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How China could contribute to a benign global rebalancing --A model-based policy study

Pingfan Hong[1]
Rob Vos
Keping Yao

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Abstract

A disorderly adjustment of the global imbalances can be costly for the stability and growth of the world economy. To avoid such a shock, we would need internationally coordinated policies from both deficit and surplus economies. Under a global adjustment framework, our study shows that China could contribute to an orderly global rebalancing by a package of policies to stimulate its domestic consumption. These policies include a progressive appreciation of RMB, fiscal stimuli of increasing social expenditures on education, healthcare, social safety net and poverty reduction, income policies to reduce inequality and to strengthen wages income, and reforms of the financial system to improve financial efficiency and mitigate financial constraints. With these policies, China's external surplus can be narrowed along with an improvement of its domestic imbalances: the excessively high saving rate will be lowered and the share of household consumption will increase, even although GDP growth will moderate slightly.

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1. Introduction

China's rapid accumulation of a prodigious sum of foreign exchange reserves (figure 1) and its large current-account surplus have drawn increasing attention in international, as well as domestic, policy debates. China's surplus, however, is only part of the broader issue of the global imbalances. The dominant part of the global imbalances remains to be the enormous deficit of the United States, at about $770 billion in 2007, matched by surpluses from China, Germany, Japan and a group of oil-exporting countries (figure 2).

Views are split among economists over the causes of the global imbalances.

Some analysts see the imbalances as the result of the current international monetary arrangement and reserve system. For example, Dooley et al (2003, 2004, a, b, c and 2005) have postulated a concept of the new Bretton Woods regime. Similar to the relationship between the United States and a group consisting of Europe and Japan in the Bretton Woods system of the post World War II era, in the new regime a group of emerging economies, including China, would keep accumulating international reserves issued by the United States so as to maintain their undervalued exchange rates, as an integrated measure in their export-led development strategy. By their view, the United States plays a role of international financial intermediation to facilitate growth in the emerging countries. The framework can be considered as an implicit international contract, in which the emerging countries promise to pay the United States the total return on the foreign investment in these countries, and in turn, the United States agrees to pay a fixed interest rate on the reserve assets accumulated by the emerging countries. Because the emerging countries are less creditworthy than the United States, i.e. the foreign investment in these countries are riskier than their holdings of the United States Treasuries, the United States should demand collateral from these emerging economies so as to secure this implicit international contract, an analogy to a total return swap in the standard private financial derivative market. In this case, the effective collateral from the

emerging countries are exactly the surplus in their current account; conversely, therefore, the United States must run a current account deficit.

Although this view has correctly identified the linkage between the imbalances and the international monetary system, Eichengreen (2004) has pointed out this view may have overstretched the analogy of the current international economic arrangement to the Bretton Woods system of the 1960s. Stiglitz (2003), UN (2005), and Hong (2005) have stressed the deficiency of the present international monetary and reserve system to cause such large chronic global imbalances, which contribute to instability and inequality in the world economy.

Others have emphasized the imbalances as the result of the structural differentials among different economies. For example, Bernanke (2005) has attributed the imbalances mainly to a global saving glut, based on the observation of two coinciding trends: a number of countries with high saving rates, mainly in Asia, seem to have enlarged their positive saving-investment gaps and long-term interest rates worldwide have been at exceptionally low levels. These savings have easily financed the large external deficit of the United States. In contrast, IMF (2005) and UN (2006) have pointed out that global aggregate savings in terms of the ratio to the world GDP have actually been declining. The widening saving-investment in Asian economies mainly reflects a drop in the investment rates in most of these economies after the Asian financial crisis of the 1990s. Therefore, it would be more proper to speak of a global investment anemia (UN, 2006), instead of saving glut.

Caballero (2006) has theorized that financial asset shortages are at the root of the global imbalances problem. A shortage of supply of assets – particularly in emerging markets – relative to the increased demand for these assets as the income of these economies rise because of underdevelopment of financial markets in emerging economies, has directed savings from these countries to the United States.

Many analysts have identified structural and policy problems in the United States as the sources of the imbalances, such as the low household savings stimulated by bubbles in stock and housing markets, as in Greenspan (2005), Greenspan and Kennedy (2005), and Lansing (2005), and the government deficit, as in Roubini and Setser (2005), Chinn (2005), and Faruqee, Laxton, Muir D, and Pesenti P. (2005). Others, however, also have linked the export-led growth model of the Asian economies, including China, to the imbalances, as in Aizenman and Lee (2005), Gosselin and Parent (2005), Gruber and Kamin (2005), and Mendoza (2004).

A few analysts believe the global imbalances are pure statistical errors, failure to account properly for the US exports, or the 'dark matter', as in Hausmann and Sturzeneger (2005).

Not a single factor could completely explain the imbalances. Most likely, the global imbalances are driven by a confluence of structural and institutional factors.

Despite a few complacent views, most analysts believe such imbalances are not sustainable. The chronic current-account deficits over the past decade have led the United States to an unsustainable foreign debt position, near $3 trillion. The concerns about the sustainability of the US deficit and its debt position have been among the major factors underlying the depreciation of the US dollar since 2002 (for more detailed information about the latest development in the imbalances, the US foreign debt position and the trend of the dollar exchange rates, see UN (2008)).

There are a myriad ways in which the global imbalances can be adjusted, and they have different consequences for the stability and growth of the world economy. The worst case scenario would be an abrupt retrenchment in the spending of households and businesses in the major deficit country, the United States, triggered by a sharp erosion of the confidence of the dollar. In such a scenario, the rebalancing would lead to a substantial contraction, not only in the United States, but also in the world economy as a whole, accompanied by a precipitous change in exchange rates and a detrimental shock to

financial markets. As quantified in an earlier simulation using the LINK global model system (Hong (2001)) and in other studies, halving the US current account deficit through a contraction in private domestic demand would entail near 5 percentage points on the US GDP growth and cut global growth by about 2 percentage points.

The role of exchange rate in the adjustment of the global imbalances has been a focus under the policy debate. Some viewers, particularly some politicians, consider a realignment of the exchange rates the exclusive channel for the imbalances to be adjusted, therefore, imposing pressures on revaluation of the currencies in the surplus countries, particularly China. However, many economists see the limit of the effectiveness of realigning exchange rate as the single instrument for global rebalancing, and more importantly, warn of serious adverse effects of a sharp change in exchange rate for the stability and growth of the world economy (UN (2002)). For example, as we will show later, our model simulation shows that halving China's current-account via realignment of exchange rate alone would require RMB to appreciate by more than 55%, at the cost of lowering China's GDP growth by 5 percentage points.

The real challenge for policymakers worldwide is not simply to reduce the global imbalances, but to reduce the imbalances while sustaining a robust global growth.

A benign rebalancing process would require policies more than realignment of exchange rates in both the United States and the surplus countries to adjust the saving and investment structure. It would also be important to reform the international monetary and reserve system so as to mitigate the institutional problems at the root of the global imbalances, although such reform can only be a much longer-term goal.

In the short to the medium term, as we have been arguing over the past few years (UN (2006, 2007, 2008), the United States would need policies to stimulate household savings and reduce public deficit. In Europe, economic stimulus should come from keeping interest rates down in an effort to stimulate private demand. In Japan, continued financial sector reform and fiscal incentives to stimulate private investment demand, as

well as a lowering of agricultural protection, should combine to reduce domestic savings. Asian surplus countries should try and boost public and private investment rates, or, if these are considered sufficiently high such as in China, boost broad-based consumption demand, particularly by redressing growing income inequality.

More importantly, all these policies would need to be coordinated internationally so as to maximize the positive policy externality and avoid an impasse (UN (2007)). In this spirit, the International Monetary Fund (IMF) has initiated multilateral consultations to include the United States, Japan, the euro area, China and Saudi Arabia. Some consensus has been reached among the participants, but no concerted actions have been followed yet.

Under an internationally coordinated framework, we would like to study what are the specific policy options China could adopt in order to narrow its external surplus while at the same time limit any welfare losses, or even achieve some welfare gains. We proposed a set of policies earlier (Vos and Hong (2007)), but we would like to validate these policies through a modeling framework in this paper.

In the next section, we will reveiw the evolution of China's external surplus by discussing some key features of China's external sector, including trade and foreign investment. Section 3 will focus on the connection between China's external surplus and its domestic imbalances, by studying the factors behind the trends of high saving rate and low consumption. Section 4 will delineate a small macro-econometric model that can capture the key features of the structure and dynamics of the Chinese economy for studying the rebalancing policies, and will also present the major findings of a set of simulations. The last section concludes by recap the key policy messages.

2. Evolution of China's external surplus

China's large current-account surplus reflects a strong performance of its exports, while China's accumulation of the prodigious sum of foreign reserves is a result of the

twin surpluses in its current account and capital account in recent years. In this section, we would like to discuss some key features in China's trade flows and foreign investment flows so that we can understand better how China's external surplus is developed. These features are also important for determining the effects of RMB appreciation on the external balance and the impact of the adjustment on GDP growth and the economy at large.

The dynamics of trade expansion

A rapid expansion of international trade has probably been the most salient indicator for China's success in its economic reforms, which marks the 30th anniversary in 2008. China's annual trade flows have jumped by nearly 100 folds for the past three decades (figure 3). Trade flows have accelerated particularly since China's accession to the WTO in 2001, growing almost three times as fast as the world average. The share of China's exports in the world was almost negligible 30 years ago, but now accounts for about 10 per cent. In 2007, China topped the US to become the second largest exporter and will likely surpass Germany in 2009 to become the largest exporting economy.

A dominant part of China's trade is with the major developed economies: the US, EU and Japan. Trade with other Asian developing countries also accounts for a large share. However, by taking into account the relative economic size of China's trade partners, China's trade will look much more evenly distributed across major regions and countries, in line with a pattern as predicated by "gravity models" of trade (table 1). For example, although China's trade flows with Africa and Latin America are still small, the shares are approximately in proportion to the relative economic size of these regions in the global economy. In fact, China's trade with Africa and Latin America has accelerated in recent years, growing at a rapid annual pace between 30-50%.

Underlying the strong momentum of China's aggregate trade has been a dynamic change in the composition of China's trade, particularly in China's exports. Thirty years ago, primary goods and manufactured goods accounted for an equal proportion in

China's exports, but now manufactured goods account for about 95% (figure 4). The share of manufactured goods in China's imports has also increased, although not as drastic as in exports, from 65% to 76% (figure 5).

