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# HOW WILL CHINA'S SAVING-INVESTMENT BALANCE EVOLVE?

## Louis Kuijs [1]

### Abstract

This paper investigates how China's saving, investment, and the saving-investment balance will evolve in the decades ahead. Household saving in China is relatively high, compared to OECD countries. However, much of China's high economy-wide saving, and the difference between China and other countries, is due to unusually high enterprise and government saving. Moreover, our cross-country empirical analysis shows that economy-wide saving and investment in China is higher than what would be expected, even if we adjust for differences in economic structure. Combined, these findings suggest that much of China's high saving is the result of policies particular to China. Looking ahead, our econometric results suggest that purely on the basis of projected structural developments—including development, changes in economic structure, urbanization, and demographics—saving and investment would both decline only mildly in the coming 2 decades, with ambiguous impact on the current account surplus. On the other hand, the potential effect on saving, investment, and the saving-investment balance of several policy adjustments could be large. These policies are identified and their likely impact assessed and quantified. This exercise suggests that rebalancing along these lines should reduce both saving and the current account surplus over time, although the surplus is unlikely to turn into a deficit soon.

# I. INTRODUCTION AND MAIN FINDINGS

As China is integrating in the world economy, questions arise about the impact of the integration of this large country on the world economy and the world financial system. One key question is whether China will become a large net provider or user of capital in the decades ahead. More immediately, with China now running large current account surpluses, the question is how the external balance will evolve and what factors, including policies would bring the surpluses down.

This issue is of course important for China's policy makers, who are currently aiming at rebalancing the composition of demand and the pattern of growth and who face the implications of the large external surplus for monetary policy. It is also important for the world economy. China is large and growing larger rapidly. It became the fourth largest economy in 2005 (at current exchange rates) and may overtake the US as the largest economy in less than 4 decades.[1] Moreover, China's economy is open. Its regime for trade and FDI is open, and external trade and FDI are quantitatively important in the economy, amounting to 64 and almost 3 percent of GDP in 2005, respectively. This means that shocks can trigger large external imbalances, as in 2005, when the current account surplus surged by $ 90 billion to around $ 161 billion.

To answer this question, this paper analyzes the current and projected future determinants and patterns of saving, investment, and the saving-investment balance (the external current account balance) in China, since these will be the driving force of capital flows.

The paper has two main contributions to the literature. First, it provides a systematic look at the sources and composition of saving and investment in China.[2] Second, on the basis of the observed patterns and the—largely policy-related—explanations proposed for them, as well as an enhanced empirical estimation of cross-country patterns of saving and investment, the paper assesses the prospects for China's saving, investment, and the saving-investment balance in the decades ahead. The key findings are as follows.

China's saving and investment are high. Reflecting China's high investment rate, China's growth has been relatively capital intensive. The bulk of investment is financed with domestic saving, with foreign direct investment playing a relatively modest role.

Much of China's high saving and investment, and the difference between China and other countries, is due to unusually high enterprise and government saving. Moreover, rising enterprise saving has driven the increase in economy-wide saving in the last decade.

Our empirical analysis of the determinants of economy-wide saving and investment patterns across countries and over time finds that saving and investment in China are significantly higher than what would be expected on the basis of these determinants. This is so given the set of determinants in the literature. This remains so if we try to improve

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[1] According to our preliminary projections.

[2] Preliminary findings were reported in Kuijs (2005).

the explanation of the cross country patterns in saving and the impact of structural changes by extending the set of determinants.

Combined, the latter two findings imply that China's high saving are largely the result of policies particular to China.

Looking ahead, purely on account of projected structural change and development—including development, demographics, urbanization, and changes in the economic structure—saving and investment would decline only mildly in the coming two decades, with ambiguous impact on the current account. We find this by feeding our projections for the determinants of saving and investment in the equations derived with our empirical analysis. This is also true for the impact of demographics, which may not be very significant until 2025.

On the other hand, the potential effect on saving, investment, and the saving-investment balance of several policy adjustments that would address the specific features and patterns identified above could be large.

Rebalancing along these lines should reduce the current account surplus. It may take some time before they sort large effect, and it is unlikely to change China's current account surplus into a deficit soon. But, some of the policy reforms could affect the structural saving-investment balance relatively quickly.

The rest of this paper is structured as follows. Section II discusses key findings on China's pattern of growth and levels of economy-wide saving and investment. Section III analyzes the composition of saving and investment and provides explanations for high saving by households, enterprises, and the government. Section IV looks ahead, assessing trends in saving, investment, and the saving-investment balance in the decades ahead. After discussing the relevant existing literature, the section first looks at what would be expected to happen to saving and investment based on cross country patterns and projections of the determinants of saving and investment. Subsequently, the section looks at the possible effect of policy changes.

## II. BACKGROUND: FINDINGS IN THE LITERATURE ON CHINA'S PATTERN OF GROWTH AND LEVELS OF SAVING AND INVESTMENT

Studies into China's pattern of growth and its level of saving suggest that: (i) growth has been relatively capital intensive, thus requiring high savings; (ii) the bulk of investment is financed with domestic saving; and (iii) economy-wide saving in China is significantly higher than what would be expected on the basis of standard determinants.

### II.1. China's capital-intensive growth

Several studies have used growth accounting to analyze the sources behind China's rapid growth of the past 25 years. Assuming a certain production technology, these studies

assess what factor accumulation and total factor productivity (TFP) have contributed to growth. Heytens and Zebregs (2003) summarize these studies, which includes Chow (1993), Hu and Khan (1997), and Wang and Yao (2002)). Although estimates differ because of variations in assumptions, the studies have converged on several findings. TFP growth has contributed significantly to GDP growth, having increased since the introduction of reforms at the end of the 1970s. Estimates of TFP growth during the reform period range between 2 and 4 percent per year. However, the contribution of physical capital accumulation has been large and growing, reflecting a high and increasing investment to GDP ratio. Consistent with slowing overall employment growth, the contribution of labor growth has been modest, especially over the last decade. Using "consensus assumptions", Kuijs and Wang (2005) did such an exercise for 1978-2004 and found similar results.[3] They found that, compared to 1978-1993, in 1993-2004 the contribution of capital accumulation to GDP growth increased, as the capital–output ratio rose from an estimated 2.2 in 1994 to an estimated 2.8 in 2004, reflecting the rapid investment growth in the last decade, while TFP growth came down.

Revised GDP data do not really change the picture. In end-2005, China's National Bureau of Statistics revised production-side GDP, largely as a result of better coverage of the service sector. 2004 GDP was revised up by almost 17 percent. Redoing the Kuijs and Wang growth accounting with the new data, now for 1993-2005, the contribution of capital accumulation to GDP growth would change little, in large part because 2/3rds of the GDP revision took the form of higher price increases.[4] On the basis of the new data, the contribution of capital accumulation was 60 percent, rather than 62 percent, while TFP growth would be 3 percent, instead of 2.7 percent (Table 1).

A useful alternative way of looking at these trends is to decompose labor productivity growth.[5] During 1993–2005, labor productivity rose by 8.4 percent per year on average, whereas employment growth declined to just over 1 percent a year. With investment as a share of GDP rising significantly in this period, the contribution of increasing capital intensity to labor productivity growth rose to two-thirds and the contribution of TFP growth declined (Table 2).

**II.2. The largely domestic origin of financing of investment**

Ample domestic saving means that external financing plays a modest role.
There is little doubt that foreign direct investment (FDI) played an important role in China's transition, rapid development, and opening up, in particular in transferring

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[3] Assuming Cobb-Douglas technology, and a capital–output ratio of 2.4 in 1978 (as in Wang and Yao, 2002; Chow, 1993; Hu and Khan, 1997), depreciation of 5 percent per year (as in Wang and Yao, 2002), and an elasticity of output with respect to labor of 0.5.

