, which provides a concrete image of the reference system to help them analyze and describe the coming international financial system.

Subsequently, DFG outlined the further evolution of BW1. For the traditional view, the fact of three U.S.D crisis happened and European countries and Japan entered the era of free economy instead of the fixed exchange rate system, which meant the BW1 collapsed. DFG did not avoid talking about it. Instead, they proposed a new point of view: “but in our view the system of freely floating exchange rates and open capital markets was itself only a transition during which there was no important periphery...there was no periphery for which a development strategy based on export-led growth was the dominant objective for economic policy...”(DFG, Sep 2003)

Based on DFG's ideas, this period was just a transition duration. During that time, the export-oriented strategy had not been regarded as basic economic development strategy. For the role transformation of the European countries and Japan's economy, DFG interpreted that they have escaped from the rank of periphery countries, and became members of central countries. It was not sufficient enough to regard these countries as reasons of the BW1 collapse. It was only a character switching during the process of economic system resetting and capital accumulation.

At this point, DFG established the opinion that the Bretton Woods system was always continuing and reviving. They believe that some countries resisted the floating exchange rate, even in the period of floating exchange rates prevailed in Europe and the America, such as the planned economic system of communist countries, and some emerging states which applied import substitution strategy. These national development strategies made their products uncompetitive in the world and capital lack of vitality.

However, with the collapse of communism in the late 1980s, those countries were forced to get rid of the self-contained condition and conform to the international trade and capital flow in the global market. They found that they had nothing at all, just the same as Europe and Japan after the Second World War. So these countries had to change their ideas to seek new opportunities of development. And a new Bretton Woods system revived.

Afterwards, DFG studied on the economic development strategy of these emerging countries, particularly Asian countries. DFG used the four standards, underestimating the value of the currency, controlling the exchange rates, accumulating foreign reserves, and

using export-oriented industries, to identify the current phenomenon of the international financial and monetary systems and the BW1. Then, DFG analyzed the relationship between the central and peripheral countries, so as to make the international financial and monetary system fit the core framework of the BW1. Accordingly, DFG put forward two outcomes: First, the BW1 still exists. Just 30 years previous, it began to gradually fade; second, an almost identical form reappeared. The differences are the rolls in the system: the reason is the development of initial peripheral countries (Europe and Japan). They would never need the center of the country as an intermediary. Whereas, the collapse of the socialist camp forced numbers of emerging countries to re-play the role that used to be played by Europe and Japan. However, not only did this system give birth to the emerging markets, while the appearance of emerging markets promoted the development of the system itself. This constituted the basic framework of the DFG's "Revived Bretton Woods" doctrine.

2.3 The demonstration of the revived Bretton Woods System existing.

The work of DFG has a significant impact on the study of the international monetary and financial system. Some experts tested the junior theory during the following time. There is a paper called " The Revived Bretton Woods System: Does It Explain Developments in Non-China Developing Asia?" Its test was objective and reasonable. The author, Steven B. Kamin, proved the existence of the new system. In the thesis, the author introduced this system firstly. Then, he applied a number of data to prove that the BW2 really existed. The data was accumulated into two parts, the core countries (America) and the peripheral countries. When Kamin dealt with the data, he got rid of the most unrealisable part, China.

First of all, Kamin discussed the current account balance in 2004. The core of BW2, America, had a significant deficit, up to \$631 billion. However, other developing countries' trading balances were all surplus. Japan used to be included into the peripheral part during BW1 period because of a deficit trading balance. However, it had become surplus. This was the same as the description of DFG, the theory of transitional period. Then, the author mentioned the real foreign exchange value of U.S.D. By observing the record, the non-China developing Asia kept the same path with U.S.D before 2002. Otherwise, they had moved in the opposite direction. The same thing also happened in Current Account and Reserve Accumulations, Real Multilateral Exchange Rate Indices, Current Account and Current Account / GDP of Non-China Developing Asia. These important standards all illustrated obvious changing.

These aspects of phenomena correspond to the BW2. These variations were strong enough to support DFG's theory. By this paper, we can find not only the BW2 existing, but also its benefits to the worldwide economy. The stimulus to international business and trade cannot be ignored. Moreover, resources distribution, employment rate and labor division were improved. Many people approved of the BW2 at that time.

