CESifo, the International Platform of the Ifo Institute of Economic Research and the Center for Economic Studies of Ludwig-Maximilians University

CESifo Venice Summer Institute

19 - 24 July 2010

"The Evolving Role of China in the Global Economy"

to be held on **23 - 24 July 2010**
on the island of San Servolo in the Bay of Venice, Italy

Why is China's Saving Rate So High? A Comparative Study of Cross-Country Panel Data

Juann Hung and Rong Qian

VIU
Venice
International
University

Why Is China's Saving Rate So High?
A Comparative Study of Cross-Country Panel Data*

Juann H. Hung
Macroeconomic Analysis Division
Congressional Budget Office
Email: Juannh@CBO.gov

Rong Qian*
University of Maryland
Email: Qian@econ.umd.eud

July 8, 2010

***Rong Qian was a 2009 summer associate at CBO.**

The authors give special thank to Priscila Hammett for her valuable research assistance.

Abstract

This paper use a large cross-country panel data to estimates models of national saving rates in order to address two related issues. First, to what extent does China's saving rate exceed the projections of credibly estimated models of saving rates? Second, what are the factors primarily responsible for China's extraordinarily high saving rates?

We find that China's national saving rate is higher than the predictions of our benchmark models by about 10 to 12 percentage points on average from 1990-2007, depending on whether China is included in the dataset. The predominant drivers of China's high saving rates are its relatively low *old dependency ratio*. To a lesser extent, *low urbanization, strong economic growth*, and *weak social safety net* are also important factors responsible for China's high saving rates. In comparison, *high degree of currency undervaluation* is a lesser contributor to China's high saving. Some factors shared by East Asian economies – those underlying their high-saving-high-growth strategy – also appear to have contributed to China's growth rate.

Why Is China's Saving Rate So High? A Comparative Study of Cross-Country Panel Data

Juann H. Hung and Rong Qian

1. Introduction

China's extraordinarily high national saving rate has been a subject of much concern and analysis. In March 2005, Fed Chairman Ben Bernanke proposed the notion that "savings glut" (i.e., too much saving than needed for domestic investment) in some part of the world – notably China and some oil-exporting countries – has contributed to the large US current account deficit and global imbalance. Since then, concerns about the mounting global imbalance – and more recently, the conviction in some quarters that the large saving glut was a main culprit of the 2008-2009 financial meltdown and the accompanying great recession– have drawn even more attention to China's high saving rate.

China's saving rate is even higher than the average of other high-saving countries, such as its East-Asian neighbors and OPEC countries (Figure 1). Its national saving rate was 54.4 percent in 2007, more than twice of the average saving rate of OECD countries (Table 1A). Moreover, high saving, not weak investment is responsible for China's large excess saving. China's investment/GDP ratio averaged 41 percent from 2000 through 2008, more than double that in the United States (20 percent) over the same period. However, China's national saving rate was even higher: it averaged 48 percent from 2000 to 2008, compared to 15 percent in the United States. China's high national saving also appears to be largely a result of high private saving: its average government saving during 2000-2006 was -1.9 percent of GDP, while its average national saving was 43.9 percent (Table 1B).

Even though many hypotheses have been advanced to make sense of China's extraordinarily high saving rate, it remains unclear to what extent each of those hypothetical factors indeed contributed to making China's saving rate higher than most other countries. In particular, whether China's exchange rate policy has played a significant role in driving its high saving rate has been subject to much debate. Many analysts have opined that China's policy of undervaluing its currency is a major reason for its high saving rate.[1] However, other economists have argued that a revaluation of the yuan will not necessarily eliminate China's surplus saving because it is mainly rooted in complicated structural factors.[2]

Indeed, most analysts would agree that saving is driven by various motives, opportunities, incentives, and constraints. And, as reported in section 2 of this paper, an increasingly large literature has suggested that there are several structural and economic factors that could have played a part in its high saving for the past two decades: a weak social safety net, an underdeveloped consumer credit market, a low degree of urbanization, a relatively young population, and rapid economic growth.[3] It would appear important to take those factors into account in any attempt to assess the effect of exchange rate policy – or other types of policies – on China's excess saving.

[1] For example, see a Financial Time article by Wolf (2010) and the papers he cited in that article.

[2] For example, Spence (2010) argues that China's exchange rate is but one facet in the complexity of its transition toward a middle-income economy, and that revaluing the yuan is unlikely to get rid of China's surplus saving because china's high savings are embedded in its overall economic structure – such as the government's extensive control of income (directly and through ownership of the state-owned enterprises. Similarly, Rodrik (2009) maintains that China's exchange rate policy is mainly designed as a second-best solution to reduce the distortions and inefficiencies in its economic/financial infrastructure that tend to retard its economic growth. Thus, pressuring China to revalue its currency may do more harm than good.

[3] People in a country that provides little social safety net may tend to save more to "self-insure" for bad times and old age. Those a country with an underdeveloped banking/financial system may tend to save more because credit is not easily available to tide them over hard times or help finance their purchases of expensive items. Countries with a relatively younger population tend to have a higher saving rate because older people tend to be net dis-savers. Fast-growing economies also tend to have a higher saving rate because, when the economy is growing, workers' saving will increase relative to retirees' dissaving. For more detailed discussion, see Section 3.1.

Against this backdrop, this paper investigates two related empirical questions. First, to what extent does China's saving rate exceed the projections of credible models of saving rates? That is, if we include most traditional and newly formed theoretical determinants (or their proxies/instruments) of saving rates in a model, how much of China's saving rate is left unexplained? Second, what are the factors primarily responsible for China's extraordinarily high saving rates? To what extent is China's high saving rate attributable to its institutional/demographic/economic characteristics, as opposed to exchange rate policies and other macroeconomic policy variables – such as inflation, the real interest rate, and the government budget balance?

Our empirical method consists of two stages. In stage one, we estimate models of national saving, using a large panel data set of roughly 70 countries over the time span from 1980 through 2007. In this stage, we are mainly interested in identifying plausible models of national saving rate. We consider several explanatory variables, including variables that traditionally not considered as policy instruments (such as real per capital income, income growth, demography, social safety net, financial development, etc), and those considered as macroeconomic policy instruments (such as government saving, interest rates, inflation, exchange rate, and an index of currency undervaluation). Following Loayza, Schmidt-Hebbel, and Serven (2000), we use a dynamic panel approach with generalized-method-of-moments (GMM) estimation. That method has gained much popularity over the years as a way to address many issues in the estimation of equations that include lagged dependent variables as well as explanatory variables that are

potentially endogenous.[4] On the whole, our coefficient estimates on the traditional list of variables are not too far off from those of Loayza, et al. (2000).

In the second stage, we use estimated models to make in-sample predictions of national saving rates for individual countries and measure the extent to which a country's national saving deviates from models' predictions for that country. Overall, our estimated models do a very decent job of explaining national saving rates of 70 countries in the sample. Thus, they provide a useful benchmark to assess the extent to which China's saving behavior differ from an average country, and the relative contributions of different explanatory variables to China's high saving rate.

Based on our estimates, we find that China's *lower old dependency ratio* than that of other countries is the most important factor responsible for China's higher saving. To a lesser extent, China's *stronger economic growth, weaker social safety net,* and *lower urbanization ratio* are also important factors responsible for China's higher saving rates. China's *currency undervaluation* turns out to be a relatively modest contributor to China's high saving.[5] Other variables either contribute little or have a negative contribution to China's saving rate. Overall, China's national saving rate is higher than the predictions of our benchmark model by about 10 – 12 percentage points, depending on whether China is included in the dataset.

[4] The GMM estimators was proposed by Chamberlani (1984); Holtz-Eakin, Newey, and Rosen (1988); Arellano and Bond (1991); and Arellano and Bover (1995). It has been applied to cross-country studies by, among others Easterly, Loayza, and Montiel (1997), and Rodrick (2008).

[5] Of course, the total effect of China's *currency undervaluation* on its saving rate may be higher because it is likely to have an indirect by spurring economic growth (which in turn has a positive effect on the saving rate); however, available estimates suggest that the indirect effect is quite small as well. The estimates in Rodrick (2008) imply that a 10 percent real depreciation of the Chinese yuan will increase China's growth by 0.86 percentage points. This paper's estimate implies that a one percentage point increase in China's growth will increase China's saving rate by about 0.2 percentage points, and the same increase in China's level of per capita GDP will increase its saving rate by about 0.03 percentage points. On average, the yuan's undervaluation increased 3 percent per year between 2001 and 2007. Both estimates combined imply that the yuan's undervaluation should increase China's national saving rate by about 0.06 percentage points per year.

By including *the East-Asia dummy* in some of our models, we also find that some factors shared by East Asian economies (but unique to the rest of the world) have also contributed to China's growth rate. Those factors are mainly those underlying the high-saving-high-growth strategy of East Asian economies. However, it is beyond the scope of this paper to disentangle the many complex factors that are likely to be proxied by that dummy.

The remainder of the paper is organized as follows. Section 2 presents existing theories of China's high saving rate. Section 3 reports the choice of explanatory variables, empirical strategy, and the regression results. Section 4 compares China's national saving rate to the long-term forecast of our benchmark model. Section 5 uses our estimated models to account for the gap between saving rates of China and the United States. Section 6 discusses the relationship between China's high saving and the East Asia model of economic growth. Section 7 concludes.

2. Existing Theories of China's High Saving Rate

Several authors have offered various explanations of why China's national saving rate is higher than the saving rate of most countries. Those explanations can be roughly summarized as follows:

(1) The Chinese have a higher demand for saving in part because of their frayed social safety net and an under-developed financial sector.[6] The declining public provision of education, health, and housing services and the lack of pension programs (or, the breaking of "the iron rice bowl") creates a strong motive for the Chinese to save. An under-developed banking/financial sector adds to that "precautionary demand" for saving because it is difficult for consumers to borrow from banks to tide them over hard times. China's small

[6] These two factors are the preferred explanations of China's rising household saving rate offered by Chamon and Prasad (2008). Blanchard and Giavazzi (2006) and Kuijs (2006) also attributed China's high saving rates to these two factors.

firms – which generally do not receive the preferential treatment that large/state-owned enterprises do – also tend to retain earnings because they need them to finance their ventures as well as provide a cushion for bad times.

(2) China's drive to industrialize its economy is responsible for policies that favor industry at the cost of jobs and consumer spending.[7] This policy bias has led to higher national saving in two ways. First, it has led household disposable income to decline relative to national income. Thus, even if the consumption share of disposable income stays constant, the consumption share of national income will decline – and the national saving rate increase – as the economy grows.[8] Second, those policies not only have helped to keep corporate profits high, they also allowed/encouraged those profits to be retained in the companies rather than distributed to shareholders, adding to national saving.[9]

(3) China has a high rate of economic growth. According to the life-cycle hypothesis (LCH), people save when they are wage-earners in order to finance their negative saving after they retire. When the economy is growing, workers' saving will increase relative to retirees' dissaving, thereby raising aggregate saving.[10] This channel may even be stronger for countries such as China where social safety net is weak for retirees.

---

[7] This point is particulary emphasized by Kuijs (2006). Several studies have found that the rapid growth in total factor productivity (TFP) is a main pillar of China's real GDP growth in the reform era, second only to capital formation. For example, Kuijs and Wang (2006) found that capital accumulation contributed over 50 percent, and TFP growth about 33 percent, to China's output growth between 1978 and 2004, with employment growth contributing the modest remainder. Bosworth and Collins (2007) also have similar findings.

[8] Partly as a result of China's pro-industry policy, the share of wages and other household income in GDP fell from 72 percent in 1992 to 55 percent in 2007. See Aziz and Cui (2007).

[9] See Kuijs (2006). An article in *the Economist* (October 1st, 2009) with the title "The hamster-wheel" also reports that China's state-owned enterprises now provide a modest pay-out to the government, but until 2008 they paid nothing at all. In 2008, almost 45 percent of listed companies in China did not pay a dividend.

[10] See Modigliani and Cao (2004).

(4) China has an undervalued currency. An undervalued currency undercuts the abilities of Chinese consumers to purchase foreign goods and services, thereby boosting China's saving.

(5) China's one-child policy – a policy intended to reduce "the mouths to be fed" until the country's capital stock has accumulated enough to mop up its large pool of excess labor – has resulted in a surplus of men. This in turn has generated a highly competitive marriage market, driving up China's saving rates as households with sons are forced to raise their savings to increase the chance of winning a bride. This theory was mainly proposed to explain the observation that China's saving rate started to shoot up around 2002 just as the gender ratio for the marriage-age cohort began to be seriously out of balance.[11]

If valid, the combination of several factors proposed in the literature – frayed social safety net, under-developed financial sector, one-child policy, heavy-handed industrial policies, undervalued currency, and strong growth rate – suggests that part of the root cause of China's high saving is the poverty and underdevelopment of the country and its haste to grow and catch up. Indeed, China was a destitute country when its pro-market economic reform started in late 1978. And, despite its rapid economic growth over the past three decades, its real per capital GDP in 2007 was still only about one-third of an average upper-middle income country (such as Brazil, Mexico, and Turkey), and no higher than an average lower-middle country (Table 1A and Figure 2).[12] But, how valid are those factors? How important are those factors when compared to other factors such as demography and urbanization?

[11] See Wei and Zhang (2009).

[12] For example, China's real per capita GDP was only 38% of that in Mexico in 2007.

3. Estimating Models of National Saving Rates

In this section, we test the validity of most theories discussed in the preceding section, as well as that of other traditional variables of saving. We estimate models of national saving, not private saving. This is largely because we are primarily interested in shedding light on whether the "global imbalance" can be largely accounted for by the vast differences in pre-existing economic and institutional conditions among countries such as China and the United States. It is also partly because data on household saving is much more limited than data on national saving.

3.1 Explanatory Variables

Following Loayza et al. (2000), our specifications are reduced-forma linear equations, drawing upon a broad range of theories for explanatory variables. Those variables include "traditional" variables – those that have been included in some previous studies or another – as well as "new" ones – namely, *income-adjusted growth rate*, *government social spending*, *currency undervaluation*, and *the East-Asia Dummy* – that are important to the purpose of this study. Those explanatory variables, and the reasons for which they included in the empirical specifications, are presented below.[13]

Real income per capita. In a standard Keynesian model, saving is a positive function of income because people's ability to save begins to rise after their income exceeds subsistence level of consumption.[14] Lower-income people thus tend to consume a larger share of their income than

[13] Some variables, such as measurs of income inequality and degree of financial openness, are not included in our study because of the limited availability of good-quality data of across countries over our sample period.