[4] Pending revised expenditure data, it is assumed that 15 percent of the increase in GDP was contributed by investment. The February 2006 World Bank Quarterly Update on China discusses the revision and its implications.

5 Using the Cobb-Douglas production function underlying the growth accounting,  labor productivity growth can be decomposed into TFP growth and a term capturing the increase in the capital–labor ratio).

foreign technology. FDI into China constitutes a large share of total FDI into emerging markets. However, at 3-4 percent of GDP, FDI has not been a key source of financing in China. Indeed, as is the case in most countries, domestic savings has been the dominant source of financing. Thus, even as the investment to GDP ratio increased from 34 percent in 2000 to over 40 percent in 2005, gross domestic saving increased even more rapidly. As a result, the current account rose from 1.7 percent of GDP in 2000 to over 7 percent of GDP in 2005.[6]

## II.3. Trying to explain China's economy-wide saving

A body of literature aims at explaining saving patterns across countries and over time. Focusing on the factors that affect household saving, the empirical literature aims at explaining saving by macro economic variables including government finance, interest rates, inflation, terms of trade, and the current account balance, supplemented by variables capturing demographic trends and per capita GDP. See for instance Masson, Bayoumi, and Samiei (1995) and IMF (2005).

Loayza, Schmidt-Hebbel, and Servén (2000) (hereafter called LSHS) provide an overview of empirical studies in this area in developed and developing countries. Their own cross country empirical work is among the richest in terms of the types of determinants considered. Based on their survey and their own work, they conclude that private sector and national savings are affected by:
- The level of development (per capita income), with the positive influence of per capita income larger in developing countries;
- Economic growth, with much of the causation running from growth to saving;
- Fiscal policy, with its impact on national savings typically only partly offset by responses in private saving;
- Pension reform, with direct short-term effects depending on the financing of the transition deficits and long term effects likely dominated by labor market effects;
- Financial liberalization, with the impact on saving of interest liberalization mixed, but a strong effect from expanding the supply of credit to people that had been credit-constrained;
- Demographics, with an increase in the share of young and elderly dependents in the population tending to reduce private saving;
- Urbanization;

as well as by foreign borrowing and foreign aid, and uncertainty.

These factors explain only part of China's saving. Kraay (2000) found, based on a cross-country regression using the LSHS variables, that China's high national saving rate—on average 37 percent between 1978 and 1995, compared to an international average of almost 21 percent—can be partly explained by high growth and, to a lesser extent, favorable demographics. However, even using this relatively rich set of explanatory

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[6] There is a discrepancy between on the one hand the difference between gross national saving and gross domestic capital formation from the national accounts and on the other hand the current account data. This discrepancy was about 3 percent of GDP in 2004.

variables, China's national saving rate was 10 percentage points higher than what would be expected based on China's characteristics. In 2004 China's national saving rate was almost 10 percentage points higher than the average 37 percent between 1978 and 1995, if calculated as the sum of gross capital formation plus the current account balance, as is the case in the empirical studies (see footnote 7). Thus, China's national saving in recent years has been 15-20 percent of GDP higher than what would be expected on the basis of these traditional determinants of saving.

In section IV.2 we show that there is some scope for improvement in estimating cross country patterns of saving. However, even with an extended set of determinants, a significant part of China's saving rate remains unexplained. We will argue that the remainder is because of policy-related factors particular to China.

## II. GOING BEYOND TOTALS: THE COMPOSITION OF SAVING AND INVESTMENT

An understanding of the factors behind China's high saving and investment requires a look at the sectoral composition.

### III.1 An overview of sectoral patterns of saving and investment

While it is well-known that China's national saving and investment are quite high, compared with other countries, it is less well-known who saves. Kraay (2000) notes that before to the 1978 reforms high saving "were engineered by state fiat", via administered relative prices that ensured high profits in state-owned enterprises, which then could be directed to the state's investment priorities. Household saving were low in the pre-reform area. After the reform, such "state-engineered" saving has diminished, whereas rising household incomes made household saving newly prominent.

However, saving by enterprises and the government has remained important. The following are key points on the sectoral patterns of investment and saving, derived from the flow of funds tables in the national accounts. More detail can be found in Kuijs (2005).[7] Table 3 shows these patterns, based on our estimations, pending the revision of demand-side GDP data and flow of fund data subsequent to the revision of the production-side GDP data in January 2006. Appendix I describes how we estimate the revised demand-side and flow of funds data.

*Saving*

Table 4 compares the sectoral composition of saving and investment in China with that in other countries.[8]

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[7] This paper introduced the approach of using the flow of funds data for this purpose.

[8] The numbers in this paragraph are updated and revised to take into account the revision of the production-side GDP data and an estimate of the pending demand-side GDP revision.

Households in China contribute significantly to national saving. The household saving rate, as a share of household disposable income, rose steadily from about 5 percent before 1978 to over 30 percent in the mid-1990s (Modigliani and Cao (2004)). Thereafter, it declined gently to around 25 percent in 2000, at which it broadly remained since. As a share of GDP, household saving is estimated to have been around 16 percent in recent years (Table 3). This is significantly more than in OECD countries, but less than in India, the other large developing country currently undergoing a rapid integration in the world economy, but with much lower overall saving and investment and a quite different sectoral composition of saving (Table 4). Household survey data suggest that household saving rates in urban and rural areas were broadly similar: 26 percent in rural areas and 24 percent in urban areas in 2004. Thus, with urban per capita incomes about 3.3 times higher than those in rural areas, total urban saving is over twice as high as rural saving, despite the fact that urbanization is a bit over 40 percent.[9] The balance between saving and investment is in principle available as net financial investment.[10] This balance came down from 14-16 percent of GDP in the mid-1990s to around 10 percent of GDP in recent years. The bulk (over 90 percent) of households' net financial investment is in bank saving deposits.

Enterprise saving from retained earnings constitutes a large and increasing source of saving in China (Tables 3 and 4). In recent years, as enterprise saving increased to around 20 percent of GDP, it has overtaken household saving as the largest source of financing. The saving-investment deficit of enterprises is estimated to be around 11-13 percent of GDP in recent years. Of the deficit in 2002, 4.5 percent of GDP was financed by capital transfers from the government. The remaining 6-8 percent of GDP is financed by outside financing, mainly bank loans and foreign investment.

Government saving is remarkably high compared to other countries, and is much higher than suggested by the headline fiscal data. It is estimated to have been almost 6 percent of GDP in recent years. As a result, the government runs a significant saving-investment surplus, which forms an additional financing source. Indeed, in addition to its own investment, the government finances investment via capital transfers to state-owned enterprises in the power, electricity, water, transport, and other infrastructure sectors. The transfers have been about 4.5 percent of GDP in recent years. The investment by these enterprises established by the government financed by capital transfers are adding to overall public investment.

*Investment*

Investment by the enterprise sector distinguishes China from other countries, and shows most of the variation over time. Enterprise investment rose from about 26 percent in 2000 to 32 percent in 2005. This means that in recent years, Chinese enterprises invested 14

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[9] As rural people invest a larger share of their income, partly in their household enterprise, per capita financial saving is much lower in rural areas. The *stock* of per capita savings deposits was 6.6 times higher in urban areas.