And at the end of 2008, the influence of the subprime mortgage crisis flowed into Europe. Several experts were trying to establish a the "New System" to resolve the crisis. At the same time, there was a symposium in Renmin University of China. The attendant officials from IMF also discussed the expectations of monetary system. (Heintz, J., Pollin, R. and Garrett-Peltier, H. 2009) The European state leaders were also trying to find a way to resolve the crisis, and find an effective method to prevent this kind of crisis from occurring in the future by building a new system. Gordon Brown, British Prime Minister,

and Nicolas Sarkozy, the French president, declared that they needed an improved Bretton Woods System. (IMF. 2009) This happened before the Group of twenty (G20) in 2009. They wanted to establish a new monetary system. These was an imperious demand of the BW2.

2.4 The revived system versus the floating exchange rate system

After the BW1 collapsed, the floating exchange rate system dominated the universal economic market. However, the revived system is the fixed rate system. Actually, the difference between the BW2 and current system is the difference between the fixed rate monetary policy and the floating rate policy. Which one is better? There are two opposite opinions existing.

Some experts supported the BW2. The first reason is that this new system is more stable and creditable. Comparing to the current floating exchange rate system, the BW2 is more similar to the fixed rate system. In the BW2, Asian currencies are valued by the U.S.D. On the other side, the floating rate system is more convenience to establish a pricing standard. Moreover, based on the pricing standard, U.S.D does not value itself. (Bernanke, B. 2007)

Secondly, the BW2 is fairer than floating rate system. In this new system, some privilege of developed countries, like inflation and seigniorage tax, was discarded. The fairness improving was a benefit to the developing in the international financial market. And, the BW2 also stimulates economic nationalism.

However, some other people who support the floating exchange rate system raised some suspect. They believed that the revived system had the similar problems with the original

one: excessively expansionary economic policy in the America and the lack of convincing to anti-inflationary commitment. One of the most prominent phenomenon is the growing medium-and-long-term public debt and burden (public hygiene programs, war spending). In the most of the 20th century, the United States was a debtor nation with a large amount of current account deficit. But, in the new century, it has become a creditor nation. There is an idea that if Asian countries does not diversify their reserve, the United States will hard to maintain the deficit stability in the long term. Otherwise, it will lead to an obvious depreciation of U.S.D and an adverse effect on Asian countries' Export-oriented mode. However, this view is controversial. Bali Essence Green (Barry Eichengreen, 2005) declared that the view did not make a difference between the collective interests and personal interests into account. The 1960s gold pool's experience had shown that when people were worried about others throwing U.S.D, they would throw dollar immediately, which caused the interests of the collective to loss.

Another problem is the BW2 is an informal monetary system without an identified agency. The participating countries are hard to coordinate and identify an acceptable compromise. The dispute resolution mechanism of BW2 has a significant flaw. During the period of the Cold War, some large economic entities, such as Western Europe, Japan and the United States, were allies. (Cooper, R.N. 2009) The world's economics did not diversified and compete seriously. But now there are more participants in the global market. Moreover, there are more bilateral negotiations between the United States and Europe, and impeccable co-ordination existing. So the diversification and competitiveness were inescapable.

In addition, the Euro can currently substitute the position of U.S.D but not in the 1970s. Now the Europe is supported by an economic entity, European Union, which is as big as America. The Euro is capability to become a core of a new system. In other words, it does not need to relay on the U.S.D anymore. Other currencies have more choices to cooperate. The Euro zone has built up a central bank to restrain inflation, with a more balanced current account and higher income levels. So, in the current world, multi-currency and floating exchange rate mechanism is highly likely. Asia can also establish a common monetary area by itself. (Chinn, M., and Frankel, J. 2008) They have not to link with America.

If the relationship between Asian countries and America is too closed, American policy will affect Asian countries' economy directly. For example, supposing the Federal Reserve (Fed) cannot control inflation, they need to expand the economy through the traditional budget deficit financing in view of the political pressure or take over a considerable part of financial institutions. The economic crisis will be exacerbated:

- (1) The inflation was inputted in the United States;
- (2) Capital control needs to eliminate hot money inflows;
- (3) Allow other currencies against U.S.D, through the free floating exchange rate system or let its exchange rate peg other currencies, such as the euro.

But, so far, these kinds of things have not appeared, because the Fed did not stray from its anti-inflationary goal.

