China's Rise, Twin Surplus and the Change of China's Development Strategy[1]

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Introduction

This is a pilot paper of a comprehensive research project on China's adjustment of development strategy. In this paper, a framework for a systematic study of China's long term growth trajectory is laid out. More detailed studies will be carried out afterwards, when more efforts will be devoted to the modeling of China's growth process and the testing of corresponding observations empirically. In the first section, a brief summary of China's economic growth over the past 25 years and a brief analysis of the current economic situation are given. In the second section, a simple analytical framework is presented and China's growth and its constraints are discussed broadly within this framework. In the third section, factors that lead to China's high growth are identified and analyzed. The fourth section focuses on the possible changes in China's development strategy in the next 5-10 years. In the fifth section special attention is given to the issue of "twin surpluses". The final section is a short summary.

I.　　China's economic performance over the past 25 years

Over the past two decades and a half, China has maintained an annual average grwoth rate of 9.4% (Figure.1). In 1990, China's GDP was $387.8 billion, accounted for 1.7 percent of the world total and ranked the 9th in the world. In 2003, China's GDP reached $1.4 trillion, accounted for 3.9 percent of the world total and ranked the 7th in the world. In 2004, with GDP supassing 1.65 trillion US dollars at current exchange rate, China has become the 6th largest economy in the world. In per capita terms, China's achievement is also impressive. In 1990, China's per capita GDP was only $339. In 2003, it was more than tripled, surpassing $1000 US dollas. China's economic achievement is beyond any doubt. However, the fundamental question of whether China's growth is sustainable remains unsolved.

Figure 1 China's Economic Growth rate since 1978
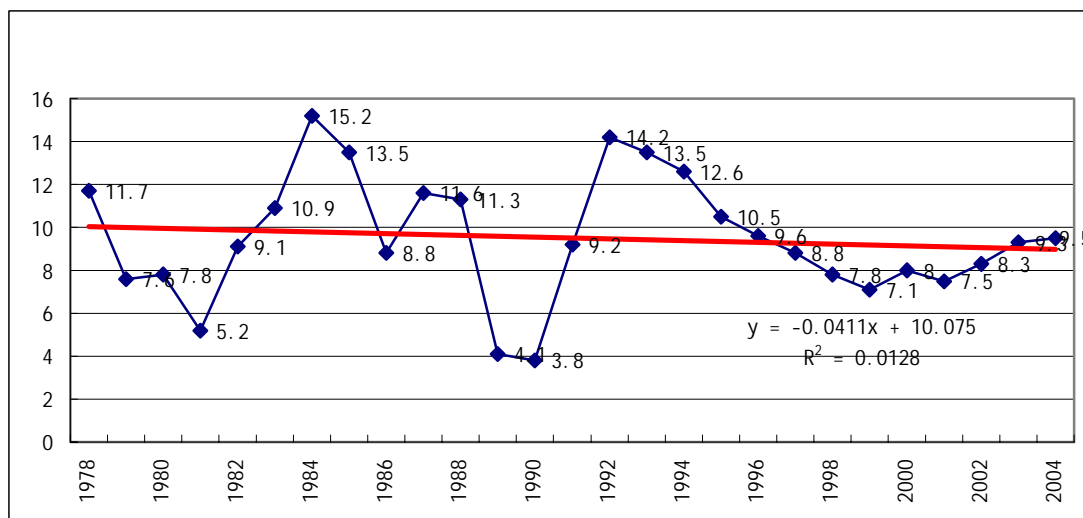
Source: State Administration of Statistics

In the wake of the Asian Financial Crisis, China's growth rate once slowed down to 7%-8%. However, in the second half of 2002, the Chinese economy was bottomed out. After 3 years' strong growth, in 2005, China's economy has begun to show signs of cooling down or stabilizing. However, the cooling down does not mean that the Chinese economy is heading for hard-landing. What we have seen is a natural process of business cycle, and a result of the government's macroeconomic control. The growth is becoming more balanced (most bottlenecks have disappeared) but the growth momentum has not been lost. Statistics that came out in recent months shows that China's growth momentum is still quite strong. More specifically, the growth rate of fixed assets investment is still high; and so are the growth rate of real estate investment and that of housing price. Some deep-rooted structural problems fail to improve (in terms of investment growth vis-à-vis consumption growth, domestic demand vis-à-vis external demand, profitability, efficiency and so on). The recurrence of overheating in the economy cannot be entirely ruled out. However, the achievement made by the Chinese government is already remarkable, because since 2003, three years in a row, the economy has maintained a growth rate of more than 9 percent while inflation has been kept under around 3 percent, which is something the Chinese government has never been able to achieve in the past 25 years. The reduction in volatility of economic growth is an encouraging sign of maturity of the economic management and the underlining economic system. It can be confidently said that as long as the government can continue to manage the economy carefully and avoid making major policy blunder, the Chinese economy will be able to maintain a growth rate above 9% for 2005, while keeping a low but positive inflation rate. There is no reason to doubt that a relatively high growth and low inflation cannot be maintained in years to come.

II.   An Analytical Framework of China's Economic Growth

China's growth process is one of interaction between institutional reforms and parameters of economic growth. On the one hand, the institutional reforms that released individuals' long-suppressed initiative, creativity and energy, ignited the growth process. On the other hand, economic growth not only brings old institutional problems to the fore, but also creates new institutional problems, which in turn call for more institutional reforms. This is a never-ending process. The high growth in the early 1980s can be largely attributed to institutional reforms and policy changes. The deepening of the marketization and globalization contributed greatly to the economic growth in the 1990s and the early 2000s. Despite the fact that factors in arenas of culture, politics and institutional economics may be more important in understanding China's economic growth, and there is still great room for further institutional reforms that can create new impetus to economic growth in the future, in this paper, China's growth will be discussed mainly in the perspective of growth theory rather than in institutional economics.

Ideally, a simultaneous system of differential equations should be used to describe China's growth process. However, mathematically, this is almost an impossible task. Economists have to

be content to use simpler and more manageable analytical frameworks. In analyzing growth potential, the most commonly used approach is the so-called growth accounting based on new classical growth theory. Furthermore, there are different models that can be used for growth accounting. As long as the accounting structures are well-defined, any accounting framework can be legitimately used, conditional on the availability of data, the convenience of analysis, and specific perspectives of the analysis.

In Growth theory, growth of an economy is attributable to three factors: capital, labor and technical progress. Technical progress is a residual factor, which is used to account the proportion of growth unaccountable by growth of capital and labor. To account economic growth two different production functions can be used. The most commonly used production function for accounting growth is the aggregate production function:

$$Y = F(K, L, t) \tag{1}$$

where Y is GDP, K is the stock of capital, L is employed labor, and t is a shift factor representing technical progress.

Based on this aggregate production function, economic growth can be attributed to growth of capital, growth of labor and technical progress.

Another commonly used production function is the so-called fixed coefficient production function:

$$Y = \min\left(\frac{K}{v}, \frac{L}{u}\right) \tag{2}$$

where v is called the capital-output ratio, u is the labor-output ratio.

In developing countries, it is assumed that labor supply is unlimited and capital is scarce. Therefore, growth in developing countries is constrained by and only by the availability of capital. Recent studies show that despite the rapid aging, in the next decade, China will not be faced with labor shortage yet, which is an issue we will return to later. Therefore, it is appropriate to use formula (3) as the basis of our analysis of China's growth potential:

$$Y = \frac{K}{v} \tag{3}$$

From which a sort of Harrod-Domar model can be derived:

$$n = \frac{i}{v} + \left(-\frac{\dot{v}}{v}\right) \tag{4}$$

where n is the growth rate of Y; i is the investment rate; v is the capital-output ratio, symbol $\left(\dot{x}\right) = \frac{dx}{dt}$.

Here, the main difference between equation (4) and the textbook Harrod-Domar model is that capital-output ratio in equation (4) is a variable. The equation says that economic growth rate (the growth rate of GDP) is equal to the investment rate divided by the capital-output ratio plus the rate

of decrease in capital-output ratio. If the speed of change in the capital-output ratio is zero, we return to the textbook Harrod-Domar model. From the equation, it can be seen that growth depends not only on the investment rate divided by the capital-output ratio but also changes in the efficiency of the use of capital, which implies that if the speed of capital accumulation is equal to the growth rate of the capital-output ratio, the economic grow rate will be equal to zero. An interesting possibility is that, if the investment rate and the capital-output ratio are interrelated with each other, under certain circumstances, an optimum investment rate may exist.