[10] Typically a statistical discrepancy appears when the flow information is combined with the "below the line" information on changes in financial assets.

percentage point of GDP more than those in Korea and 23 pp more than those in the US (Kuijs (2005)). Investment by households, largely in residential real estate, increased somewhat, as a share of GDP, in recent years, but is not much out of line with levels in other countries. Direct investment by the government (that is, excluding investment financed by capital transfers) has been relatively steady at 3-3.5 percent of GDP, a level comparable to other countries (Table 3).

These patterns have important implications. First, the large role of retained earnings and capital transfers in financing investment indicates that the role of the domestic financial system in channeling financial resources to investment is not as large as often thought. Second, as elaborated in section IV.2.2, the government has several instruments to adjust saving and investment patterns.

## III.2 Explaining China's high saving

*Households*

As mentioned above, the literature largely focuses on households. While this misses out on several of the factors driving saving, we can use it to investigate possible reasons for China's relatively high household saving rate, compared to OECD countries. Of the saving determinants suggested by the literature mentioned in section II.3, those that are commonly seen as having had a particularly significant role in China are demographics; high economic growth; (lack of) government policy and spending on health, education, and social safety; and (lack of) financial sector development.

The impact of demographics on saving stems from individuals smoothing consumption over their lifetime while the age distribution of their income follows a hump-shaped profile (IMF (2005). This "life-cycle" behavior means dissaving when young, little saving early in adult life, high saving at the middle and end of the working life, and then no or negative saving after retirement. A demographic transition triggered by lower birth rates—as started in China around 25 years ago—initially increases household saving as it reduces the number of young dependents and increases the number of working adults. Later in the demographic transition, downward pressure on saving emerges as a larger portion of the population retires and reaches old age. In line with this, empirical research finds quite strong negative effects on domestic saving of higher young age dependency ratios (YADR) and old age dependency ratios (OADR), with the impact of the latter stronger (for instance, LSHS). For China, Modigliani and Cao (2004) find empirical support for the impact of demographics on household saving, as well as of the economic reforms since 1978 and the increase in growth and growth prospects they generated.

Relatively high household saving in China also appears to be a result of the "withdrawal of the government" in many spheres during the transition. In addition to general increases in perceptions of uncertainty common in transition countries, in China now the majority of households are not insured for medical costs and people typically spend significant shares of their income on school fees, particularly in rural areas. In rural areas, there are also few people covered by a pension system, whereas in urban areas there are concerns

about the financial viability of the pension system. The associated burden and uncertainty with regard to future health costs, education, and pension provision seems to boost precautionary household saving. International evidence suggests such effects on precautionary saving occur. Chou, Liu, and Hammitt (2003) found that introduction of a National Health Insurance in Taiwan reduced household saving by an average of 9-14 percent. Wagstaff and Pradhan (2005) found that the introduction of a health insurance scheme in Vietnam significantly increased the consumption share, especially that of the poor. For China, surveys appear to confirm that household saving is motivated by precautionary motives.

In the context of the striving to a harmonious society, and the planned associated shift from government spending on investment to consumption, the government intends to take more responsibility in these areas, including by committing to free compulsory education for children in rural areas before 2010 and expanding its contributions to and coverage of the rural health insurance scheme.

Relatively underdeveloped financial markets may also have played a role in keeping household saving high. This is largely by keeping many households credit-constrained. China's consumer credit, as a share of GDP is at 17 percent of GDP (at end 2005) not much lower than in other countries at a similar level of development. But, consumer credit is much higher in developed countries. International experience suggests that financial market development would, by reducing the number of credit constrained people, reduce household saving (LSHS).

*Enterprises*

Reasons for relatively high saving and investment by enterprises include a high share of—relatively capital-intensive—industry in GDP. Investment tends to be higher in industry than in other sectors, due to the inherent capital intensity of the processes, which also means that a higher share of total value added is distributed to capital. These relatively high enterprise earnings in industry—if retained, as is the case in China to a large extent, particularly in SOEs—are the core of enterprise saving. Empirical evidence across countries confirms a strong association between saving and investment on the one hand and the share of industry in GDP on the other hand (see section IV.2.1 and Figures 2 and 3).

Another key factor is that Chinese companies pay out relatively low dividends. In particular, for historical reasons SOEs pay only limited dividends to shareholders, and none at all to the state, their largest shareholder, although the increase in profitability in recent years has stimulated a policy discussion on the distribution of SOE profits.

The increase in enterprise saving in the last 10 years is associated with a steady rise in profits and profitability of enterprises. Profits in industry, as a share of value added, increased from 10.6 percent in 1995 to 17.3 percent in 2000 and 21.6 percent in 2005. Retained earnings, in the whole economy, rose between 2000 and 2005 by an estimated 5 percentage point of GDP to around 20 percent of GDP. In addition to cyclical factors, the

increase in profitability is underscored by retrenchment and restructuring of SOEs. First, the importance of private companies has increased. Private companies tend to be more profitable, having higher rates of return on assets in the same industry (Zhang (2004)). The share of SOEs and collectively-owned companies in total investment has declined from around 80 percent in the early 1990s to 50 percent in 2004 (NBS, Statistical Yearbook). Second, as part of the restructuring, SOEs have transferred much of the social responsibilities they previously held to the state, whereas many SOEs have also improved their core profitability. As a result, the proportion of SOEs making losses has fallen from 25 percent in 1999 to an estimated 8 percent in 2004, and centrally managed SOEs made (post depreciation) profits of RMB 600 billion in 2005. More generally, in recent decades an increasingly large section of China's corporate sector has been able to combine first world prices (through exports) with third world labor costs.

Is it possible that a "corporate veil" means that the distinction between corporate and household sector saving is artificial and does not mean much? If all households own shares and if incentives and decisions of firms are well-aligned with the interest of households, it may not matter much whether saving is done by firms or households. Such a situation may describe the relationship between small firms and their owners. However, it does in general not describe China well. Shareholdership is not very widespread, and corporate governance of larger firms is such that firms' decisions and interests are often not aligned with those of households or, in case of SOEs, the state.

*Government*

High government saving has been the result of a growth-oriented economic policy emphasizing investment. When China's government finances were under severe strain in the early 1990s, government consumption was reduced to the minimum. As revenues increased rapidly from the mid-1990s onwards, a significant part of the new revenues was used to finance investment. Currently, government revenues and total government expenditure, as a share of GDP, is not low anymore, compared to other countries at a similar level of development. However, the composition stands out. Government consumption is relatively low in China. While there is little difference in direct government investment with other countries, large capital transfers to—state-owned—enterprises distinguish China from other countries. These transfers mean that government saving and government capital spending (including those capital transfers) are substantially higher than is suggested by the headline fiscal data.
In summary:
- China's high saving rate, compared to other countries, is as much driven by high saving of enterprises and the government as by high household saving.
- Investment by households and direct investment by the government has been relatively steady at levels comparable to other countries.
- Investment by the enterprise sector distinguishes China from other countries, and shows most of the variation over time. In recent years, the differential ranged between 14 (Korea) and 23 (US) percentage points of GDP.
- High enterprise investment is financed partly by a sizeable excess of saving over investment of households, which is channeled via the banking system. Household

- saving is buoyed by demographics, precautionary saving, and relatively undeveloped financial markets.
- Government saving is high as well. About 5 percent of GDP of this saving is transferred to enterprises. High government saving has been the result of a growth-oriented economic policy emphasizing investment.
- But enterprise own saving is also high and has been rising further in recent years. Enterprise saving is boosted by an industry-oriented economic structure and a tradition of low dividend payments, especially for SOEs. Enterprise saving has risen substantially since the end-1990s as profitability has improved, and almost $3/4^{th}$ of enterprise investment is financed by retained earnings.
- Capital transfers to SOEs of almost 5 percent of GDP also keep down enterprise financing by the financial sector. These capital transfers also mean that government capital spending (8 percent of GDP) and saving (almost 6 percent of GDP) are significantly higher than suggested by the headline fiscal data.