[14] This is easily seen if we derive the Keynesian saving equation from a typical Keynesian consumption equation, $C = C_0 + \propto Y$, where C is consumption, C_0 is the subsistence consumption, Y is income, and $\propto$ is the propensity to consume. The corresponding saving equation would be $S = -C_0 + (1-\propto)Y$, implying S/Y = $(1-\propto) - C_0/Y$ Thus, $\frac{d(S/Y)}{dY} > 0$: the saving/income ratio is a positive function of income.

higher-income people. The national saving rate is expected to rise as per-capita income rises within a country or between countries, since most wage-earners in poor countries tend not to have much left to save for retirement after spending on necessities.

Growth of real income per capita. The life-cycle hypothesis (LCH) argues that the saving rate depends on the long-term rate of income growth.[15] LCH assumes that individuals maximize utility over their life time through optimal allocation of their-time resources. Thus people are dissavers when they are young (before they begin to work or when their income are still too low to cover their expenses) and when they are old and retired; the working population (those between the young and the old) are those that save. When the economy is growing, income and saving of the working population will increase relative to non-working population's income and dissaving, causing aggregate saving to rise. Of course, there could also be an effect moving in the opposite direction, as pointed out by Bosworth (1993): In a growing economy, workers will anticipate future income increases, and as a result, will tend to increase present consumption and reduce savings.

Income-adjusted growth rate. Saving rate may also be a positive function of real GDP growth rate because poor countries have an added incentive to save: to reach the Golden-Rule steady state by bumping up capital accumulation.[16] Poor countries which have the motivation to grow by saving may not be able to do so if they are mired in a "poverty trap." However, given a poor country's desire to grow and move to a higher income and consumption steady state – i.e., the Golden-Rule state, if somehow that country's growth rate picks up, that growth rate's effect on its

[15] In Modigliani's Nobel lecture (1989), this insight was illustrated as follows: If we assume that (1) aggregate saving is a linear function of income and wealth, and (2) national wealth is proportional to income (i.e., W= ω Y, where ω is a constant), then by invoking the identity that saving is the growth of wealth, we can infer $\frac{S}{Y} = \frac{\Delta W}{Y} = \frac{\Delta W}{W}\frac{W}{Y} = \frac{\Delta Y}{Y}\,\omega = \omega\, g$, where $g = \frac{\Delta Y}{Y}$. That is, the saving rate is a positive function of income growth.

[16] See Phelps (1961) and (1965).

saving rate may be stronger than that on a richer country's due to the poorer country's added incentive to save. Since this "catch-up" or "Golden-Rule" motivation for saving is likely to be positively correlated with the relative poverty of a country, we enter an income-adjusted growth rate (of real GDP per capita) in the regression to capture that additional effect of growth rate on saving rate.[17]

Dependency Ratio. The life-cycle hypothesis argues that people are dissavers when they are young, savers when they are wage-earners, and dissavers again after they have retired. Thus, a country's saving declines (rises) when its dependency ratio increases (decreases). We include both the old dependency ratio (*old non-working population/total working population)* and the young dependency ratio *(young non-working population/working population)* in our regressions.

Domestic Credit. Availability of credit, by making borrowing constraints less stringent, could lead to a decline in saving. The extent to which individuals can smooth their consumption will depend on their ability to borrow to finance consumption. If the borrowing constraint is binding, household will be unable to increase present consumption even if their expected income streams over life has increased, and they will have to lower consumption in response to a negative transitory shocks to income. Moreover, stringent borrowing constraints mean households need to save a large sum before they can think of buying a house or other big-ticket items. This paper uses *Domestic Credits/GDP ratio* as an indicator for the availability of domestic credit. The higher is this ratio, the less stringent is borrowing constraint.

Social Safety Net (Government's Social Spending). An important implication of the life-cycle framework of saving is that private saving will be affected by the extent and coverage of

[17] The relative income-adjusted growth rate of real GDP per capita of country *i* is the product of an income-adjustment factor and the growth rate of real GDP per capita of country *i*. The income-adjustment factor is the moving average of (Y^{us}/Y^{i}) of the past three years, where Y^{us} is the real GDP per capita of the United States. Thus, the adjusted growth is measured by [moving average of $(Y^{us}_{t-1,t-3}/Y^{i}_{t-1,\,t-3})$] x $[(Y^{i}_{t}/Y^{i}_{t-1}) -1]$.

social safety net provided by the government. If individuals expect to get high social security benefits when they retire, they will tend to reduce saving during their working days. Probably more important, the more generous the provision of social safety net (such as unemployment benefits, medical assistance to the poor, etc.), the less likely individuals would feel pressed to saving for bad times. We use governments' social spending as an indicator of social safety net.

Urbanization (urban population/total population). Rural households, who depend heavily on agricultural income, tend to save a larger proportion of their income than city dwellers because precautionary saving tends to be higher for households subject to higher income volatility. According to this theory, industrial countries that have a higher degree of urbanization than developing countries will also have a lower saving rate than the latter. In our view, another likely reason for the negative effect of urbanization on saving rates is related to the fact that in developing countries dual economy is the norm. While city dwellers' living standard is not far below those of industrial economies, households in many villages still do not have even most basic services such as running water, electricity, and easy transportation to shopping. In a dual economy, income inequality rises as the economy grows because the rural population is trapped in poverty. Since villagers' consumption is forced to remain roughly unchanged even as national income grows, the share of national income growth that gets saved is positively correlated with the share of the rural population. Thus, everything else being equal, the lower is the urbanization ratio, the higher is the national saving rate.

Real Interest Rate. The effect of a higher real interest rate depends on the relative strength of its substitution and the income effects. The substitution effect is positive: an increase in the real interest rate will increase saving by increasing the rate of return on saving in the current period relative to that in the next period. The income effect is negative: an increase in the real interest

rate will lower saving because it increases income (or an increase in wealth), and thus consumption, in the current period. In many developing countries, governments are known to have kept the real interest rate low as a means of financial repression to force national saving rate to rise – providing cheap credit to industries serve to promote production while the low interest rate suppresses consumption through lower interest income.

Government saving. In the hypothetical world of Ricardian Equivalence (RE), an increase in government saving has no effect on national saving. In that world, a decrease in government saving is completely offset by an increase in private saving because taxpayers view government spending as a substitute of their own spending and an increase in the government deficit as an increase in their future tax liabilities. However, most analysts believe that taxpayers' offset is smaller than predicted by the RE hypothesis, and that a decrease in government saving will decrease the national saving rate to some extent.

Inflation. Inflation may increase saving by redistributing wealth from workers (who tend to have a lower saving rate) toward capital-owners (who tend to have a higher saving rate). In many developing countries, consumer price inflation means the amount of consumer goods that wage-earners can afford will fall, amounting to forced savings. Meanwhile, the national saving rate could rise as resources are extracted for capital accumulation and growth. Many researchers have also included inflation in a saving equation as a proxy for macroeconomic uncertainty, an increase of which is expected to have a positive effect on precautionary saving.[18]

The Real Exchange Rate. The mercantilist view that countries can boost its net exports – and thus its national income and national saving – by undervaluing its currency is a long-held one. Its presumption has been that a country, to the extent it succeeds in devaluing its currency and

[18] See Loayza, Schmidt-Hebbel, and Serven (2000).

keep it undervalued, can boost and preserve the price competitiveness of its tradables. Of course, it is not a consensus view among economists.[19] Nevertheless, the mercantilist view is popular among contemporary commentators in reaction to China's large trade surplus and high saving rate.

There is also a growing literature that shows an undervalued currency has a positive effect on growth and saving through non-mercantilist channels, and provides insight to the success of growth models that includes an undervalued currency as a policy tool.[20] For example, Levy-Yeyati and Sturzzenegger (2007) show that an undervalued real exchange rate boosts output growth by increasing savings and capital accumulation. Rodrick (2008) argued that, for developing countries, currency undervaluation spur economic growth powerfully by keeping the prices of exportables high enough to attract the reallocation of resources from nontradables toward manufacturing, thereby stimulating industrialization and economic growth.[21] Korinek and Serven (2010) claim that currency undervaluation can raise growth through learning-by-doing externalities in the tradable sector that was otherwise under-developed.

We include two exchange-rate variables as explanatory variables: a measure of real currency depreciation and an index of currency undervaluation.

East Asia Dummy. It has been well known that countries in East Asia – namely, Japan, South Korea, Taiwan, China, Hong Kong, and Singapore – on average have a higher national

[19] For example, the Harberger-Laursen-Metzler hypothesis postulats that a real devaluation, which causes a decline in real income, will lead to a decrease in savings via the Keynesian channel. See Harberger (1950) and Laursen and Metzler (1950).

[20] For example, see Eichengreen (2008).

[21] Rodrick (2008) offered two classes of theories for the "stylized fact" that an increase in undervation spurs growth powerfully for developing countries. First, tradeables are special because they suffer disproportionately (compared to non-tradables) from the institutional weakness and contracting incompletness that characterize low-income environments. Second, tradeables are "special" because they suffer disproportionately from the market failures (information and coordination externalities) that block structural transformation and economic diversification. In both cases, an increase in undervaluation – that is, an increase in the relative price of tradables relative to nontradables – acts as a second-best mechanism to (partially) alleviate the relevant distortion, foster desirable structural change, and spur growth.

saving rate than do other regions (Table 1b). Some analysts have attributed this to East Asian's cultural factors, while others attributed it to the "East-Asian growth model" which includes various policies designed to promote growth through capital accumulation by ways of making credit cheaper (and more accessible) to industries than to consumers. Since it is difficult to quantify countries' culture and "growth model", we include an *East Asia Dummy* o capture any marginal effect on saving of "being an East-Asian country".

3.2 Data

The main source of data used to estimate the benchmark model is World Bank's World Development Indicator 2009. We also used data from IMF's International Financial Statistics, and data from Asian Development Bank and United Nations. After the removal of data considered as outliers, we ended up with a sample of 70 countries, from 1980 to 2007. (See Data Appendix for the criteria used for removing outliers.) The definition, construction, and sources of data are described in Appendix 1. The range of variation of the data used is presented in Table A1 in Appendix 2.

3.3 The Estimation Method

A detailed description of the estimation method used in this paper, and its assumptions and advantages, is provided in section III of Loayza, Schmidt-Hebbel, and Serven (2000). For those who are not familiar with the method, that description is briefly summarized below:

The empirical analysis is based on generalized-method-of moments (GMM) estimators applied to a dynamic system of saving rates. More specifically, GMM is used to estimate a system of two equations:

$$(1)\ s_{i,t} = \propto s_{i,t-1} + \theta' X_{i,t} + \delta_i + \epsilon_{i,t}$$

$$(2)\ s_{i,t} - s_{i,t-1} = \propto \left(s_{i,t-1} - s_{i,t-2}\right) + \theta'(X_{i,t} - X_{i,t-1}) + (\epsilon_{i,t} - \epsilon_{i,t-1})$$

where s is the saving rate, X is a set of explanatory variables, δ is the country specific effect and ϵ is the error term. The subscript i represents country and t stands for time period.

This estimation method has several advantages. First, the dynamic specification of equation (1) allows us to use annual data to estimate both the long-run and short-run effects of the explanatory variables, as opposed to distort the available information by phase-averaging using an arbitrary phase length (such as five- or ten-year moving average) to deal with the presence of inertia in saving rates.[22] Second, equation (2) allows us to study the time-series relationship between the saving rate and its determinants by eliminating country-specific effects, while equation (1) allows us to study their cross-country relationship. Finally, the GMM-system estimators allows us to control for the potential endogeneity of the explanatory variables, the possible presence of unobserved country-specific effects correlated with the regressors, and the problem that the within (i.e., fixed-effect) estimators of $\propto$ and θ are inconsistent in a dynamic specification as in equation (1).[23]

The instruments for the regression in equation (2) are the lagged levels of the corresponding variables, while the instruments for equation (1) are the lagged differences of the

[22] Inertia in saving rate can arise from lagged effects of the explanatory variables on saving, or from consumption habits and from consumption smoothing.

[23] When the lagged dependent variable is included as a regressor (to allow the effect of inertia in saving rate), the within (i.e., fixed-effect) estimators of $\propto$ and θ are inconsistent. This is because the within model will have the first regressor $s_{i,t-1} - \overline{s_i}$ that is correlated with the error $\epsilon_{i,t} - \overline{\epsilon_i}$, . Instrumental-Variable (IV) estimators using lags as instruments will not solve the problem because any lags of $s_{i,z}$ will also be correlated with $\overline{\epsilon_i}$.

corresponding variables.[24] These are appropriate instruments under this additional assumption: *there is no correlation between the differences of the right-side variables and the country-specific effect in equation (1), even if there is correlation between the levels of those variables and the country-specific effect.* With this method, we do not need to assume that the explanatory variables are strictly exogenous, even though we still need to assume that the explanatory variables are weakly exogenous – that is, they can be affected by current and past realizations of the saving rate but not by future saving rates.

The consistency of the GMM-system estimators depends on whether lagged values of the explanatory variables are valid instruments in the saving regression. To address this issue, we perform two specification tests. The first is the Sargan test of overidentifying restrictions first suggested by Arellano and Bond (1991), which tests the joint validity of the instruments. When the null hypothesis cannot be rejected, the error term is uncorrelated with the instruments. The second is the test of the hypothesis that the error terms $\epsilon_{i,t}$ are not serially correlated or, if it is correlated, that it follows a finite-order moving-average process. First-order serial correlation $\Delta\ \epsilon_{i,t}$ is expected, even if $\epsilon_{i,t}$ are serially uncorrelated, because Cov$(\epsilon_{i,t} - \epsilon_{i,t-1}, \epsilon_{i,t-1} - \epsilon_{i,t-2}) \neq 0$. But $\Delta\ \epsilon_{i,t}$ will not be correlated with $\Delta\ \epsilon_{i,t-k}$ for $k \geq 2$, if $\epsilon_{i,t}$ are serially uncorrelated. Thus, if the test fails to reject the null hypothesis that Cov$(\Delta\ \epsilon_{i,t}\ ,\ \Delta\ \epsilon_{i,t-k}\ ) = 0$ for $k = 2\ and\ 3$, we conclude that the original error-term is serially uncorrelated.

[24] In equation (2), $\left(s_{i,t-1} - s_{i,t-2}\right)$ is correlated with $(\epsilon_{i,t} - \epsilon_{i,t-1})$, yielding inconsistent estimators. To circumvent this problem, Anderson and Hsiao (1981) suggested using $s_{i,t-2}$, which is uncorrelated with$(\epsilon_{i,t} - \epsilon_{i,t-1})$, as an instrument for $\left(s_{i,t-1} - s_{i,t-2}\right)$.