Within the framework of Harrod-Domar model, in order to predict the growth trends, what we need to do is to analysis the trends of the changes in investment rate and capital output ratio. The simplest analytical method is extrapolation. In this paper, we will follow the traditional approach to check whether China's investment rate and the capital-output will have any significant changes and what are the reasons behind them, if there will be changes. However, the paper will not stop here. The novel points in the paper include the following. Firstly, we assume that investment is constrained by saving, but saving does not automatically translate into investment. Secondly, saving and investment are disaggregated according to three sectors: households, government and foreign countries, and the saving-investment gaps are studied separately. Thirdly, while there must be an overall balance for the economy as a whole, imbalance (existence of the saving-investment gap) in each individual sector is allowed in the short run. For example, government budget deficit can be financed by the private sector and current account deficit can be financed by foreign investors. Fourthly and most importantly, the balance of flow of funds for the economy as a whole is a necessary but not a sufficient condition for smooth growth of the economy. The balance between flow variables in the long-run is conditional on the sustainability of certain stock-flow ratios. When the ratio is too high, flow balances for individual sectors eventually will be wrecked, even funds are available for the maintenance of the balance of the sector concerned. For example, even private and foreign funds are available for financing government deficit, the high government debt/GDP ratio may deter the private and foreign savings from flowing into the government. The fiscal break down of the government in turn will lead to the break down in the growth process of the economy as a whole, regardless whether total saving is enough for the need of total investment.

Suppose that investment consists of enterprise investment, government investment and foreign investment and they are financed by household saving[2], government saving and foreign saving. That is:

$$i = i_e + i_g + i_f = s_h + s_g + (s_f + s_r) \tag{5}$$

where $i_e, i_g, i_f, s_h, s_g, s_f, s_r$ represent enterprise investment rate, government investment rate and foreign investment rate (FDI), household saving rate, government saving rate, foreign saving rate and reinvested saving, respectively.

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[2] Here, household saving includes enterprise saving.

Here, all types of investment and saving are measured as shares of GDP.[3]

Rewrite the variables in identity (5), we have

$$\left(i_e - s_h \right) + \left(i_g - s_g \right) + \left(i_f - s_r - s_f \right) = 0 \tag{6}$$

The above identity shows that if domestic investment (including FFEs' investment that is occurred within the boundary of the mainland of China) is fully financed by domestic saving that includes FFEs' reinvested profits, current account deficit and hence foreign saving used by China (new foreign capital foreign inflows) will be zero[4].

In the paper, China's economic growth potential will be analyzed within the framework built on equations (4) and (6). Based on these two equations, we can put forward the following propositions:

(1) China's growth rate depends on the improvement in the efficiency of capital (the capital-output ratio) as well as the investment rate.

(2) The efficiency of capital and the investment rate may not be independent. In other words, there can be an optimal investment rate, which will give an optimal growth rate.

(3) Investment is constrained by the availability of saving. However, in an open economy, investment is ultimately constrained by foreign saving that can be used to supplement the shortfall of domestic saving. In other words, the increase in the investment is constrained by the current account deficit that China can run.

(4) Even if in aggregate terms, total investment can be financed by total saving (domestic plus foreign), the individual imbalances expressed in each bracket still can bring a smooth growth into an end, due to the corresponding accumulation of stock variables as a result of individual imbalances. In China's context, there are at least three cases should be examined.

   a) The possible break down of the balance between private investment and household saving because of the excessive accumulation of household saving deposits.

   b) The possible break down of the fiscal balance because of the excessive government debt, even if private saving is available to finance government deficits.

   c) The possible break down of external balance because of the excessive accumulation of foreign claims (foreign debts or foreign exchange reserves).

The observations (1) and (2) are conventional which are based on equation (4). The observations (3) and (4), which are based on both equations (4) and (6), will be further developed in future papers. To discuss the last two observations rigorously, ideally, we should establish a differential equation system consisting of dynamic functions for saving, investment and equilibrium conditions. However, the methodology implied in observations (3) and (4) is used more rigorously in the section on China's twin surpluses.

III.   The Major Driving Forces of China's Economic Growth

In the following section, to avoid complication, the focus is on the question of how China's growth is boosted and whether the growth momentum can be maintained when measured against

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[3] Unless specified, all lowercase letters in the paper such as i_e and s_h are variables divided by GDP.
[4] In countries like India, if foreign investment is financed by reinvested profits by foreign firms rather than new inflows, the new investment is not counted as new foreign investment.

the variables in equation (4). Equation (4) is used as a framework to organize our thoughts on China's rise and the possible obstacles that may thwart such a prospect.

High Saving Rate and Investment Rate

According to the Feldstein (1983), the saving and investment are highly correlated across countries, which can be explained by either imperfection of the capital market or the endogeneity of government fiscal policy. Investment must be financed by saving and saving will translate into investment. However, the relationship between investment and saving is more complicated. In a more recent study, Rodrik (1998) found that increase in the investment rate precedes that in the saving rate. According to him, focus on saving performance is not a good strategy to explain economic growth. Increase in the saving rate is a result of economic growth, not a fundamental determinant factor of it. Hence the high investment rate rather than the high saving rate is the key to economic growth. However, the traditional saving-investment relationship seems applicable in China, despite the discrepancy between the two variables. Experience shows that investment is more or less constrained by saving. More rigorous test will be carried out in the future papers to check whether the above-mentioned observations are correct.

Over the past 25 years, on average, China's saving rate is above 35 percent (Figure 2). In the past three years, according to official sources, the saving rate has been increasing steadily. It seems that it will reach about 50% in 2005.

Figure 2 China's Saving Rate from 1981
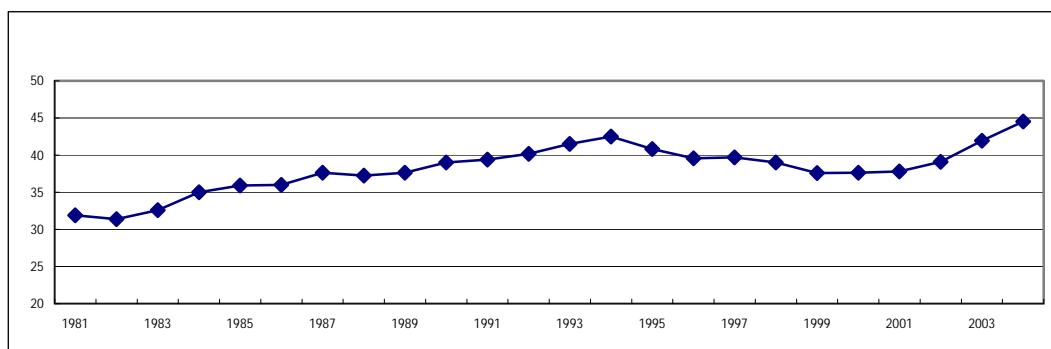
Source: Asian Development Bank, *Key Indicators 1999-2005*.

In table 1 China's saving rate is disaggregated into the saving rate of household and that of government.

Table 1 China's saving rate and the distribution of saving (%)

	Saving Rate			Distribution of total saving			
	Total	Households	Government	Households	Government	Non-financial enterprises	Financial enterprises
1992	40.3	32.6	32.0	56.1	15.3	27.9	0.8
1993	41.9	33.4	33.0	54.0	15.2	30.0	0.8
1994	43.1	33.8	31.7	52.5	13.7	33.0	0.8
1995	41.8	31.4	33.6	51.0	14.0	35.2	-0.1
1996	40.3	30.8	31.7	52.9	13.5	31.4	2.2
1997	40.8	30.5	32.3	50.9	13.8	34.3	1.0
1998	40.0	29.9	30.0	51.0	13.2	34.3	1.5
1999	38.6	27.6	31.0	48.0	14.9	35.6	1.4
2000	38.5	25.5	32.5	42.9	16.5	39.1	1.5
2001	38.9	25.4	35.9	41.6	19.5	38.2	0.8

Source: Author's calculation

The national saving rate in China is much higher than in almost all developing and developed countries, including high-saving countries such as Japan and Korea. The high household saving rate is the major contributing factor to the high national saving rate (Table 2). However, in recent years China's enterprise saving and government saving also very high, especially, enterprise saving is very high (Table 2).