As elaborated in section IV.2.2, these patterns suggest that the government has several powerful instruments to adjust saving and investment patterns.


## II. WHAT ARE THE PROSPECTS FOR SAVING AND INVESTMENT IN THE COMING DECADES?

What is the main guide for assessing the future: theory, cross-country evidence, or recent patterns?

### IV.1 Existing literature

Several papers have recently looked at the prospects for China's saving, investment, and resulting capital flows, with varying conclusions.

Fehr, Jokish, and Kotlikoff (2005) suggest China would remain a large net saver. Their results are based on the fact that China's saving behavior, economic growth, and fiscal policy are currently very different from that in the other countries, with the current private sector's saving behavior suggesting a very low rate of time preference.[11] They use a neoclassical model to analyze international capital flows in a "world" proxied by the US, the EU, Japan, and China. They assume that China's high saving rate will go down only slowly. Initially, capital mainly flows from the 3 developed regions to China, because at the world interest rate a lot of investment in China generates more than the required rate of return. If China's own saving does not fall too fast, and the world interest rate—which applies to all countries—does not decline too fast, China's investment will fall faster than saving. Thus, within the next decades, capital will start to flow from China to the other regions, and in the coming decades China will export significant amounts of capital to the other countries. This is so even if Chinese saving behavior, captured by its

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[11] Indeed, Mcdonald and Lu (2005) find that, based on a model with mainstream neoclassical assumptions, the rate of time preference that would generate current rates of Chinese saving is negative, implying a higher weight on the economic welfare of future generations relative to the current generation.

time preference rate, and fiscal policy in the long run gradually approaches that of developed countries, but especially if this adjustment is delayed and successive cohorts of Chinese "continue to save like current cohorts." [12] After 2050, this is reversed, so that capital will again flow from the US, EU, and Japan to China.

In contrast, Dollar and Kraay (2005), using a normative approach, suggest that China should be a significant net borrower. They investigate what net foreign asset (NFA) position China would have in 20 years or so if international capital flows, and economic behavior more generally, were in line with (i) open economy theory and/or (ii) other emerging markets. Calibrating a theoretical model of international capital flows on China data, this model would predict a NFA position of -17 percent of wealth. They also estimate non-structural cross-country regressions of NFA, in which China is always an outlier with 5 to 7 percentage points higher NFA relative to wealth than is predicted by its characteristics. They explain the difference with the actual NFA position by China's extensive capital controls. Without these controls, China's residents would have borrowed more from abroad. Looking ahead, it is likely that capital controls will be liberalized. This should lead to a lower, significantly negative, NFA position in the future, and negative current accounts along the way.

These 2 papers indicate the range of possible outcomes for the future path of the current account balance and capital flows, depending on several factors, including the relative speed of the decline in saving and investment and the impact of capital controls.

**IV.2 Our analysis looking ahead**

The forward looking work in this paper consists of 2 elements. First we look at cross-country data (over time) to find relationships for saving and investment on the one hand and "structural" variables on the other hand, in order to gauge what would happen to China's saving and investment in the decades if China would behave like the average country. In this, we build on the existing literature. But we extend the set of variables in order to say more about the impact of structural changes on saving and investment. The key finding here is that, purely on account of projected structural developments, saving and investment decline only mildly in the decades ahead, with ambiguous impact on the net external surplus.

Second, we look at the potential effect of several policy adjustments. These adjustments are the ones identified as necessary to rebalance the composition of demand and to rebalance the pattern of growth. As elaborated below, two types of policy adjustments will tend to reduce both saving and investment. A set of reforms, largely macro economic in nature, to change the composition of demand would in addition have a significant negative impact on the saving-investment balance. A second set of reforms, largely of microeconomic nature and meant to change the pattern of growth would, through changes

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12 In their base case, future cohorts gradually adopt Western (i.e., US) saving behavior so that the Chinese born in 2050 and thereafter have the same time preference as Americans in 2004 (the US time preference rate is assumed time-invariant). The difference between their 2 scenarios starts to kick in after 2020.

in the structure of the economy, reduce both saving and investment, but not necessarily the saving-investment balance.

**IV.2.1. What can we learn from the cross-country data?**

We use this to evaluate what pressures would impinge on saving, investment, and the saving-investment balance in the decades ahead as a result of structural developments in the decades ahead, as opposed to through policy adjustments discussed in section IV.2.2.

Section II.3 discussed the set of variables used by the general literature to explain differences in saving rates across countries and over time, and how this traditional set of variables leaves much of China's saving unexplained. This is in part because the traditional variables do not capture factors influencing enterprise saving, and—largely being macroeconomic variables—only capture short term developments but not changes in economic structure during development. LSHS add urbanization, a structural variable. But the residual in their analysis is still large.

In light of these observations, we extend the set of variables in our empirical estimation of saving and investment, emphasizing "structural" variables that show trends in the medium and long term. We use data from the World Bank World Development Indicator database and the International Monetary Fund's World Economic Outlook database, from 1960-2004, expressed in 5 year averages.

Our model is similar to the existing literature in the following aspects (LSHS discuss the expected effects of variables). We expect gross domestic saving to be positively affected by GDP per capita and growth in GDP per capita and negatively affected by the young age dependency ratio, the old age dependency ratio, and the urbanization rate. We also expect saving to be negatively affected by the credit to GDP ratio. We include the interest rate and inflation without having a prior about the sign. We expect a positive impact of public saving. As an extension vis-à-vis the existing literature, we add public spending on health, education, and the social safety net in GDP, which we expect to have a negative impact on saving. This effect would include a direct effect via the government balance and a possible indirect effect on precautionary household saving. The main innovation with respect to the existing literature is that we want to account for differences across countries in enterprise saving. We think these mainly occur because of differences in economic structure and corporate governance setting. Thus, we expect gross domestic saving to be positively affected by the share of industry in GDP and negatively by corporate governance, although we have not been able to include data on corporate governance with sufficient coverage.

Our regression of gross domestic saving on the above set of variables needs to deal with several econometric issues. The data is an (unbalanced) panel, with a cross section and a time dimension. However, the time element is very short, and unbalanced. There are several econometric issues that we need to deal with. First, the choice whether to use original data or 5 year or 10 year averages. The choice of 5 year average is arbitrary. The advantage of using averages is that we do not need to use a dynamic specification to

allow for inertia. This avoids one important source of potential unbiasedness and inconsistency.[13] However, this comes at the cost of potentially distorting the available information by "phase averaging". Second, since our data has a cross section dimension, we need to deal with likely unobserved country-specific effects. These make OLS estimation likely biased and inconsistent. We do this by using a within-group panel estimator. Third, some of the explanatory variables may be jointly determined with the left-hand side variable, causing contemporaneous correlation with the error term. This would seem less likely with our structural variables than with macroeconomic variables like the interest rate and fiscal variables, but the concern remains valid, for instance with regard to GDP growth. One common way to deal with this is to use an instrument that is assumed to be uncorrelated with future realizations of the error term, such as lagged values of the variable in question. Thus we use lagged GDP growth as instrument for contemporaneous real GDP growth.