3.4 Regression Results

We report the estimation results of the system-GMM regressions in two sets of tables. The first set of tables, Tables 2A and 2A', reports results of regressions that do not include *adjusted growth* as a regressor, with Table 2A reporting results that include China in the sample and Table 2A' those that do not include China in the sample. The second set of tables, Tables 2B and 2B', reports results of regressions that include *adjusted growth* as a regressor, with Table 2B results that include China in the sample and Table 2B' those that do not. In all tables, the first column includes only nonpolicy variables as regressor; in each of the next four columns, one type of policy variables – *the real interest rate, government saving, inflation,* and *the two exchange rate variables (i.e., change in the exchange rate and undervaluation)* – are added as a regressor one at a time because those policy variables are likely to be strongly correlated; the sixth regression includes *the East-Asia dummy* as a regressor besides all nonpolicy variables as well as the two exchange-rate variables.

All tables show that the specification tests generally support the use of GMM-system panel estimates. In all regressions, the Sargan test of overidentifying restrictions cannot reject the null hypothesis that the instruments are uncorrelated with the error term. Likewise, the tests of serial correlation reject the hypothesis that the error term is either second-order or third-order serially correlated, giving additional support to the use of lagged explanatory variables as instruments in the regression. In other words, these specification tests give support to our assumption regarding the instruments employed in the system-GMM procedures. Thus, in the subsequent discussion, we will interpret our estimates under the assumption that we have succeeded in isolating the effects of the exogenous component of the explanatory variables on the saving rate.

General observations of results presented in all four tables:

- All explanatory variables, except *inflation,* are statistically significant at the 95% confidence level in at least two tables. They also all have the expected, or theoretically justifiable, sign. Explanatory variables' coefficients in Tables 2B and 2B' are somewhat more stable across models than those in Tables 2A and 2A'. In particular, the coefficient estimates on both *urbanization* and *social safety net* in Tables 2A and 2A' are considerably more varied in magnitude and statistical significance across models than those in Tables 2B and 2B'.
- National saving rate is estimated to be a positive function of *real GDP per capita, growth rate of real GDP per capita, income-adjusted growth rate, government saving, real exchange rate change (i.e., real currency depreciation), and undervaluation;* and a negative function of *domestic credit/GDP, old dependency, young dependency, social safety net, and urbanization*.[25] *The real interest rate* has a negative coefficient, suggesting that its income effect outweighs the sum of its substitution and wealth effects. This is not that counterintuitive for developing economies in which other motives for saving is likely to outweigh the substitution effect of the real interest rate.[26] A one-percentage point increase in *government saving* leads to about 0.3 percentage-points increase in national saving, suggesting that there is a partial Ricardian Equivalent effect.

[25] The real exchang rate is the price of the US dollar in foreign currency terms, adjusted for the relative prices. Thus, a higher level of the real exchange rate means the real purchasing power of a country's currency is lower in dollar terms, and an increase in a country's real exchange rate means a depreciation of its currency.

[26] Loayza, Schmidt-Hebbel and Serven (2000) point out that such result should be taken with some caution. In view of the strong negative correlation between inflation and the real interest rate, the real interest rate measure may reflect more the action of nominal interest-rate controls and financial repression than the intertemporal rate of substitution of consumers.

- The coefficient estimates on the lagged dependent variable are around 0.5 in all four tables, indicating that there is a high degree of persistence in national saving. This in turn implies that the long-run effects (on saving rate) of other explanatory variables are about twice as large as their respective short-run effects, if all changes in these variables were permanent.

Comparing Table 2A to Table 2B:

- The coefficient estimate on *income-adjusted growth rate* is statistically significant, with an expected sign and a reasonable magnitude, in all six regressions reported in Table 2B. This offers some evidence of the "catch-up effect hypothesis" which argues that the marginal effect of economic growth on the saving rate tends to be higher for poor countries with high growth rate than for richer countries.
- The coefficient estimate on *urbanization* in all regressions in Table 2B is statistically significant at 90% confidence and lies within a narrow range (from -0.027 to -0.070); in comparison, it is statistically significant in only two regressions in Table 2A and its magnitude varies much more widely (-0.001 to 0.084) than in Table 2B. A similar comparison also applies to the coefficient estimates on *social spending*, though to a lesser extent. This suggests that the specification with *income-adjusted growth rate* is a better specification than the one without.

Comparing Table 2A to Table 2A':

- The *East-Asia dummy* has a large, positive, and statistically significant coefficient in both tables, even after all nonpolicy variables and the two exchange-rate variables are accounted for. However, its coefficient is much smaller in Table 2A' (short-term= 4.25; long-term=

8.69) than in Table 2A (short- term=6.76; long-term=14.45). This suggests that the factors captured (or proxied) by that dummy was even more forcefully at work to boost saving rate in China than in its East-Asian peers, and that the coefficient estimate on the *East-Asia dummy* in Table 2A was driven more by China than other East-Asian economies.

- The coefficient estimates on the two exchange-rate variables – *change in real exchange rate (i.e., real currency depreciation)* and *undervaluation* – are statistically significant with similar magnitudes in both Tables 2A and 2A'. This suggests that the marginal impact of real exchange rates on saving rates in China is not markedly different from that in other countries. In each table, the magnitudes of those exchange-rate coefficients are also stable regardless of whether the *East Asia dummy* is included in the regression, suggesting that the net effect of factors captured/ proxied by that dummy is largely independent of the exchange rate.

Comparing Table 2B to Table 2B':

- On average, the coefficient estimates on *income-adjusted growth* are somewhat larger in Table 2B than in Table 2B'. This suggests the catch-up effect is more powerfully at work in China than in other countries.
- The coefficient on the *East-Asia dummy* of Model B6 when China is excluded from the sample (column 6 in Table 2B') is statistically insignificant and quantitatively much smaller than that when China is included in the sample (column 6 of Table 2B). In comparison, the coefficients on *income-adjusted growth* of Model B6 remained statistically significant and equal in magnitude regardless of whether China is included in the sample or not. This suggests that (1) the factors proxied by the *East-Asia dummy* are highly

correlated with the drivers of the "catch-up" growth in China's East-Asian neighbors; and (2) there are other factors proxied by the dummy that are more powerfully at work in China than in other East-Asian economies.

Comparing our results to the literature:

How do our estimates compare to others in the literature? As far as we know, IMF (2005) is the only study of national saving rate using a large cross-country panel dataset since the influential work by Loayaza et al. (2000), or LHS (2000).[27] A comparison between coefficient estimates in Table 2A – the regression closest to of LHS (2000) and IMF (2005) in regression specification and the construction of explanatory variables – and those two previous papers are presented in Table 3. Given that there are considerable differences between our paper and those papers, it comes as no surprise that there are some differences in the size of the estimators in those three studies.[28] Having said that, it is reassuring that our long-term coefficient estimates on the *old dependency ratio*, *the young dependency ratio*, *urbanization*, *the real interest rate*, and *the real exchange rate change*, are all reasonably close to those in LHS (2000); those on the *growth of real per capita GDP*, *real per capita GDP*, and *domestic credit/GDP* are qualitatively comparable to, though noticeably smaller (in absolute terms) than, those in LHS (2000). Our coefficient estimate on *government saving* (0.283) is also close to that in IMF (2005).

[27] IMF (2005) applies the same methodology as in Loayaza, Schmidt-Hebbel and Serven (2000) to a smaller set of explanatory variables.

[28] The differences are several – including differences in model specification, measurement of independent and explanatory variables, number of countries and sample period. For example, national saving in our paper is calculated as Gross National Income (GNI) minus consumption. In LHS (2000), it is Gross National Disposable Income, which equals to GNI plus all net unrequited transfers from abroad. LHS's data are from 1965 to 1994, and ours are from 1980 to 2007.

4. How High is China's Unexplained Saving?

To what extent can China's high saving be explained by variables included in our models? Table 4 shows that China's national saving rate is higher than the predictions of all 12 models presented in Tables 2A and 2B, even though the extent of its "unexplained saving" – the difference between national saving and long-term forecast of a regression equation – varies across the models.[29] By the standard of those 12 models, China's unexplained saving ranged from 3.7 to 19.8 percentage points. By the standard of those same models estimated with the dataset excluding China (regressions in Tables 2A' and 2B'), China's unexplained saving ranged from 11.8 to 21.3 percentage points.

Which of the models is most appropriate as the "benchmark model" for our purpose? Among the 12 models in Tables 2A and 2B, by the standard of the average unexplained saving of all countries in the full dataset, the best model appears to be A6, the model that includes *the East-Asia dummy* and *the two exchange rate variables* but excludes *adjusted-growth rate*. By the standard of the average unexplained saving of all OECD countries and that of China, the best model is B6, the model that includes *the East-Asia dummy, the two exchange rate variables,* and *adjusted-growth rate*. However, neither model A6 nor B6 is suitable as the benchmark model for our purposes because our preceding analysis suggest that the *East-Asia dummy* is largely be due to China-specific factors – including its unique industrial-policy mix as well as its government's ability to command those policies through the state-owned enterprises and other means – that are not shared by all countries. Among models that do not include the *East-Asia dummy* as an

[29] The long-term model forecasts are obtained by ignoring fixed-effects of each country, summing up only the long-term marginal effects of all explanatory variables in each model, where the marginal effect of Variable X = (level of Variable X)* [coefficient of Variable X/(1-coefficient of lagged saving)].

explanatory variable, the unambiguous winner is Model B5 (the model that includes *income-adjusted growth rate* and *the two exchange rate variables* besides all nonpolicy variables).

Several observations suggest that Model B5 is the most suitable choice as our benchmark model. To begin with, the average unexplained saving rate by its standard (i.e., the difference between national saving rate and the long-term forecast of Model B5) is smaller than that of all other models except Model A6 and B6 (Table 4). Furthermore, Model B5's ability to fit national saving rates of other countries remain relatively unchanged regardless of whether it is estimated with or without China in the dataset (Figures 3.1- 3.11). This is clearly not the case if Model B6 were chosen as the benchmark model. While the long-term forecast of Model B6 outperforms that of B6' for China and Japan, the opposite is true for all G-7 industrial countries as well as other East-Asian economies (Figures 4.1-4.11). These results further reinforce the interpretation that *the East-Asia dummy* mostly captures or proxies factors that are unique to China, not a determinant of saving rates common to most countries and thus should not be included as an explanatory in our benchmark model.

Using Model B5 as the benchmark model, China's average unexplained saving was about 10.3 percentage points, or 24% of its national saving, from 1990 to 2007. If we use Model A5 (of Table 2A), which differs from Model B5 only in its exclusion of *adjusted-growth rate* as an explanatory variable, China's average unexplained saving rate would be even higher at 14 percentage points. Either by the standard of B5 or A5, China had a higher level of unexplained saving rate over its sample period than almost all other countries included in the sample; only Bhutan has higher unexplained saving rate than China by both standards (Tables 4A, 4B, 4A' and 4B').

5. What Factors are Responsible for China's High National Saving Rate?

Although about one-quarter of China's saving rate is unexplained by our benchmark model, the extent of China's saving rate explained (about 33 percent of GDP) is still considerably higher than the average saving rate of the OECD countries as well as that of all 70 countries in the sample (both are about 22 percent of GDP). Moreover, the average "unexplained saving" of OECD countries and of all countries in the sample, respectively, are both near zero when compared to the forecast of the benchmark model. Those results suggest that we can use our benchmark model to assess the relative contributions of our explanatory variables to the saving-rate gap between China and those two groups of countries. We will limit our quest to assess the contributions of those variables to the large saving gap between China and OECD countries.

Many of our explanatory variables – especially *the growth rate (*including *the income-adjusted growth rate), old dependency, urbanization, social spending,* and *currency undervaluation* – appear to be promising candidates of accounting for the China-OECD saving gap large, given that their relative sizes in those two economies (Table 5). However, whether that's the case also depends on the elasticity of saving rate with respect to each variable (i.e., the estimated coefficient on that variable in the benchmark model). Since the coefficient estimate on each variable varies somewhat across the models, we present the marginal contributions of each explanatory variable of all models excluding *adjusted growth rate* in Tables 6A, and those including *adjusted growth rate* in Tables 6B; their respective counterparts estimated with the dataset excluding China are reported in Tables 6A' and 6B'.

Those four tables indicate that, regardless which model is used as the benchmark, *China's much lower level of old dependency ratio* stand out as the explanatory variable most responsible for China's much higher saving rate. The rankings of other factors are somewhat model-

dependent. Based on our benchmark model (Model B5), the other important factors, in a descending order of importance, are China's higher *growth rate of real GDP per capita* (including *the adjusted growth*), *weaker social safety net,* and *lower urbanization ratio.* All of those factors' contributions to the saving gap have declined somewhat in recent years; but they remain more important than other factors. The contribution of China's *lower old dependency ratio* declined somewhat from **77%** (= 14.1/18.4) in 1990-2000 to **59%** (= 13.9/23.6) in 2001-2006; that of China's *higher growth rate* fell from **29%** (=(2.0+3.4)/18.4) to **19%** (=(2.2+2.0)/23.6), that of its *weaker social safety net* fell from **27%** to **19%**; and that of its *lower urbanization* fell from **26%** to **17%**. China's real exchange rates – including both effects of *real currency depreciation* and *currency undervaluation* – turns out to be a more modest contributor to its higher saving rate than those four factors in both subperiods: its contribution was **14%** (=2.6/18.4) in 1990-2000, and **12%** (=2.9/23.6) in 2001-2006. The other variables generally made either little or negative contributions to China-OECD saving gap.

Admittedly, our benchmark model has become less able to account for China's saving rate since 2001 (Figure 3.1). Even Model B6 – which includes the East-Asia dummy and thus our most "Chinese" model of national saving – has become increasingly unable to track China's saving rate since 2001 (Figure 4.1). Clearly, some factors not included in our models have become increasingly important in driving China's saving rate in recent years. What might they be? One possibility is the widening gender-imbalance hypothesized by Wei and Zhang (2009), which argues that the saving rate started to shoot up around **2002** largely because that's when the gender ratio for the marriage-age cohort began to be seriously out of balance, forcing households with sons to raise their savings to increase the chance of winning a bride. Another, less established, factor may be the increase in the transfer of income away from the household sector (to banks and

businesses) as a result of policymakers' schemes to resolve the crisis posed by the surge in non-performing loans (NPLs) that began in the late 1990s. The government began to carry out a variety of measures to reduce the NPLs since 1998; those efforts began to speed up in earnest since 2001 as the government stepped up the country's transition from a centrally planned economy to a market-oriented one.[30] According to Pettis (2010), the government's measures to resolve the bad-loan crisis all resulted in passing the bail-out costs on to bank depositors.[31] Thus, he argues, household income – already a relatively low share of domestic income by international standards – declined further. It is undeniable that China's household income share did begin to decline significantly since 2001, regardless of whether the NPL bailout was the main cause (Figure 5). That decline, combined with a rising personal saving rate during the same period (Figure 6), no doubt contributed to the rise in China's national saving rate unexplained by our models in recent years.[32]

6. China's High Saving and the East-Asian Economic Growth Model

The finding that Model B6, which includes the *East-Asia dummy,* explained nearly 92 percent of China's saving rate from 1990 to 2006 begs this question: how much of China's high saving rate is attributable to factors that are shared by East Asian economies but different from the

[30] See Xu (2005).