2.5 The improvement of the revived system

After the economic crisis in 2007, people's opinion was not persistent to support the BW2. Debt and credit between the "Excess" savings could collapse. In fact, in recent years, many people warned that the BW2 was destined to collapse, and pain to the world economy. BW2's critics believed that the American deficit gap would never get external funding to make up like before and the raising of the trade protectionism would destroy the global trading system. They were also worried about the devaluation of the American dollar. BW2's supporters claimed that it is hard to deny that these problems could take place but they were not high likelihood issues. There was no massive trading war starting. China has not stopped purchasing the American debt; even U.S.D was confronting with the pressure of devaluation.

The essay "Bretton Woods 2 Is Dead, Long Live Bretton Woods 3?" is written by Jörg Bibow. This paper rejected the effect of BW2, especially during the economic crisis. This paper applied the Domar's principle of stable economic system, which is related to the international debt, tax rate and international trading balance. Then, he referred to a new financing and monetary system the Bretton Woods 3(BW3). Currently, consumption in the U.S. was shrinking, which reduced the demand for Chinese manufactured goods, and the Middle East oil. The U.S. trade deficit had reduced slowly, but, at the same time, Chinese trade surplus was still expanding. In other words, the U.S. external imbalance was resolving along with decreased depth of dependence on external financing. The current account balance of 2008 and 2009 showed the flow of the excess borrowing and saving in the global scale. The Middle East's trade surplus disappeared, the U.S. trade

deficit narrowed, the European Union did not change much, and there was a slight increase in China's trade surplus.

This new natural imbalance demonstrates a strong bilateral relationship. China would continue to provide financing to the United States, but the Middle East was no longer undertaking this task. In addition, the nature of the U.S. economic imbalance had changed. The deficit was no longer caused by a negative household savings rate, but a tremendous government deficit. Although China still purchased the U.S. bonds, the types of purchases were focused on short-term securities, while Chinese government was selling the long-term debt. This means that China was no longer the inhibiting factor of long-term U.S. interest rate rises. The Fed itself had also been active to keep mortgage rates lower than the level of interest rate. This is the BW3. It is an evolution of BW2. The BW2 is existing and evaluating.

2.6 Objectives

From the part above, lots of work has been done on this issue. But the majority of previous study is based on the data that was collected before the crisis. The economic circumstance has alternated because of the crisis. From the 2007, the United States kept decreasing its interest rate. The government decreased the interest rate 0.5%, 0.25% and 0.25% in September, November and December respectively. Before the July 2008, U.S.D was in a devalued path. However, from July to November, it had appreciated 20%. The former studies are not adequate any more under the new economic circumstance. Moreover, the researches on this issue are lack of data analysis. Theory research dominates the most of the part. Moreover, the previous research did not connect the U.S. to other participating countries. In this paper, the correlation between the changes of the American monetary

and fiscal policies and the China's economic situation will be tested by the statistic method.

Chapter 3 Methodology and Outcomes

Stability of the revived Bretton Woods

3.1 Variable selection

In the revived system, the United States played the most important roll. China was the most critical trading partner to U.S. at that time. During the period of crisis, the Federal Reserve had to apply some measures to respond the crisis. The aim of these measures is to keep American deficit and dollar appreciation. Those measures can affect the equilibrium in the cycling. If severe inflation occurred in a participating country because of American responding measure, the revived system was definitely unstable. It is well known that there was a severe inflation in the period of this crisis. When a country's economy is instability, inflation is an obvious feature. By testing whether the serious inflation in China is related to the U.S. government actions to maintain the system, the stability of the new system during the economic crisis can be found.

Chinese CPI, exchange rate, M2 and Federal Reserve rate(FFR) are selected to construct model from tremendous amount of factors. These factors are representative and obvious. The reasons of selections are listed below.

The indexes that measure a country's inflation level mainly include CPI, wholesale non-price index and average GDP index. Here the CPI is used as a standard to measure the stability of Chinese economy. If the rocketing CPI is correlated to the revived system, we would suspect the efficiency of the system. A vulnerable system cannot be ongoing in a long term.

Why the U.S. FFR is chosen to behalf of the response of government to the subprime mortgage crisis? The main reason is that the intermediate target of monetary policy implementation was to affect the interest rate. During the period of crisis, the Federal Reserve issued some coping strategies. The most frequent tool is interest rate adjustment. The U.S. government needed to maintain the trading balance deficit and the dollar appreciation as the BW2 principles. The U.S. applied several financial instruments to achieve these goals. After the U.S. subprime mortgage crisis, the effect of various monetary policy tools will eventually be executed by changing FFR. For example, the changes in interest rate could affect the exchange rate, and the exchange rate could affect the import and export. The trading balance is regulated and controlled by this way. If American interest rate is comparatively higher, the U.S.D will become popular. Asian countries would keep U.S.D as their foreign currency reserve. Moreover, the federal funds rate is the basis for all interest rates. Its change affected the U.S. money supply directly.