Table 5 summarizes the regression results. Equation (1) and (2) are estimated with 2 stage least square. Equation (2) includes public spending on health, education, and social safety as a determinant, which strongly reduces the number of observations. Equation (3), our preferred one, is a 2 stage least square panel estimation. The results suggest:
- GDP per capita has the expected, statistically significant positive effect;
- GDP per capita growth it is not statistically significant;
- the credit to GDP ratio has the expected, statistically significant negative effect;
- the real interest rate has a statistically significant negative effect;
- inflation has a negative effect, but it is not statistically significant;
- public saving has the expected, statistically significant positive effect;
- the young age dependency ratio has an unexpected, not statistically significant, positive effect, although equation (1) finds a negative effect, as do other studies including LHSH;
- the old age dependency ratio has the expected, statistically significant, negative effect;
- the urbanization rate has the expected negative effect, although it is not statistically significant;
- the share of industry in GDP, the main innovation with respect to the existing literature, has a strong statistically significant effect;

Regression (2) suggests that public spending on health, education, and the social safety net do not have a statistically significant effect, a result which may be affected by the limited number of observations.

Some other variables do also not have a statistically significant effect (GDP growth, inflation, urbanization) or have a sign at odds with our prior (young age dependency). This is not uncommon in the estimation of cross-country saving equations (for instance

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13 Otherwise, the inclusion of the lagged dependent variable on the RHS, in combination with the individual effects, implies correlation of an explanatory variable with the disturbance terms. This makes both the OLS and the within estimators biased and inconsistent.

LSHS and IMF (2005). What is important for the conclusion of this paper is that the effect of the industry to GDP ratio and public saving is strong and statistically significant, and robust to changes in the specification.

We regress gross fixed capital formation (henceforth called investment) on the same set of variables, with the exception that we exclude public spending and include 2 variables aimed at proxying the investment climate: "quality of the courts" and "policy uncertainty". We would expect better scores on these variables to lead to higher investment, other things being equal.

Table 6 summarizes the regression results. Equation (1) and (2) are estimated with 2 stage least square. Equation (2) includes quality of the courts and policy uncertainty, which strongly reduces the number of observations. Equation (3), our preferred one, is a 2 stage least square panel estimation. The results suggest:
- GDP per capita has the expected positive effect, but it is not statistically significant;
- GDP per capita growth is not statistically significant;
- the credit to GDP ratio is not statistically significant;
- the real interest rate is not statistically significant;
- inflation is not statistically significant;
- the young age dependency ratio is not statistically significant;
- the old age dependency ratio is not statistically significant;
- the urbanization rate has the expected, statistically significant, negative effect;
- the share of industry in GDP has the expected, statistically significant, positive effect.

Regression (2) suggests that policy uncertainty and the quality of the courts do not have a statistically significant effect, a result which may be affected by the limited number of observations.

We can use the regression results to indicate the expected levels of saving and investment in China, given the determinants. On the basis of the values of the right-hand side variables for China—excluding the country specific effect—we would expect it to save and invest about 32 and 30 percent of GDP in recent years. These include a high share of industry in GDP, high growth, and high public saving. Actual rates of saving and investment are estimated at 44 and 41 percent of GDP in the early 2000s.[14] Thus, even taking into account China's high share of industry in GDP and high public saving, the regressions suggest that the "unexplained" saving and investment in 2005 amounted to some 12 and 11 percent of GDP. These results suggest that, if China were a "typical" country, based on the set of determinants we could expect it to run a roughly balanced external current account.

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[14] In the WDI, gross domestic saving is calculated using the current account and investment. For China, this measurement gives a higher saving number than the national account number (see footnote 7).

The saving residual is lower that that in the previous literature (see above). Much of this difference comes from the inclusion of industry, as a share of GDP, as a variable. Having controlled for the structure of the economy and partly controlled for high public saving,[15] we can treat the remaining residual as a result of the special characteristics described in section II.2.[16] Part of the remaining residual is due to high government saving. The rest might be explained by factors including dividend policies and precautionary saving.

Looking ahead, purely on account of structural developments captured by the variables in the regressions, saving, investment and the saving-investment balance would decline only mildly in the decades ahead. Specifically, on the basis of these regressions and our projections for the determinants (see figures 2 and 3), we would expect a fall in gross domestic saving of only a few percentage points between now and 2025, depending on exactly how rapidly industry would decline, as a share of GDP. The negative impact of a decline in the importance of industry and lower public saving is partly offset by a higher GDP per capita. A similarly modest decline would be expected for investment between now and 2025. As a result, no significant decline in the—currently high—saving-investment balance would occur. This finding is largely consistent with the results of Fehr, Jokish, and Kotlikoff (2005).

Our scenario in IV.2.3 shows a larger fall in saving and the saving-investment balance in the case of discrete policy adjustments over and above those structural developments. These possible policy adjustments include reforms on dividend policies and capital transfers, fiscal policy reforms aimed at shifting the composition of government spending from investment to current spending and lowering precautionary saving, and financial market reforms.

**IV.2.2. A closer look at the impact of demographics in the decades ahead**

In the coming 2 decades, demographics will likely have a small net impact on China's saving, and its impact is likely to be dominated by other factors.

China is in the middle of a demographic transition. Economic theory suggests that the demographic transition boosts saving in its early phases. Eventually, though, it should reduce saving as a larger portion of the population retires and reaches old age.[17] Consistent with this, empirical research finds negative effects on domestic saving of higher young age dependency ratios (YADR) and old age dependency ratios (OADR), with the impact of the latter stronger. Our otherwise preferred specification (3) does not find a statistically significant negative effect of the young age dependency ratio (YADR) on saving, at odds with expectation. It does find an expected, statistically significant

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[15] We have only partly controlled for high public saving because the estimated coefficient is 0.30 instead of 1.

[16] Interestingly, our model can explain Japan's relatively high saving and investment in the 1970s and 1980s quite well, with positive residuals for saving of only 1-3 percentage points.

[17] There remain, however, some uncertainties about saving behavior in later stages of the life cycle, and studies based on microeconomic data have cast some doubt on the extent to which the elderly save.

negative effect of the old age dependency ratio (OADR). Our other specifications (1) and (2) find expected, statistically significant, negative effects of both dependency ratios. Estimates of the long-run impact on (private sector) saving of a 1 percentage point (pp) increase in the OADR range from -0.5 pp (our regression (1)) to -1.6 pp (LSHS). Estimates of the long term impact on saving of the YADR range from 0 pp (our regression (3)) to -0.7 pp (LSHS).

As China's demographic transition continues, the OADR is projected to rise in the coming decades, exerting downward pressure on private saving. This would start to depress saving in China significantly from 2020-25 or so onwards. However, as indicated in Table 7, until 2020-25 or so, the negative impact of aging on saving would be largely offset by the impact of a lower YADR. The overall effect would be mildly positive in the coming decade and mildly negative in the decade thereafter. After 2025 or so, when the OADR continues to increase but the YADR stops falling, the net negative effect on saving behavior eventually becomes very substantial.

Chamon and Prasad (2005) have a broadly similar conclusion. They find that in the next decade the possible decline in saving resulting from the aging of the population and the rise in the population share of the elderly is likely to be more than offset by the increase in the share of workers in the latter half of their working life that they find to be particularly high savers. They also suggest that the demographic factors by themselves would imply higher household saving over the next decade. They also suggest that these effects could switch and become less ambiguous after 2 decades or more, as the OADR continues to rise and low-saving younger cohorts become more dominant in the working-age population.