[31] According to Pettis (2010), those three tools are as follows. First, the central bank slowed the accumulation of non-performing loans (NPLs) by keeping lending rates low, making it easier for struggling businesses to rol l over the debt as the economy grew and reduced the real value of debt payments. Second, policymakers infused the banks with additional equity, partly directly and partly by purchasing bad loans at above their liquidation value. They financed these capital infusions by borrowing at artificially low rates, thereby passing the repayment burden on to lenders. Finally, the central bank mandated a wide spread between the bank lending and the deposit rate, which helped to recapitalize banks through increasing their profitability. All three tools required that bank depositors subsidise the bail-out of the banking industry.

[32] For example, see Aziz and Cui (2007) for discussion of the role of household income in China's low consumption.

rest of the world? This section discusses this issue by drawing from empirical findings of this paper, the literature, and some stylized facts.

The fact that the coefficient estimate on *the East-Asia dummy* becomes statistically insignificant when Model B6 is re-estimated without China in the dataset would seem to suggest that the dummy mainly captures China-specific factors. However, that the same dummy remains statistically significant in Model A6 – when that model is estimated using the same dataset that excludes China – suggests one cannot easily dismiss the dummy as merely a proxy for China-specific fixed effects. Since *adjusted growth rate* is included in Model B6 but not in Model A6, those two sets of results together suggest that those East-Asian factors responsible for high saving rates in East Asian economies (i.e., those proxied by *the East-Asia dummy*) are already captured by *adjusted growth rate*, the proxy for factors underlying the rapid "catch-up" growth in those economies. Thus, when China is excluded from the dataset, the *East-Asia dummy* becomes insignificant in a model that already which includes *adjusted growth rate*, but remains significant in the model that does not. What may those common factors be?

Volumes have been written about why the East-Asian economies have managed to grow much more rapidly than other developing economies. In that literature, the so-called East-Asian growth model can be loosely described as a "high saving- high investment-high growth-high saving" strategy modeled after Japan's model of economic growth and development.[33] Although specific policy mix varied across East-Asian economies, that growth model basically relies on heavy government interventions that favor capital formation (i.e., industrialization) at the expense of consumer spending, through various means that effectively force savings from consumers to

[33] For example, see Hirono (1988) and other articles collected in Hughes (1988). A study by the World Bank (1993) also emphasizes that a "virtuous circle" – going from higher growth, to higher savings, to even higher growth – has played a central role in successful development experiences in East Asia.

keep the cost of financing low for investment.[34] For example, several East-Asian economies – including Japan, South Korea, and Taiwan – adopted policies of credit creating (in some sub-periods during their years of industrialization) to provide affordable credit to business, allowing inflation to effectively curtail consumer spending. Until recent years, consumers generally had more difficulty obtaining credit than did business entities in those countries. Indeed, even in Japan, which grew to become a rich and industrialized country more than three decades ago, policies that favor business investment at the expense of consumer demand have only begun to fade or be reversed in recent years.[35] Haggard (1988) argues that a key element underlying those East-Asian governments' ability to implement those policies with success is their political systems "in which economic policymaking process was relatively *insulated* from direct political pressures and compromises" and "legislature are historically weak or non-existent and other channels of political access and representation tightly controlled, even under nominally democratic regimes."

There is plenty of evidence that China has adopted its neighbors' successful strategies of achieving rapid growth through high saving and investment. For example, China's policies are known to favor capital-intensive investment, which arguably is less effective in creating jobs to absorb its large pool of excess labor than labor-intensive investment. Growth has been capital-intensive and profits have outpaced wage income, contributing to depress household consumption relative to national income. (Capital-intensive production has been encouraged by low interest rates and by the fact that most state-owned firms do not pay any dividends, allowing them to reinvest all their profits. Furthermore, the government has also favored manufacturing over

[34] Foreign credit tended to be too expensive or too scant during the early stage of industrialization in those countries after WWII.

[35] Japan's national saving rate stayed over 30 percent throughout its fast-growing decades. It fell below 30 percent only after 1997 as its government deficit continued to rise during its prolonged economic slump of the past two decades. Still, despite its large government deficit, Japan's average national saving rate during 2000-2006 (26.4%) was still higher than that of OECD (23.8%).

services by policies such as holding down the yuan exchange rate and suppressing the prices of inputs such as land and energy.) Most economists now agree that a main reason underlying the rise in China's national saving rate is that households' disposable income had grown more slowly relative to GDP. Kuijs (2005, 2006) even argues that "China's high saving rate, compared to other countries, is as much driven by high saving of enterprise and the government as by high household saving."

It is fair to say that all three players – the household sector, the corporate sector (both private-owned and state-owned enterprises), and the government – have been responsible for China's high saving rate. This is consistent with what one would expect from a country that has adopted the East-Asian growth model, especially if the first two groups' high savings are in part induced by government policies. Indeed, the household saving/GDP ratio has again surpassed enterprises saving/GDP after 2004, the year Kuijs's data ended (Figure 7). This resurgence of households saving/GDP occurred despite the decline in the share of national income going to households. In fact, China's household saving rate has continued to rise rapidly since the early 1990s, reaching nearly 30 percent by 2008 (Figure 8).

The evolution of national saving and economic growth in Japan, the grandfather of the East-Asian growth model, suggest that once the Chinese economy is better developed and ranked among rich countries (in terms of real GDP per capita), we are likely to see a slow "normalization" of China's saving rate. Given that China's real GDP per capita in 2007 was still slightly below that of Japan in the early 1960s, however, it is unlikely that China's saving will decline to a more "normal" level within the next decade.[36] Nevertheless, there are signs that that process of

[36] Japan's real GDP per capita (in PPP-adjusted 2005 dollar) was $5698 in 1960. In comparison, China's real GDP per capital was $5084 (in PPP-adjusted 2005 dollar) in 2007. (China's data is taken from 2009 World Economic Indicator, published by the World Bank; Japan' data is from Bureau of Labor Statistics of the United States.)

"normalization" has begun. For example, the government allowed its currency to fall against the US dollar for over 17 percent from June 2005 to July 2008 (the beginning of the 2008-2009 global financial turmoil). That trend is likely to continue once the global economy begins to recover on a more solid footing. The government has also begun to strengthen the social safety net in recent years, especially after 2005 (Figure 8).[37]

7. Conclusion

This paper finds that, on average, China's national saving rate is higher than the predictions of our benchmark models by about 10 to 12 percentage points on average from 1990-2007, depending on whether China is included in the dataset. Many traditional determinants of saving indeed have a statistically and quantitatively significant effect on national saving rates. The predominant drivers of China's higher saving rates are its *low old dependency ratio* and, to a less extent, its *strong growth rate*, *weak social safety net*, and *low urbanization.* The contribution of China's *currency undervaluation* to its saving rate is relatively more modest. Our results also suggest that some factors shared by East Asian economies have also contributed to China's growth rate. Those factors are mainly those underlying the high-saving-high-growth strategy of East Asian economies. However, it is beyond the scope of this paper to disentangle the many complex factors that are likely to be proxied by that dummy.

Our results imply that as the average Chinese population become older and its national income converges to its potential, its saving rate will also begin to decline.

[37] For example, the Chinese government has promised to spend 850 billion yuan ($125 billion) in 2009-11 to widen health-insurance coverage and improve public clinics and hospitals. It is also reforming the pension system which now leaves out over half of urban workers and 90% of their rural counterparts.

Appendix 1. Definition of Variables and Sources of Data

Data are obtained from the World Bank's *World Development Indicators 2008*, except otherwise indicated. Outliers removed from the sample include (1) Domestic Credit/GDP greater than 1000; (2) Real interest rates greater than 50 or smaller than-50; (3) Inflation rates greater than500.

Adjusted growth rate of real GDP per capita of country *i* is the product of an income-adjustment factor and the growth rate of real GDP per capita of country *i*. The income-adjustment factor is the moving average of (Y^{us}/Y^{i}) of the past three years, where Y^{us} is the real GDP per capita of the United States. That is, the adjusted growth is measured by [moving average of $(Y^{us}{}_{t-1,t-3}/Y^{i}{}_{t-1,\,t-3})$] x $[(Y^{i}{}_{t}/Y^{i}{}_{t-1}) -1]$.

Domestic credit (% of GDP) includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available (including institutions that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other banking institutions are savings and mortgage loan institutions and building and loan associations.

East Asia Dummy is set to equal 1 for China, Japan, South Korea, Singapore, and Hong Kong; it is set to zero for all other countries. (Taiwan is not included in the dataset because *World Economic Indicators* does not include data for Taiwan.)

GDP per capita, PPP (constant 2005 international $): GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 international dollars.

Gross savings (% of GNI) are calculated as gross national income less total consumption, plus net transfers. Source: World Bank and OECD.

Growth rate of real GDP per capita of country *i* is measured by $100*((Y^{i}{}_{t}/Y^{i}{}_{t-1}) -1)$, where $Y^{i}{}_{t}$ is real GDP per capita of country *i* in year *t*.

Index of currency undervaluation is constructed in the same fashion as that in Rodrick (2008).

Inflation is the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

National Saving Rate is the percent of Gross National Saving (Gross National Income-Consumption) to GNI.

Old dependency is the ratio of the old population (i.e., those older than 64 year) relative to the working-age population (i.e., those who are 15 year or older but not older than 64.)

Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator.

Real exchange rate (2000 = 100) is the index of the bilateral real exchange rate of a country's currency relative to the dollar. For the U.S., the real exchange rate is the Federal Reserve Board's broad index of its trade-weighted real exchange rate relative to its major trading partners.

Social spending is government's social spending as a percent share of GDP. Social spending includes expenditure on unemployment benefit, social security, healthcare, and education. Data are obtained from OECD, United Nations, (ECLAC's Social Panorama), and the Asian Development Bank. OECD are used for

Urbanization is measured by the mind-year urban population as percent of total population. Urban population is population of areas defined as urban in each country and reported to the United Nations.

Young dependency is the ratio of the young population (i.e., those younger than 15 year old) relative to the working-age population (i.e., those who are 15 year or older but not older than 64.)

Appendix 2. Descriptive Analysis of Data

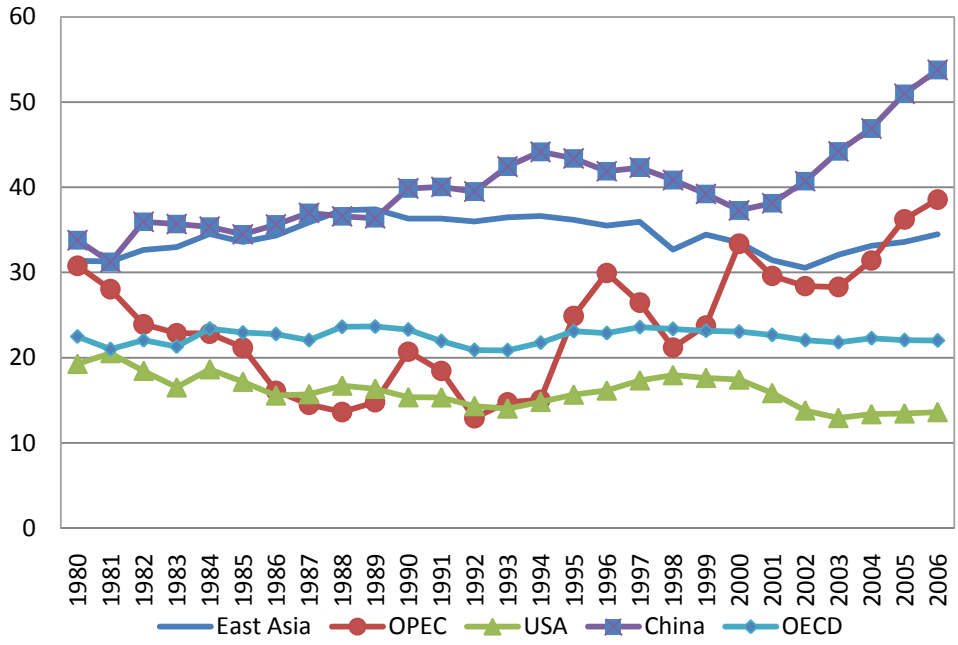
Table A1. Summary Statistics				
	Mean	Std. Dev.	Min	Max
National Saving Rate	19.1	10.5	-59.0	70.0
Urbanization	51.4	23.4	4.7	100.0
Young Dependency	57.7	24.1	19.4	110.7
Old Dependency	11.3	6.5	3.7	30.7
Growth of Real GDP/Capita	2.2	4.6	-31.3	58.5
Log(Real GDP Per Capita)	850.6	123.6	549.3	1093.4
Domestic Credit/GDP	58.9	46.0	0.1	313.5
Inflation	15.3	35.3	-13.1	492.4
Real Interest Rate	7.0	10.0	-49.8	48.4
Adj. Growth of Real GDP/Capita	34.2	65.3	-4.6	484.4
Net Government Saving	14.6	9.9	-10.5	83.5
Gov't Social Spending	14.3	7.7	0.0	35.8
Change in Real Exchange Rate	0.0	0.2	-0.9	2.8
Log (Currency Undervaluation)	0.0	0.5	-2.1	1.5

Table A2. Correlation Matrix of Variables in the Regression Equations of National Saving Rates