There are two aspects that should be concerned when the efficiency and stability of a new economic system are tested. The first essential is the internal stability of increasing public debt in American domestic demand underwriting. The second one is the stability of

increasing the U.S. external debt under the revived system, relating to U.S.D role as majority global currency reserve and America as the sponsor of global development. (Domar, E.D. 1944.) These two aspects are also related to the FFR. Therefore, the FFR is an adequate representative of monetary and financial policy actions.

The exchange rate can influence the trading balance that government has to regulate and control. The revived system requires the external debt and trading deficit in the United States. American government should maintain their national debt attractive and import. The exchange rate is the frequently-used tool to regulate these things. So those are valuable factors.

M2 tests the flow direction of money. In other words, the flow of U.S.D can be figured out by observing the M2. In the U.S.D cycling of BW2 that mentioned previously, U.S.D should keep stable between difference countries. M2 can exam whether the cash flow is coincidence with the standard of BW2 and whether there are excessive inflows or outflows in China.

3.2 Data prossing

3.2.1 Stationarity and cointegration analysis for time series data

Table 3.1

Time	CPI	Exchange	M2	FFR
	(%)	rate		(%)

2007. 1	2.20	0.1284	351498.77	5.25
2007. 2	2.70	0.1290	358659.25	5.26
2007. 3	3.30	0.1292	364104.66	5.26
2007. 4	3.90	0.1295	367226.45	5.25
2007. 5	3.40	0.1304	369718.15	5.25
2007. 6	4.40	0.1310	377832.15	5.25
2007. 7	5.60	0.1319	383884.88	5.25
2007. 8	6.50	0.1320	387205.04	5.02
2007. 9	6.20	0.1329	393098.91	4.94
2007. 10	6.50	0.1333	394204.17	4.76
2007. 11	6.90	0.1347	399757.91	4.49
2007. 12	6.50	0.1357	403401.30	4.24
2008. 1	7.10	0.1380	417846.17	3.94
2008. 2	8.70	0.1397	421037.84	2.98
2008. 3	8.30	0.1413	423054.53	2.61
2008. 4	8.50	0.1428	429313.72	2.28
2008. 5	7.70	0.1434	436221.60	1.98
2008. 6	7.10	0.1450	443141.02	2.00
2008. 7	6.30	0.1463	446362.17	2.01
2008. 8	4.90	0.1460	448846.68	2.00
2008. 9	4.60	0.1464	452898.71	1.81
2008. 10	4.00	0.1464	453133.32	0.97
2008. 11	2.40	0.1464	458644.66	0.39

2008. 12	1.20	0.1461	475166.60	0.16
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Based on the table 3.1, a software, Stata 12.0, was used to regress the unit root test (DF test). The result is that the first difference of Chinese CPI index, the second difference of the exchange rate, the second difference of money supply (M2), and the no difference U.S. FFR are the stationary time serious data.

Table 3.2

items	ADF	0.0100	0.0500	0.1000	DW
CPI-I(0)	-0.4042	-2.6700	-1.9566	-1.6235	0.9162
CPI-I(1)	-2.3853	-2.6756	-1.9574	-1.6238	2.1400
ER-I(0)	5.2891	-2.6700	-1.9566	-1.6235	0.9752
ER-I(1)	-1.6307	-2.6756	-1.9574	-1.6238	2.7337
ER-I(2)	-8.1867	-2.6819	-1.9583	-1.6242	2.0766
M2-I(0)	6.7694	-2.6700	-1.9566	-1.6235	1.7342
M2-I(1)	-1.2444	-2.6756	-1.9574	-1.6238	2.0214
M2-I(2)	-5.6513	-2.6819	-1.9583	-1.6242	1.8138
FR-(0)	-2.5961	-2.6700	-1.9566	-1.6235	0.7575
FR-(1)	1.8785	-2.6756	-1.9574	-1.6238	2.0291

From the table 3.2, there is no possible of cointegration relationship existing among the three pairs of time series data, CPI and exchange rate, CPI and the U.S. FFR, as well as CPI and M2. Although there is no cointegration problem existing between CPI index and other three factors, it only means that there is no long-run equilibrium relationship. what to study here is how those factors influence CPI index in a short term. The unit roots test is also a preparation of the Granger-causality test.

