

# **Chinese Economic Imbalance and Structure Reform after the Crisis**

## **—Based on Financial Development Analysis**

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### **Abstract**

After the financial crisis, Chinese economic imbalance has reduced however economic growth also reduced. In this case, Chinese government puts forward to 4 trillion Yuan economic stimulation plan to spur domestic consumptions instead of overly depending on export industry which has been influenced dramatically in the crisis. With the recovery of Chinese economy, the problem of Chinese economic imbalance becomes essential again. This paper takes advantage of equilibrium model to analyze the reason and degree for Chinese economic imbalance adjustment after the crisis and compare our adjustment with U.S. current account reversal. Meantime, this paper makes use of VAR model to forecast the route of Chinese current account when U.S. gets rid of the financial crisis. In the end, this paper makes conclusions and points out some suggestions about structure reform.

**Keywords:** Chinese economic imbalance; economic structure; financial development; crisis

Note: the author is a Ph.D. student and is very interested in submitting this paper for publication in the special issue.

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## **I.Introduction**

On the background of global economic crisis, Chinese government has adjusted economic structure to spur domestic consumptions instead of overly depending on export industry which has been influenced dramatically in the crisis. The prompt and potent economic stimulation worked well so that Chinese economy recovers fast in the world. However, in the long run, it is hard to rely on expanding domestic demands to develop economy because of Chinese laggard financial development. Why Chinese consumers save money in the bank rather than consuming them even though they have more revenues these years? As we know, the savings are mainly used in paying the education fees for children and paying the high price of real estate. The former results from low domestic credit to private sector which means family savings is the main source of the education fees. The latter is due to undeveloped financial market. In this instance, investors are lack of other investment channels except investing on real estates and stocks, which results in huge expansion of these markets before the crisis. As for consumers, there is heavier burden to pay the highly increased price of the real estate with little private credits, which is an obstacle for them to consume more other commodities. Therefore, Chinese domestic demands are hardly to start up without great developments in financial sector. That is to say, when the government spending is ceased since the economy is recovering, China is still depending on external demands rather than internal demands. Then Chinese economic imbalances before the crisis will not change after the crisis.

Data analysis about financial development comparing China with other main countries shows that Chinese financial sector is behindhand. In this case, through our equilibrium model, empirical test and forecast, we find that when the global economic crisis is over, the global imbalances will remain on the same route like it is before the crisis. Chinese current account surplus will enhance for more exports from U.S. and other external demands; Meanwhile, U.S. current account deficit will increase for the recovery of financial market in turn saving capitals from China and other high saving-rate countries will continue supporting U.S. consumption and imports. To get out of Chinese economic imbalance and realize the economic structure reform from relying on external demands to internal-driving economy, the key is to greatly develop the financial sector in advance, including setting up complete private credit system, increasing domestic credit to private sector, making use of diverse financial tools, developing financial

market to provide more investment and financing channels and so on in the future years.

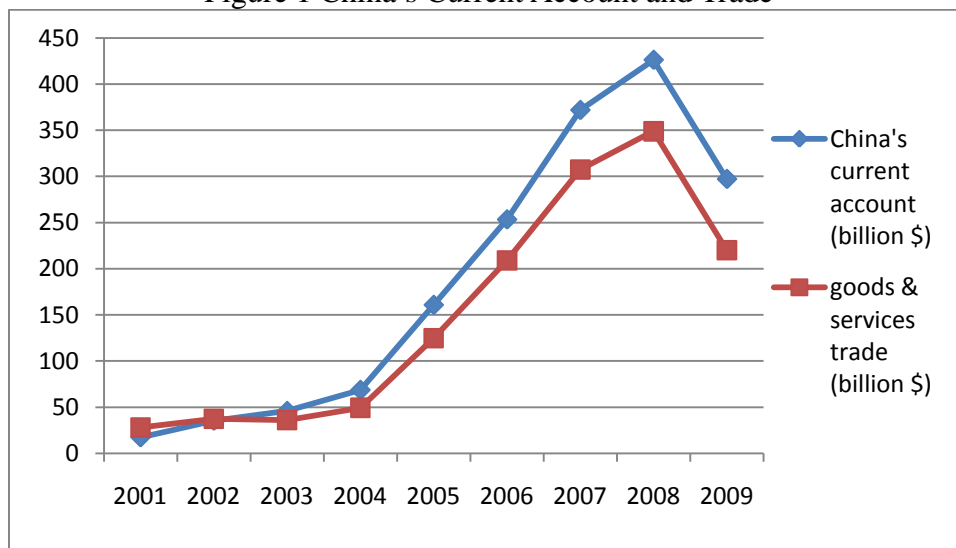
In what follows, we will analyze three questions in detail. First, do Chinese economic imbalance and structure change after the financial crisis? Second, what determine Chinese economic imbalance internally? Third, how it works to influence economic imbalance? Fourth, what should Chinese government do in the future in order to truly realize economic structure reform? Based on these four questions, this paper is organized as follows. Section II briefly explores what. Section III provides a brief analysis of the empirical methodology and specified models used in the present paper to estimate what. Section IV discusses what. Section V analyzes what. Section VI presents concluding remarks and discusses some policy implications.