	Saving Rate	Urbanization	Young Dependency	Old Dependency	Growth of Real GDP/Capita	Log(Real GDP/Capita)	Domestic Credit/GDP	Inflation	Real Interest Rate	Adjusted Growth Rate	Gov't Saving	Social Spending	Change in Real Exchange Rate	Log (Currency Undervaluation)
Saving Rate	1.00													
Urbanization	0.31	1.00												
Young Dependency	-0.41	-0.67	1.00											
Old Dependency	0.17	0.59	-0.82	1.00										
Growth of Real GDP/Capita	0.28	0.08	-0.24	0.13	1.00									
Log(Real GDP Per Capita)	0.45	0.79	-0.81	0.72	0.14	1.00								
Domestic Credit/GDP	0.27	0.42	-0.53	0.48	0.01	0.60	1.00							
Inflation	-0.18	-0.01	0.09	-0.08	-0.20	-0.12	-0.11	1.00						
Real Interest Rate	-0.10	0.02	0.07	-0.06	0.03	-0.06	-0.11	-0.39	1.00					
Adjusted Growth Rate	-0.08	-0.35	0.23	-0.24	0.46	-0.44	-0.27	-0.03	0.07	1.00				
Government Saving	0.29	0.30	-0.29	0.29	0.06	0.41	0.10	-0.07	-0.08	-0.27	1.00			
Social Spending	-0.15	0.59	-0.65	0.81	-0.16	0.67	0.33	-0.16	0.01	-0.42	0.55	1.00		
Change in Real Exchange Rate	-0.05	-0.06	0.12	-0.08	-0.12	-0.07	0.00	0.04	-0.03	-0.04	0.00	0.02	1.00	
Log (Currency Undervaluation)	-0.10	-0.43	0.30	-0.44	0.08	-0.54	-0.43	0.18	0.03	0.33	-0.32	-0.68	0.09	1.00

Figure 1. National Saving Rate by Region

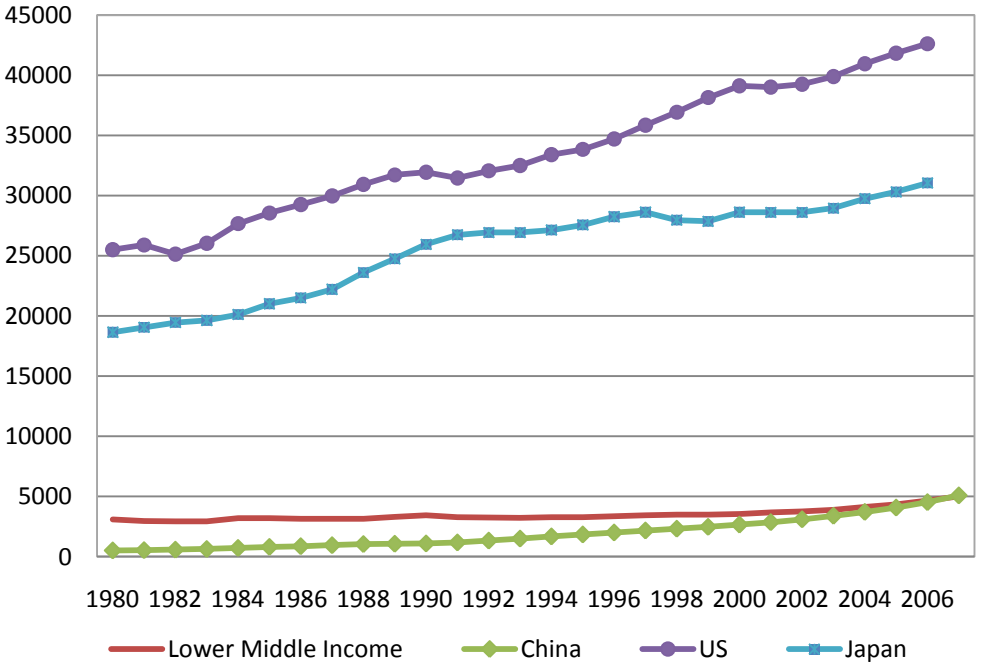
(percent)



Source: World Bank national accounts data and OECD National Accounts

Figure 2. Real GDP Per Capita

(Constant 2005 Int'l Dollars Based on PPP Rates)



Source: World Development Indicators 2008

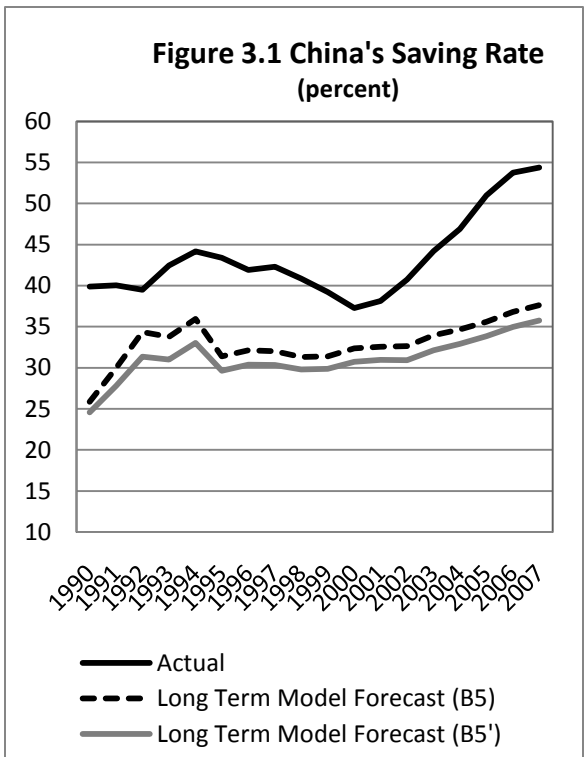


Figure 3.1 China's Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Actual
Long Term Model Forecast (B5)
Long Term Model Forecast (B5')

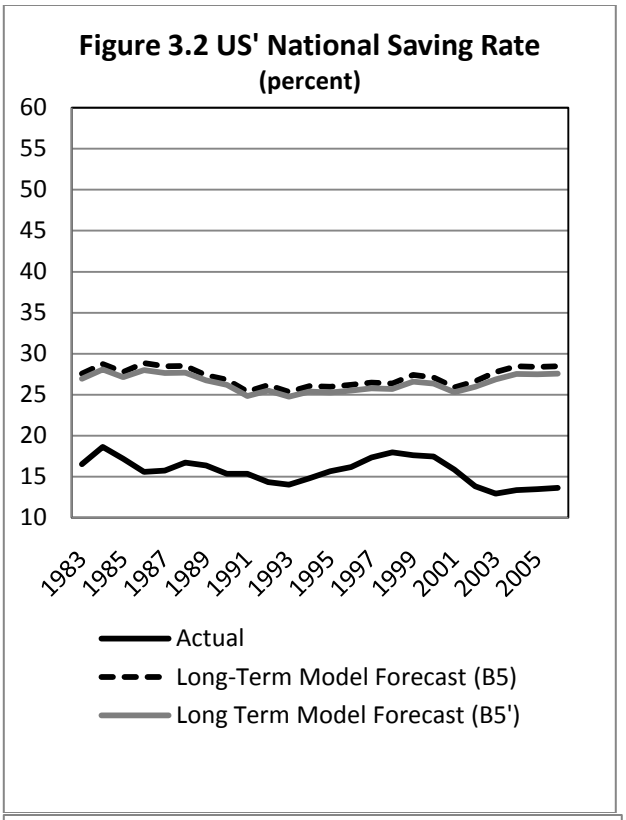
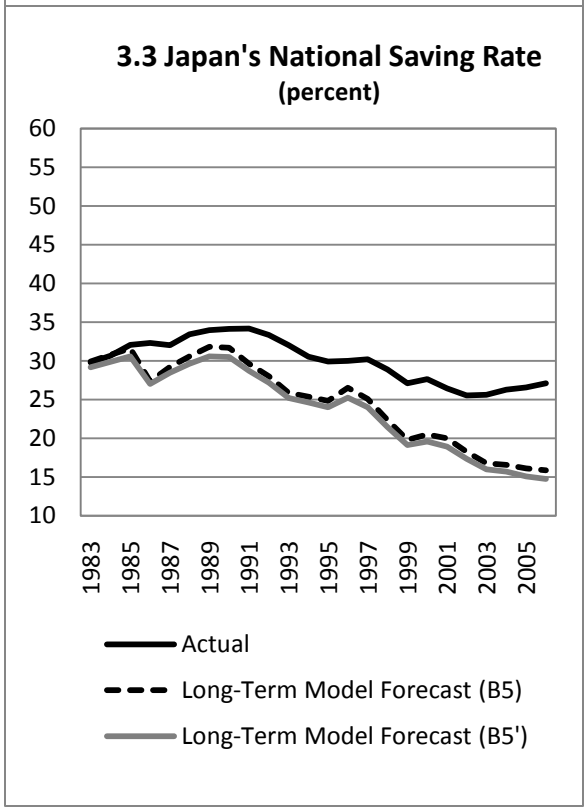
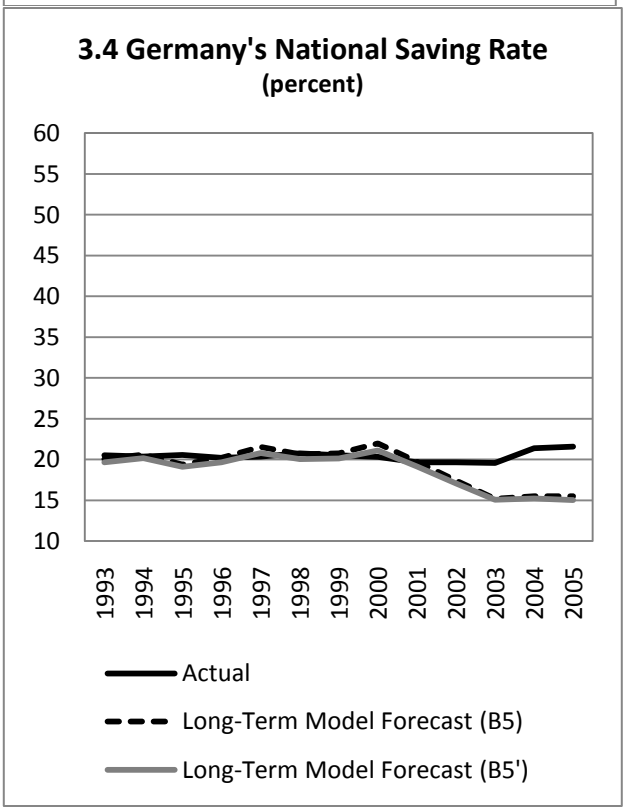
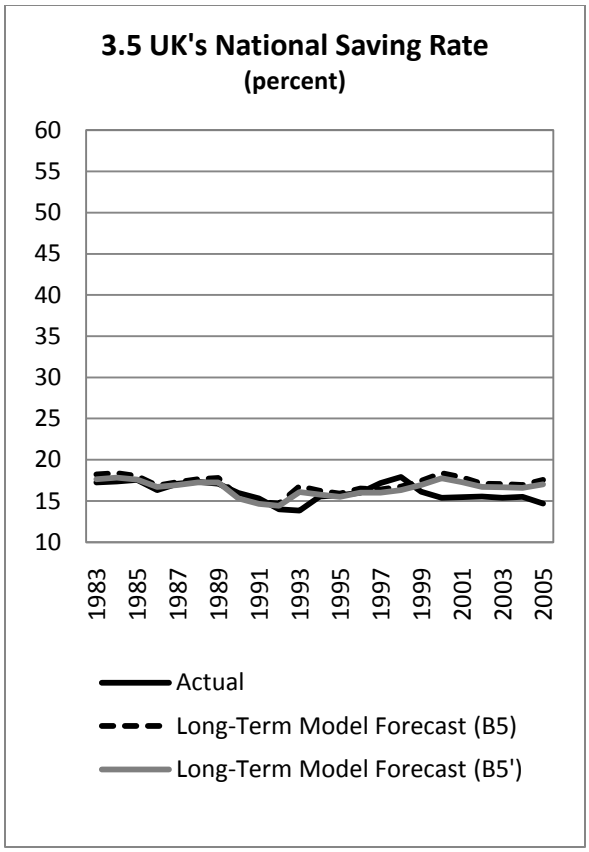
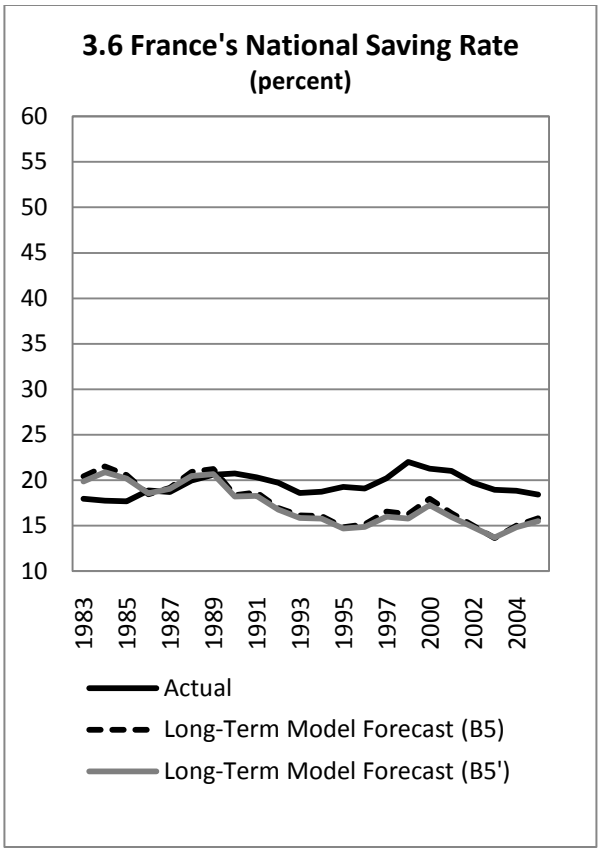


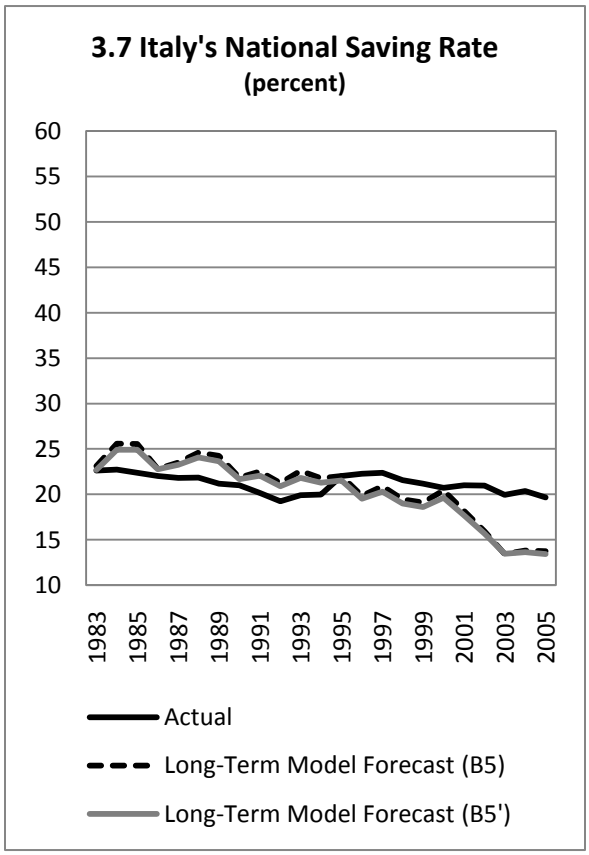
Figure 3.2 US' National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005
Actual
Long-Term Model Forecast (B5)
Long Term Model Forecast (B5')