"Processing trade" is a jargon for describing a special structure of China's trade. It refers to some part of China's exports of final goods that are assembled and processed by Chinese factories with imported inputs: high-tech components from developed economies, intermediate parts from other Asian economies, and raw materials from Africa and Latin America. More than 50% of China's exports are categorized as processing trade.

The booming of processing trade in China is consistent with China's international comparative advantage in low-cost (but relatively skilled for assembling) labour. It has, however, also brought some challenges. For example, the high intensity of energy in processing trade has exacerbated China's shortage of energy and aggravated environmental degradation in China. It has also led to some misconception about China's aggregate energy consumption, consumption of primary commodities and GHG emission: a sizable proportion of these are related to the production of exports and should therefore be counted as the share of the other countries of the final users.

In processing trade, domestic value-added accounts for only a small margin in China's exports (Chen et al (2001)). However, the share of domestic inputs seems to be increasing in recent years (Li and Syed (2007)). The share of labor-intensive consumption goods, which used to dominate China's exports, has increasingly been replaced by share of capital goods and parts and components, which are now accounting for more than 40 percent of total exports. Measures of product sophistication for China's exports have risen significantly over the last decade (figure 6). Domestic production capability is near or even exceeding imported goods in intermediate products, such as chemicals.

About 60 per cent of China's exports are produced by foreign-invested enterprises (FIEs) in China, and these enterprises account for a greater share of output of higher value-added production.

The fundamental driving forces for China's trade expansion have been the economic reforms of the past thirty years. Among the most strategically important trade-related reforms are: (1) the set-up of special economic zones in the coast areas in the 1980s as the pilot programme for experimenting trade policies, which were later propagated to the country at large; (2) a sequential reforms of exchange rate policies; (3) a complex set of reforms associated with China's accession to the WTO in the late 1990s and early 2000s; and (4) proactive participation in a wide variety of regional and bilateral trade agreements. China's accession to the WTO alone, including the preparation during the decade-long negotiation and the post-accession implementation, involved significant removal of trade barriers and profound revision of a large number of trade-related laws. For example, un-weighted average tariffs declined from about 43 per cent in 1992 to below 10 per cent in 2005, with all import quotas and licensing being abolished during 2005. More importantly, all these trade-related reforms have been carried out in a gradual pace and in accordance with other reforms in the broad economy, including reforms of the state-owned enterprises, reforms in labour and financial markets and in macroeconomic policy regimes. Some export-promotion policies are indeed controversial. For example, the tax rebates on exports have promoted exports but may have also led to misallocation of resources and frauds (Yu (2006)).

Towards two-way capital mobility

China's trade expansion has been inextricably linked to foreign investment inflows, particularly foreign direct investment (FDI) inflows. Before 1980, FDI inflows to China were minuscule, but the inflows have surged since the 1990s (figure 7). In 2007 China registered $75 billion in FDI inflows, accounted for about 20% of the total FDI inflows to all developing countries. For the last three decades, accumulated FDI inflows to China have totaled about $800 billion. However, the ratio of FDI to total fixed

investment in China has been moderating in recent years, dropping from about 12% in the 1990s to about 6% in 2007, which is lower than this ratio in many other developing countries.

Although a large number of countries are reported to be the source countries for FDI inflows to China, the lion's share is from just a few countries. In fact, 10 economies account for 85% per cent of the total FDI flows to China in 2006 (table 2). Hong Kong SAR has always been on the top, accounting for about one third. The United States and the EU are also among the top 10, but their shares in FDI inflows to China have actually moderated in recent years. One caveat is that the large shares of Hong Kong SAR and a few other small economies, such as the Virgin Island and Samoa, in FDI inflows to China may include some round-tripping FDI inflows to China, namely, investment made by Chinese companies abroad to take advantage of some policy benefits toward foreign investment.

Most FDI inflows to China are located in China's east coast areas. Jiangsu, Guangdong, Shanghai, Zhejiang and Beijing accounted for about 70% FDI inflows in 2006. More than 60% percent of FDI inflows in the same period were concentrated in manufacturing, to be followed by real estate, 13%.

However, some noticeable changes have been reported in recent years in the distribution of FDI inflows both across regions and among industrial sectors. For example, during 2006, FDI inflows to the three North-eastern provinces (featured by the state-owned heavy industries) increased by nearly 50 per cent. The same strong growth has also been witnessed for the provinces in central and western areas, such as Chongqing and Sichuan. Meanwhile, FDI inflows are growing more rapidly in services sector, away from manufacturing. Tentative data for 2007 show that the share of FDI inflows to manufacturing sector dropped by several percentage points from the previous year, while the share in services sector increased significantly.

Some of these changes in regional and structural distribution of FDI inflows could be the direct result of the changes in China's development policies attempting to narrow the disparity in economic development across regions by encouraging more investment in the central and western areas, and changes in industrial policies to promote services sector. In addition, these changes in FDI inflows can also be the response to the appreciation of RMB in the past two years, which have reduced profit margins for some manufacturing sectors in the east coast areas, driving the relocation of factories toward other regions.

Rapid increases in FDI inflows to China over the past two decades have been driven by a number of factors, for example, the potential domestic market of the Chinese economy and the associated economies of scale, and China's international comparative advantage for becoming a global manufacturing base. China's FDI policies to provide incentive and to improve business environment conducive to foreign investment have also played a crucial role. Until 2007, FIEs enjoyed huge tax incentives, along with other preferential treatments. The standard enterprise income tax rate was 33%, but a tax rate of 15% applied to FIEs located in the special economic zones, or in manufacturing in the economic and technological development zones. During 2007, such preferential tax rate was revoked, but other preferential treatments remain.

China has also progressively made changes in regulations, guidelines and laws for FDI inflows in accordance with changes in the broad industrial policies and development policies. For example, the amendments in the Catalogue for the Guidance of Foreign Investment Industries in recent years relaxed restrictions on market access in services industries, and encouraged those FIEs that would use improved technology and less polluting, but "restricted" and "prohibited" those FIEs that would use outdated technologies, over-exploit scarce natural resources and tend to harm the environment.

Large FDI inflows to China have not only promoted China's export growth but also led to an increasing share of FIEs in China's domestic markets. For example, foreign companies have taken one third or even higher shares of China's domestic

markets in the products of light industry, chemicals, pharmaceuticals, machinery and electronics, and as high as 90% of the market share in some sectors. Such a trend has instigated a debate on the role of FDI inflows in China's development. Most analysts agree on the positive role of FDI in promoting China's trade and in providing employment growth, but some have voiced the doubt about any positive effects of FDI inflows on China's technological innovation, economic security and development of national industry. Some analysts have pointed out the adverse impact of FDI inflows on China's environment protection and stability of asset markets. Most recently, some Chinese analysts even suggest policies to curb, rather than to promote, FDI inflows, although these recommendations have not been adopted by the authorities.

Given China's high domestic savings rate, the importance of FDI inflows to China would more lie in their roles for bringing in advanced technology and management skills than for just providing additional capital.

In fact, as a result of its high domestic savings, China has stepped up its outward investment in recent years.

China registered $18.5 billion in its FDI outflows during 2006 (no official data for 2007 yet, but a significant increase is expected from 2006). This amount accounts for less 2% of the world total FDI flows in the same year, but the pace has accelerated most recently, growing by several times from 2003 to 2006 (table 3). China's FDI outflows are spread over almost all economies in the world, but Latin America and Asia are the main destinations, accounting for about 60% and 30% of China's FDI outflows in 2006 respectively.

Acquisition of natural resources seems to be one of the key strategic considerations for China's outward FDI strategy. Other considerations include supporting of exports, expanding of market presence, acquiring foreign skills, establishing local distribution networks, growing exposure to international business and increasing in

financial strength, relocating mature industries to lower wage sites, and building international brands and accessing advanced technologies (Pamlin and Long (2007)).

During 2006, 59% of China's outward FDI flows went to mining, quarrying and petroleum, 24% went to services and 6% went to manufacturing.

50% of China's FDI outflows are made by the state-owned companies, but more private companies are encouraged to do so.

China's investment in overseas natural resources has encountered mixed reactions around the world. It has been warmly welcomed by many resources-rich countries, such as those in Africa and Latin America, but it has also caused some concerns, and even encountered strong protectionism. For example, the US government blocked CNOOC's attempt to acquire the US oil company UNOCAL in 2005 and Huawei's bid for 3Com most recently in 2008.

Along with China's piling up of a huge sum of foreign exchange reserves, China has also adopted a number measures to encourage outward portfolio investment.

Among these measures, China has established the Qualified Domestic Institutional Investors' mechanism (QDII) to allow some Chinese financial institutions to invest in foreign financial assets. However, during 2007 only a small fraction of the quota allotted for QDII was utilized, partly because the returns on China's domestic stock market have been much higher than overseas markets.

China has also launched China Investment Corporation (CIC), a sovereign wealth fund of $200 billion, to invest in those foreign assets that are expected to have higher returns than holdings of the US Treasuries. Sovereign wealth funds are nothing novel. Worldwide, some forty countries have such funds, with the assets totaling more than $3 trillion, almost doubling the size of all the hedge funds. China's sovereign wealth fund is

expected to face a number of challenges, such as political and security concerns in foreign countries, and the issues of governance and risk management.

These measures to increase China's outward investment may help manage better foreign exchange reserves, but they cannot resolve the surplus in China's current account.

Some controversial issues

Given these special features in China's external sector, there are some controversial issues.

The first issue is about the linkage between the processing trade and China's current-account surplus.

Some analysts believe China's current account surplus (or trade surplus, more precisely) is attributable to the domination of processing trade (for example, Yu (2006)). When they decompose trade surplus (which accounts for 80% or more of China's current account surplus in recent years), they find that most surplus is registered in processing trade. An extreme case, for example, is for 2005, when processing trade registered a surplus of $140 billion and general trade registered a deficit of $38 billion, out of the total trade surplus of $102 billion. From a microeconomic point of view, processing trade as a group must run surplus, because the value of output (which is also the value of exports) of those enterprises engaged in processing trade must be larger than the value of input (which is the value of imported input plus the value-added in China) in order for these enterprises to be profitable. Since processing trade accounts for a large proportion of China's trade, as the reasoning goes, China must be in a trade surplus.

Such an argument, however, cannot hold from macroeconomic point of view. The Chinese economy is not a collection of just the enterprises engaged in processing trade, or all kinds of foreign trade, but it also consists of other enterprises and consumers. As we will see in section 3, the trade balance or the current account balance depends on the

aggregate consumption, saving and investment of the economy, not on the microeconomic nature of processing trade, although the large share of processing trade can have special impact on such macroeconomic features as the elasticity of China's trade to changes in relative prices and changes in exchange rate, as will be discussed in section 4.