3.2.2 Time series data and Granger-causality test

Granger causality test is a technique for determining whether one time series is useful in forecasting another. Ordinarily, regressions reflect "mere" correlations, but Clive Granger, who won a Nobel Prize in Economics, argued that there is an interpretation of a set of tests as revealing something about causality. A time series X is said to Granger-cause Y if it can be shown, usually through a series of F-tests on lagged values of X (and with lagged values of Y also known), that those X values provide statistically significant information about future values of Y .

The paper tried to be well-known on the causal relationship between the domestic currency supply and the causes of its changes, such as interest rate regulation, Chinese CPI index, and exchange rate fluctuations, after the U.S. subprime mortgage crisis injury. Granger-causality relationship test for those three sets of data was executed.

Table 3.3

Null Hypothesis :	Obs	F – Statistic	Probability
X does not Granger Cause Y	22	6.368 17	0.008 63
Y does not Granger Cause X		4.578 19	0.025 67
Z does not Granger Cause Y	22	5.76353	0.01228
Y does not Granger Cause Z		0.290 23	0.751 73
Z does not Granger Cause X	22	1.263 45	0.307 92
X does not Granger Cause Z		3.079 54	0.072 22
Y does not Granger Cause M	22	1.135 58	0.344 43
M does not Granger Cause Y		6.542 67	0.007 81
X does not Granger Cause M	22	0.369 70	0.696 36
M does not Granger Cause X		0.911 82	0.420 57
Z does not Granger Cause M	22	1.473 40	0.256 70
M does not Granger Cause Z		5.324 43	0.016 02

From the table 3.3, six causal relationships were found that listed below: (1) Chinese CPI index Y change and exchange rate X changes are reciprocal causation relationship; (2) Chinese CPI index Y and the U.S. FFR is unidirectional causation relationship. In other word, changes of the U.S. FFR are the reason for the change of Chinese CPI. But Chinese CPI index change has no effect on the U.S. FFR; (3) There is no Granger causality relationship existing between Chinese exchange rate X and the U.S. FFR Z. So these two factors cannot affect each other; (4) The relationship between Chinese CPI index Y and the money supply M is a one-way Granger. M is the Granger cause of Y, but Y is not the Granger cause of M ; (5) There is no Granger causality existing between changes in Chinese exchange rate X and changes in the money supply M; (6) Interestingly, Chinese money supply M and the U.S. FFR Z is unidirectional Granger causality relationship, which means M is the Granger cause of Z and Z is not M Granger cause.

3.2.3 Model and Analysis

The paper established a Autoregressive Distributed Lag Model.

$$Y = \beta_0 + \beta_1 Y_{(-1)} + \beta_2 \Delta X + \beta_3 \Delta M + \beta_4 \Delta Z + \beta_5 Z_{(-1)} + u_t$$

$$\Delta X = X_t - X_{t-1} \quad \Delta M = M_t - M_{t-1} \quad \Delta Z = Z_t - Z_{t-1}$$

The reason why choose lag information as variables.

This is because Chinese inflation index exhibited a autocorrelation problem in the course of development and evolution. Using Lagrange multipliers regression analysis for the equation, that is listed above, identifies the problem of the autocorrelation. The residuals, $e_{(-1)}$, t-test value is 5.169692, 0.0001 significance level position, which is far less than the significance level of 5%. It can be considered that the inflation index has autocorrelation problems. So structuring the regression model should choose an autoregressive model; At the same time, because of the small sample size of analysis, the simple regression model in which dependent variables are one period lagged is selected.

The cause that added exchange rate variable into model

This is because, in theory, the RMB exchange rate appreciation will reduce exports and increase imports, and decline Chinese foreign exchange reserves. It can effectively restrict Chinese foreign exchange reserves increasing, which was due to the affection of money supply growth and thus help to reduce Chinese inflation rate. The several of the assumptions will be in the model.

Causes of choosing the money supply as a independent variable in the model

This is based that inflation in China was mainly due to excess liquidity since from the beginning of 2007 to the first half of 2008. The change of Money supply has directly effect on changes of the CPI index. It will be seem as an independent variable of the CPI index changes, which will make the model more significant. In addition, the use of broad money supply (M2) as the representative of the money supply is more stable and representative than M1.