## II. Do Chinese Economic Imbalance and Structure Change after the Financial Crisis

### 1. Chinese Economic Imbalance Adjustment

After the financial crisis, China's current account has adjusted dramatically, which can be seen in figure 1. From figure 1 we can see that after 2004, China's current account soars greatly, but in 2008 the growth speed slows down and it turns to decrease by 30% in 2009 when China's economic imbalance triggered by huge current account surplus reverses.

Figure 1 China's Current Account and Trade



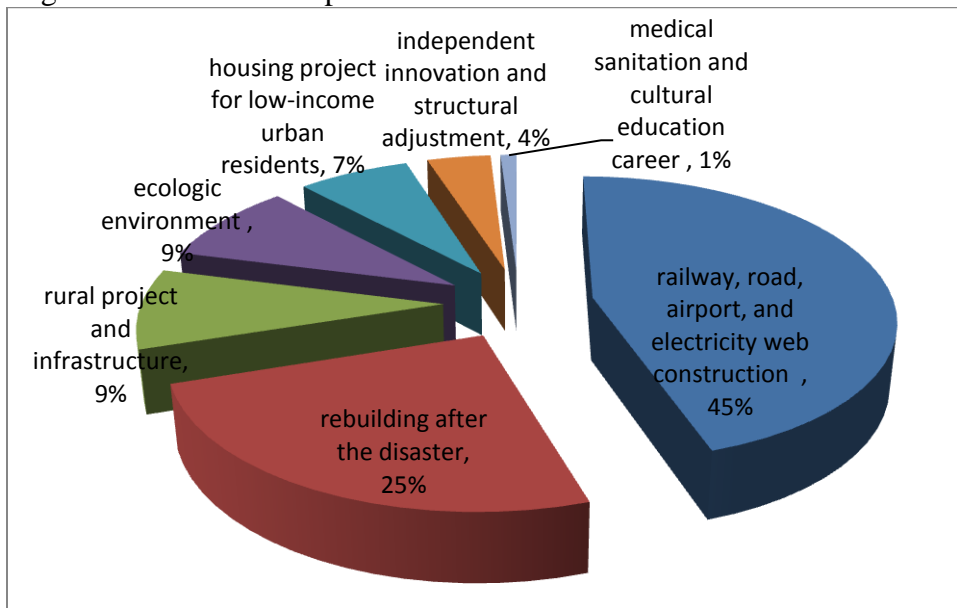
Data source: State Administration of Foreign Exchange

This is because of China's export-oriented development mode: when world economy is prosperous, the external demands need China's exported products and support China's economic growth; however, when world economy is depressing in the crisis, the external demands decrease and influence Chinese economy a lot through international trade channel.

## 2. Chinese Economic Stimulation Plan after the Financial Crisis

Although the pressure of Chinese economic imbalance has been released after the financial crisis, GDP also goes down since Chinese exports decrease dramatically. Facing such condition, Chinese government adopts expansionary economic stimulation policies in order to change the economic developing structure from depending on external demands to internal demands so that the economy will not be influenced dramatically in the crisis. Among the economic stimulation plan, the scale of fiscal policy is up to 4 trillion Yuan and that of monetary policy is up to 9.6 trillion Yuan, which are aim to spur domestic demanding in order to repair the loss of GDP depending on trade surplus.