The second issue is about the dependency of the Chinese economy on trade, or, more specifically, on exports. This question is also closely related to a broader debate about the decoupling of China (and to a lesser degree, other emerging economies) from the US economy. In other words, if the US economy falls into a recession, whether China can sustain a robust growth and support the global growth.

The ratio of China's exports to GDP is about 40%, which is higher than those of the US (12%) and Japan (15%), but lower than those of a few other Asian economies, such as Hong Kong (100%), Malaysia (100%) and Singapore (100%). By this measure, some analysts think China's economic growth has become highly dependent on exports. This ratio, however, cannot properly define the dependency of the Chinese economy on exports. As discussed above, more than 50% of China's exports are processed trade, containing a large proportion of imports. By stripping out the import content and by also adjusting the gross value of exports to value-added, some analysts estimated that the "actual" share of China's exports to GDP should be about only 10% (Anderson (2007)). Of course, also as discussed above, if the share of domestic inputs in the processed exports is increasing, the degree of China's dependency on exports is also on the rise.

A more sophisticated approach to the analysis of China's dependency on exports should be through a well-specified economic model, rather than through a simple statistic analysis of the ratios and shares. How exporting companies in China (foreign-owned and Chinese owned as well) would adjust to an external shock, be it a decline in external demand or a change in relative prices, and, more importantly, how macroeconomic policies would respond to an external shock, such as fiscal stimuli to domestic consumption, are more important factors than those ratios and shares for defining China's

dependency on trade. Our tentative model exercise shows that a drop of China's exports by 3% will lead to a decline of GDP by about 0.8 per cent in the short run, but will have a limited impact on China's GDP growth path in the medium term.

There are other debatable issues. For example, some anecdotes indicate nontrivial part of China's current account surplus in recent years may reflect the disguised portfolio capital inflows to invest in the A shares of Chinese stock markets, which are not open to individual foreign investors. Even if it is true, this cannot make a significant change to the fact of China's large current account surplus.

3. Domestic imbalances as the mirror-image of the external surplus

From the national accounting, we can derive the following relationship between current account balance and the balances in the domestic economy.

$$X-M = (S-I) + GB \qquad 3.1$$

This accounting identity shows that current account balance is equal to the domestic saving-investment gap plus government balance.

A common misconception for some analysts is to mistake this identity relationship for a causal relationship, trying to explain one side of the equation by the other side. For example, some analysts would focus exclusively on the left-hand, considering exports and imports as the predominant factors for determining current account balance (this could be the rationale for those who believe exchange rate is the only instrument to adjust current account imbalance). Some others may focus exclusively on the right-hand side, emphasizing exclusively the importance of government balance and saving and investment behavior for determining current account balances.

A proper interpretation of the identity is that any factors that cause an imbalance on the left-hand side must also affect the variables on the right-hand side. For example, if

a change in exchange rate would alter the external balance, it must also alter the domestic savings-investment gap and/or government balance.

We will see this when we come to the discussion of the model simulation.

In this regard, China's current-account surplus must coincide with a large imbalance in its domestic economy. China has the highest investment rate in the world, more than 40 per cent of GDP. However, China's saving rate is even higher than its investment rate, at about 50 per cent (figure 8). As a result, the share of consumption in GDP has dropped to very low level, particularly the share of household consumption, which has dropped below 40 per cent of GDP, the lowest among the world sizable economies. In other words, there has been a tendency in the Chinese economy for an increasing proportion of GDP to be used for exports and for the purpose of reproduction, at the expense of domestic consumption.

The declining share of consumption is attributable to two broad trends: a rising propensity to save for households and a dropping disposable income relative to GDP (figure 9).

Lower propensity to consume

The first trend can largely be explained by a change in the saving/consumption behavior of households in response to market-oriented reforms. For example, reforms of the state-owned enterprises have led to the end of the life-time employment in China, increasing uncertainties for many households about their job security, future income and many social services the state-owned enterprises used to provide.

Reforms of public healthcare, education, pension and housing are all characterized by reduced government/public provision of these services, shifting the responsibility to households. In absolute terms, government spending on these items has been increasing, or even in terms relative to total government spending, public

expenditures on these items have not declined either, but the proportion paid directly by households on these services has been increasing. For example, the proportion paid directly by households for health spending has increased from less than 20 per cent in the 1980s to more than 60 per cent in the 2000s (Blanchard and Giavazzi (2005)). People in the rural area would usually have to pay much higher proportion of their spending on healthcare than people in the cities. For example, it is reported that only 20% of the itinerant workers who come from the rural area to work in the cities are covered by basic injury insurance. The same is true for education, particular higher education, which used to be mostly covered by the government but now is a big burden for many families (of course the proportion of youth going to higher education has increased by several folds compared with decades ago).

Households are facing more uncertainties to cover the financial needs for these services not only for today but also for the future. Moreover, an underdeveloped financial system in China cannot provide adequate financial services for households to hedge these uncertainties and to smooth these financial needs over their life cycle. The result is an increased precautionary saving rate.

Compared with the rapidly advanced reforms in other fields, major reform of financial system has been postponed until most recently. The banking sector is still dominated by four large banks, with all interest rates still being set directly by the authorities (allowing for a limited variation). Non-banking financial sector in particular is extremely underdeveloped. Rural areas and small- and medium-sized enterprises (SMEs) have difficulties to access financial resources. Credit market for consumers is very small, and the number of financial instruments is in paucity—for example, even the conventional commercial bond issuance is in a very small share of GDP. Equity markets had experienced a long period of poor performance until 2006, and despite the strong performance of the past two years, volatility remains extremely high.

For households, bank deposits are still the major instrument for keeping their savings. The controlled and low interest rates on deposits, much lower than GDP growth

rate (figure 10) could have also led to a higher saving rate: given the same amount of what households expect to need in the future (for example, to buy a new house), a lower rate of return on savings would mean that higher savings are required today (contrary to some conventional views that lower interest rate will lead to lower savings and higher rate will lead to higher savings).

Declining disposable income share

The second trend involves more complicated factors (Aziz and Cui (2007)). The share of disposable income in GDP has dropped by 10 percentage points over the past decade, to about 60 per cent. Wage share declined the most, but the shares of both investment income and government transfer also fell. A weak employment growth and a large surplus labour force in the countryside can to some extent explain the declining of the wage share in GDP. Despite a strong GDP growth for decades, employment growth in China has been on a relative slow pace, partly because of the continuous layoffs from the state owned enterprises. The underdeveloped financial system has a direct impact on employment growth and wages: for example, the SMEs, which are supposed to be more dynamic than the large state-owned enterprises in hiring, are facing more financial constraints. The financial constraints can also explain the rising saving rate of firms, which is part of the increasing domestic savings.

Other factors, such as widening income inequality, can also lead to a weaker growth of consumption relative to GDP growth. China's GINI coefficient is near .45, up from .30 two decades ago.

China's large current-account surplus also reflects another domestic imbalance: a deficit in its environment account. China is facing serious environmental degradation: water and air pollution, and desertification. Some of the environmental problems are inextricably related to the rapid expansion of exports, as mentioned earlier. In a conceptual green national account, the full costs of environment degradation and

resources depletion could take away 5 percentage of GDP per annum, as suggested by some economists.

With such inextricable correlation between China's external surplus and domestic imbalances, rebalancing the external surplus would need RMB appreciate to alter the relative prices so as to reallocate resources between domestic and external sectors, but it would also need other policies to more directly rectify the structural domestic imbalances. These policies include increasing government expenditures on public healthcare, education, and social security, because these expenditures will not only boost aggregate consumption directly, but also induce more household consumption as these expenditures will mitigate uncertainties for households, thus reducing their needs for precautionary savings. The shares of China's government expenditures on health care and education are low compared with many other countries. Policies to narrow income inequality and to maintain minimum wage can also boost consumption. Meanwhile, reforms of the financial system to lighten financial constraints on the SMEs can also boost employment and disposable income, as well as reduce savings of firms. Improving financial efficiency and containing financial volatility can reduce household savings as well. Meanwhile, financial reforms can go in tandem with reforms of the exchange market in China, providing necessary conditions for adopting more flexible exchange rate.

4. Modeling and policy simulation

We would need a modeling framework to assess the overall effects of these proposed policies on current account balance, GDP growth, savings, investment, and consumption etc.

Modeling Chinese economy

Ideally, we should use a global model to simulate these policies, as a global model can reflect fuller effects of these policies by taking into account the transmission effects

cross countries. However, we are under a number of capacity constraints: the original LINK global modeling framework has been phased out while a new one is not in place yet. Therefore, we decided to develop a small Chinese model for this purpose only.

Two broad categories of modeling approaches can be useful for this purpose: stochastic dynamic general equilibrium (SDGE) modeling and macro-econometric modeling.

The former has increasingly been used by many central banks and the IMF (Elekdag (2006)). With a dynamic programming framework to specify optimal inter-temporal decision-making households and businesses, SDGE modeling is considered to be more theoretically rigorous than other approaches. In practice, SDGE modeling can also include many market imperfections, such sticky price, monopolistic competition and home biasness.

Macro-econometric modeling on the other hand still has the advantage of flexibility. With the latest developments in econometric techniques, such as co-integration and error-correction and by following proper economic theory as the guidance for specification, macro-econometric modeling can also maintain a high degree of rigor.

We have followed the latter approach because of our experience and existing capacity, but we have taken some theoretical features of the former in specifying behavioral equations.

The model is specified on the basis of the expenditure GDP identity of the national accounting. Four behavioral equations are defined for determining household consumption, investment, import demand and exports respectively. It also includes a government sector. No monetary sector is defined (for the current version) so prices are defined in relative terms and the exchange rate is defined in real terms (see Annex for a complete set of equations). In general, all the behavioral equations in the model follow the “error-correction” specification to reflect both the dynamics of the adjustment in the

short run and a desirable balanced economic structure in the long run. While some coefficients are econometrically estimated (based on our early work in LINK modeling), some are calibrated following economic principals.

At the core of the model is a consumption function, which is specified by following the theoretical framework of inter-temporal decision-making households facing uncertainty, as follows.

$$MaxE_t \sum_{j=0}^{T-t} \beta^j U(C_{t+j}, z_{t+j}, v_{t+j}) \qquad 4.1$$

$$s.t. A_{t+j+1} = A_{t+j}(1+R_{t+j}) + Y_{t+j} - C_{t+j}$$

In this framework, E_t is the expectation operator conditionally based on information at time t. C is a homogeneous consumption good. A is the asset the consumer can invest with a rate of return R. Y is disposable income. In addition to C, the utility is assumed to be also a function of other variables, as denoted by z for a vector of observable variables, and by v for unobservable variables. Beta is the discount factor (Attanasio (2000)).