Causes of involving the lagged independent variable of U.S. FFR data

This is because that Chinese inflation index change is not only related to the current U.S. FFR movements, but also the pre-Federal funds rate variation. The U.S. FFR changes revealed the modification of the United States' monetary policy. Not only was the Chinese CPI index related to current factors. The previous monetary policy interacted with the current one as well. However, the sample size of analysis is small, and the impact on Chinese CPI index from the U.S. FFR weakened gradually with the lag increasing, so the first order lag model is chosen.

Causes of choosing lag differential form of Z, X, M

This is in order to solve the multicollinearity problem among the independent variables. This paper uses the correlation matrix for the above Y, Z, X, M data, which is multicollinearity test.

Figure 3.4

correlation	Y	Z	X	M
Y	1.000000	-0.027238	0.206660	0.174850
Z	-0.027238	1.000000	-0.964977	-0.960372
X	0.206660	-0.964977	1.000000	0.981921
M	0.174850	-0.960372	0.981921	1.000000

As can be seen from the figure 3.4, Z and X, M have comparatively high correlation. If Y is the dependent variable and M, X, Z is independent variables, these variables have serious multicollinearity problem. To solve this problem, the paper will apply the lag difference method. After processing ΔX , ΔM , ΔZ , $Z(-1)$ and $Y(-1)$, the correlations show the following table.

Figure 3.5

$Z_{(-1)}$	$Y_{(-1)}$	ΔZ	ΔX	ΔM
1.000 000	0.041 682	0.471 267	0.151 438	-0.143 429
0.041 682	1.000 000	-0.257 699	0.722 340	-0.206 186
0.471 267	-0.257 699	1.000 000	-0.114 310	0.154 123
0.151 438	0.722 340	-0.114 310	1.000 000	0.116 298
-0.143 429	-0.206 186	0.154 123	0.116 298	1.000 000

Based on the figure 3.5, the correlation among ΔX , ΔM , ΔZ , $Z(-1)$ and $Y(-1)$ has been improved. Despite the correlation between ΔX and $Y(-1)$ is a little bit high (but it is also smaller than the experimental critical value, 0.8), other correlation problem has been fully resolved.

The paper runs the multicollinearity test of ΔX and $Y_{(-1)}$ by VIF. And the result is: VIF (β_2) = 1.5, which is less than 5 (Usually, the value, that is more than 5, is regard as a serious problem of collinearity in experience). And it can be considered that there is no multicollinearity problem existing.

3.3 model regression analysis

Because least squares regression model cannot produce an unbiased estimate from a autocorrelation model, therefore the maximum likelihood method is much more adequate for the present model analysis and the results are as follows:

$$\begin{array}{l}
 Y = -1.58285 + 0.89284Y_{(-1)} + 362.270638\Delta X + 2.34306e-05\Delta M - 0.93007\Delta Z + 0.40719Z_{(-1)} \\
 (t:)(-3.62) \quad (15.59596) \quad (2.331521) \quad (1.063076) \quad (-1.950153) \quad (6.017351) \\
 (p:)(0.0003) \quad (0.0000) \quad (0.0197) \quad (0.2877) \quad (0.0512) \quad (0.0000) \\
 R^2 = 0.957337 \quad \text{Adjusted } R^2 = 0.932958 \quad \text{DW} = 1.878632
 \end{array}$$

Based on the outcome of the model regression, the fitness of the equation is good. DW value is close to 2. The p-values of each variables' coefficients are at the 5% significance level. Except ΔM , ΔZ , other p-values are less than 0.05, which means significant. Moreover, the coefficient of ΔZ is very close to the 5% significance level.

However, due to ΔM , and ΔZ 's coefficient problem, the problem of multicollinearity is still concerned. Tests of the correlation coefficient or the variance inflation factor (VIF) cannot absolutely guarantee solving the problem. So variables, ΔM and ΔZ are discarded. Regression analysis the YZ ($Y = \beta_0 + \beta_1Y_{(-1)} + \beta_2\Delta Z + \beta_3Z_{(-1)} + ut$) individually. The results are as follows:

$$\begin{array}{l}
 Y = -1.875\ 296\ 747 + 0.973\ 464\ 009\ 1Y_{(-1)} - 1.045\ 193\ 124\ \Delta Z + 0.465\ 322\ 804\ 8Z_{(-1)} \\
 (t:) (-5.891\ 222) \quad (27.307\ 68) \quad (-3.968\ 500) \quad (10.001\ 68) \\
 (p:) (0.000\ 0) \quad (0.000\ 0) \quad (0.000\ 1) \quad (0.000\ 0) \\
 R^2 = 0.945\ 539 \quad \quad \quad DW = 1.951\ 744
 \end{array}$$