Figure 2 Investment Proportion of 4 Trillion Yuan Fiscal Stimulation Plan



In the 4 trillion Yuan fiscal stimulation plan, 1.8 trillion Yuan is used to construct railway, road, airport, and electricity web; 1 trillion Yuan is planned for rebuilding after the disaster; 0.37 trillion Yuan is used for rural project and infrastructure; 0.35 trillion Yuan is arranged for ecologic environment; 0.28 trillion Yuan is used for housing project for low-income urban

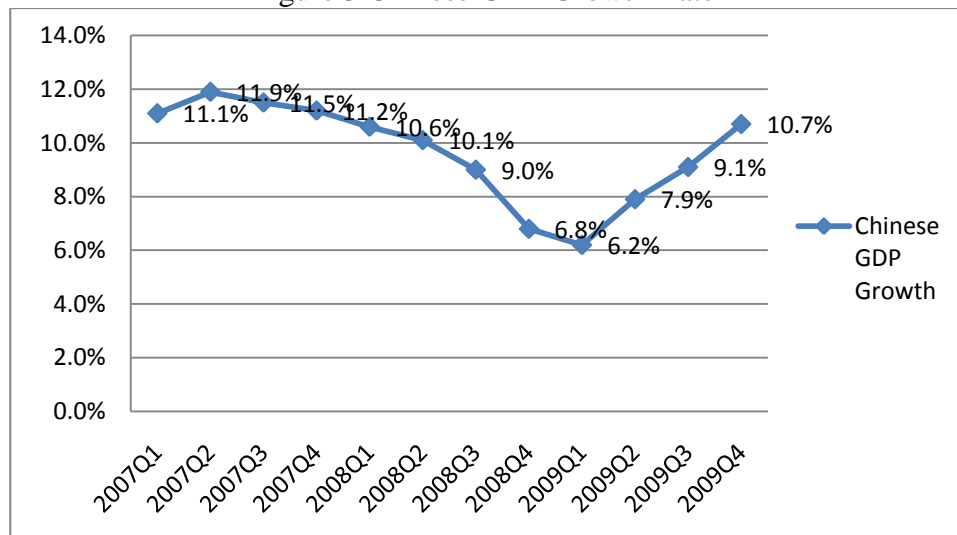
residents; 0.16 trillion Yuan is planned for independent innovation and structural adjustment; and 0.04 trillion Yuan is arranged for medical sanitation and cultural education career.

From figure 2 we can see that the fiscal stimulation money is mainly used in the area of railway, road, airport and electricity web construction, which may be helpful to promote GDP growth but not useful to improve economic structure to really start domestic consumption since the obstacles for internal demands are not dealt with.

### 3. Chinese Economic Recovery

The large-scale economic stimulation plan does promote Chinese economy recovering in 2009 (see figure 3). China has prevented great economic depression and kept high economic growth in the crisis. From figure 3 we can see that Chinese economy recovers in 2009 in shape “V”.

Figure 3 Chinese GDP Growth Rate



However, the genuine intention of economic growth is consumption. Without realizing GDP driven by consumption is not real economic growth. It is only GDP transformation: GDP of last year transfers to national income, then it becomes savings, and savings will transform to investment which will become GDP of this year.

In this case, when government policy exits since China has walked out from the crisis and recovered its economy, it is hardly for China to develop depending on domestic demanding which only existed in the case of large-scale government stimulation.

### III. What Determine Chinese Economic Imbalance Internally?

Why Chinese consumers save money in the bank rather than consuming them even though they have more revenues these years? As we know, the savings are mainly used in paying the education fees for children and paying the high price of real estate. The former results from low domestic credit to private sector which means family saving is the main source of the education fees. The latter is due to undeveloped financial market. In this instance, investors are lack of other investment channels except investing on real estates and stocks, which results in huge expansion of these markets before the crisis. As for consumers, there is heavier burden to pay the highly increased price of the real estate with little private credits, which is an obstacle for them to consume more other commodities. Therefore, Chinese domestic demands are hardly to start up without great developments in financial sector. Then China still has to rely on external economic growth by exporting to realize high GDP growth rate. Therefore, Chinese economic imbalance is potentially going on.

According to the research on measuring financial development index of King & Levine (1993)、Rajan & Zingales (2003) , this paper makes use of Domestic credit to private sector of GDP, Stocks traded total value of GDP, and Market capitalization of listed companies of GDP to represent and compare financial development levels of China and other countries.