Many implicit assumptions need to be made for the framework in order to warrant the existence of a solution for the dynamic problem, or for the solution to be more traceable. For example, the utility is assumed to be separable over time, etc.

The necessary condition for the inter-temporal maximization problem above to have a solution defines the following equation, namely the Euler equation.

$$U'_{c_t} = E_t[U'_{c_{t+1}} \beta(1+R_{t+1})] \qquad 4.2$$

U' is the partial derivative of the utility function with respect to consumption.

We have to assume a specific utility function in order to derive a closed form of

consumption from the Euler equation. In general, it is difficult to get a closed form consumption function. A widely adopted form of consumption function from the Euler equation approach in many empirical studies has been the "log-linearized" equation (Hong (1999)). For our purpose, since we are interested mostly in studying the changes of consumption in response to policies, rather than the absolute level of consumption, we can use a Taylor expansion of the original consumption equation of any functional form to obtain a linear (or log-linear) form.

A log-linear closed-form consumption function in our model is defined as follows.

log(CN) - log(CN(-1)) = ccn1 * (log(Y(-1)) - log(CN(-1)) + ccn2) + ccn3 * (log(Y / Y(-1))) + ccn4 * log(WLTH / WLTH(-1)) + ccn5 * (RISK - 100) / 100 + adjcn 4.3

In this equation, the long-run income propensity to consume is unit, as defined by the co-integration part of the equation (otherwise, the model economy will collapse eventually). In the short run, change in consumption will be determined by (1) the adjustment to the deviation of consumption from its long-run equilibrium relationship with disposable income, with the adjustment coefficient ccn1 equal to 0.20; (2) the innovation of disposable income, with the short-run propensity to consume, ccn3 equal to 0.4; (3) the wealth effect, with ccn4 equal to 0.10; and (4) the uncertainties (discussed below).

Policies affect consumption through three variables: disposable income, wealth, and uncertainty.

Disposable income is defined in a simplified relationship with GDP and effective tax rate. Tax policy and government transfer can alter disposable income.

Y = cy * GDP * (1 - TAX) +GT 4.4

Wealth is defined as accumulation of savings adjusted by valuation effects, such as returns on assets. Reforms of financial system to provide households more efficient financial instruments should have impact on valuation of wealth.

$$WLTH = vadj * WLTH(-1) + (Y - CN) + ADJWLTH \quad (4.5)$$

Uncertainties facing households are defined by an index in the model, which is normalized at a value of 100 in the baseline. This index is further defined as the sum of two sub-indices.

$$RISK = RISK1 + RISK2 + ADJRISK \quad (4.6)$$

One sub-index links the uncertainties of households to policies such as government provision of social service relative to GDP.

$$RISK1 = 50 - (GS / GDP - crisk10) * 100 + crisk11 \quad (4.7)$$

Another sub-index links macroeconomic volatilities to the uncertainties facing households, for example, the change in exchange rate, change in inflation, etc.

$$RISK2 = 50 + (sqr((EX / EX(-1) - 1)^2) - crisk20) * 100 + crisk21 \quad (4.8)$$

In other part of the model, the investment function follows the traditional "accelerator" model, with the role of FDI adding to it.

For the external sector, both the imports and the exports are divided into two categories: processing trade and general trade, to reflect the special feature in China's trade as discussed in section 2. While demand for general imports is defined as a function of income and relative prices, demand for processing imports, naturally, is defined as a function of processing exports.

log(MD) - log(MD(-1)) = cm1 * (log(MD(-1)) - cm2 * log(GDP(-1)) - cm3 * log(PM(-1) / PD(-1)) - cm4) + cm5 * log(GDP / GDP(-1)) + cm6 * (log(PM / PD) - log(PM(-1) / PD(-1))) + ADJMD 4.9

As defined in the co-integrated part of the import demand function (4.9), the long-run income elasticity for import is unity and the long-run price elasticity is -0.92. The short-run elasticity is in the same magnitude.

Both processing exports and the general exports are defined as a function of the GDP in the rest of the world and the relative prices, but with different value of elasticity. The processing exports are more elastic than the general exports in response to changes in world GDP and relative prices.

The sum of the absolute values of the price elasticity in the import demand function and export demand function is greater than one, complying with the Marshall-Leaner condition (Hong (1999)) so as to warrant a convergent adjustment of the global imbalances in response to a change in exchange rate.

While purchasing power parity is assumed to hold in the long run for the relationship between exchange rate and the relative prices between domestic goods and foreign goods, a less-than-unity degree of pass-through is defined for changes in the exchange rate in the short run. For example, only 40% of a change in exchange rate will be passed through to import prices. A deviation from the long-run PPP will take many years to adjustment with the adjustment coefficient in front of the co-integration term at -0.2.

So far the model does not include the supply side of the economy, namely, the production and the productive factors. It is implicitly assumed that the supply side can adjust to the changes in demand, both at the aggregate level and structural wise. For example, as shown in the scenarios below, if there is a switch in the consumption between imported goods and domestic produced goods, the supply side will change

accordingly with re-allocation of labour and capital across sectors. The adjustment mechanism on the demand side as defined in the error-correction form can be interpreted as implicit adjustment process of the supply side. Since the policy simulations are focused on the medium run, supply-side constraints are not crucial, but if the model is used for long-term policy study, the supply side should be explicitly modeled.

Before the model is used for policy analysis, a number of multiplier tests were carried out to check the system property of the model, such as changes in tax, in government spending, in relative prices, in external demand, and in degree of uncertainty. All the test results seem to be consistent with the observed data in two base years, 2006-2007.

Five nested policy scenarios

A baseline profile for the Chinese economy for 2008-2015 is built on the basis of the latest trends and structure as in 2006-2007. The baseline features a GDP growth moderating gradually from the current pace of about 10% to 8% in 2012, RMB exchange rate vis-à-vis the US dollar appreciating by 3% per annum until 6 Yuan/$ in 2012, current account surplus stabilizing around the current level relative to GDP, and the domestic saving and investment rates remaining at the current levels. Given the nature of the policy simulation, the levels of these economic variables in the baseline should not matter much, while the variations from these levels matter the most to show the policy effects.

Five nested scenarios are simulated to show the effects of various policies.

The first scenario is to simulate effects of a pure external shock on the RMB exchange rate. The results show that adjusting China's current-account surplus by half of the current level relative to GDP, if only through exogenous shocks on the exchange rate, would imply a sharp appreciation of RMB to 4.6 Yuan/$, a appreciation of more than 55% from the current level. Such a shock would also entail a significant cost on GDP,

depressing GDP growth to below 5%, compared with the current growth of 10%. This is obviously a too costly adjustment (figures 11-13).

This result seems to confirm the fact that China's external surplus seems to be very inelastic to RMB appreciation, at least in the short run. Since China de-pegged RMB from the US dollar in July 2005, RMB has appreciated by about 15% vis-à-vis the dollar, but China's trade surplus (total, as well as the surplus vis-à-vis the US) has continued to grow strongly in the same period. A few factors could explain such low elasticity, if we recall those key features of China's external sector as discussed in section 2. The nature of processing trade (large share of imported inputs, and low proportion of China's value-added), the dynamism in the change of China's export composition, and the relocation of the manufacturing factories from the east coast to other areas with lower labour cost within China (many factories are also reported to have moved to other Asian economies over the past two years), all these factors have led to a small degree of pass-through of the change in RMB exchange rate to the prices of exports and a low price-elasticity in foreign demand of China's exports at the macro level.

The second scenario is built on the basis of the first one. An increase of government expenditure by about 0.5% of GDP per annum for 5 years in a row is imposed to stimulate the economy in order to alleviate some of the adverse effects of the exchange rate shock as in scenario one. The results show a recovered GDP growth, to about 6.5% and further narrowing of current-account surplus as import demand is stimulated by increased government expenditure.

In the third scenario, on top of the second one, we assume 70% of the increased government expenditure as in scenario two will be exclusively for social spending on such items as education, healthcare safety net and poverty reduction. As a result, the uncertainties facing households are mitigated so that they would reduce precautionary savings. In this case, the GDP growth path turns slightly higher than in scenario 2, but household consumption increases by about 2 percentage points of GDP from the previous one.

In scenario 4, we assume more successful reforms of the financial system to improve financial efficiency so the rates of returns on household savings become higher. In this case, household consumption rate and GDP growth will be even higher than scenario 3.

In the final scenario, under the new circumstance that fiscal stimuli and other policies have strengthened consumption and import demand, pushing China's current-account surplus to only 2.5% of GDP, we can consider reducing the stance of RMB appreciation as initially imposed in scenario one to a level that just halve the current-account surplus, but not over it. The final results show that, with all other policies, an appreciation of RMB by about 5% per annum for 5 years can reduce China's external surplus by half. While GDP growth seems to be slightly lower than the baseline, consumption to GDP ratio is three percentage points higher than the baseline, reversing the declining trend over the past decade (figures 14-18).

5. Concluding remarks and policy implications

In summary, we have studied via model simulations a policy mix. The essential part of these policies feature (1) an increase of government expenditure by 0.5% of GDP per annum for five years, with 70% of the increased expenditure earmarking for social spending, such as education, healthcare and social safety net; (2) reforms of the financial system to improve financial efficiency; and (3) an appreciation of RMB by 5% per annum for five years.

The simulations show that, China's current account surplus will be reduced by more than half in five years, average annual GDP growth will be lower by about one percentage point than in the baseline to end of the simulation period, but consumption to GDP ratio will be three percentage points higher than in the baseline.

Does the government have adequate policy space to afford these policies? The simulation shows that government deficit will increase by about 2.5 percentage points of GDP compared with the baseline. The ratio of government deficit to GDP will be around 3.5 per cent to the end of the simulation period (figure 19). Given that the government debt is about 20% of GDP such a deficit/GDP ratio should not be alarming at all.

If the level of consumption can be a proxy for economic welfare, this simulation shows that such an adjustment is welfare-improving (figure 20), which will not only adjust China's external imbalance (thus contribute to a benign global adjustment), but also resolve some of China's domestic structural problems by moving the economy towards a more efficient growth trajectory.