The regression equation results showed that all the coefficient of variation was significant based on the 1% significant level. But the coefficient of ΔZ and $Z(-1)$ value are slightly different between two models. Its actual impact to the Y is little difference. The data comparison shows that both before and after the impact of numerical equations revealed very close assumptions. The difference did not exceed the maximum 3.4%, and thus model selection can be considered credible.

Chapter 4

The result analysis

By regression analysis of model and its associated data, the following conclusions can be found.

4.1 The affections from the RMB exchange rate changes to Chinese CPI index is distinguish from common sense.

In the model, the coefficient of ΔX is positive, which means that when the RMB exchange rate appreciates, the Chinese CPI may be synchronized rising. And there is mutually Granger causality between the two factors. It can also be said that when the Chinese CPI Index rises, the RMB exchange rate will be synchronized. Why does this not the same as the common sense, when China's CPI rises, the exchange rate upward movement can effectively relieve on the CPI index rising pressure? The reasons are the following:

4.1.1 Hysteresis effect

According to the elasticity theory of exchange rate determination, in order to improve the international balance of payments through exchange rate depreciation, when the balance is deficit, despite the Marshall - Lerner condition was fulfilled, a J-curve effect appeared. Therefore, the exports will not reduce and imports will not increase immediately after the exchange rate appreciation, which made further expansion of the international balance of payments surplus. These actions are expected to appreciate the balance of payments surplus by decreasing an international exchange rate. The desire to reduce the foreign

exchange reserves will not be able to achieve. And greatly increase in foreign exchange reserves reversed the reducing effects of Chinese tightening monetary policy. Ultimately, exchange rate increase cannot be mitigated inflation trends that was brought about by excess liquidity. On the contrary, the CPI index increased while RMB exchange rate continued to rise. The Granger causality tests of CPI index data and reserves data (figure 4.1) show that changes in foreign exchange reserves is Granger cause of changes in the CPI index. Thus, it is not hard to explain the regression results violate the common sense.

Figure 4.1

Null hypothesis	obs	F-statistic	Probability
CPI is not Granger Cause of foreign currency reserve	22	1.39647	0.27446
Foreign currency reserve is not Granger Cause of CPI	22	4.27333	0.03137

4.1.2. The force of inertia

For years, in the foreign exchange market, because of the payments surplus of Chinese international balance, the U.S.D supply in the foreign exchange market increased. The market required RMB appreciation. However, export growth is an important driver of economic growth in China. The majority of export enterprises were labor-intensive enterprises. The negative effect of the RMB appreciation was serious to that type of industry, which made Chinese government be cautious about appreciation of the RMB. Even though the appreciation occurred, the increase scale was not satisfied with the market conditions, so the market would form a great appreciation expectation and absorb foreign capital inflows. These promoted Chinese foreign exchange reserves to increase continuously. Eventually, Chinese currency became much harder to exchange U.S.D. Even if the central bank issued large amount of bills, the problem still cannot be effectively corrected. The problem of excess liquidity, together with other domestic

economic factors, led to inflation index rising continuously. It resulted in a CPI index and exchange rate rising.

4.1.3. Small sample

The scale of the sample is relatively small and the time interval is shorter. In the short term, the exchange rate appreciation on inflation inhibition cannot be verified.

4.2 Diminishing marginal utility

Secondly, the U.S. government implemented a series of loose monetary policy in response to the subprime mortgage crisis. During 2007-2008, the U.S. government achieved its policy goals through the FFR, while changes in the FFR is the Granger causes of Chinese CPI index change. Model reveals the rate of change in the FFR to achieve the effect of Chinese CPI in the short term, " $-0.93007 \Delta Z + 0.40719 Z (-1)$ " indicates that as long as the current U.S. FFR, compared with the previous period is lower, its effect to the Chinese CPI index is acceleration. But the lower the FFR, the weaker this effect will be. It also shows that if the interest rate is 1 percent in the previous period, the current interest rates only rise in 44% larger than previous. ($-0.93007 \Delta Z + 0.40719 Z (-1) < 0, \Delta Z > 0.4378Z (-1)$) or so, will reduce Chinese CPI index.