Table 1 Contrast of Financial Development Index (%)

Financial Development Index	Countries	2001	2002	2003	2004	2005	2006	2007	2008
Domestic credit to private sector of GDP	China	111	119	127	120	114	113	111	108
	U.S.	179	169	184	191	195	202	210	190
	High-income countries	150	144	148	150	155	160	163	158
	Middle and low-income countries	50	53	55	54	53	56	60	61
Stocks traded, total value of GDP	China	34	23	29	39	26	62	230	126
	U.S.	288	244	143	166	174	253	310	257
	High-income countries	160	138	95	112	129	171	217	167
	Middle and low-income	19	16	21	26	24	38	90	59

	countries								
Market capitalization of listed companies of GDP	China	40	32	42	33	35	91	194	65
	U.S.	138	107	131	140	137	148	145	83
	High-income countries	102	82	98	105	110	123	123	64
	Middle and low-income countries	33	30	40	42	49	72	112	48

Data source: WDI database

Through table 1, we can see that recently Chinese and low-income countries' Domestic credit to private sector of GDP has not been changed. Meantime, American index has increased gradually and reach up to 2 times of Chinese index. Chinese index is also much lower than high-income countries' index.

Secondly, comparing the index of Stocks traded total value of GDP, Chinese index is very low before 2007, and in 2007 it suddenly soars up to 217%, 3.7 times of the index of last year. However, it is still much lower than the level of U.S. (310%). After the financial crisis, international stock market has been influenced greatly. Chinese stock market performs obviously whose stocks traded total value of GDP decreased by 50% in 2008. Chinese index is lower than that of high-income countries.

Thirdly, Chinese index of market capitalization of listed companies of GDP also increases dramatically in 2007, which is over that of U.S. for the first time. However, it dropped to 65% in 2008, one thirds of the level of last year. Even though it exceeds low-income countries' index, there is still a gap comparing with U.S. index in 2008.

In order to better analyze the influence of development of financial market on China's economic imbalance, we will take advantage of equilibrium model in the next section to study it.

#### IV. Equilibrium Model Analysis

##### 1. Model and variables

A Closed Economy-Time evolves continuously. Yield rate has two parts: that of capitalized

output plus capital profit. Let  $X_t$  denotes total output and  $V_t$  denotes total capital. The parameter  $\sigma$  means the ability of financial capital transformation, which is used to measure developing degree of financial market ( $0 < \sigma < 1$ ), so that

$$(1) \quad r_t = \frac{\sigma X_t}{V_t} + \frac{\dot{V}}{V_t}$$

Let  $W_t$  denote the savings accumulated by agents up to date  $t$ . In equilibrium, it must be equal to total capital, so that

$$(2) \quad W_t = V_t$$

In equilibrium, consumption demand must be equal to output supply. Let  $\theta$  ( $0 < \theta < 1$ ) measures the level of consumption, so that

$$(3) \quad \theta W_t = X_t$$

$$(4) \quad r_* = g + \sigma \theta^2 \quad (g = \dot{X}_t / X_t)$$

$$(5) \quad \dot{W}_t = (1 - \sigma) X_t + r_t W_t - \theta W_t$$

Which together with (1) yields the equilibrium capital demand and supply functions:

$$(6) \quad \frac{W_t}{X_t} \xrightarrow{t \rightarrow \infty} \frac{1 - \sigma}{g + \theta - r}, \quad \frac{V_t}{X_t} \xrightarrow{t \rightarrow \infty} \frac{\sigma}{r - g}$$

Let  $CA_t$  denotes current account, so that

$$(7) \quad CA_t = \dot{W}_t - \dot{V}_t$$

$$(8) \quad \frac{CA_t}{X_t} \xrightarrow{t \rightarrow \infty} -g \frac{(r_* - r)}{(g + \theta - r)(r - g)} \quad 3$$

An open economy-assume there are two districts, estimating district U which represents U.S. and district R which represents China.  $X_t = X_t^U + X_t^R$ ,  $W_t = W_t^U + W_t^R$ ,  $V_t = V_t^U + V_t^R$ , and  $x^R = X_t^R / X_t$ , according to function (1), so that

$$(9) \quad r_t V_t = (\sigma^U - x^R (\sigma^U - \sigma^R)) X_t + \dot{V} \quad 4 \quad \text{and}$$