These policy proposals are in fact very much in the same spirit of China's new development strategy as laid out by the Chinese authorities in late 2007, namely, to sustain a balanced development path of high-quality, rather than to pursue a simple goal of high GDP growth. China has recently already taken some policy measures to narrow its external surplus and to stimulate domestic consumption demand. These measures include, for example, allowing more flexible exchange rate, phasing out most tax rebate on exports, unifying corporate tax rate for both domestic firms and the FIEs, strengthening rural income by eliminating agricultural tax, rising minimum taxable income level, and implementing the labour law, which defining the minimum wage, as well as increasing social spending. As illustrated by our study, the stance of these policies may need to be scaled up and, more importantly, to be accompanied by continued reforms of the financial system, as well as other ongoing reforms, so as to be effective in rebalance the domestic economic structure while at the same time contribute to a benign adjustment of the global imbalances.

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Annex: a small macro-econometric model for China

```
GDP  = CN  + I  + G  + X  - M  + INV

'consumption function'

CN  = exp(log(CN(-1))  + ccn1  * (log(Y(-1))  - log(CN(-1))  + ccn2)  + ccn3  * (log(Y  / Y(-1)))  +
ccn4  * log(WLTH  / WLTH(-1))  + ccn5  * (RISK  - 100)  / 100)  * adjcn

'disposable income'

Y  = cy  * GDP  * (1  - TAX) +GT

‘wealth’
WLTH  = VADJ  * WLTH(-1)  + (Y  - CN)  + ADJWLTH

‘uncertainties’
RISK1  = 50  - (GS  / GDP  - crisk10)  * 100  + crisk11

RISK2  = 50  + (sqr((EX  / EX(-1)  - 1)^2)  - crisk20)  * 100  + crisk21

RISK  = RISK1  + RISK2  + ADJRISK

'investment function'
'

I  = exp( log(I(-1))  + CI1  * ( log(GDP(-1))  - log(I(-1))  + CI2)  + ci3  * (log(GDP  / GDP(-1)))  + CI4
* (log(FDI  / FDI(-1)))  + CI5  * ((R  - R(-1))  / 100))  * ADJI

'government'

‘total expenditure’
GEXP  = cgexp  * GDP

‘expenditure on social sectors’
GS  = cgs  * GEXP

‘expenditure on other sectors’

GO  = (1  - cgs)  * GEXP

‘government transfer to households’
GT  = cgt  * GS

‘government consumption’
G  = cg  * GEXP

‘government revenue’
GRN  = GDP  * TAX

‘government balance’
GB  = GRN  - GEXP

'external sector'
```

'

‘import delfator’
PM = exp(log(PM(-1)) + cpm1 * (log(PM(-1)) - log(PM$(-1)) - log(EX(-1)) + cpm2) + cpm3 * log(PM$ / PM$(-1)) + cpm4 * log(EX / EX(-1))) * adjpm

'export deflator''

PX$ = exp(log(PD) - cpx$1 * log(EX) + cpx$2) * adjpx$

'import demand'

M = MD + MP

'MP--processing trade
'MD--domestic demand for import

MD = exp (log(MD(-1)) + cm1 * (log(MD(-1)) - cm2 * log(GDP(-1)) - cm3 * log(PM(-1) / PD(-1)) - cm4) + cm5 * log(GDP / GDP(-1)) + cm6 * (log(PM / PD) - log(PM(-1) / PD(-1)))) * ADJMD

MP = exp(log(XP) + cmp1 * log(EX) + cmp2) * ADJMP

‘exports’

X = XD + XP

‘XD—exports rely on domestic inputs’

‘XP—processing trade in exports’

XD = exp (log(XD(-1)) + cx1 * (log(XD(-1)) - cx2 * log(WGP(-1)) - cx3 * log(PX$(-1) / PW$(-1)) - cx4) + cx5 * log(WGP / WGP(-1)) + cx6 * (log(PX$ / PW$) - log(PX$(-1) / PW$(-1)))) * ADJXD

XP = exp (log(XP(-1)) + cxp1 * (log(XP(-1)) - cxp2 * log(WGP(-1)) - cxp3 * log(PX$(-1) / PW$(-1)) - cxp4) + cxp5 * log(WGP / WGP(-1)) + cxp6 * (log(PX$ / PW$) - log(PX$(-1) / PW$(-1)))) * ADJXP

‘trade balance’
TB = X - M

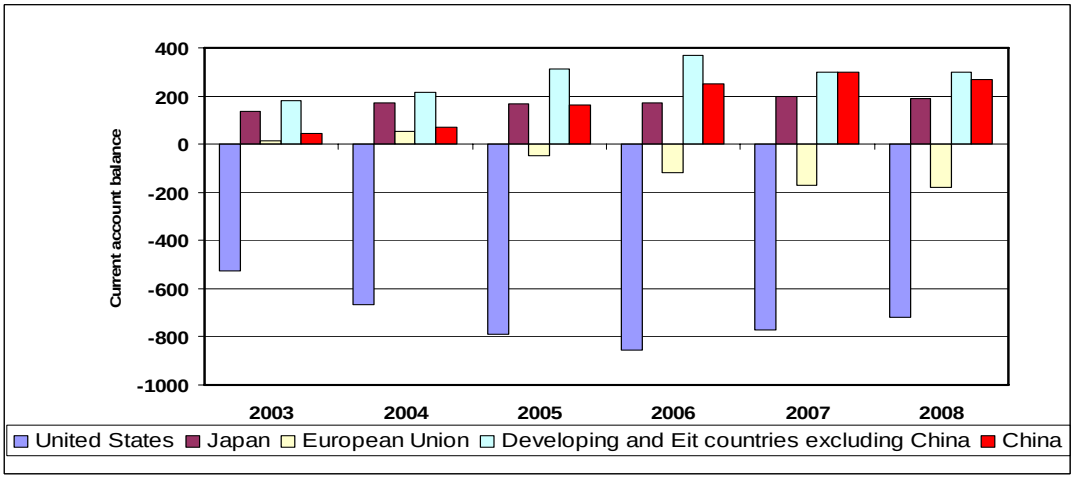
TB$ = TB / EX

‘FDI flows’
FDI = FDI(-1) * (1 + (GDP / GDP(-1)) - WGP / WGP(-1)) + adjfdi

Figure 1

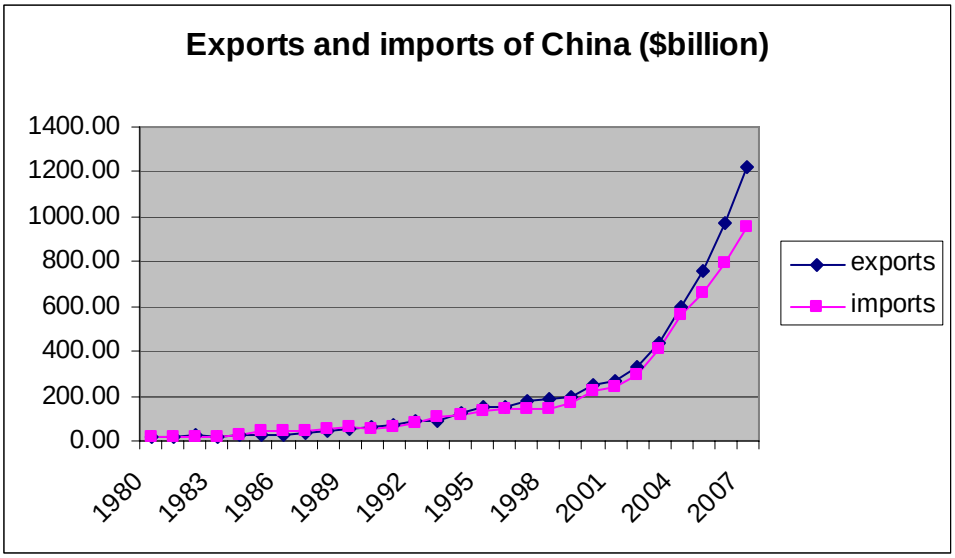
Source: *China Statistical Year Book*

Figure 2



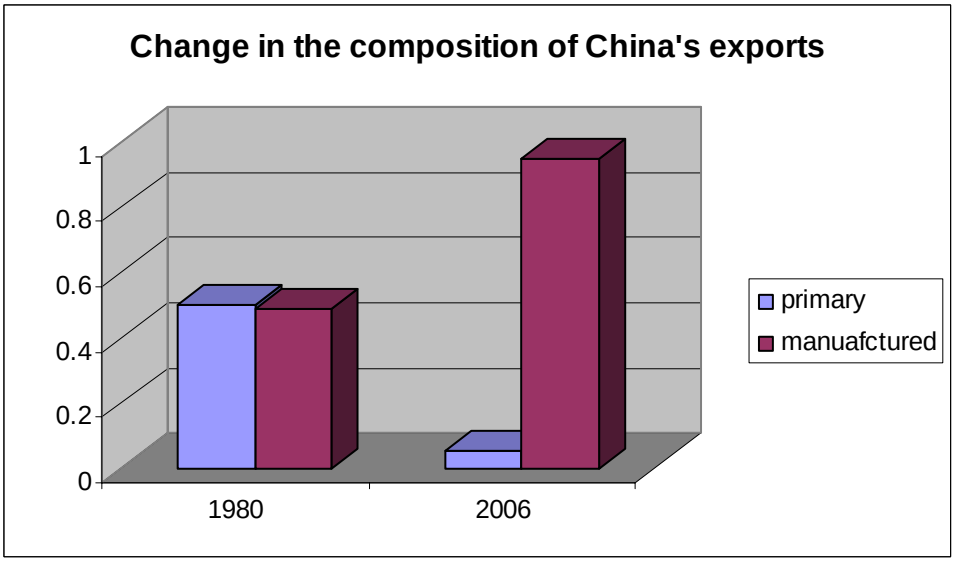
Source: United Nations *World Economic Situation and Prospects 2008*