Investment is generally found to be positively related to the YADR (Higgens, 1998), because of a relatively higher demand for investment related to schooling and to a growing labor force (infrastructure). As populations age, though, the labor force grows more slowly and the level and composition of investment shift with the needs of an older population (medical facilities). We find a statistically not significant effect of the YADR and a statistically significant effect of the OADR. In general, investment is notoriously difficult to estimate econometrically, which is why we pay less emphasis it.

The net effect on the saving-investment balance tends to vary during the different stages of a demographic transition. Countries with young populations should have current account deficits, as investment demand outstrips domestic saving. As children age, fertility rates decline, and life expectancy rises, the ratio of workers to the total population increases, which tends to cause saving to rise faster than investment. Thus, during the middle stage of a demographic transition, there should be a current account surplus, other things being equal. Eventually, as the aging of the population continues, the net impact on the saving-investment balance become ambiguous, reflecting uncertainty about the relative effects of rising elderly ratios on saving and investment.

**IV.2.3. Policy adjustments**

In section IV.2.1, we concluded that purely on account of structural developments, including demographics, saving and investment decline only mildly in the decades ahead, with ambiguous impact on the currently high net external surplus. In section II.2, we already found that China's high saving is to a large extent rooted in policies, with respect to households, enterprises, and the government's own saving.

Policy adjustments would have a major impact of saving, investment, and the saving-investment balance. In essence, the current special features that distinguish China from other countries—in particular, high enterprise and government saving—are due to particular policies and policy issues, as opposed to "cultural factors" or particular behavior guiding household choices. Rebalancing those policies would make China look more like other countries, in terms of saving and investment. Broadly, we can distinguish two types of policy adjustments. The first one is a group of largely macro economic measures which would have a significant impact on the saving-investment balance.[18] The second type is a group of largely micro economic measures that would shift the structure of the economy, away from industry and capital, towards services and labor. While this latter group of measures will have a major influence on the level of investment and saving, as well as on the structure of the economy, it will not have a major impact on the saving-investment balance.

Table 8 shows some rough, illustrative, estimates of the possible impact, of these measures in the long term. Such impact would be gradually phased in the coming, say, 15 years.

Strengthening corporate governance and dividend policies. This would lower retained earnings by enterprises. In response, investment would be lower. But, under normal circumstances, the demand for investment would not drop as much as the capital transfers fall, and net borrowing by the enterprise sector would increase. Some of the dividend would go to households. The rest, from SOEs, would go to the government. It is likely to be spent on government consumption. In all, this would lead to a net decrease in China's saving-investment balance. Looking at current levels of retained earnings in SOEs, a conservative estimate would be a 4 pp of GDP reduction in enterprise saving and, with half of this leading to less investment and 1 pp of GDP to increased household saving, a residual 1 pp of GDP reduction in the saving-investment balance.

Shifting the composition of government spending from investment to "consumption". The most likely and appropriate way to do this is to reduce capital transfers and use the proceeds to boost spending on health and education. This will directly reduce government saving by the full amount. To the extent that this spending successfully targets households concerns about future costs, it would also, indirectly, reduce households'

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[18] These do not include capital controls. Dollar and Kraay see capital controls as the key binding constraint on a reduction in the saving-investment surplus. We argue that reforms in fiscal policy and domestic financial markets are more binding.

precautionary saving. In all, their should be a strong negative effect of this shift on the saving-investment balance. While such measures take time to implement, communicating bold future plans can have rapid effect on household behavior. Assuming that (i) capital transfers, currently some 5 pp of GDP, will be fully phased out, and that investment will fall by 3 pp of GDP as a result; (ii) all of the revenues are used to increase government expenditure on health and education; (iii) that the indirect effect on household saving is 2 pp of GDP, this shift could reduce national saving by 7 pp of GDP, total investment by 3 pp of GDP, and the saving-investment balance by 4 pp of GDP.

Financial market reform should, by increasing access to financing, lower private sector saving. This is largely because reform will reduce the number of credit-constrained people and small enterprises, and the associated need for saving for anticipated purchases of consumer durable, life-cycle events (such as weddings), and investment. To the extent that the reform is associated with higher interest rates, it would also reduce investment. Assuming investment would fall by one-half of a 3 pp of GDP, drop in household saving, the net effect should still be a 1.5 pp of GDP reduction in the saving-investment balance.

A number of largely microeconomic measures to rebalance the economic structure in the direction of less industry, more services is discussed in Kuijs and Wang (2005). These policies would bring down both saving and investment, but with an ambiguous impact on the saving-investment balance.

Starting from a current account surplus of about 6 percent of GDP in 2005, the total long run impact of this purely illustrative scenario would be to roughly balance the current account surplus. At the same time saving and investment would also be much lower than the 46 and 40 percent of GDP in 2005.

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Table 1. China: Growth accounting, 1978-93 and 1993-2005

| | 1978-93 | | 1993-2005 | |
| --- | --- | --- | --- | --- |
| | pct per year | | pct per year | |
| Average growth | | | | |
| GDP | 9.7 | | 9.5 | |
| Factors | | | | |
| capital | 8.9 | | 11.8 | |
| labor | 2.5 | | 1.1 | |
| TFP | 3.8 | | 3.0 | |
| | | share of total | | share of total |
| Contribution to GDP growth | | | | |
| Total: GDP | 9.7 | | 9.5 | |
| factors | 5.6 | 60 | 6.3 | 68 |
| capital | 4.4 | 46 | 5.7 | 61 |
| labor | 1.2 | 13 | 0.5 | 6 |
| TFP | 3.8 | 40 | 3.0 | 32 |

Sources: NBS, and staff estimates.

Table 2. Sources and aspects of growth (1978-2005)
(average annual increase, in percent)

| | 1978-93 | 1993-2005 |
| --- | --- | --- |
| GDP growth | 9.7 | 9.5 |
| Employment growth | 2.5 | 1.1 |
| Labor productivity growth | 7.0 | 8.4 |
| From TFP growth | 3.8 | 3.0 |
| From increasing K/L ratio | 3.1 | 5.3 |
| Memorandum items (in percent) | | |
| Investment/GDP ratio (period average) | 29.4 | 36.6 |

Source: NBS (2005), and staff estimates.

Table 3. Saving and Investment in China (percent of GDP) 1/

|  | 1996 | 2000 | 2004 | 2005 |
|---|---|---|---|---|
| **Households** | | | | |
| S | 20 | 15 | 16 | 16 |
| S-I | 14 | 10 | 10 | 10 |
| **Enterprises** | | | | |
| S | 13 | 15 | 19 | 20 |
| S-I | -16 | -11 | -13 | -11 |
| **Government** | | | | |
| S | 5 | 6 | 6 | 6 |
| S-I | 3 | 3 | 3 | 2 |
| **China** | | | | |
| GNS (above the line) | 37 | 35 | 41 | 44 |
| Gross capital formation | 38 | 34 | 41 | 40 |
| Current account (bop data) 2/ | 1 | 2 | 4 | 7 |

Source: NBS, and author's estimates.

1/ Broad estimates, using new production-side GDP data, with estimates
   for the flow of funds data (see Appendix).

2/ There is a discrepancy between on the one hand the difference between
   gross national saving and gross domestic capital formation from the
   national accounts and on the other hand the current account data.
   This discrepancy was about 3 percent of GDP in 2004.