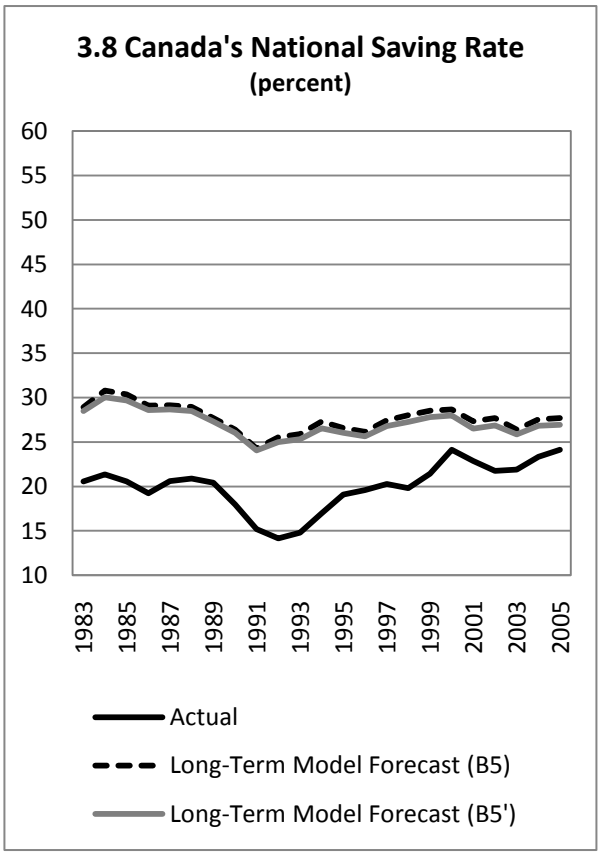

3.3 Japan's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')

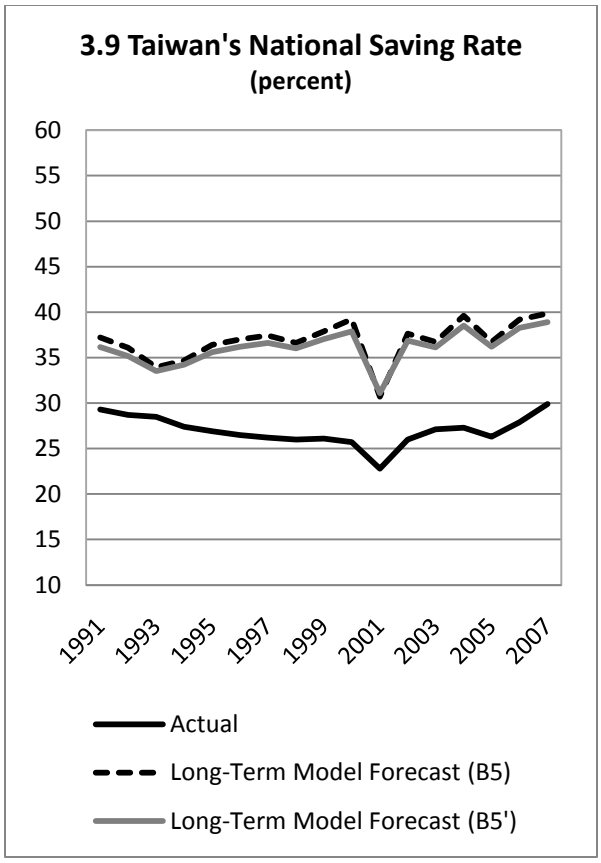

3.4 Germany's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')

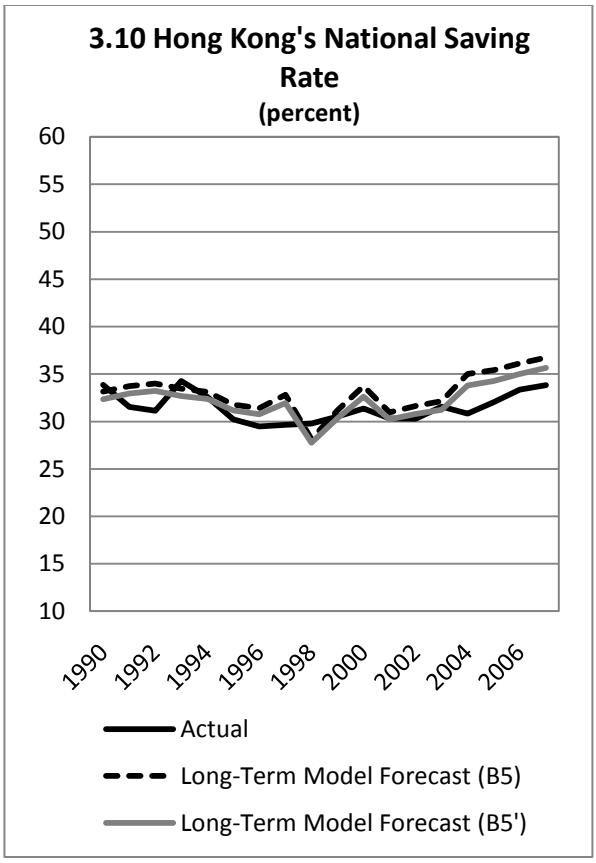

3.5 UK's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')

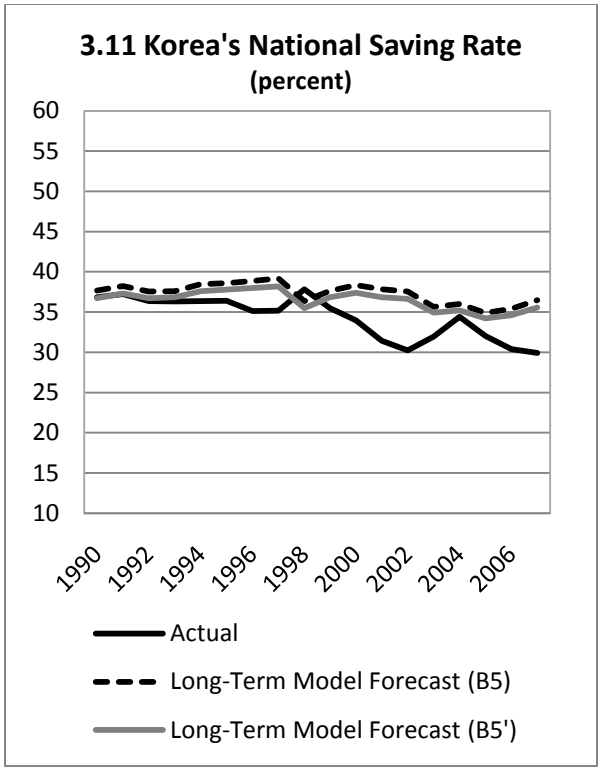

3.6 France's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983
1985
1987
1989
1991
1993
1995
1997
2000
2002
2004
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')


3.7 Italy's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')


3.8 Canada's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')


3.9 Taiwan's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1991
1993
1995
1997
1999
2001
2003
2005
2007
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')


3.10 Hong Kong's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1990
1992
1994
1996
1998
2000
2002
2004
2006
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')


3.11 Korea's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1990
1992
1994
1996
1998
2000
2002
2004
2006
Actual
Long-Term Model Forecast (B5)
Long-Term Model Forecast (B5')

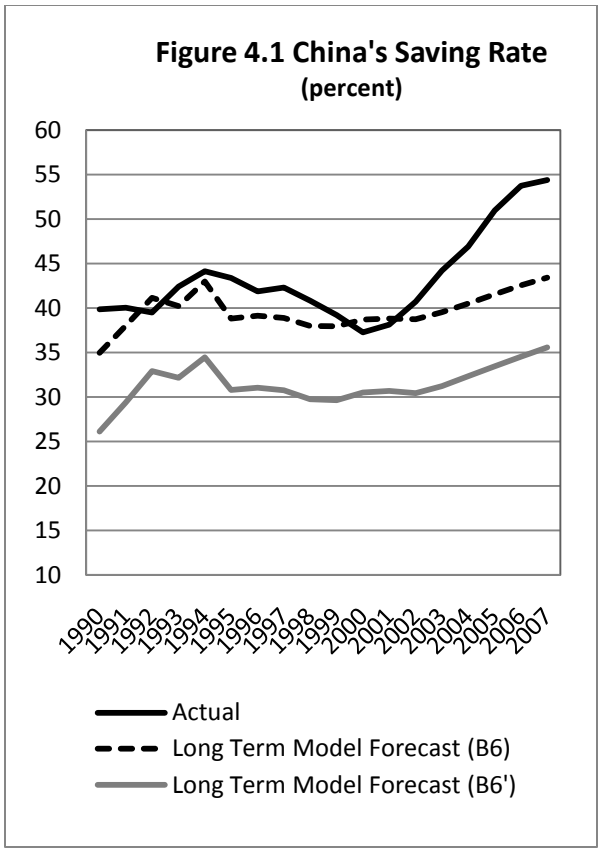


Figure 4.1 China's Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Actual
Long Term Model Forecast (B6)
Long Term Model Forecast (B6')

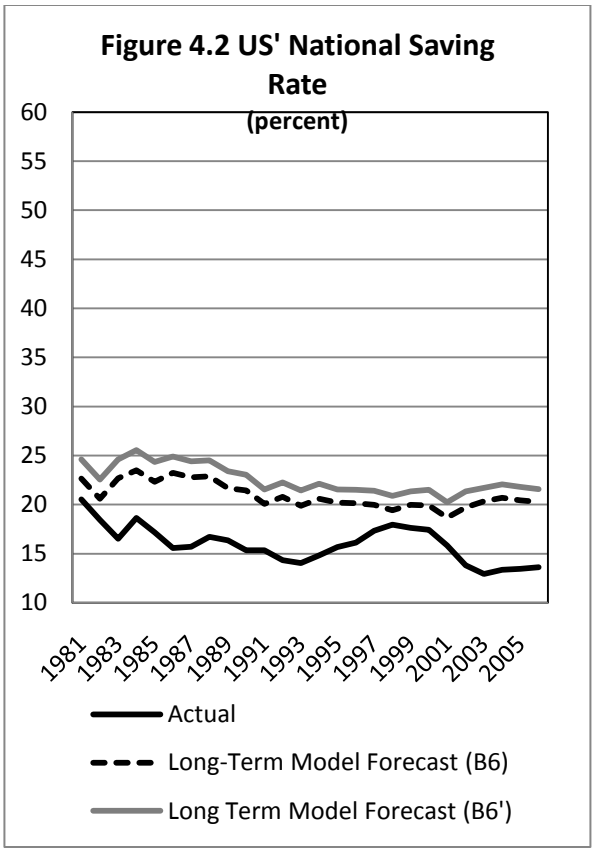
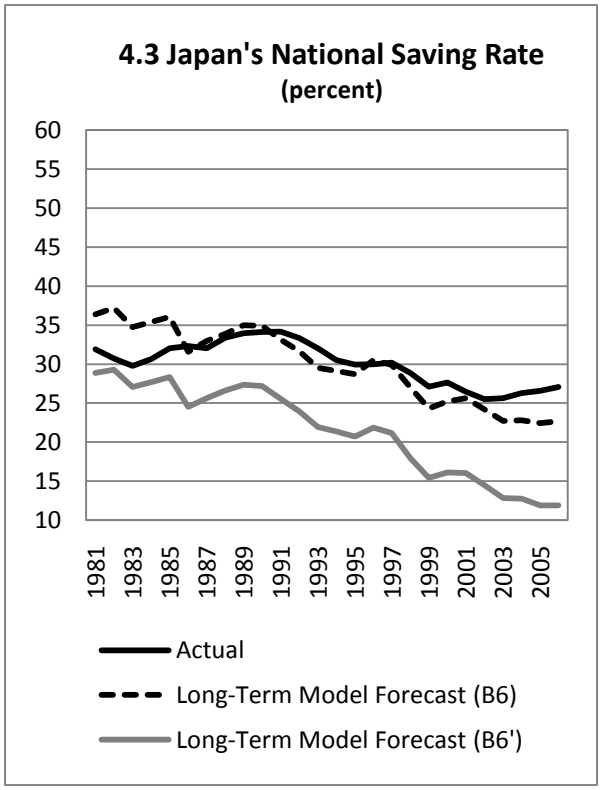
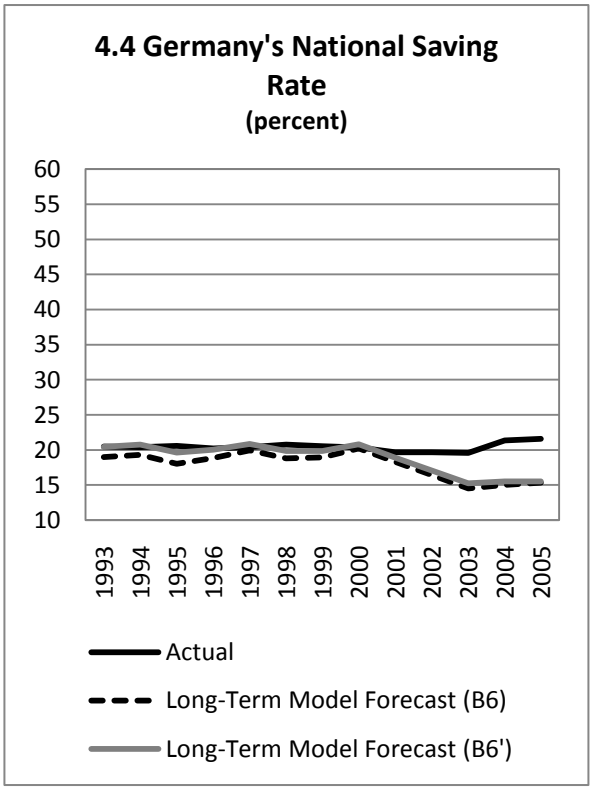
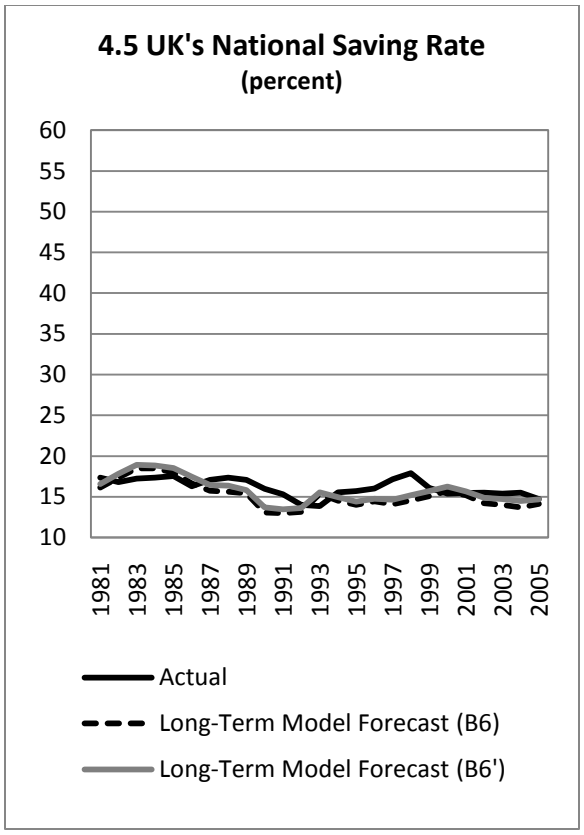
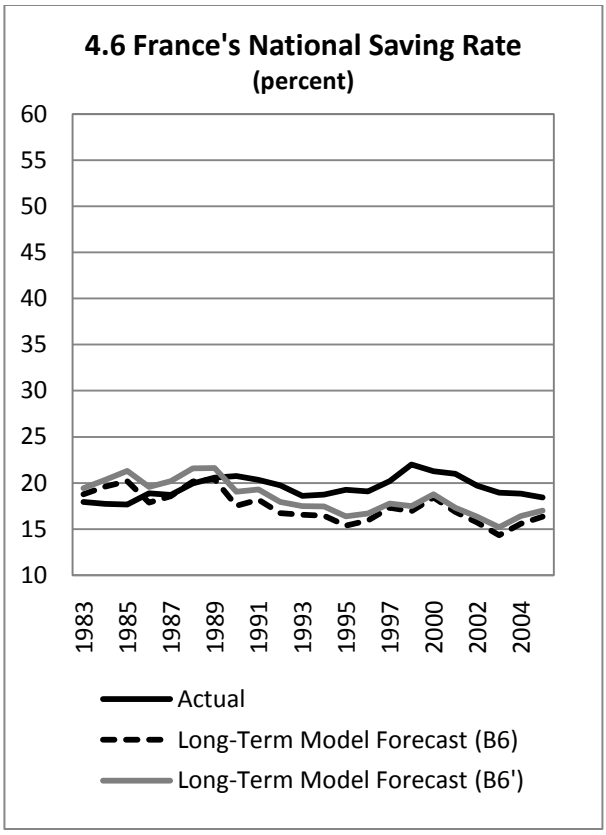