$$(10) \quad r_t = g + (\sigma^U - x^R (\sigma^U - \sigma^R)) \theta$$

<sup>2</sup> Proof see appendix 1

<sup>3</sup> Proof see appendix 2

<sup>4</sup> Proof see appendix 3

## 2. Equilibrium Analysis

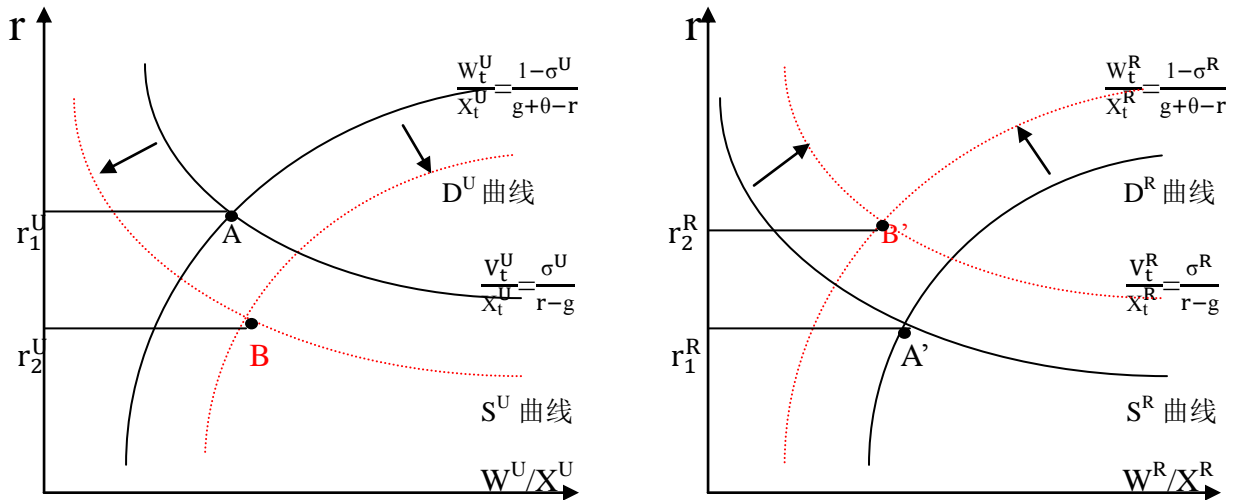
(1) Chinese current account is still surplus and U.S. current account is still deficit

U.S. financial crisis reduces the impact on financial market. Therefore the variable  $\sigma^U$  goes down and  $\sigma^R$  relatively increases. This will result in the decrease of  $r_t$  in the equilibrium, according to function (10).

Assuming that total  $V$  and  $W$  will not change, and  $g^U=g^R$ ,  $\theta^U=\theta^R$ . In a closed economy, according to function (4),  $r_*^U=g+\theta \sigma^U$ ,  $r_*^R=g+\theta \sigma^R$ ; in an open economy, according to function (10),  $r_*^R < r_t = r_+ = r_*^U - x^R(\sigma^U - \sigma^R)\theta < r_*^U$ . Although the variable  $\sigma^U$  goes down and  $\sigma^R$  relatively increases in the crisis, we know  $\sigma^U$  is still over  $\sigma^R$  based on the analysis above and table 1. Therefore, according to function (8), it is proved that  $CA^U/X^U < 0$  and  $CA^R/X^R > 0$ . That is to say, Chinese current account is still surplus and U.S. current account is still deficit.

(2) The current accounts of China and U.S. both have reversed after the crisis.

Figure 4 Equilibrium Charts of Capital Demand and Supply



From figure 4, we can see that  $\frac{W_t^U}{X_t^U} = \frac{1-\sigma^U}{g+\theta-r_1^U} > \frac{1-\sigma^U}{g+\theta-r_2^U}$  and  $\frac{V_t^U}{X_t^U} = \frac{\sigma^U}{r_1^U-g} < \frac{\sigma^U}{r_2^U-g}$ , so that  $\dot{W}_t^U > 0$ ,  $\dot{V}_t^U < 0$ .

According to function (7)  $CA_t = \dot{W}_t - \dot{V}_t$ , we get that  $CA_t^U > 0$ , which means that U.S. current account deficit is going to decrease.

Similarly, from figure 4, we also see that  $\frac{W_+^R}{X_t^R} = \frac{1-\sigma^R}{g+\theta-r_2^R} < \frac{1-\sigma^R}{g+\theta-r_1^R}$  and  $\frac{V_+^R}{X_t^R} = \frac{\sigma^R}{r_2^R-g} > \frac{\sigma^R}{r_1^R-g}$ , so that  $\dot{W}_t^R < 0$ ,  $\dot{V}_t^R > 0$ . According to function (7)  $CA_t = \dot{W}_t - \dot{V}_t$ , we get that  $CA_t^R < 0$ , which means that Chinese current account surplus is going to decrease. Actually, both China and U.S. current accounts reverse since the variable  $\sigma$  measuring developing degree of financial market after the crisis changes and in turn  $r$  changes in the equilibrium.