Table 2 Saving: An International Comparison of household saving rate

	China 2001	USA 2002	France 2002	Japan 2002	Korea 2002	Mexico 2001
Household saving as % of disposable income	25.3	6.4	16.6	12.6	7.4	9.8

Source: Kuijs (2005).

There is a vast literature on China's high saving rate (Kuijs, 2005; Wakabayashi and MacKellar, 1999; Kraay, 2000; Modigliani and Cao 2004). In these studies, the factors contributing to the high saving rate include growth of per-capita income, and the demographic situation, macroeconomic policy, institutional and cultural factors. These analyses are carried out at both aggregate and more disaggregate levels. Currently, the precautionary saving due to the lack of social security system, the weakening of family support system in rural areas, the collapse of health care system and the under-funding of education system is emphasized in explaining the high saving propensity of the Chinese households. In future papers, the dynamic paths of household saving, enterprise saving and government saving will be more carefully studied.

In the long-run analysis, demographic factors are playing more important roles. It seems that the demographic factors will set the trend of the change in the saving rate and the short run factors will lead to the fluctuation of the saving rate along the trend line. The long run trend of Chinese households' saving behavior can be most conveniently studied on the basis of the life cycle model. According to this model, household saving is largely determined by the dependency ratio

According to a study (Cai and Wang 2005), both the dependency ratio and the structure of the dependency have important impact on the saving rate. In the period between 1953 and 2000, the

proportion of children in the total population dropped from 36.3 percent to 22.9 percent, that of working population and that of the aged population increased from 59.3 per cent to 70.2 percent, and form 4.4 percent to 7 percent, respectively. As a result, China's total dependency ratio has decreased. From 1982 to 2002, the total dependency ratio dropped by 33.3%, which is attributable to a significant decrease in Child-dependence ratio and a moderate increase in of aged-dependence ratio. It is expected that the combination of lengthy retirement and the one-child policy eventually lead to a steady increase in the dependency ratio, which is projected to reach 1:2 in 2030[5]. This rising dependency ratio is thus likely to translate into a steadily falling saving rate in China. However, as pointed out by many observers (Perkins, 2005), the falling should not be pronounced in the coming decade. It is an issue for the more distant future. In another study, Wakabayashi and MacKellar 1999 pointed out that due to the increase in the aged dependency ratio, China's household saving rate will begin to drop in 2025. It seems that it is a consensus view among all important studies that in the near future, there will be no major changes in Chinese household saving behavior that are caused by demographical factors. At least we can safely conclude that in the coming 5 years, the demographic factor will not lead to a significant fall of China's household saving rate. On the other hand, those short-run factors contributing to the high household saving rate mentioned above will not go away in at least in 5 years' time. In short, both long-run and short-run factors are conducive to a persistent high saving rate.

The high investment rate is another important characteristic in China's growth process. In growth literature, saving automatically translates into investment. Therefore, an independent dynamic investment function is not necessary. However, as mentioned earlier, there is persistent discrepancy between investment rate and saving rate in China. To understand China's growth an independent investment function is necessary. Due to the time constraint, we have to leave this task for future studies and use the saving rate to predict China's future growth.

In short, in line with convention wisdom, the single important engine of China's growth is the high investment rate supported by the high saving rate. Over the past 25 years, China's investment rate has been hovering around 40 percent. In 2004, the share of China's fixed assets investment in GDP was about 45 percent. In contrast to other developing countries, the headache facing the Chinese government is the saving rate and investment rate being too high rather than being too low. China's high saving rate and investment rate have deep- rooted cultural, social and political as well as economic causes, which can be discussed in other places.

It seems that there is no evidence that the Chinese households will change their saving behavior in the foreseeable future. It seems safe to say that even if its capital-output ratio is high and the incremental capital-output ratio is increasing (capital efficiency is lowering), due to the very high saving rate, China still can manage to achieve a high growth rate in the next 5 years.

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[5] An Internal Report, 2004, Social Security Reform in China: Issues and Options.

China's Improved Capital Efficiency

According to equation (4), besides saving rate and hence investment rate, capital efficiency measured by the capital output ratio is another key element to economic growth.

The studies by the Institute of World Economics and Politics show that, contrary to the prevalent conception, over the past decade, China's efficiency measured by both capital-output ratio and TFP fail to show obvious tendency of declining (Table 3). The same is true of the total factor productivity (Table 4). However, these are controversial problems. We hope that more light will be shed on these problems through our future studies.

Table 3 Capital Output Ratios of China's Industries (1998-2002

Industries	1998	1999	2000	2001	2002
Total	4.92	4.60	4.03	3.76	3.34
Mining	4.04	4.57	4.37	3.98	3.37
Extraction of petroleum and natural gas	5.22	4.81	3.30	3.85	4.03
Mining & processing of ferrous metal ores	10.63	9.91	8.30	6.97	5.96
Mining & processing of non-ferrous metal ores	2.46	2.22	2.01	2.05	1.85
Mining & processing of non-metal ores	5.12	4.78	5.04	4.83	4.21
Food processing	7.28	6.34	5.57	4.79	4.02
Manufacture of food	3.08	2.92	2.47	2.33	2.09
Manufacture of beverages	4.64	4.37	4.10	3.92	3.58
Tobacco	3.23	3.22	3.03	2.56	2.03
Textiles	2.23	2.04	1.74	1.68	1.59
Textile wearing apparel, footwear, & caps	2.95	2.74	2.33	2.04	1.92
Leather, fur, feather and related products	10.53	9.85	8.36	6.77	5.67
Process of timber, wood, bamboo & rattan products	1.43	1.34	1.33	1.29	1.25
Furniture	1.99	2.05	1.83	1.57	1.49
Paper and paper products	5.00	4.64	4.46	4.14	3.56
Printing, reproduction of recording media	4.96	4.72	4.65	4.19	3.60
Products for culture, education & sport activity	9.06	8.86	7.83	6.63	5.85
Processing of petroleum, coking, processing of nuclear fuel	6.54	6.60	5.18	4.82	4.20
Chemical materials and products	7.40	6.77	5.78	5.12	4.43
Drugs	1.96	1.71	1.50	1.46	1.44
Chemical fibers	5.12	4.21	3.38	3.32	3.03
Rubber	7.09	6.98	6.14	5.35	4.45
Plastics	2.83	2.67	2.30	2.11	1.89
Non-Metallic mineral products	2.40	2.22	2.02	1.87	1.81
Smelting& pressing of ferrous metals	6.83	6.53	5.58	4.92	4.14
Smelting & pressing of non-ferrous metals	2.84	2.48	2.07	1.98	2.08
Metal products	2.80	2.60	2.32	2.08	1.79
General purpose machinery	1.94	1.83	1.68	1.49	1.36
Special purpose machinery	1.74	1.63	1.43	1.30	1.08
Transportation equipment	2.12	2.06	2.00	1.76	1.42
Electrical machinery & equipment	1.29	1.21	1.05	1.04	0.97
Communication equipment, computers & other electronic products	1.31	1.26	1.10	1.21	1.15
Measuring instruments & office machinery	0.79	0.71	0.59	0.65	0.70
Electric power	9.25	8.63	8.92	8.38	7.67
Production & distribution of gas	10.50	5.03	5.94	4.44	4.80
Production & distribution of running water	9.13	8.80	8.82	8.90	9.41
All manufacturers	3.75	3.49	3.03	2.74	2.39

Source: Estimated by Wang Ling, Institute of World Economics and Politics, based on "China Statistic Year Book" (1999-2003   China Statistic Press, Beijing.