4.3 Economic interdependence between the two countries

By the Granger causality analysis between the U.S. FFR and Chinese M2 money supply, we got an unexpected result. M2 is the Granger cause of the U.S. FFR changes, which further explained the interdependence of the two economies was much closer in the current world. The reason, Chinese money supply (M2) became the Granger cause of the U.S. FFR, was due to U.S.D receiving from Chinese foreign trade eventually formed the

Chinese foreign exchange reserves. The process to increase foreign exchange reserve was also the process of Chinese money supply accelerating. And the main investment channel of Chinese foreign exchange reserve was the United States' Treasury bonds. The action that Chinese government purchased large amount of American Treasury bill is similar as the Federal Reserve bought national debt in the open market. It will increase the U.S. money supply, thereby promoting market interest rates lower. Of course, now this effect seemed not great, because the size of the two economies is distinguish between each other and Chinese foreign exchange reserves will not be fully used to buy the U.S. Treasury bonds. But there is no doubt that, due to the increase of Chinese foreign exchange reserves and money volume, Chinese enterprises were encourage to expand production scale; due to increased purchases of the U.S. Treasuries, the U.S. money supply from Chinese purchase of the U.S. Treasury bonds will boost the U.S. consumption and imports. But from the regression test, this effect is very weak during economic crisis period.

4.4 The effect of American policy to China

Fourth, the Chinese current CPI index change contacted closely with the previous data. The coefficient between current and previous data is up to 0.89284. This indicated that once Chinese CPI index steps into higher inflation range, the decline has to confront greater difficulty in the short term, which is consistent with the theory of rational expectations school. In other words, once people format an economic phenomenon expectation, it will be possible to reverse an economic phenomenon only when the government uses fiscal or monetary policy to break this expectation. In the latter half of

the year, 2008, the U.S. subprime mortgage crisis deteriorated into the international financial crisis, the impact range from the virtual economy expanded to the real economy. The expectations of the breadth and depth of the subprime crisis were broken, and the global recession fears appeared. The global economy shifted to liquidity shortage from the widespread problem of excess liquidity. After the United States took the quantitative easing monetary policy, China produced a sustained level of inflation pressure.

4.5 Summary

From the formulas detective, the BW2 cannot be consistent with the stabilized condition. And by the regression analysis, the core of the revived system, deficit and external debt, is the cause of serious inflation in China.

Chapter 5

Conclusions and Recommendations

5.1 Conclusions

Now most of the countries around the world have failed to escape the economic crisis, which just proved enormous problems inherent and great instability in this system. Based on the earlier BW1, the United States had an official responsibility to keep a peg for U.S.D. The Fed has delivered low inflation, but the policy of Asian countries has formed a status benefit to great American current-account deficits, asset price bubbles, and high global liquidity created. The economic crisis which occurred in August, 2007 caused to a series damage in American economic growth, declining American current-account deficits, otherwise, to some extent that the BW2 has become one of the most important reasons of the crisis. (Cooper, 2009) Moreover, it may be the foundation of the next crisis. The lawful currency of the worldwide content, powerful center of a huge country, in freely convertible restraint, floating exchange rate would provide a mechanism for all major currency areas, including Asian countries, which helps these countries to adjust global imbalances and against future crises.(Dooley, M., Folkerts-Landau, Garber, 2009)

5.2 Recommendations

Currently, the U.S. "subprime" crisis was caused by the global economic crisis has prompted people to rethink on the long-term effectiveness of the BW1. To build the international monetary system has two basic ideas: First is to return the gold standard. All

the countries participated into gold standard National Alliance and agreed on setting its currency relative to gold in a stable relationship. In theory, this system retains the current financial globalization welfare, overcome the accumulation of capital and the world economy virtualization, avoiding the few countries to obtain distribution rights through monetary "inflation tax" and "seigniorage . "But its fatal flaw is a conflict between the limited nature of the gold stocks and unlimited growth of economic development and the gold standard is not sufficient to ensure that the world economy would avoid the threat of inflation or deflation. The second is to build a "world currency" system. The "Father of Euro", Mundell, pointed out that an international gold system is needed now and set world currency based on the system, , the existing IMF should be transformed into the World Bank. And its functions include the world currency issue, regulatory capital flows as a super bank. (Zhou, 2009)

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