### (3) Why current account adjusts so much in the crisis?

In the analysis above, we assume  $g^U = g^R$ ,  $\theta^U = \theta^R$  in order to simplify the research. Actually when we release this assumption, the change of current account is to be much greater. Because of  $g^R > g^U$  in reality, in the equilibrium model analysis, it is found that the change of current account will be larger than that in the condition of  $g^R = g^U$ . Meantime, the consumption levels in the two districts are also different.  $\theta^U > \theta^R$  results in that more adjustments for the current account.<sup>5</sup> In conclusion, much higher economic growth rate plus so lower consumption rate of China compared with those of U.S. make the current account adjust very much.

To sum up, using the equilibrium model, we have studied why and how the current account changes after the financial crisis. The decrease of U.S. financial development index which makes the relative increase of China's index affects the adjustments of current account. However, since China's financial market cannot be improved and developed immediately, China's domestic consumption is unable to start as we hope. China still highly depends on external demands. In this case, the adjustment of China economic imbalance is temporary. That is to say, the problem of economic imbalance will go back to the original route when the crisis is over.

## V. Empirical Test and Forecast

In this section, we will forecast when China and U.S. current accounts would reverse again by testing the obvious relationship between U.S. financial development and current account. When

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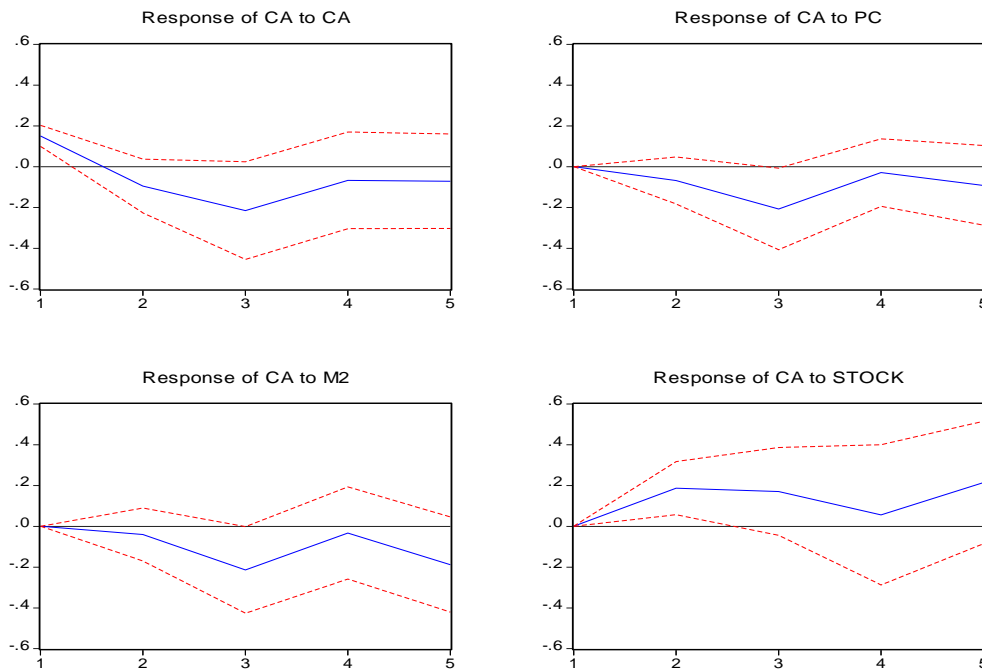
<sup>5</sup> Proof see appendix 3

U.S. financial market and economy recover, China will still mainly rely on exporting products to U.S. and the economic imbalance will be severe again.

This paper adopts Current account/GDP (CA/GDP), Private Credit/GDP (PC/GDP), M2/M1 and Stock/GDP to set up VAR model. Data source is World Bank WDI database, from 1988 to 2007. According to AIC, SC and LR standard test, we get that when the lag number is 3, the explanation and forecast of VAR model are the best. Empirical results are shown in figure 5.