Table 4 TFPs of China's Industries (1998-2002

Industries	1998	1999	2000	2001	2002
Total	0.79	0.85	0.96	1.03	1.16
Mining	1.02	0.86	0.88	0.93	1.09
Extraction of petroleum & natural gas	1.08	0.93	1.27	1.01	0.93
Mining & processing of ferrous metal ores	0.78	1.03	1.08	1.19	1.12
Mining & processing of non-ferrous metal ores	0.77	0.99	1.08	1.02	0.93
Mining & processing of non-metal ores	0.97	1	0.89	0.91	1.03
Other mining	1.66	0.78	0.99	0.96	0.49
Timber and timber processing	1.09	1	1	1.15	1.17
Food processing	0.55	0.63	0.71	0.82	1
Manufacture of food	0.95	0.96	1.09	1.1	1.15
Manufacture of beverages	0.93	0.95	0.99	1.02	1.09
Tobacco	1.1	1.01	1.02	1.14	1.41
Textiles	0.88	0.96	1.11	1.13	1.19
Textiles wearing apparel, footwear,& caps	0.95	1	1.11	1.19	1.19
Leather, fur, feather and related products	0.69	0.73	0.84	1	1.19
Process of timber wood, bamboo & rattan products	0.9	1	1.03	1.12	1.17
Furniture	1.02	0.95	1.01	1.14	1.17
Paper& paper products	0.89	0.94	0.93	0.96	1.09
Printing, reproduction of recording media	1.08	1.03	0.97	0.94	1.07
Products for culture, education & sport activity	0.99	0.96	1.03	1.12	1.13
Processing of petroleum, coking, processing of nuclear fuel	1.03	0.82	1.03	1	1.12
Chemical materials and products	0.87	0.88	0.98	1.05	1.15
Drugs	0.87	0.99	1.11	1.13	1.14
Chemical fibers	0.71	0.84	1.06	1.14	1.23
Rubber	0.92	0.89	1	1.06	1.21
Plastics	0.91	0.93	1.05	1.1	1.19
Non-metallic mineral products	0.97	1	1.07	1.13	1.11
Smelting & pressing of ferrous metals	1.01	0.9	0.95	1.01	1.14
Smelting & pressing of non-ferrous metals	0.79	0.98	1.16	1.21	1.04
Metal products	0.87	0.93	1.02	1.1	1.26
General purpose machinery	1.01	1.04	1.07	1.17	1.21
Special purpose machinery	0.86	0.92	1.05	1.15	1.38
Transportation equipment	1.06	1.03	0.98	1.08	1.29
Electrical machinery & equipment	0.95	1.01	1.15	1.16	1.24
Communication equipment, computers and other electronic products	1.02	1.05	1.19	1.07	1.15
Measuring instrument and office machinery	0.84	0.92	1.11	1.14	1.21
Other manufactures	1	1.02	1.1	1.14	1.19
Electric power	0.82	0.89	0.82	0.89	0.97
Production & distribution of gas	0.49	1.19	0.89	1.21	1.04
Production & distribution of running water	0.76	0.83	0.83	0.85	0.84
All manufactures	0.77	0.83	0.96	1.07	1.24

Source: Estimated by Wang Ling, Institute of World Economics and Politics, based on "China Statistic Year Book" (1999-2003), China Statistic Press, Beijing.

In China, the improvement or the maintenance of efficiency broadly can be attributed to three factors: institutional reform, allocation improvement and technology progress. In the future, more detailed studies will be carried out for each major contributing factors. It seems that there are plentiful evidences that China still has room to raise its efficiency. For example, China's future adjustment of industrial structure, the improvement of X efficiency will lead to the further lowering of the capital output ratio and the increase in TFP.

Taking into consideration the current situation and trends of China's investment rate and capital-output ratio, it seems safe to say that in the near future (say in 5 years' time) China's

current growth momentum can be maintained. However, it is also important to note that growth is no linear. At certain point, the growth may accelerate or collapse suddenly, the possibility of which will be more carefully studied in other papers.

Heavy Investment in Infrastructure

Good infrastructure is one of the most cited contributing factors to China's high growth rate and its attraction to foreign investors. China's political and economic systems and its socialist heritage, in turn, are among the most important factors that enable China to do so. With abundant financial resources and a relatively effective government, China has been able to mobilize resources of huge scale and spend billions of dollars on highways, railways, ports, fiber-optic networks and other infrastructures. The development of China's physical infrastructures is extremely rapid. Take highways for example, in 1988, the mileage of China's expressways was just 147 kilometers. 10 years later, in 1998, the mileage increased by 60 times to 8,733 kilometers. From 1998 to 2001, another 17,463 kilometers expressway was built. By 1999 the total length of rail lines opened to traffic in China had reached 65,780 km, including electrified lines of 8,988 kilometers. More a comprehensive and update account of China's achievement in infrastructures will be given in another paper. After more than two decades' efforts in building infrastructures, China has developed into a place for one-stop shopping, where companies could obtain everything from raw materials to packaging and get their products to customers anywhere in the globe almost as conveniently as in a developed country. The highly developed infrastructures lay a solid foundation for China's industrialization and become one of the most important factors in attracting huge capital inflows in the form of FDI. Within the framework of Harrod-Domar model and In terms of equation (4), it can be said that given the investment rate, the heavy investment in infrastructures contribute to the improvement of the efficiency of capital. In other words, it leads to a lower capital-output ratio. It is worth mentioning that without an authoritative government, it would be much more difficult and costly to mobile resources to launch the large-scale constructions of infrastructures. Think of India!

Relative Abundance of Human Capital

In 2003, the total population of China reached 1.292 billion consisting of 523.76 million urban and 768.51 million rural populations. China's population growth rate stood at 2.2 percent in 1961-1980. It fell to less than 1 percent in 1996-2000. However, China has a huge population base, which means that the country's population will grow by about 10 million every year over the next two decades. The population is expected to reach a peak of 1.46 billion by the mid 2030s.[6]

In 2003, China's population over the age of 16 was 998.89 million and the economically

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[6] Cao Li "1.46b people by 2030s may hinder development", *China Daily*, Updated: 2004-10-25 08:02

active population was 760.75 million and the workforce participation rate was 76.2 percent.[7] According to Cai Fang, the growth rate of China's working-age population will decrease from above 1.2 percent in 2005 to zero percent in 2014(Fig 3).

Figure 3 Working-age population and the growth rate of working –age population (units: million persons and %)
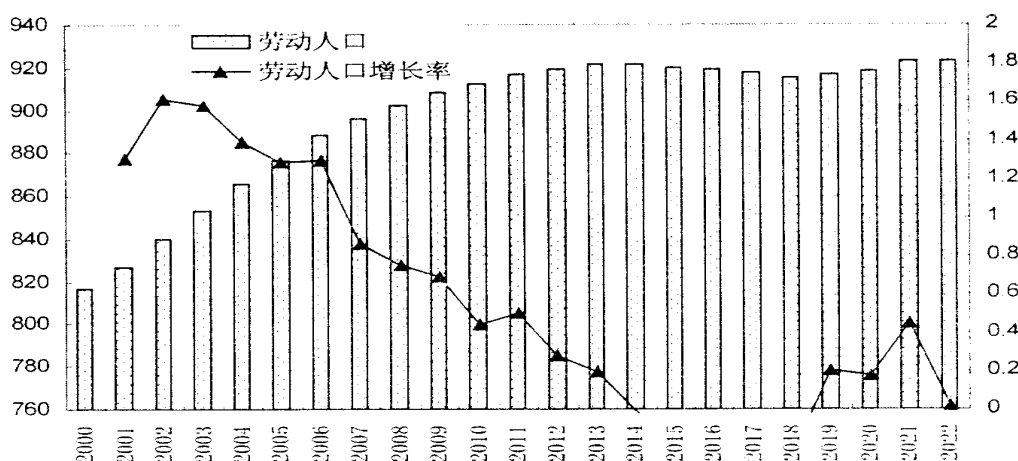
Note: RHS and LHS are new labor force (white bar) and the growth rate of new labor force (black line).
Source: Cai Fang (2005).