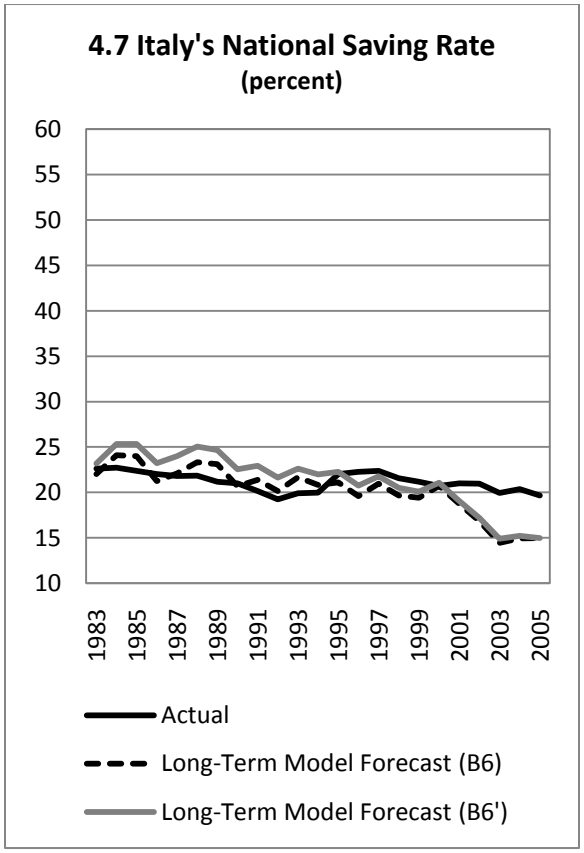
Figure 4.2 US' National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005
Actual
Long-Term Model Forecast (B6)
Long Term Model Forecast (B6')

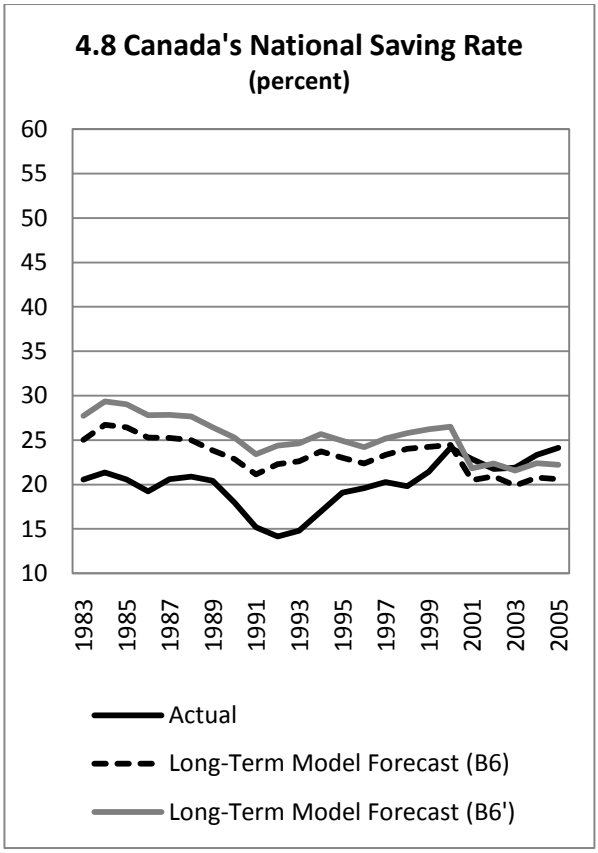

4.3 Japan's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')

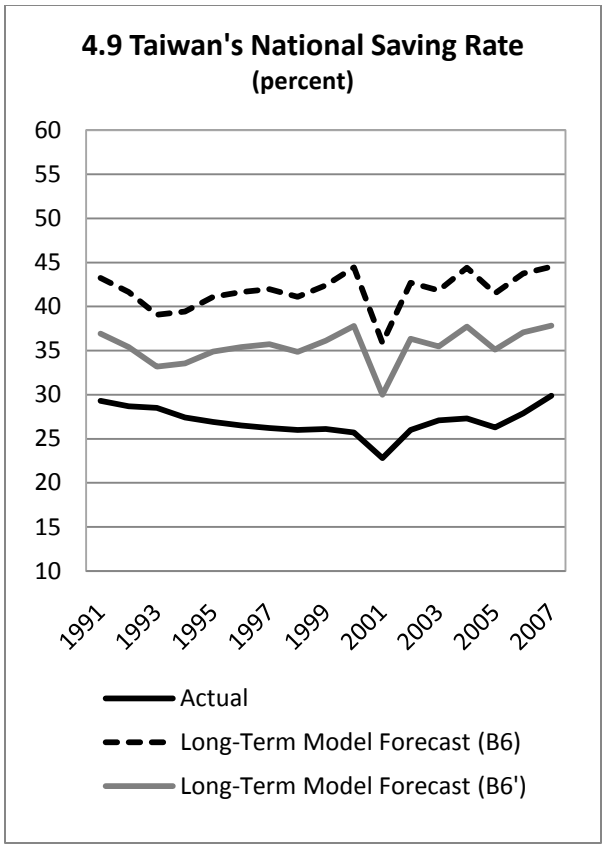

4.4 Germany's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')

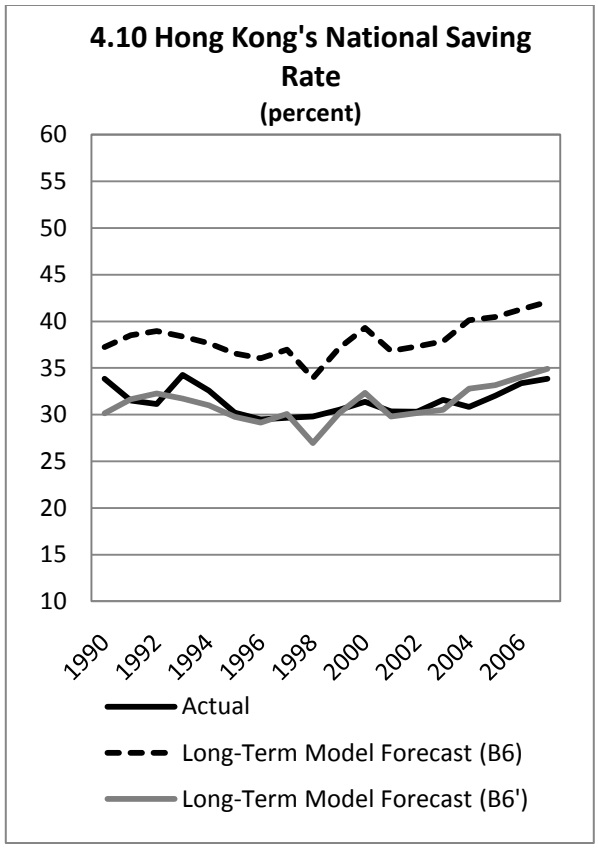

4.5 UK's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')


4.6 France's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983
1985
1987
1989
1991
1993
1995
1997
2000
2002
2004
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')


4.7 Italy's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')


4.8 Canada's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')


4.9 Taiwan's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1991
1993
1995
1997
1999
2001
2003
2005
2007
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')


4.10 Hong Kong's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1990
1992
1994
1996
1998
2000
2002
2004
2006
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')

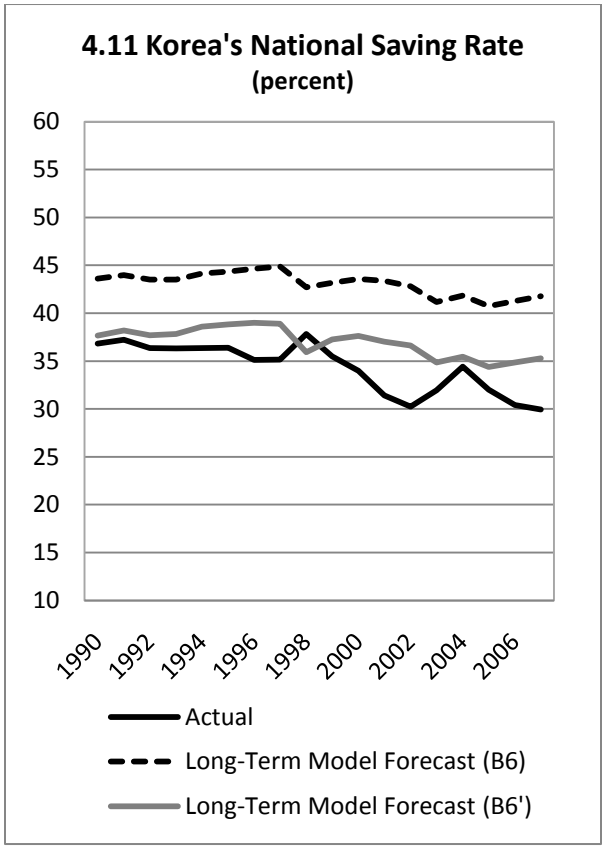
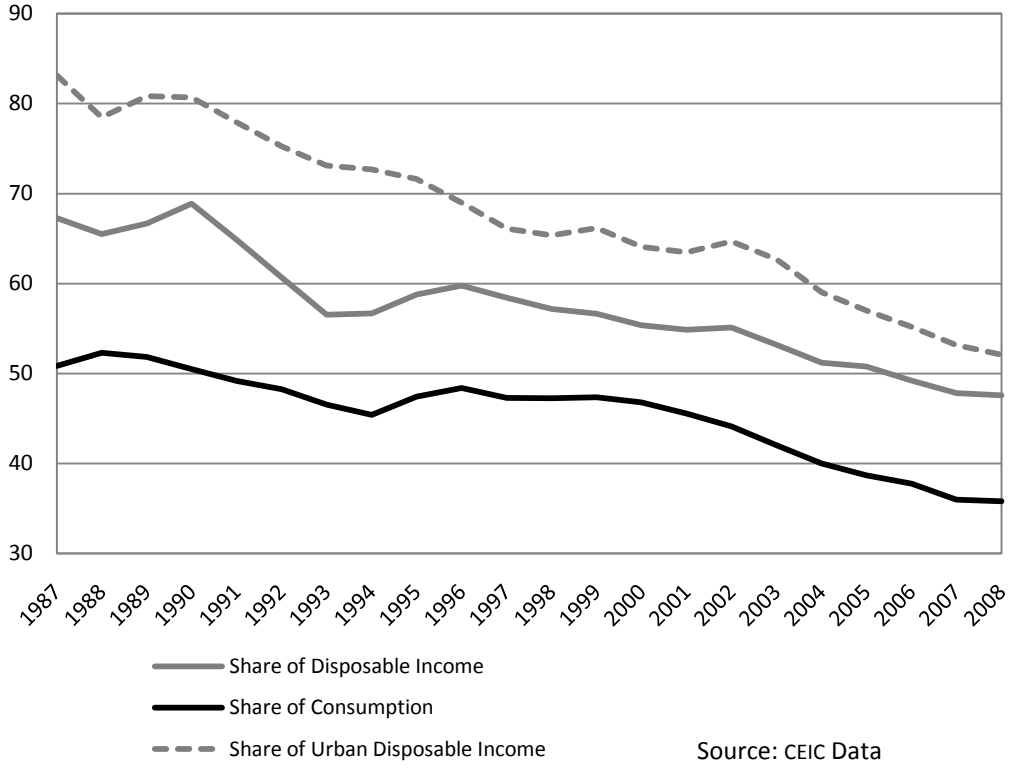

4.11 Korea's National Saving Rate
(percent)
60
55
50
45
40
35
30
25
20
15
10
1990
1992
1994
1996
1998
2000
2002
2004
2006
Actual
Long-Term Model Forecast (B6)
Long-Term Model Forecast (B6')