Figure 5 Impulse Response Function Graphs

Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



Impulse response function graphs are able to measure the impact orbit of variable random disturbance for one standard deviation. From figure 5 we can see that the first graph is impact result from CA/GDP itself. The other three graphs show the trend of CA/GDP after the impacts of financial development variables, from which we can see that the influence from each variable would last about 4 years then the influence orbit would come back to the original level at the fourth year.

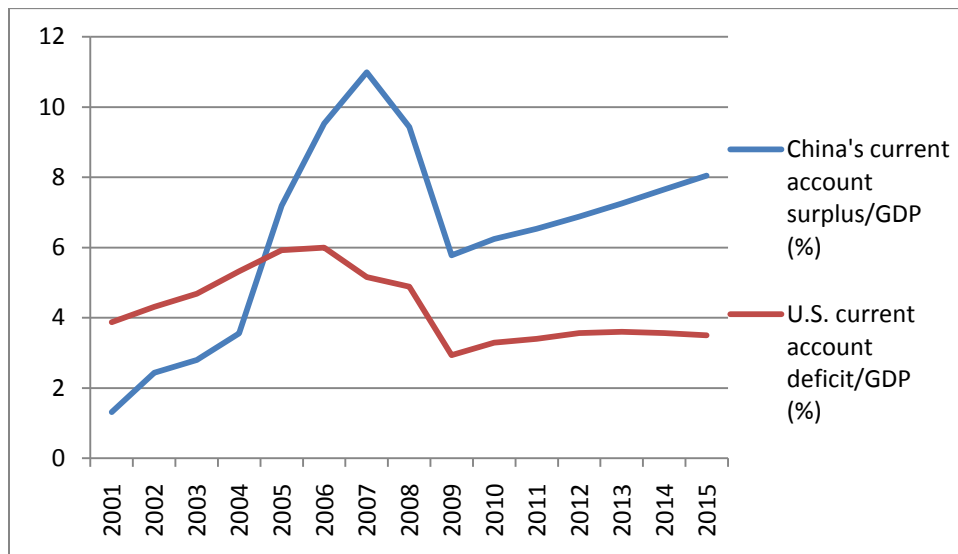
Based on the VAR model, this paper takes advantage of Variance Decomposition Table to research the importance of variables impacts. From figure 6, we can see that Private Credit/GDP, M2/M1 and Stock/GDP accounts for 70% after period 4, which can greatly represent financial development level and reflect the impacts from financial market.

Figure 6 Variance Decomposition Table

Period	S.E.	CA/GDP	PC/GDP	M2/M1	STOCK/GDP
1	0.150636	100.0000	0.000000	0.000000	0.000000
2	0.270044	43.47283	6.360687	2.247774	47.91871
3	0.487260	32.91592	20.06169	20.01558	27.00680
4	0.497033	33.47289	19.62423	19.67613	27.22675
5	0.584924	25.65973	16.64571	24.53293	33.16163
6	0.610085	26.74608	16.33186	24.03355	32.88852
7	0.709279	21.50904	17.20820	24.00290	37.27986
8	0.822029	21.00333	16.30756	23.34079	39.34832

From figure 7 we can see that the IMF forecast also proves the empirical test results. In 2007, U.S. broke out financial crisis and the current account deficit over GDP has decreased until the fourth year-2010. Since the crisis does not firstly happened in China, Chinese current account surplus still increases in 2007, but in 2010 when U.S. current account deficit go up, China's economic imbalance become worse again even though in the crisis China's current account surplus reduced nearly half of the peak level.

Figure 7 IMF Forecast about Current Account Balance



## **VI. Conclusions and Policy Implications**

Chinese economic stimulation plan does not help to change economic structure overly depending on external demands. Fiscal stimulation should increase expenditure on education, health care, social safety nets and poverty reduction. Besides, the government has to use income policies to reduce inequality and to strengthen wage income, and advance reforms of the financial system to improve financial efficiency and to mitigate financial constraints.

Chinese unenlightened financial development is the key to constrain domestic consumption and in turn result in external economic imbalance. Chinese financial development level is about half of U.S. level especially domestic credit to private sector. In this case, family saving is the main source of the education fees. And in a financial market lacking of diverse investment channels, investors unreasonably invest money on real estates and stock markets. That is why Chinese indexes of stocks traded and market capitalization of listed companies increase and decrease so dramatically before and after the crisis.