In the period of 1998-2003, annual growth in labor productivity has been nearly 7%. Theoretically speaking, the growth rate of labor force should be 1-2 % so that a growth rate of 8-9% can be maintained. Even though the growth rate of labor force may drop to zero in 2014, there are still abundant redundant rural laborers who are ready to fill any gaps in labor supply. In 2003, among the 1.292 billion total populations, rural population was 768.51million, accounted for 59.46 percent of the total population, and among the 998.89 million populations over the age of 16, the rural portion was 575.14 million[8]. The ratio of economically active rural labor over the total rural population was more than 75 percent. It is predicted that from 2001 to 2010, rural laborer will grow by 63.5 million.[9] Statistics shows that about one third of China's rural laborers are not fully employed. China now has some 150 million redundant rural laborers[10] and the number is increasing by 6 million every year.[11] It is expected that rapid migration of China's rural population to urban areas since 2001 would continue. Some 160 million to 180 million farmers will settle in towns and cities until 2010. This means that 14.93 million to 16.62 million rural residents will

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7 The rate of economically active population at and above 16 over the total labor force at the same age group.
"China faces prominent employment problem," *People's Daily* online. June 25, 2004.
[8] "China faces prominent employment problem," *People's Daily* online. June 25, 2004
[9] China to train 60 million rural laborers before 2010, *China Daily*, 2003-09-27 22:03 (Xinhua). Chen Xiwen, Han Jun: Rural labourers need urbanization, 2002-05-20,*China Daily*.
[10] This should be regarded as rural unemployment or disguised unemployment.
[11] China to train 60 million rural laborers before 2010, *China Daily*, 2003-09-27 22:03 (Xinhua). Chen Xiwen, Han Jun: Rural laborers need urbanization, 2002-05-20, *China Daily*: The authors are two authorities in the field. However, the calculation of the number of the new redundant rural laborers was not available.

relocate in urban areas every year.[12] Therefore, there is no reason to worry that labor supply will become a bottleneck for China's growth in decade to come.

Compared with other developing countries, not only in the supply of cheap labors, but also in that of white-collar workers and engineers, China's advantage is very great. On top of the relatively low illiteracy countrywide, technical and managerial workers are also being trained in large numbers, with more than 1,000 Chinese universities turning out over 900,000 graduates every year. Young Chinese technicians are better prepared for work than their foreign counterparts, and they make superior workers. Chinese engineers are well trained in mathematic and their professions, although their English is not as good as their Indian counterparts. China is utilizing its comparative advantage in abundant supply of skilled workers, technicians and engineers as well as unskilled workers, and making greater inroad in the higher value chains of the global production networks. In other words, steady increase in human capital contributes to growth through the improvement of the efficiency of capital goods. China's relatively good shape in universal education is attributable to its socialist legacy, namely the foundation laid by the mass movement of illiteracy elimination and the popularization of primary education during the pre- reform period, as well as its ancient cultural tradition. The abundant supply of quality human capital not only contributes to the improvement of capital efficiency but also to the attraction of FDI. In terms of equation (4), it contributes at the same time of the increase in the nominator and decrease in the denominator, so contributing to the high growth rate of the Chinese economy. However, this observation still needs to be tested empirically.

Integration with the Global Economy

In contrast to the situation depicted by dual gap analysis, China lacks neither financial resources nor foreign exchanges. However, the continuous inflows of FDI features China's growth pattern for more than a decade. FDI has raised the GDP growth rate in two ways. One is through higher capital accumulation. Another is higher productivity in the form of lower capital-output ratio, which in turn was brought about by the spillover effect of FDI and the entry into the international production network. Although in China FDI's major role is not to supplement domestic savings, which are abundant in China, FDI flows could improve the efficiency of translating saving into investment, and hence raise the investment rate. FDI's contribution to improving efficiency by bringing in advanced technology and managerial skills seems less controversial.

Since the early 1980s China has adopted export-oriented strategy of development. The aim is to gradually integrate the Chinese economy with the global economy on the basis of comparative advantages. Over the last two decades, China's trade growth rate has been about 4.5 times the world average. In 2004, with total trade volume surpassed 1.2 trillion US dollars, China has become the third largest trading nation, only after the United States and Japan, and China's

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[12] China's labor market to be reshaped UPDATED: 09:37, March 31, 2005

trade/GDP ratio has rose from a negligible small figure in the early 1980s to more than 75%. China's openness has already surpassed almost all the major trading nations and become one of the most open economies in the world. China's integration with the global economy improves China's resource allocation, provides China access to advanced technology and injects dynamism by bringing competitive pressure on Chinese enterprises. Quantitative research results on the contributions by each element o China's integrated into the world economy (FDI and trade and so on) are available and will be incorporated in later papers.

IV.   Adjustment of China's Development Strategy

Despite the fact that it is entirely possible that China will be able to maintain a high growth rate for another decade or more, possibility is not equivalent to reality. There are many countries in the history of the world economy, which were able to achieve high growth rate for decades and then suddenly growth stopped and the countries fell into long-drawn stagnation. For many Chinese economists, China's growth is too spectacular to be true. There must be something wrong! But nobody knows what is wrong. In this section, China's development strategy is discussed in the context of eliminating imbalances created over the past 25 years and preventing these imbalances to accumulate to lead a crash of China's economic growth. In this section proposals on needed adjustment of development strategy are given.

Reducing the Over-Dependence of External Market

There is no doubt whatsoever that China's export-oriented growth strategy is a great success. Besides its role in job creation, China's foreign trade improved China's resource allocation and Chinese enterprises' productivity. Without the competition pressure and better knowledge of the outside world introduced by the development of trade, there would be no possibility for Chinese producers to improve the quality and scope of their products.

However, a trade over GDP ratio over 75 percent is way too high for a large economy such as China, say nothing of the fact that it is still rising fast. Firstly, over-exposure makes the Chinese economy too vulnerable to cyclical movements of the world economy. Secondly, over-competition worsens the terms of trade and makes the so-called "immiserizing growth" possible. Thirdly, China's export drive has caused panic among its trading partners. Protectionism sentiment has been running high, which will not be calmed down by failing to address it. In any case, as pointed out by Setser[13], China is about to run up into some severe limits on the capacity of its export sector to continue to grow at its current rate, whether protectionism or limits on the amount of vendor financing the PBoC can provide. It is hard to believe that China can continue 30% y/y export

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[13] Brad Setser, Two articles on China. One good. One not so good. June 19, 2005, Brad Sester website.

growth for another 3 years (exports would go from $590 to $1220 or more).[14] Obviously, following China's becoming the third largest trading nation in the world, faced with worsening global imbalances, and rising protectionism specifically aimed at China, it is in the interest of China to readjust its growth strategy to reduce the over-reliance on the external economy, instead to stick to the old export-led growth strategy for another 10 years. Hence, effective polices must be introduced to stimulate domestic demand. Fourthly, the political cost of the continuation of this export drive will be high. The Chinese government should scrap preferential treatments implicit as well as explicit for export enterprises and to stimulate domestic demand more vigorously. China should also speed up restructuring of its industrial structure to give more impetus to the development of non-tradable sectors and upgrade its export structure from relying on labor-intensive products to high tech and high value-added products.

Not only China's over-reliance on the external economy in quantitative terms is problematic, but also problematic is its trade structure and position in international production networks. As a result of FDI inflows and participation in the international production networks, China has been labeled as the "workshop of the world". The question is whether China has been accumulating ability of climbing up the ladder. The answer is not clear. China is still faced with losing possibility of becoming an OMB due to the lack of creativity, and being locked into the status of the workshop of the world forever.[15]Before the opening up, there was a self-contained industrial structure in China, which included self-relied R&D facilities and programs. Now the self-contained structure is disintegrated for good. Due to lack of investment in R&D, Chinese enterprises hold very few technologies with own property rights. China's global competitiveness ranks very low in the world. On the other hand, multinationals have made big inroad in China's domestic markets. China's car industry is a case in point. The strategy of "market for technology" ends up with losing market without gaining technology. The family appliance is one of China's most competitive industries boasting beating multinational out off markets and making great inroad in developed countries. Now multinationals are coming back with vengeances. The old tactics of cutting prices in competition with multinational is no longer working in many areas. For new products, innovation and creation count the most. It was said the profit margin for some color TV sets sold in the US priced at several hundred US dollars was just one US dollar. Many Chinese textile exporting enterprises have profitability of less than 3%. The extremely low profit margins make it impossible for domestic enterprises to inject enough money for R&D. So far in China there are no enterprises that are comparable with the few Indian multinationals. Many Chinese exporters are faced with the danger of being wiped out of markets.