Figure 3



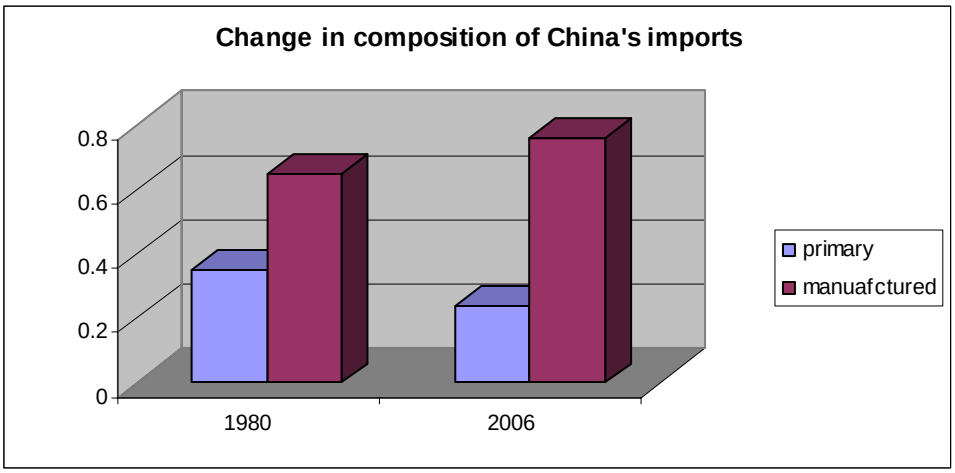
Source: *China Statistical Year Book*

Figure 4



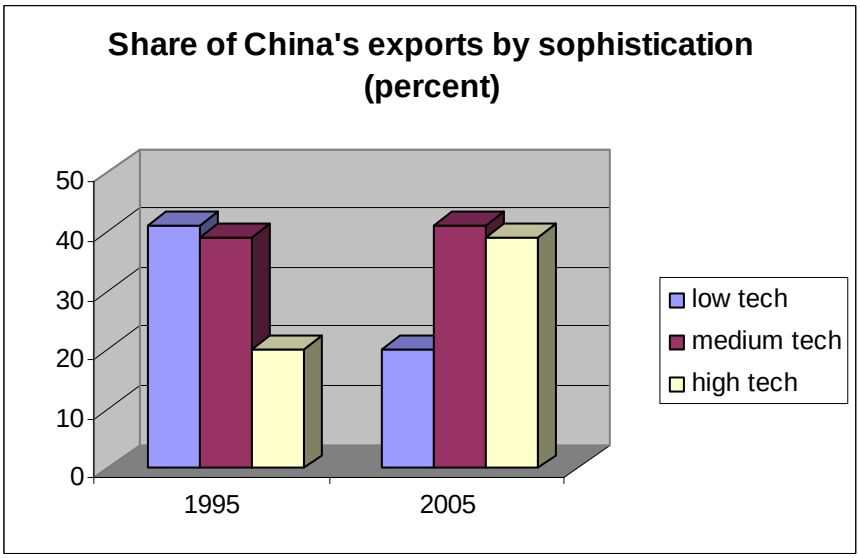
Source: *China Statistical Year Book*

Figure 5



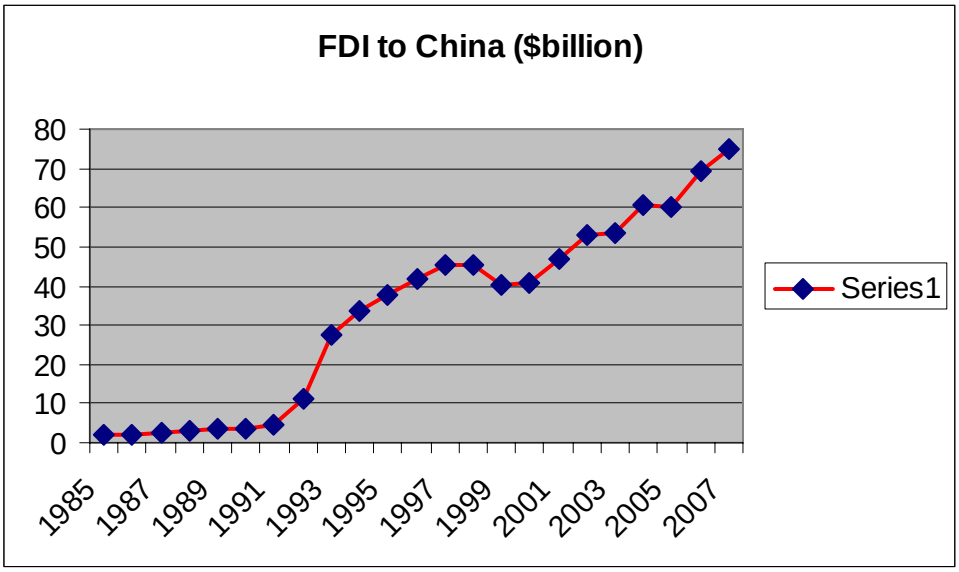
Source: *China Statistical Year Book*

Figure 6



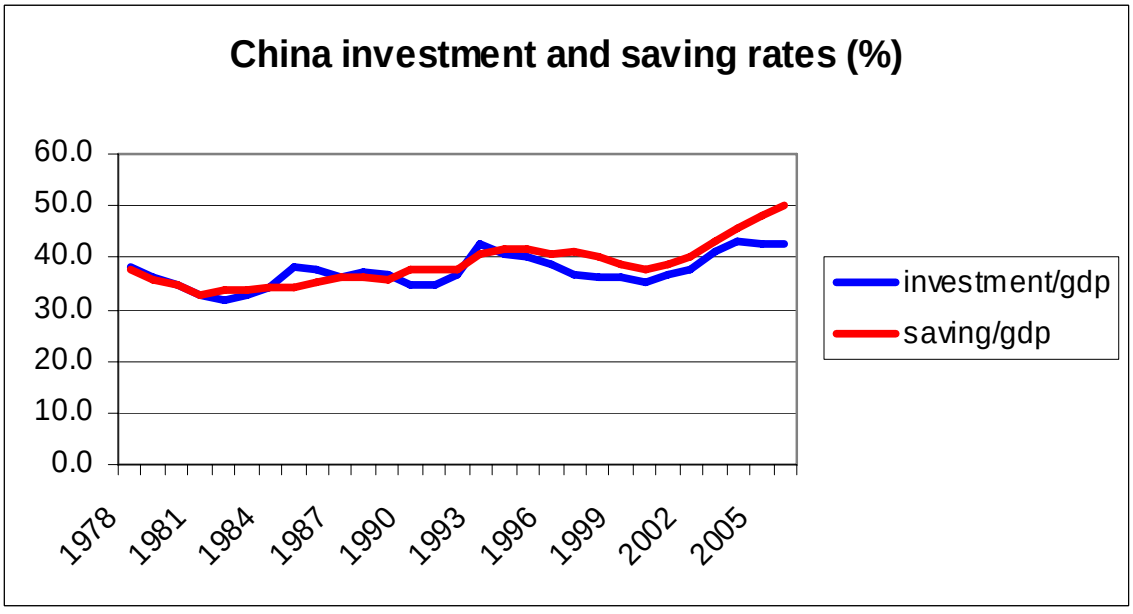
Source: Li Cui and Murtaza Syed

Figure 7



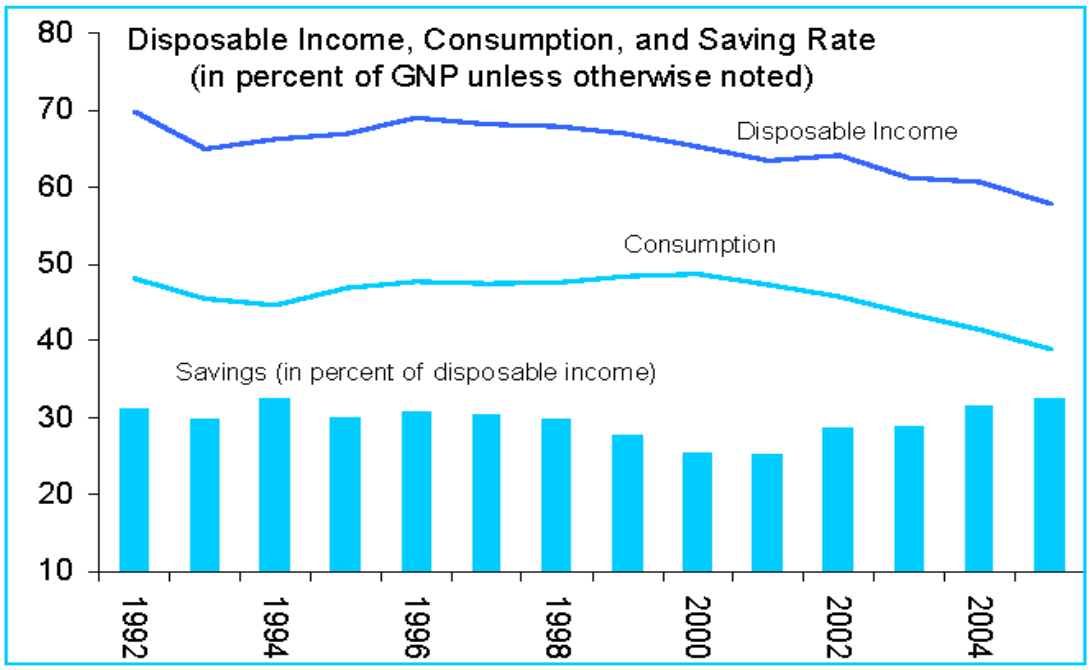
Source: *China Statistical Year Book*

Figure 8



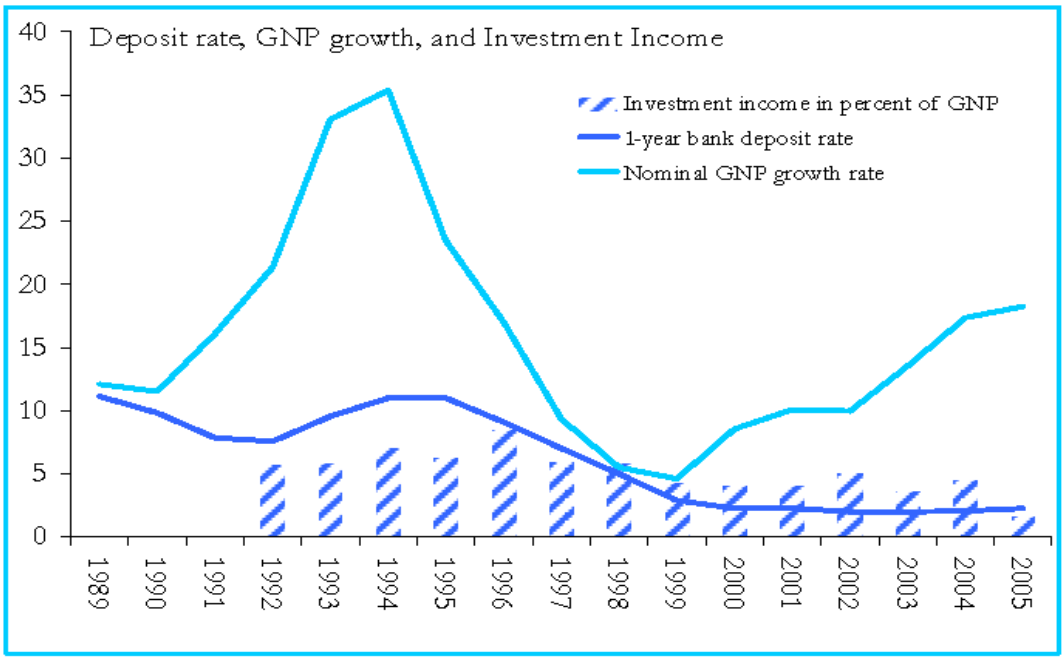
Source: *China Statistical Year Book*

Figure 9