Based on equilibrium model, it can be proved that Chinese current account is still surplus and U.S. current account is still deficit after the crisis; current accounts of China and U.S. both have reversed after the crisis; much higher economic growth rate plus so lower consumption rate of China compared with those of U.S. make the current account adjust very much.

Through empirical analysis, the influence from financial development variables would last about 4 years then U.S. current account would come back to the original level at the fourth year. At that time, China and U.S. economic imbalance orbit will come back to the original route. This result is consistent with IMF forecast data. In 2010 when U.S. current account deficit increases again, Chinese current account surplus increases at the same time. Without the change of economic development structure and the improvement of Chinese financial market, the problem of global imbalance will not be solved.

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## Appendix:

1. Prove (4)  $r_* = g + \sigma\theta$  as follows.

According to functions (1), (2), (3),  $r_* = \frac{\sigma X_t}{V_t} + \frac{\dot{V}}{V_t} = \frac{\sigma X_t}{W_t} + \frac{\dot{W}}{W_t} = \sigma\theta + \frac{\dot{X}_t/\theta}{X_t/\theta} = \sigma\theta + \frac{\dot{X}_t}{X_t} = \sigma\theta + g$ .

2. Prove (8)  $\frac{CA_t}{X_t} \xrightarrow{t \rightarrow \infty} -g \frac{(r_* - r)}{(g + \theta - r)(r - g)}$  as follows.

$\dot{W}_t = gW_t$ ,  $\dot{V}_t = gV_t$ , so that  $\frac{CA_t}{X_t} = g \left( \frac{W_t}{X_t} - \frac{V_t}{X_t} \right) \xrightarrow{t \rightarrow \infty} g \left( \frac{1 - \sigma}{g + \theta - r} - \frac{\sigma}{r - g} \right) = g \frac{-(g + \sigma\theta) - r}{(g + \theta - r)(r - g)} = -\frac{r_* - r}{(g + \theta - r)(r - g)}$ .

3. Prove (9)  $r_t V_t = (\sigma^U - x^R(\sigma^U - \sigma^R)) X_t + \dot{V}$  as follows.

According to function (1) we can get  $r_t V_t^U = \sigma^U X_t^U + \dot{V}_t^U$  and  $r_t V_t^R = \sigma^R X_t^R + \dot{V}_t^R$ .

Plus these two equations we get that  $r_t V_t = \sigma^U (X_t - X_t^R) + \sigma^R X_t^R + \dot{V}$ .

Since  $x^R = \frac{X_t^R}{X_t}$ , then  $r_t V_t = \sigma^U (X_t - x^R X_t) + \sigma^R x^R X_t + \dot{V} = X_t (\sigma^U - x^R(\sigma^U - \sigma^R)) + \dot{V}$

4. According to function (8)  $\frac{CA_t}{X_t} \xrightarrow{t \rightarrow \infty} -g \frac{(r_* - r)}{(g + \theta - r)(r - g)}$  and  $r_t = r_+ = r_*^U - x^R(\sigma^U - \sigma^R)\theta$  in the

paper, we can that  $\frac{CA_t^U}{X_t^U} = -g^U \frac{r_*^U - r_+}{(g^U + \theta - r_+)(r_+ - g^U)} = -g^U \frac{(\sigma^U - \sigma^R) x^R \theta}{(g^U + \theta - r_+)(r_+ - g^U)} = -\frac{(\sigma^U - \sigma^R) x^R \theta}{(1 + \theta/g^U - r_+/g^U)(r_+/g^U - 1)}$

$$= -\frac{(\sigma^U - \sigma^R) x^R \theta}{\left(1 + \theta/g^U - r_*/g^U + (\sigma^U - \sigma^R) x^R \theta / g^U\right) (r_+/g^U - 1)}$$

$$= -\frac{(\sigma^U - \sigma^R) x^R \theta}{\left(1 + (\sigma^U - \sigma^R) x^R \theta / g^U - \left(r_*/g^U - \sigma^U \theta / g^U\right) + \theta(1 - \sigma^U) / g^U\right) (r_+/g^U - 1)}$$

$$= -\frac{(\sigma^U - \sigma^R) x^R \theta}{\left((\sigma^U - \sigma^R) x^R \theta / g^U + \theta(1 - \sigma^U) / g^U\right) (r_+/g^U - 1)}$$

$$\lim_{g^U = g^R} \frac{CA_t^U}{X_t^U} < \lim_{g^U < g^R} \frac{CA_t^U}{X_t^U} < 0.$$