Reducing the Excessive Investment and Raising Capital Efficiency

China has maintained a very high growth rate of investment over the past 25 years. Due to

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[14] Ibid.
[15] There are several excellent case studies done by Prof. Lu Feng from Beida University available in Chinese.

the fact that the growth rate of fixed assets investment has been consistently higher than that of GDP, in 2004 the share of investment in GDP already surpassed 45 percent. Given the current trend, the share will surpass 50 percent of GDP fairly soon. How high China's investment rate really is, is a matter deserving more careful studies, because the statistics are not that reliable. However, it is fair to say that China's economic growth is driven mainly (to what extent is a matter of controversy) by investment rather than technology progress. Compared with developed countries, China's capital output ratio is quite high (comparison). To maintain a given GDP growth rate, China has to increase its investment rate continuously to compensation a high capital output ratio, which has shown sign of edging up in recent years (Figure 4). Perhaps the situation is worsening quickly in the past two years—however, data are not available. The low efficiency of capital is caused by misallocation of resources as manifested by numerous wrong investment decisions at both industrial and enterprise level. Many wasteful investments are caused by undue interventions by local governments that blindly pursue high growth for political and fiscal purposes. Market failure also contributes to the failures of investment.

China's high investment rate is the mirror image of low consumption rate of households (or equivalently high saving rate of households). The fundamental causes of low consumption rate means are a matter of debate, which we do not have space to dwell on. The low rate means lack investment in human capital and it will have serious consequences on China's future growth. Give the income level, China must first stabilize and then eventually reduce the share of investment in GDP.

Furthermore, an excessive high investment rate may lead directly to the rise of capital-output ratio. It is obvious that the growth rate of investment cannot continue to surpass that of GDP, and must be slow down at some point in time. Rather than just being wasteful, the more worrying aspect of the investment fever is its possible long-term damage to the nation. With the erection of a paper and pulp factory, a whole river is polluted. The cost for cleaning up the river in the future probably will vastly surpass the value created by the factor in its whole life. The growth drive while having improved the living standard of the population of current generation, the bills for cleaning up the air, water and environment in general will be huge. Some irretrievable damages have already been done. I am not sure what sort of compliments we will get from our children, when they drive gas-hogging SUVs on congested roads through concrete forests in a smoggy morning some twenty years from now on.

Figure 4 Incremental Capital Output Ratio (ICOR) in China from 1980-2003
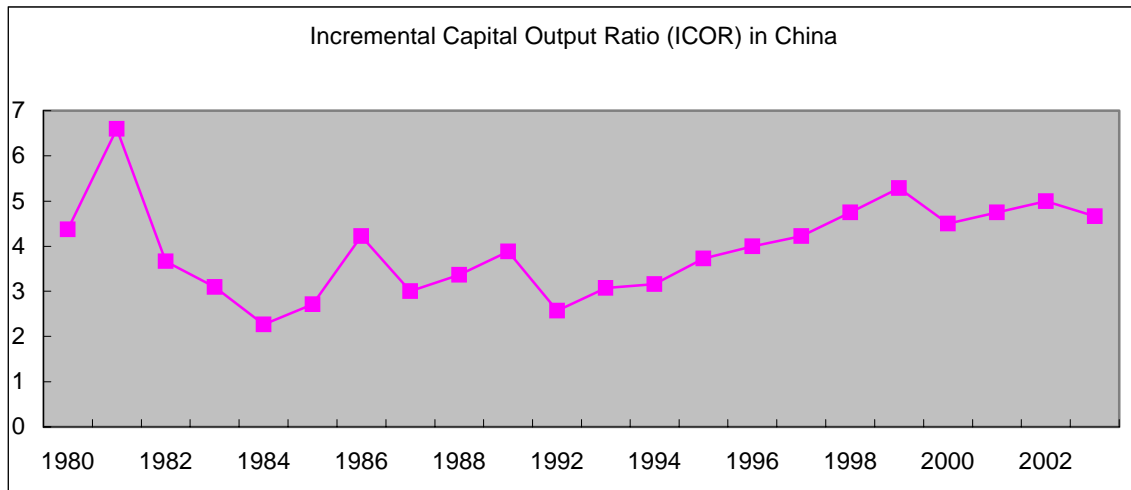
Source: Author's calculation.

Improvement of Energy Efficiency and Reduction of the Use of Mineral Resources

In China, manufacturing industries rather than service industries have played a pivotal role in growth. Hence, China's grwoth is companied by dramatically increased demand for energy and mineral resources. In 2003 China imported 1.8 million barrels of oil a day. China's share of oil consumption in the world increased from 3.5% in 1990 to 7.7% in 2003. In the same year, China's oil import accounted for 30% of its total oil consumption and its increase in oil consumption accounted for 40.7% of the increase in the world oil consumption. In 2004, China's oil imports increased 35% over the previous year reaching to 122.7 million tons. China's share of oil import in the total oil import of the world increased from 0.2% in 1990 to 5.1% in 2004. China has surpassed Japan to become the world's second-largest oil importer, next only to the United States that consumes 25.7% of the world total. Currently, China's oil dependency ratio is above 40%. It is expected that the ratio will reach to 50% in 2010. It is claimed that Chinese demand has been a big factor, pushing oil prices to record levels last year. Currently, China is striking deals with oil exporters around the world to secure its supply. China's current strategy is to diversify oil supply sources all around the world. This is a costly and risky strategy. But would China have other options?

China is the world's largest buyer of copper, the second largest buyer of iron ore, and the third largest buyer of alumna. China's total trade in mineral products has exceeded US$100 billion in recent years. Thanks to China's high economic growth, China's annual growth rate in the demand for industrial minerals has consistently been in the double-digits since the early 1990s. China accounted for almost half of the increase in global demand for industrial minerals over this period. It is expected that by 2010, due to the increase in domestic consumption, China may become an importer of some mineral sources that it currently exports.

The demand for iron ore increased drastically in recent years. One of the most important

factors contributing to the dramatic rise in iron ore price is attributable to China's high demand for ore, which in turn is a result of China's dramatic increase in demand for steel used in real estate development. In 2004, China has produced 275 million ton steel, which registered a growth rate of 32.3% over the previous year, and accounted for a quarter of the total production of steel in the world. By the end of 2006 China will add 150 million ton steel production capacity, on the top of 310 million tons it already has.[16] Chinese enterprises' anxiety to strive for resources against one another in the international market also contributed to the price hike of iron ore price.

Not only China's stomach for energy and mineral resources is great, but also its way of using energy and mineral resources are extremely wasteful. China cannot carry on with the way of development as it has been over the past decades. Domestic and global supply of energy and mineral resources is limited. China's growth has suffered greatly in the past several years due to energy and mineral resources bottlenecks. China's demand for energy and mineral resources has also created great impact on the global market.

China must change its growth pattern characterized by heavy investment and heavy use of energy and mineral resources. Otherwise, any major external supply shocks may rock China off its original growth trajectory. China can reduce its reliance on the external supply of oil and mineral resources by raising energy efficiency, using more nuclear and hydraulic power and improve its overall efficiency. More importantly, China needs to adjust its industrial structure to increase the share of the service sector and industries that are more labor intensive, tech intensive and knowledge intensive. In the short run, China should consider raising prices of energy and levying energy taxes.

V. China's Twin Surplus and Its Implications for Global Imbalances

According to national income account, we have the following identity:

GDP = household savings of residents + government savings[17]+ savings of foreign investors+ consumption
= investment + consumption + export - import

where

saving of foreign investors[18] = reinvested profit + investment income; investment
= investment by domestic firms + government investment + reinvestment by foreign funded enterprises + new FDI inflows

Therefore,

household savings of residents + government savings + reinvested profit +investment income
= investment by domestic enterprises + government investment + reinvested profit + new FDI + trade surplus

The above relationship can be rearranged as follows:

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[16] Reference News, Feb. 24, 2005 page 18
[17] Here *government savings = taxes - government consumption.* Government consumption is included in general consumption in the identity.
[18] These foreign investors refer to those who already possess ownership within the boundary of the hosting country.

$$\left(houshold \ \ saving \ \ of \ \ residents - investment \ \ by \ \ domestic \ \ enterprise s \ \ \right)$$
$$+ \left(government \ \ saving - government \ \ investment \right)$$
$$+ \left(reinvested \ \ profi - FDI \right) = current \ \ account \ \ balance$$

Where *FDI = new FDI inflows + reinvested profit by foreign funded enterprises.* In China, reinvested profit by foreign funded enterprises (FFEs) is accounted a part of FDI.[19]

Based on the relationship, we have

$$\left(i_e - s_h \right) + \left(i_g - s_g \right) + \left(i_f - s_r \right) = s_f = c \tag{7}$$

Where *c* is the current account deficit/GDP ratio. It says that if domestic saving is not sufficient for financing domestic investment, foreign saving can be used in the form of current account deficit. When domestic saving is larger than domestic investment, domestic saving will flow out in the form of current account surplus.