Table 4. China: Comparing Saving with Other Countries.1/
(in percent of GDP)

| | China | United States | France | Japan | Korea | Mexico | India |
|---|---|---|---|---|---|---|---|
| Total Domestic Savings | 41.7 | 14.3 | 20.7 | 25.5 | 31.0 | 20.8 | 28.3 |
| Household saving | 16.0 | 4.8 | 10.8 | 8.2 | 4.5 | 8.0 | 22.0 |
| Enterprise saving | 20.0 | 10.3 | 9.5 | 19.4 | 14.8 | 10.6 | 4.8 |
| Government saving | 5.7 | -0.9 | 0.3 | -2.2 | 11.7 | 2.2 | 1.5 |
| Difference China-others *due to:* | | 27.4 | 21.0 | 16.2 | 10.7 | 20.9 | 13.4 |
| Household saving | | 11.2 | 5.2 | 7.8 | 11.5 | 8.0 | -6.0 |
| Enterprise saving | | 9.7 | 10.5 | 0.6 | 5.2 | 9.4 | 15.2 |
| Government saving | | 6.6 | 5.4 | 7.9 | -6.0 | 3.5 | 4.2 |

Source: NBS (national accounts), via CEIC, OECD National Accounts, and Indian authorities.
Data for China is for 2005 (estimated), for Mexico 2001, for India 2004, and for other countries 2002.

Table 5: Regression results for gross domestic saving

| | 1<br>OLS<br>Yes | | 2<br>OLS<br>Yes | | 3<br>Panel-within 1/<br>Yes | |
|---|---|---|---|---|---|---|
| Estimator<br>Instruments | | | | | | |
| Log of real per capita GDP 2/ | 2.15 | (3.11) | 2.67 | (2.60) | 8.46 | (2.04) |
| Real GDP growth | -0.74 | (-1.49) | 0.65 | (0.66) | -0.94 | (-0.82) |
| Credit to GDP ratio 3/ | 0.04 | (2.00) | 0.06 | (2.03) | -0.05 | (-1.71) |
| Real interest rate 4/ 5/ | -8.30 | (-0.60) | -13.92 | (-0.59) | -26.19 | (-2.21) |
| Inflation 4/ 5/ | -18.47 | (-2.10) | 1.35 | (0.12) | -15.07 | (-1.33) |
| Public saving (percent of GDP) | 0.16 | (1.58) | 0.39 | (2.00) | 0.30 | (2.25) |
| Young dependency ratio | -0.15 | (-5.64) | -0.20 | (-3.82) | 0.13 | (1.34) |
| Old dependency ratio | -0.47 | (-2.87) | -0.77 | (-2.24) | -0.60 | (-2.07) |
| Urbanization ratio | 0.00 | (-0.07) | -0.04 | (-0.62) | -0.19 | (-1.36) |
| Public spending (percent of GDP) 6/ | | | 0.11 | (0.49) | | |
| Industry/GDP | 0.53 | (7.95) | 0.35 | (2.46) | 0.61 | (3.38) |
| Constant | | | | | -52.19 | (-1.43) |
| Dummies for decades | * | | | | | |
| Dummies for 5 year periods | | | | | * | |
| Adjusted R-squared | 0.42 | | 0.58 | | 0.86 | |
| S.E. of regression | 10.47 | | 5.75 | | 5.07 | |
| Durbin-Watson stat | 0.32 | | 1.34 | | 1.87 | |
| Number of observations | 418 | | 70 | | 418 | |

Notes: T statistics in brackets.
1/ T stastistics calculated using White period coefficient covariance are robust to serial correlation.
2/ in US$ 2000 prices, at current exchange rates.
3/ The credit to GDP ratio is bounded lower than 200 percent
4/ log(1+x/100)
5/ The nominal interest rate and inflation are bounded lower than 50 percent.
6/ Public spending on health, education, and social security and welfare.

Table 6: Regression results for gross capital formation

| | 1 OLS | | 2 | | 3 Panel-within 1/ | |
|---|---|---|---|---|---|---|
| Log of real per capita GDP 2/ | 2.19 | (6.92) | 0.7 | (1.03) | 5.60 | (1.55) |
| Real GDP growth | 0.66 | (7.64) | 0.56 | (3.69) | 0.91 | (0.83) |
| Credit to GDP ratio 3/ | 0.03 | (2.83) | 0.04 | (2.36) | 0.01 | (0.53) |
| Real interest rate 4/ 5/ | 7.00 | (1.09) | -2.43 | (-0.27) | 7.44 | (0.82) |
| Inflation 4/ 5/ | 7.66 | (1.73) | -10.18 | (-1.59) | 9.42 | (1.04) |
| Young dependency ratio | 0.04 | (2.98) | 0.04 | (1.37) | 0.03 | (0.30) |
| Old dependency ratio | -0.06 | (-0.89) | 0.04 | (0.28) | -0.45 | (-1.82) |
| Urbanization ratio | -0.12 | (-6.20) | -0.04 | (-0.82) | -0.20 | (-2.02) |
| Industry/GDP | 0.25 | (8.62) | 0.41 | (7.10) | 0.17 | (2.17) |
| Policy uncertainty | | | 0.03 | (0.73) | | |
| Quality of the courts | | | 0.02 | (0.65) | | |
| Constant | | | | | -14.62 | (-0.46) |
| Dummies for decades | * | | * | | | |
| Dummies for 5 year periods | | | | | * | |
| Adjusted R-squared | 0.26 | | 0.53 | | 0.62 | |
| S.E. of regression | 5.89 | | 4.19 | | 4.21 | |
| Durbin-Watson stat | 0.69 | | 1.04 | | 1.81 | |
| Number of observations | 561 | | 121 | | 509 | |

Notes: T statistics in brackets.
1/ T stastistics calculated using White period coefficient covariance are robust to serial correlation.
2/ in US$ 2000 prices, at current exchange rates.
3/ The credit to GDP ratio is bounded lower than 200 percent
4/ log(1+x/100)
5/ The nominal interest rate and inflation are bounded lower than 50 percent.

Table 7. The impact of demographics on private saving in China

| | 2005 | 2015 | 2025 | 2035 | 2045 |
|---|---|---|---|---|---|
| Rough estimates: | | | | | |
| young age dependency ratio | 32 | 27 | 27 | 26 | 26 |
| old age dependency ratio | 11 | 11 | 14 | 18 | 22 |
| | | | | | |
| Impact on private saving (compared to 2005), percent of GDP | | | | | |
| Loyoza, Schmid-Hebbel, and Serven (2000) | | | | | |
| effect young age dependency | | 3 | 4 | 4 | 4 |
| effect old dependency | | -1 | -6 | -11 | -19 |
| total | | 2 | -2 | -7 | -14 |
| | | | | | |
| Impact on domestic saving (compared to 2005), percent of GDP | | | | | |
| Our estimates | | | | | |
| Regression (1) 1/ | | | | | |
| effect young age dependency | | 1 | 1 | 1 | 1 |
| effect old dependency | | 0 | -2 | -3 | -5 |
| total | | 0 | -1 | -3 | -5 |
| Regression (3) 1/ | | | | | |
| effect young age dependency | | 0 | 0 | 0 | 0 |
| effect old dependency | | 0 | -2 | -4 | -7 |
| total | | 0 | -2 | -4 | -7 |

Source: United Nations Population Projections, Loyoza, Schmid-Hebbel, and Serven (2000), and author's estimates.
1/ See table 5.

Table 8. Estimated impact of potential policy measures on saving, investment, and the current account, change from 2005 (in percent of GDP)

| | Demo-graphics | Dividend policy | Shift government spending | | | Financial market reform | Rebalan-cing economic structure | Total |
|---|---|---|---|---|---|---|---|---|
| | | | Capital transfer | Increasing government spending health/educ. | Indirect effect | | | |
| **China** | | | | | | | | |
| S | 0 | -3 | 0 | -5 | -2 | -3 | -5 | -18 |
| I | 0 | -2 | -3 | 0 | 0 | -1.5 | -5 | -11.5 |
| S-I | 0 | -1 | 3 | -5 | -2 | -1.5 | 0 | -6.5 |
| | | | | | | | | |
| Memorandum items, in 2005 | | | | | | | | |
| S | | 47 | | | | | | |
| I | | 40 | | | | | | |
| S-I | | 7 | | | | | | |

Source: author's estimates.