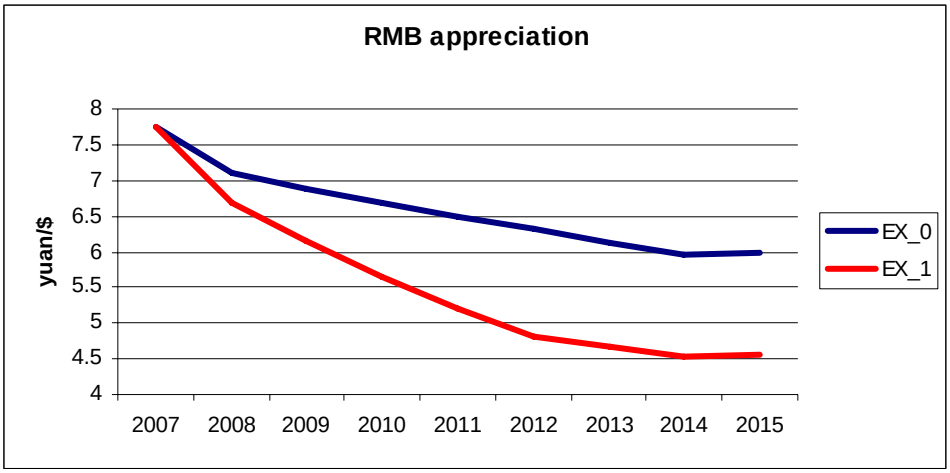
Source: Aziz and Li IMF Working Paper 07/181

Figure 10



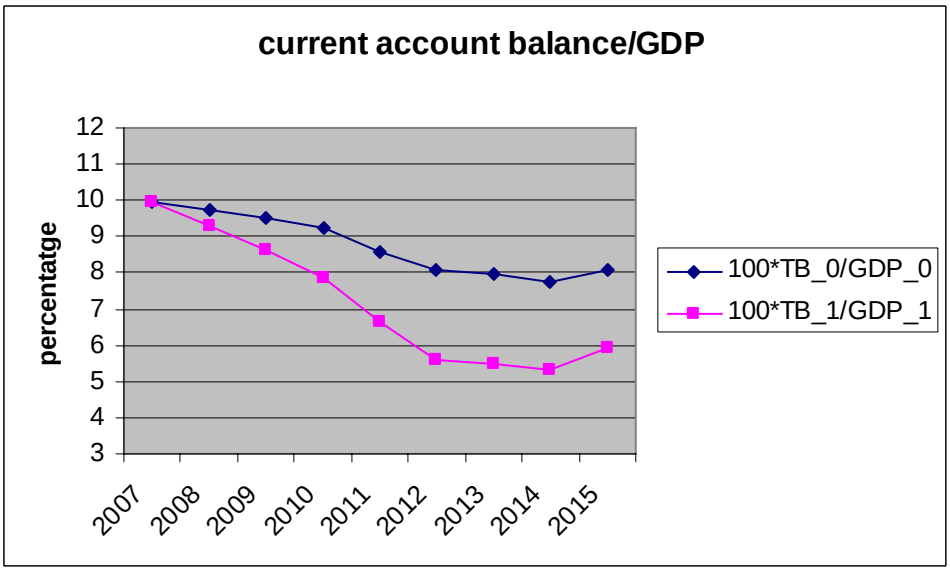
Source: Aziz and Li IMF Working Paper 07/181

Figure 11 (figure 1 of 3 for scenario 1)



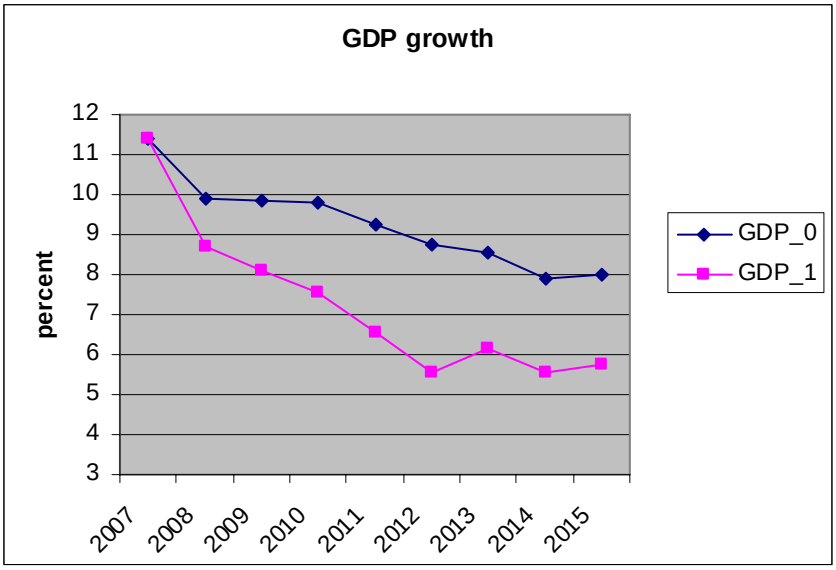
Source: the author's simulation

Figure 12 (figure 2 of 3 for scenario 1)



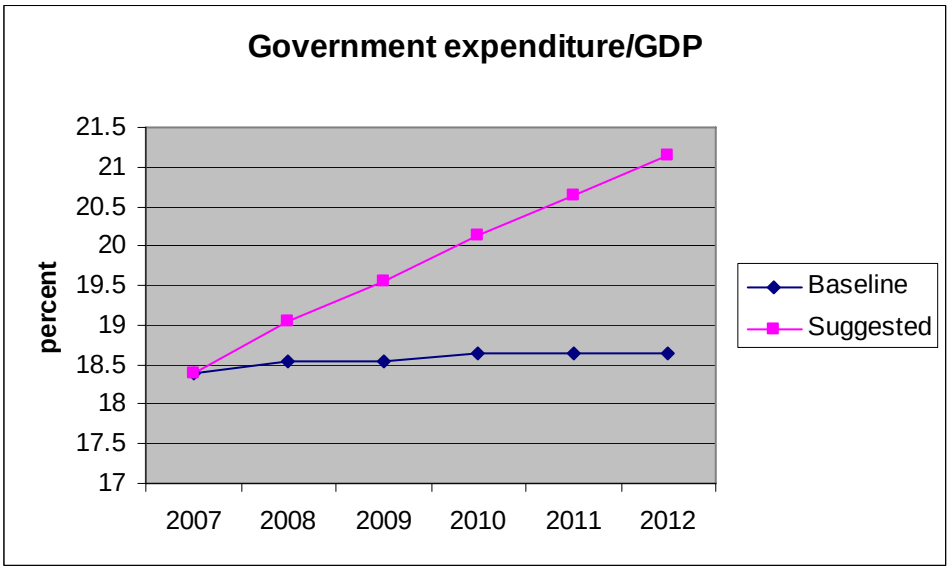
Source: the author's simulation

Figure 13 (figure 3 of 3 for scenario 1)



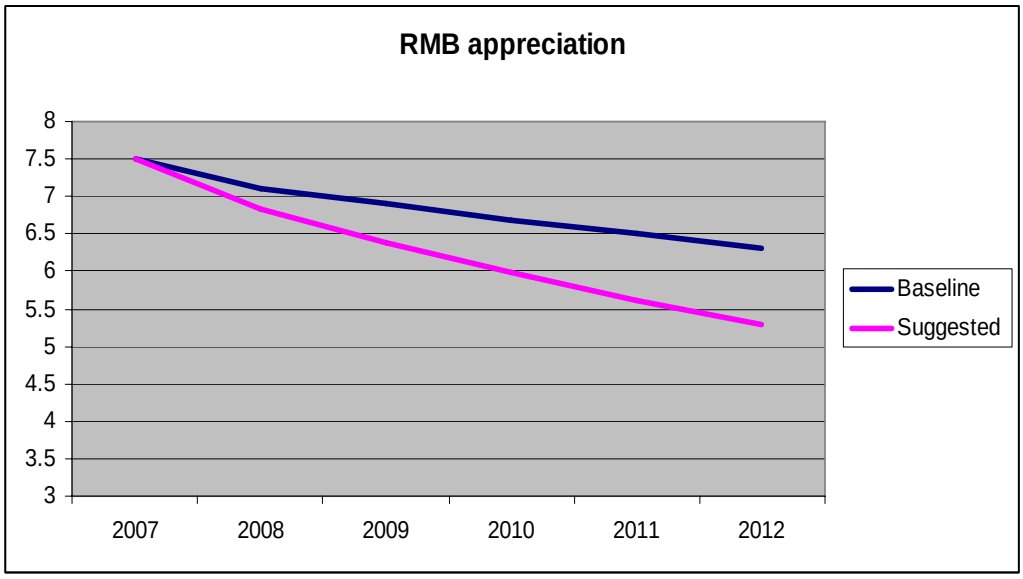
Source: the author's simulation

Figure 14 (figure 1 of 7 for final scenario)