In this section, in the study of China's twin surpluses, the methodology that has been mentioned in the second section will be used. The key feature of this method is to check the sustainability of flow balance with the sustainability of the stock resulted from the accumulation of the corresponding flows.

If we assume that government budget deficit and reinvested profits is zero, equation (7) can be rewritten as

$$s_h - i_e - i_f = -c \tag{8}$$

For a typical developing country, domestic saving should be less than investment by domestic firms. To simplify analysis, we assume that domestic saving is equal to investment by domestic firms. Hence we have

$$i_f = c$$

The above relationship says that if FDI inflows are entirely financed by foreign saving, the FDI must be equal to current account deficit. In other words, without running current account deficit, a country cannot really utilize FDI.

If the current account deficit is equal to zero, namely

$$s_h - i_e - i_f = 0$$

Than both investment by domestic enterprises and that by FFEs are financed by domestic saving. Under this circumstance, we have

$$s_h - i_e = i_f$$

i_f also represents the value of accumulated foreign exchange reserves, which are usually held in the form of the US treasury bills. The above equation implies that while foreign investors

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[19]   Here we do not discuss outward FDI by developing countries.

obtain equity assets i_f , the hosting country obtains an equal amount of foreign debt assets (TBs). The above relationship implies that FDI crowds out an equal amount of investment by domestic enterprises, and the excess domestic saving cannot be used except for buying TBs. The question for the above relationship is whether the exchange of equity assets for debt assets will increase the host country's welfare or reduce its welfare in a given time horizon. Unfortunately, this is a question that has never been explicitly asked, let alone to be answered. A more relevant situation can be depicted by

$$s_h - i_e = i_f - c \tag{8'}$$

Here we assume that $-c > 0$. The relationship implies that domestic saving is not only sufficient for the financing of all investment but also the creation a certain amount current account surplus. According to the definition of international balance of payments account, the right hand side of the equation can be regarded as the change in foreign exchange reserves. Corresponding to (8'), the hosting country is a capital exporting country. The capital exported by the hosting country is equal to $-c$. The current account surplus will also take the form of the increase in the holding of the US treasury bills[20] Hence the increase in foreign exchange reserves is equal to $i_f - c$. In other words, the twin surpluses are the result of displacement of domestic investment by FDI and lack of investment opportunities by domestic enterprises.[21] A more completed form is

$$\left(s_h - i_e\right) + \left(s_g - i_g\right) + s_r = i_f - c \tag{9}$$

That is the sum of the positive household and government saving-investment gaps plus reinvested profit by FFEs equals to the increase in foreign exchange reserves. In this paper's context, $i_f - c > 0$ means that the hosting country is accumulating foreign exchange reserves. In contrast, if $i_f - c < 0$, the hosting country is depleting foreign exchange reserves. It is worth emphasizing that here $-c$ represents the proportion of increase in foreign exchange reserves created by the hosting country's export of capital, and i_f represents that created by country's debt-equity asset swaps.

Put the normative judgment aside, a key question is whether the accumulation of foreign exchange rate reserves is sustainable, given the flow equilibrium as defined by equation (9). Because China is running twin surpluses, here we consider only the case where $i_f - c > 0$. Remember that current account deficit is equal to trade deficit plus outflow of investment income

$$c = \left(m - x\right) + \left(1 - s_r'\right)y_f$$

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[20] Here, we assume that the capital exporting developing country does not export capital in the form of outward FDI.

[21] If current account surplus is assumed to be created by FFEs, the analysis will be more complicated.

Where y_f is total profit of FDI and s_r' is the rate of reinvestment[22] by FFEs, which we temporary assume is a constant. m is import and x is export.

In the following, we further assume that total profit produced by FFEs is

$$Y_f = \pi \frac{K_f}{v_f}$$

Where π is the profit rate; K_F is capital stock of foreign investment, and v_f is the capital-output ratio of foreign investment. The relationship between stock and flow variables of FDI can be expressed as

$$\frac{dk_f}{dt} = \frac{d\left(\dfrac{K_f}{GDP}\right)}{dt} = \left(\frac{FDI_1}{K_f} + \frac{s_r'\pi}{v_f}\right)k_f - nk_f = \Delta fdi + \left(\frac{s_r'\pi}{v_f} - n\right)k_f$$

Where, in contrast to reinvested FDI, FDI_1 is the newly cross-border FDI; n is the growth rate of GDP.

Provided that $fdi_1 = \dfrac{FDI_1}{GDP}$ is an exogenous variable, we can have the following result:

$$k_f = -\frac{\Delta fdi_1}{[\dfrac{s_r'\pi}{v_f} - n]} + C1 e^{\left(\dfrac{s_r'\pi}{v_f} - n\right)t} = \frac{v_f \Delta fdi}{nv_f - s_r'\pi} + C1 e^{\left(\dfrac{s_r'\pi}{v_f} - n\right)t}$$

Hence

$$y_f = \frac{-\pi}{s_r'\pi - nv_f} fdi_1 + C_2 e^{\left(\dfrac{s_r'\pi}{v_f} - n\right)t}$$

(10)

and

[22] Here the denominator is different from s_r, which is reinvested profits of FFEs divided by GDP

$$c = (m-x) + \left(1-s_r'\right) y_f = (m-x) + (1-s_r') \left[\frac{-\pi}{\left(s_r' - nv_f\right)} fdi + C_2 e^{\left(\frac{s_r'\pi}{v_f} - n\right)t} \right]$$

(11)

From (11), it can be seen that the influence of the reinvestment rate of profits by the FFEs on the current account balance is complicated. Other things being equal, in the short-term, the higher the reinvestment rate, the smaller the outflows of investment income. In contrast, in the long-term, the higher the reinvestment rate, the larger is the outflows of investment income. This means that other things being equal, following the passage of time, the negative impact of FDI inflows on the current account balance will become bigger and bigger. In long-run, more and more trade surplus will be required to balance the ever-increasing investment income out flows. Even after having taken into consideration the positive impact of the yields of TBs held by the hosting country on the investment income flows, the conclusion will not be influenced, because the TB yields are much smaller the profitability of FDI. Furthermore, following the slowing down of the growth rate, the current account balance problem will become increasingly serious.

It can be argued that unless under some strict conditions, such as the reinvestment rate is 100 percent, are satisfied, China's twin surpluses are not sustainable.

But what will happen, if trade account is positively impacted by FDI inflows?

It is possible that the current account balance can be maintained. However, the increase in

y_f means that to balance the increase in the investment income outflows, higher and higher growth rate of net export should be maintained. However, it is highly unlikely that the growth of the global economy and that of global trade will allow China to maintain such high growth rate of net export.

More careful studies should be done on the above result. The sustainability is a long-term issue. A more urgent problem is that the existence of twin surpluses is related to market distortion and may have caused large welfare losses to China.

China failed to translate its capital account surplus into a current account deficit as developing countries usually do. By running the twin surpluses, China is making bad deals with the rest of the world, especially with the United States. As pointed out by the late Professor Rudi Dornbusch, it is certainly not reasonable for residents of poor countries to buy US treasury bills in preference to investing resources in their own countries so as to raise their productivity and standard of living.