Figure 1. China: Household Saving Rate (in percent of disposable income)
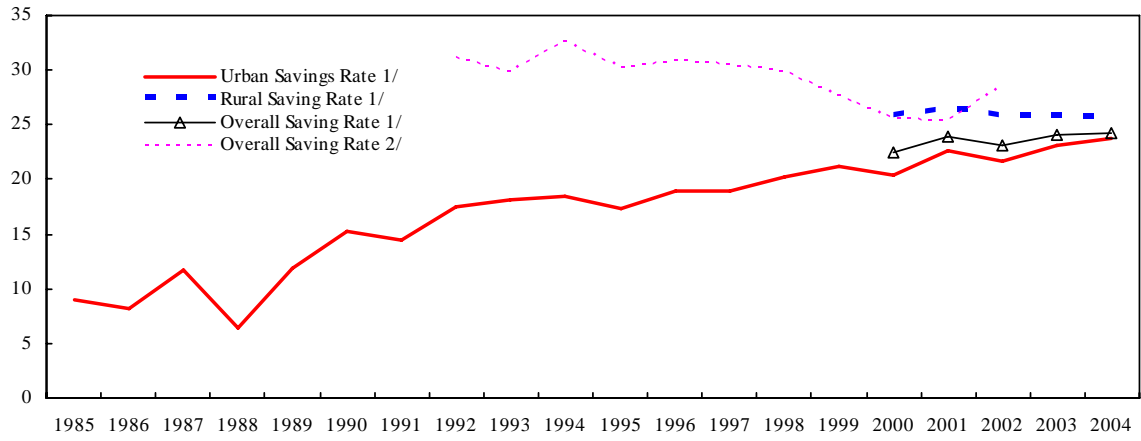


Source: NBS, and author's estimates
1/ From NBS; household survey. 2/ From NBS; Flow of Funds tables.

**Figure 2. Gross Domestic Saving**

Gross Domestic Saving, as share of GDP (percent)
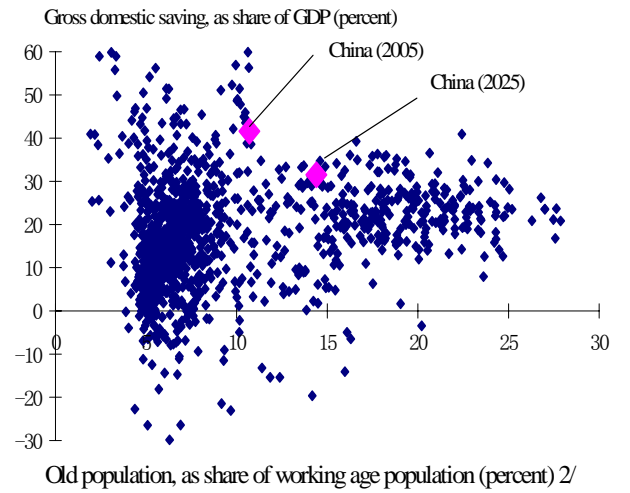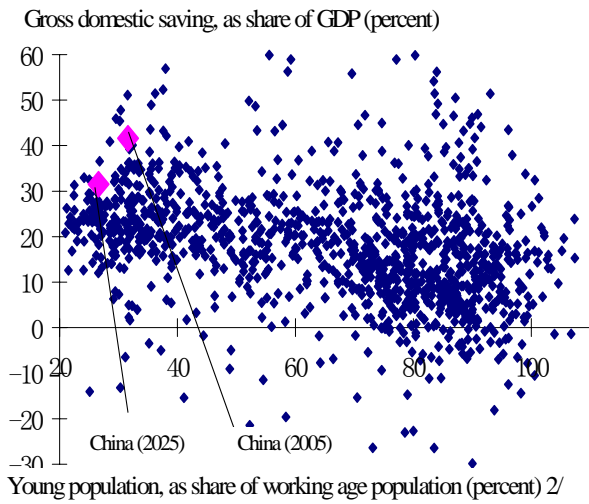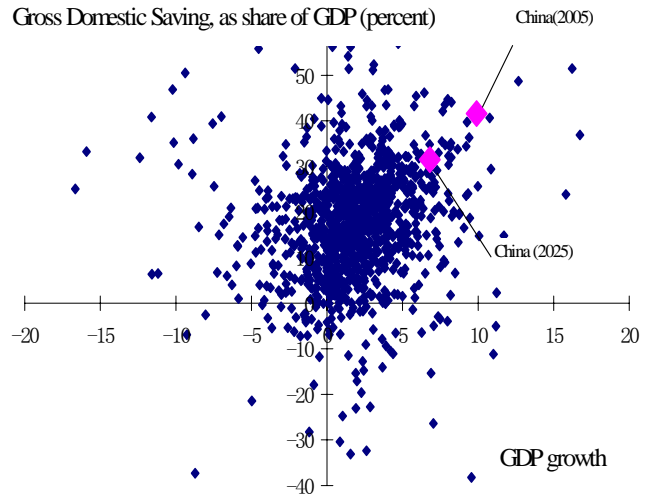
China (2005)

China (2025)

GDP per capita 1/

Gross Domestic Saving, as share of GDP (percent)

China(2005)

China (2025)

GDP growth

Gross domestic saving, as share of GDP (percent)

China (2025)    China (2005)

Young population, as share of working age population (percent) 2/

Gross domestic saving, as share of GDP (percent)

China (2005)

China (2025)

Old population, as share of working age population (percent) 2/

Gross domestic saving, as share of GDP(percent)

China(2025)

Urbanization3/

Gross domestic saving, as share of GDP(percent)

Public Spending

**Figure 3. Gross Capital Formation (Investment)**

Gross capital formation, as share of GDP (percent)

China (2005)

China (2025)

GDP per capita 1/

Gross capital formation, as share of GDP (percent)

China (2005)

China (2025)

GOP Growth

Gross capital formation, as share of GDP (percent)

China (2005)

China (2025)

Young population,as share of working age population (percent) 2/

Gross capital formation, as share of GDP (percent)

China (2005)

China (2025)

Old population, as share of working age population(percent) 2/

Gross capital formation, as share of GDP(percent)

China(2025)

Gross capital formation, as share of GDP(percent)

Public Spending

Gross capital formation, as share of GDP (percent)

China (2005)

Industry, as share of GDP (percemt)

Source: World Development Indicators (2005).
1/ logarithimic scale.
2/ young people: 1-14 yesrs old; working age people: 15-64 years old; old people: 65 years and older.
3/ urbanization means urban population as share of total population(percent).

**Appendix: Assumptions on GDP revision**

For simplicity it is assumed that (i) expenditure GDP will be revised so as to equate production-side GDP; (ii) 15 percent of the revision is contributed by investment, and the rest by consumption.

Looking at the sectoral composition, the following is assumed:

- The increase in investment is all done by the enterprise sector;
- This higher investment is all financed by higher internal saving (retained earnings), meaning that there is no change in the S-I balance of the enterprise sector;
- The increase in consumption is done by households;
- This increase is financed by higher household income, meaning that there is no change in household saving;
- Unchanged household saving with higher household income means a lower household saving rate.