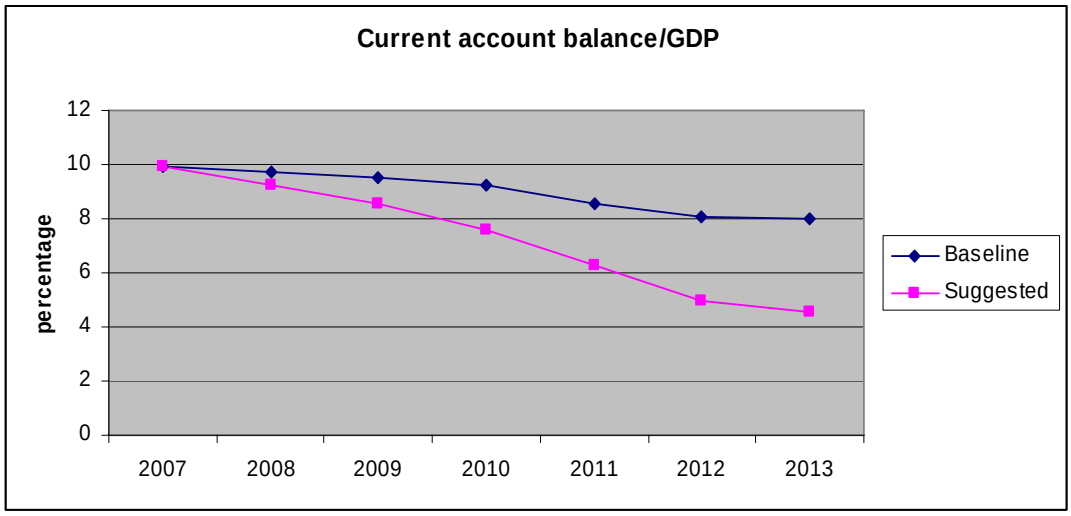
Source: the author's simulation

Figure 15 (figure 2 of 7 for final scenario)



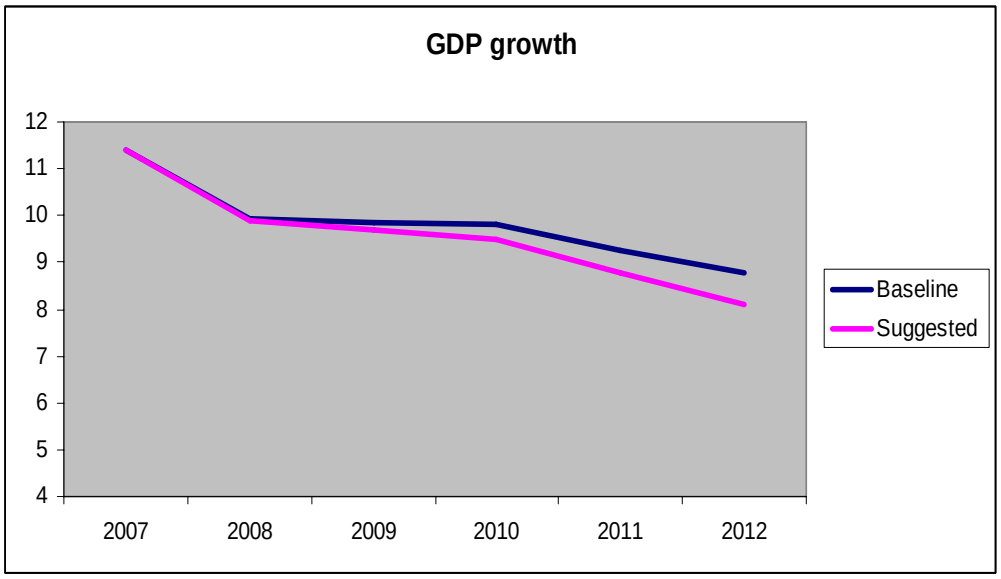
Source: the author's simulation

Figure 16 (figure 3 of 7 for final scenario)



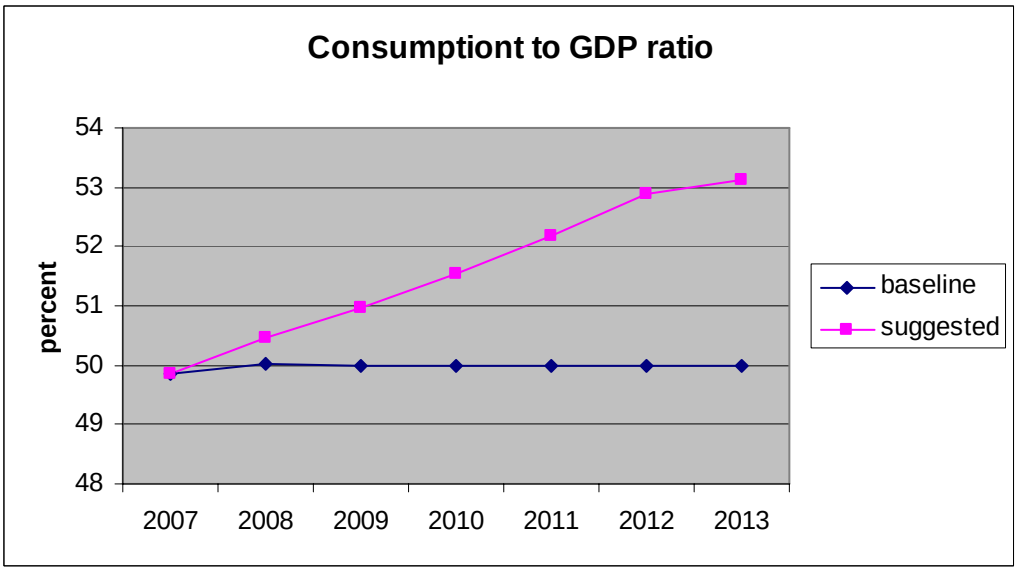
Source: the author's simulation

Figure 17 (figure 4 of 7 for final scenario)



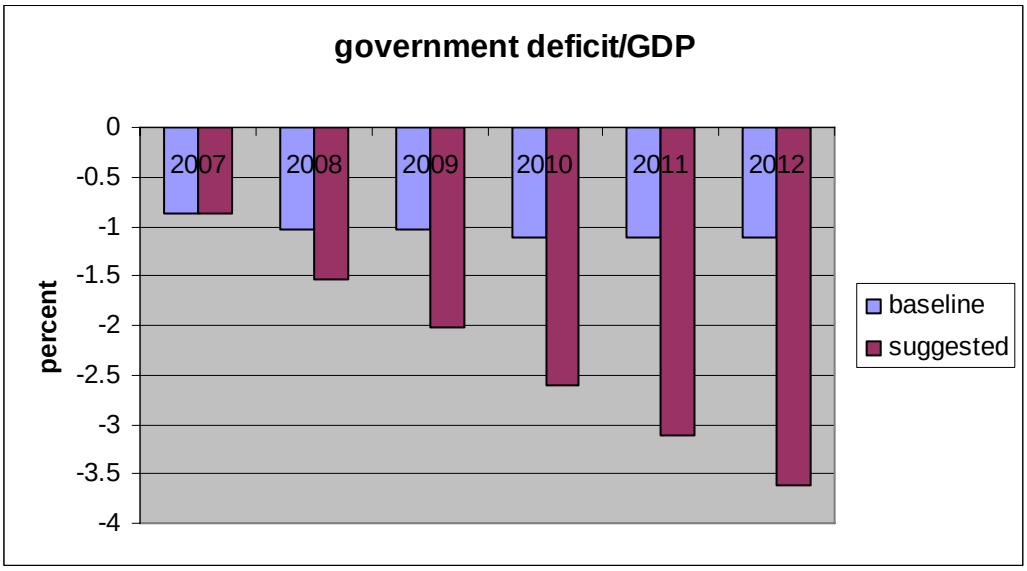
Source: the author's simulation

Figure 18 (figure 5 of 7 for final scenario)



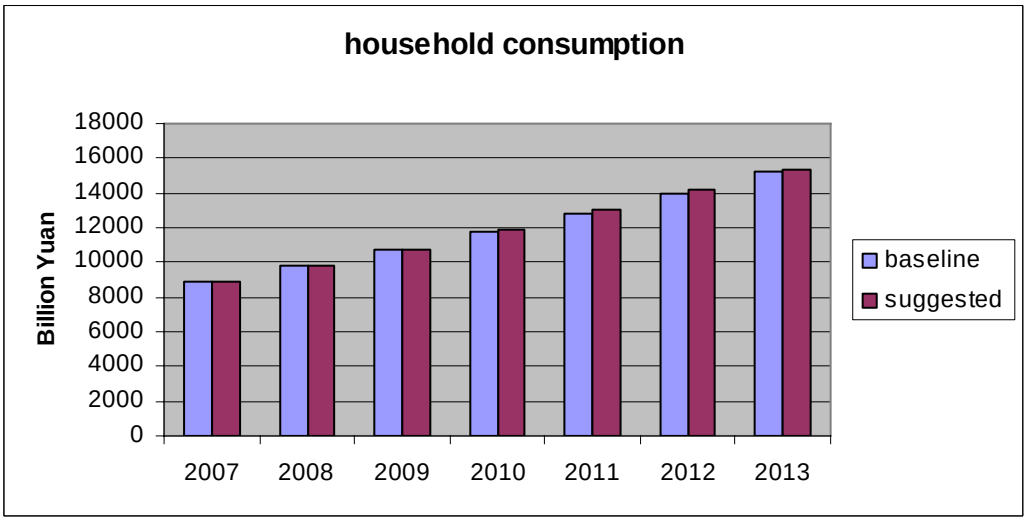
Source: the author's simulation

Figure 19 (figure 6 of 7 for final scenario)



Source: the author's simulation

Figure 20 (figure 7 of 7 for final scenario)



Source: the author's simulation

Table 1 Distribution of China's trade across the world

(Percentage, average for 2005-2006)

	US	EU	Japan	EiTs	Africa	Asia	Latin Am.
Share of China's trade	16.7	16.3	12.6	2.1	1.2	41	3.4
Share of GDP	31.8	26.4	14.4	1.5	2.1	12.2	6.5

Note: the share of China's trade with each region/country is defined as the average of China's export to and imports from the region divided by China's total exports and imports. The share of GDP for each region in the world total is calculated based on exchange rates.

Source: UN Trade Statistics, and the author's estimate

Table 2 FDI inflows to China by source countries (percentage)

	2005	2006
Hong Kong, China	29.75369	32.10528
Virgin Islands	14.95521	17.84749
Japan	10.82439	7.29613
Europe	9.35456	9.063015
Republic of Korea	8.567551	6.180319
United States	5.074597	4.54628
Singapore	3.654099	3.586863
Taiwan, China	3.566887	3.389102
Macao, China	0.995382	0.956672
Australia	0.664621	0.87573
Sum of the share	87.41099	85.84688

Source: *China Statistic Year Book*

Table 3 Shares of China's outward FDI flows by region (%)

	2003	2004	2005	2006
Asia	52.5	54.6	35.7	30.1
Africa	2.6	5.8	3.2	2.8
Europe	5.3	3.1	4.1	4.8
Latin America	36.4	32.1	52.7	59
North America	2	2.3	2.6	2
Oceania	1.2	2.2	1.7	1.3
Note: FDI outflows in $billion	*2.83*	*5.5*	*12.26*	*18.5*

Source: *China Statistic Year Book*