The irrationality of China's flows of funds across its borders has been pointed out by Paul Krugman and many others, myself included, many years ago. It is assumed in development economics that developing countries should run current account deficits and capital account

surpluses, so as to utilize foreign saving to obtain an investment rate higher than what their domestic saving can support. However, while running a very large capital account surplus, China is running a moderate current account surplus for more than a decade. It can be said that while a significant amount of China's investment is financed by FDI, a larger amount of foreign consumption and investment is financed by China's saving via China's purchasing the TBs. In this sense, US direct investment in China is the recycled Chinese saving. During this process, China earns a low return on the TBs and the US earns a much higher return on its direct investment in China.

China's inability to finance its domestic investment directly by its own saving and its reliance on FDI is attributable to a large extent to distortions in domestic financial markets. For example, even though a huge amount of household savings is packed into banks as saving deposits, small-middle sized enterprises cannot get enough, if any, credit from the banks. On the other hand, due to the preferential policy towards FDI, the enterprises can establish joint ventures with foreign investors easily so as to get the financing needed. In fact, these enterprises may not need to buy foreign goods at all (which is implied by excess saving over investment). They simply sell the foreign exchanges injected by their foreign partners to the People's Bank of China and then use the RMB thus obtained to buy goods and services available domestically. If the enterprises have access to domestic bank credit or if there is no preferential policy towards FDI, either capital inflows would not happen, or a current account deficit would occur (in the case in which foreign goods and services are really needed). In either case, there should be no increase in foreign exchange reserves. The market distortion is also related to undervaluation of the exchange rate. If a country really needs FDI to improve its welfare, the exchange rate should be set at an appropriate level to allow the capital inflow to be translated into a current account deficit.

More recently, capital flows in just for exchange rate arbitrage and rent- seeking, China's unfinished financial reform and numerous preferential policies have created too many opportunity for arbitrage. The increase in FDI ended up with increase in foreign exchange reserves rather than foreign goods and technologies. This phenomenon obviously is a reflection of recourses misallocation, which in turn is caused by market distortion.

Last but not least, China is faced with an extremely difficult issue: how to handle its huge foreign exchange reserves. As a result of running twin surplus persistently over more than a decade, China has accumulated a huge amount of foreign exchange reserves, most of which are in the form of American TBs. It is expected that China's foreign exchange reserves will exceed 1000 billion US dollars very soon. China is expected to surpass Japan to become the number one foreign exchange reserve holder in the world.

Owing to the worsening of global imbalances characterized by huge American current account deficits, the US dollar has begun its long expected descending since 2002. The devaluation of the US dollar is necessary for the correction of global imbalances. However, the wobbly dollar is spelling big trouble for Asian countries. Among them, China is most vulnerable.

Most of China's foreign exchange reserves are in US dollars. As pointed out by some observers, all policy options for the People's Bank of China (PBOC) are unattractive. If the PBOC does nothing and simply hold on to the dollars, the losses will increase. If it buys more to prop up the dollar it will only have a bigger version of the same problem. If, on the contrary, they try to diversify into other currencies, they will drive down the dollar faster and create greater losses. The dilemma facing China's central bank is not unparalleled in history.[23]

I do not know how China can get out of the mess unscathed. Today's Asian countries do not need large reserves. They should reduce their holdings, before their hard earned wealth evaporate and at the same time avoid doing something stupid.

How to reduce China's foreign exchange reserves or at least reduce its growth rate? Based on relationship $\left(s_h - i_e\right) + \left(s_g - i_g\right) + s_r = i_f - c$, in principle we have the following options:

1. Reducing s_g by increasing government's current expenditures and tax cut (expansionary fiscal policy)

2. Increasing i_g by increasing government investment in infrastructure and government supported R and D (expansionary fiscal policy).

3. Reducing s_h by increasing in the provision of public expenditures (security system, medical care system and education system, etc.) (expansionary fiscal policy).

4. Reducing s_r by canceling preferential policy towards FDI.

5. Increasing i_g and reducing i_f by canceling preferential policy towards FDI.

6. Reducing c by revaluation and canceling export promotion policies.

The role of monetary policy is more complicated and more careful discussion will be conducted in the future studies. Other measures include spending the foreign exchange reserves for purposes such as commercial bank capital injection, outright purchase of foreign goods in a big way (whether this is a efficient use of foreign exchange reserves is doubtful), diversifying into other currencies and so on.

No matter what policy will be adopted to reduce the speed of the accumulation of foreign exchange reserves and finally reduce the reserves, the process must be managed with greatest care It is extremely unlikely that China will take any drastic actions to reduce its foreign exchange reserves so as to produce a big impact on the international financial market. The sheer amount of money involved will constitute an insurmountable psychological barrier to deter any decision makers to take drastic actions.

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[23] During the 1920s, some of the official holders of sterling grew nervous about Britain's weak foreign trade performance. Foreign central banks were told there was no intention of abandoning Britain's link to gold by the Bank of England. When the inevitable British devaluation came on September 20-21, 1931, many foreign central banks were hit hard and were blamed for mismanaging their reserves. The Dutch central banker, Gerard Vissering, resigned and eventually killed himself as a result of the destruction wrought on his institution's balance sheet by the pound's collapse. See "Wobbly dollar spells big trouble for central bankers" by Harold James, 01 Jan. 2005. CuEvents.com.

The global imbalances are explained along two lines: the investment-saving gap and the overvaluation of the US dollar. The investment-saving gap leads directly or indirectly to high interest rates, which in turn leads to large capital inflows. The capital inflows push up the US dollar exchange rate and sustain the US current account deficit. In this process, the strong dollar is just a facilitator of current account deficit necessitated by the investment-saving gap. On the other hand, the realignment of the dollar exchange rate vis-à-vis other major currencies is conditional on the elimination of the investment-saving gap. If the investment-saving gap persists, devaluation of the US exchange rate will lead eventually only to the rise of inflation. The real exchange rate of US dollar will remain unchanged.

Theoretically speaking, as long as, say, the devaluation is big enough, the increase in saving vis-à-vis investment can be big enough to eliminate the investment-saving gap. However, due to various reasons, the needed growth rate of GDP that can eliminate the investment-saving gap might be higher than the potential growth rate of GDP. As a result, inflation will lead to a revaluation of the real exchange rate, which in turn will result in the worsening of current account.

Therefore, a drastic devaluation is not in the interests of any party in the process of global adjustment. The ideal solution is the tightening of the US fiscal policy and, to a certain degree, money policy. Slowdown of the global economy will be a less evil compared with a drastic devaluation of the US dollar.

To avoid the collapse of the global economy caused by chaotic individual actions taken by individual government in dealing with global imbalances, international coordination is essential. The coordination should be conducted at various levels: IMF led global coordination, G7 and G20 coordination, regional coordination and so on. Without such coordination, no countries in the world will be able to get off the hook unscathed.

VI.   Concluding Remarks

In the "Communiqué of the 5th Plenary session of the 16th Central Committee of CPC" promulgated on October 11, 2005, the Chinese leadership declared that the scientific concept of development should underpin China's economic and social development. Development should be people-oriented, outdated concepts should be changed, and new development models should be found, so as to turn socio-economic development onto a track of comprehensive, harmonious and sustainable development. During the next five years, China should have stable and relatively fast economic growth, step up the transformation of economic growth pattern, improve its capacity of independent innovation, promote coordinated development of urban and rural areas, make greater efforts to build a harmonious society, and further deepen reforms and opening-up.

According to the communiqué, China's per capita gross domestic product (GDP) is to double from the year 2000 to 2010; the efficiency of utilizing resources will be improved, and the energy use per unit of GDP also known as ratio of total energy use to GDP will be reduced by 20 pct from 2005; China would rely mostly on its own strength to develop domestic companies with their own

intellectual property rights and independent brands, instead of relying on foreign technology and innovation. A group of enterprises with strong international competitiveness will be established in the next five years; the economy will be more open, and the country will have basically balanced international payments; the nine-year compulsory education will be universal and improved, job opportunities in urban areas will increase constantly, the social security system will be further improved, and the number of poverty-stricken people will be reduced.

Based on the government's track record, I have no doubt whatsoever that China will be able to achieve its new objectives. China will be able to maintain a high growth rate for the next decade while placing the growth in a more sustainable trajectory. The rise of China is unstoppable and the rise will benefit not only the 1.3 billion Chinese but also the whole mankind.

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