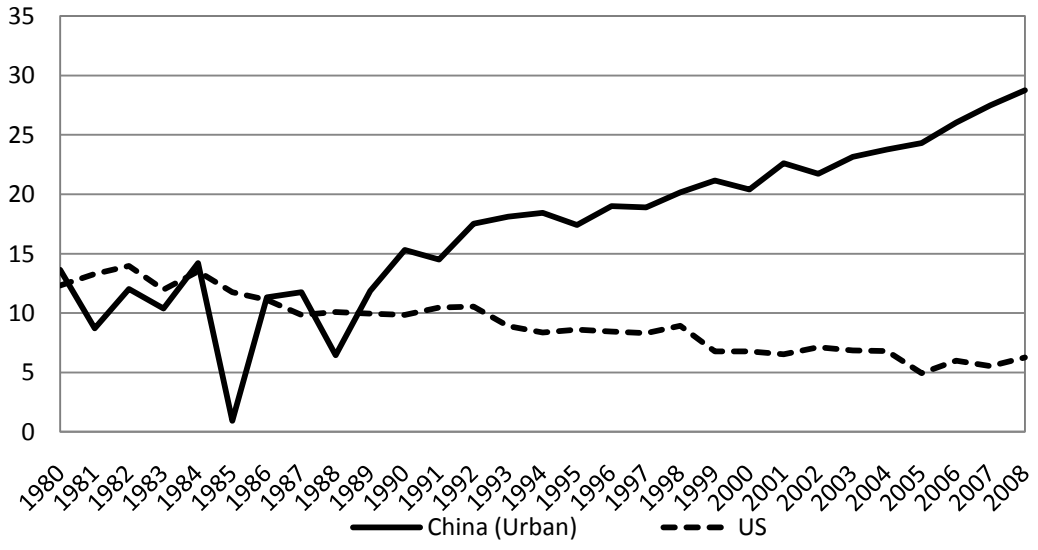
Figure 5. Disposable Income and Consumption as Percent Share of GNI



Source: CEIC Data

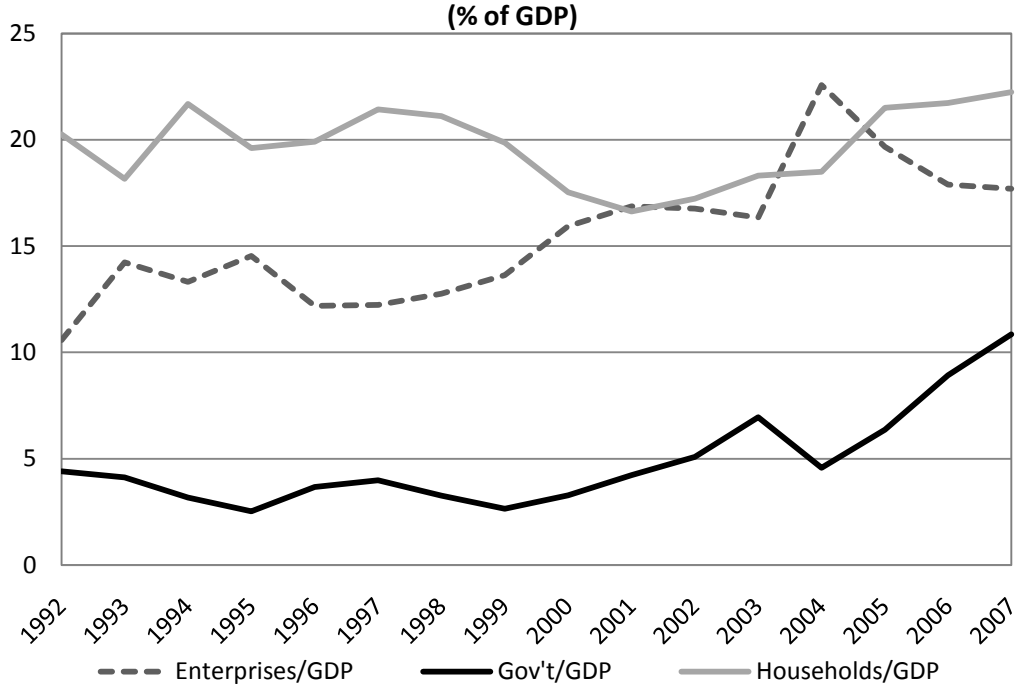
Figure 6. Household Saving Rates in China and the US

(percent)



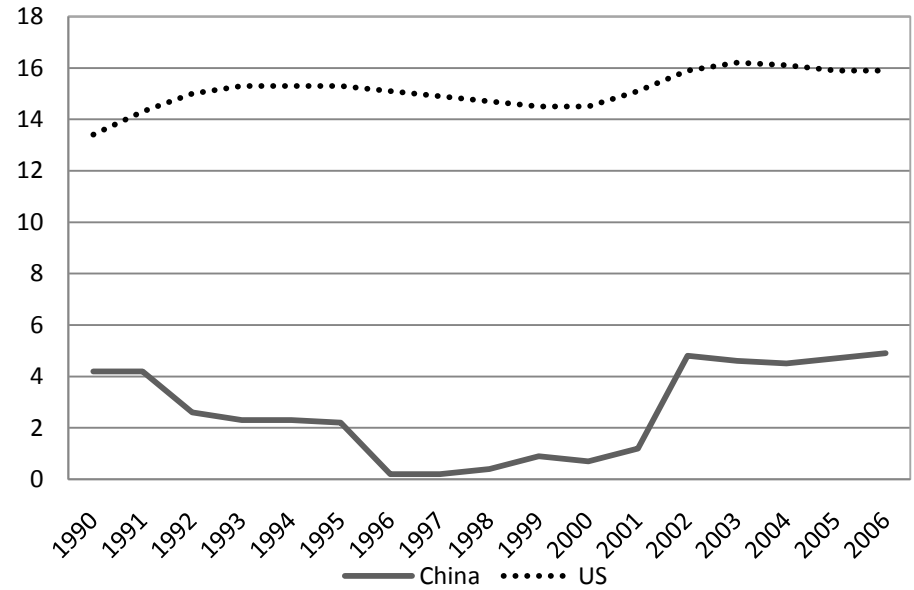
Source: CEIC Data and U.S. Bureau of Economic Analysis

Figure 7. Compositions of Gross Saving in China
(% of GDP)



Source: CEIC Data

Figure 8. Government Social Spending in China and the US (Percent of GDP)



Source: Asian Development Bank and OECD

Table 1A. Real GDP per Capita and National Saving Rate (Annual Average)							
	OECD	High Income	Upper Middle Income	Lower Middle Income	Low Income	USA	China
Real GDP per capita (constant 2005 int'l dollar based on PPP rates)							
1980-1990	20875	13280	6158	3156	1049	28420	807
1991-2000	25123	18313	7686	3367	1037	34796	1920
2001-2006	29343	21501	9125	4070	1140	40588	3613
2007	30533	25990	11665	5019	1368	43102	5084
National Saving Rate (%)							
1980-1990	22.6	20.5	20.7	19.8	9.0	17.8	35.6
1991-2000	22.5	23.8	18.8	18.0	11.0	16.7	41.1
2001-2006	22.1	30.3	18.8	23.1	14.9	15.0	45.8
2007	23.0	29.5	20.0	26.7	19.8	14.3	54.4

Note: Countries' income-level classifications are based on World Bank classification.
Source: World Development Indicators and Survey of Current Business.

Table 1B. National Saving and Government Saving by Region (%)				
	National saving/GDP	Government saving/GDP	National saving/GDP	Government saving/GDP
	1990-1999	**1990-1999**	**2000-2006**	**2000-2006**
China	41.5	-2.5	43.9	-1.9
East Asia	37.5	1.4	34.0	-1.4
OPEC	25.4	-1.4	34.5	-1.3
Asia	22.9	-1.9	21.5	-1.9
OECD	23.3	-3.1	23.8	-0.8
Latin America	17.3	-1.6	18.5	-2.1
USA	16.9	-2.8	14.4	-2.5

Table 2A. Dynamic Panel Regressions of National Saving Rates						
(Estimation method: Two-step System GMM; P-values are below coefficient estimates)						
Variable	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**
Lagged Saving	**0.51**	**0.499**	**0.535**	**0.5**	**0.564**	**0.532**
	0	0	0	0	0	0
Log (Real GDP Per Capita)	**0.036**	**0.038**	**0.032**	**0.035**	**0.03**	**0.027**
	0	0	0	0	0	0
Growth of Real GDP Per Capita	**0.11**	**0.129**	**0.153**	**0.1**	**0.213**	**0.183**
	0	0	0	0	0	0
Domestic Credit/GDP	**-0.038**	**-0.024**	**-0.04**	**-0.033**	**-0.013**	**-0.025**
	0	0	0	0	0.037	0
Old Dependency	**-0.522**	**-0.579**	**-0.44**	**-0.477**	**-0.47**	**-0.464**
	0	0	0	0	0	0
Young Dependency	**-0.161**	**-0.154**	**-0.118**	**-0.107**	**-0.148**	**-0.141**
	0	0	0	0	0	0
Urbanization	**-0.04**	**-0.077**	**-0.001**	**-0.084**	**-0.049**	**-0.002**
	0.115	0.001	0.947	0	0.197	0.966
Social Spending	**-0.194**	**-0.144**	**-0.209**	**-0.047**	**-0.051**	**-0.03**
	0	0.02	0	0.242	0.438	0.623
Inflation		**0.001**				
		0.885				
Real Interest Rate			**-0.146**			
			0			
Government Saving				**0.283**		
				0		
Change in Real Exchange Rate					**0.038**	**0.031**
					0	0
Log (Undervaluation)					**0.014**	**0.013**
					0	0
East Asia Dummy						**6.761**
						0
P values of Wald test of joint significance and other tests for consistency of estimators:						
Wald test	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test	1.00	1.00	1.00	1.00	1.00	1.00
1st-order serial correlation	0.01	0.01	0.02	0.02	0.01	0.01
2nd-order serial correlation	0.19	0.19	0.24	0.30	0.17	0.17
3rd-order serial correlation	0.15	0.15	0.19	0.23	0.14	0.14
# Observations	1188	1188	1092	1110	1170	1170
# Countries	70	70	69	67	69	69

Table 2A'. Dynamic Panel Regressions of National Saving, excluding China from Sample						
(Estimation method: Two-step System GMM; P-values are below coefficient estimates)						
Variable	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**
Lagged Saving	**0.487**	**0.471**	**0.546**	**0.488**	**0.535**	**0.511**
	0.000	0.000	0.000	0.000	0.000	0.000
Log(Real GDP Per Capita)	**0.035**	**0.036**	**0.029**	**0.034**	**0.031**	**0.029**
	0.000	0.000	0.000	0.000	0.000	0.000
Growth of Real GDP Per Capita	**0.089**	**0.095**	**0.140**	**0.065**	**0.174**	**0.170**
	0.000	0.000	0.000	0.001	0.000	0.000
Domestic Credit/GDP	**-0.034**	**-0.027**	**-0.038**	**-0.034**	**-0.012**	**-0.026**
	0.000	0.000	0.000	0.000	0.033	0.000
Old Dependency	**-0.492**	**-0.568**	**-0.411**	**-0.428**	**-0.518**	**-0.447**
	0.000	0.000	0.000	0.000	0.000	0.000
Young Dependency	**-0.149**	**-0.160**	**-0.113**	**-0.104**	**-0.154**	**-0.154**
	0.000	0.000	0.000	0.000	0.000	0.000
Urbanization	**-0.024**	**-0.038**	**0.010**	**-0.092**	**-0.051**	**-0.016**
	0.483	0.053	0.663	0.002	0.271	0.740
Social Spending	**-0.218**	**-0.149**	**-0.177**	**-0.023**	**-0.040**	**-0.057**
	0.000	0.007	0.000	0.611	0.539	0.147
Inflation		**0.002**				
		0.839				
Real Interest Rate			**-0.156**			
			0.000			
Government Saving				**0.289**		
				0.000		
Change in Real Exchange Rate					**0.036**	**0.033**
					0.000	0.000
log(undervaluation)					**0.012**	**0.010**
					0.000	0.000
East Asia Dummy						**4.248**
						0.014
P values of Wald test of joint significance and other tests for consistency of estimators:						
Wald test	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test	1.00	1.00	1.00	1.00	1.00	1.00
1st-order serial correlation	0.01	0.01	0.02	0.02	0.01	0.01
2nd-order serial correlation	0.19	0.19	0.24	0.31	0.17	0.18
3rd-order serial correlation	0.15	0.15	0.19	0.23	0.14	0.14
# Observations	1170	1170	1074	1096	1152	1152
# Countries	69	69	68	66	68	68

Table 2B. Dynamic Panel Regressions of National Saving, including Adjusted Growth as Regressor						
(Estimation method: Two-step System GMM; P-values are below coefficient estimates)						
Variable	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**
Lagged Saving Rate	**0.555**	**0.536**	**0.567**	**0.532**	**0.545**	**0.491**
	0	0	0	0	0	0
Log(Real GDP Per Capita)	**0.032**	**0.035**	**0.03**	**0.031**	**0.033**	**0.032**
	0	0	0	0	0	0
Growth of Real GDP Per Capita	**0.089**	**0.069**	**0.103**	**0.065**	**0.144**	**0.138**
	0	0	0	0	0	0
Adjusted Growth Rate	**0.01**	**0.012**	**0.005**	**0.008**	**0.008**	**0.007**
	0	0	0	0	0	0
Domestic Credit/GDP	**-0.033**	**-0.022**	**-0.034**	**-0.032**	**-0.002**	**-0.019**
	0	0	0	0	0.733	0
Old Dependency	**-0.492**	**-0.549**	**-0.459**	**-0.48**	**-0.547**	**-0.458**
	0	0	0	0	0	0
Young Dependency	**-0.157**	**-0.171**	**-0.1**	**-0.117**	**-0.164**	**-0.154**
	0	0	0	0	0	0
Urbanization	**-0.029**	**-0.057**	**-0.027**	**-0.047**	**-0.05**	**-0.07**
	0.009	0	0.079	0	0.024	0
Social Spending	**-0.126**	**-0.115**	**-0.111**	**-0.003**	**-0.122**	**-0.042**
	0.001	0.005	0.005	0.942	0.003	0.328
Inflation		**0.013**				
		0.162				
Real Interest Rate			**-0.144**			
			0			
Government Saving				**0.287**		
				0		
Change in Real Exchange Rate					**0.035**	**0.041**
					0	0
Log (Undervaluation)					**0.011**	**0.013**
					0	0
East Asia Dummy						**6.648**
						0
P values of Wald test of joint significance and other tests for consistency of estimators:						
Wald test	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test	1.00	1.00	1.00	1.00	1.00	1.00
1st-order serial correlation	0.01	0.01	0.02	0.02	0.01	0.01
2nd-order serial correlation	0.18	0.18	0.25	0.29	0.18	0.18
3rd-order serial correlation	0.17	0.17	0.20	0.24	0.15	0.14
# Observations	1188	1188	1092	1110	1170	1170
# Countries	70	70	69	67	69	69

Table 2B'. Dynamic Panel Regressions of National Saving, including adjusted growth, excluding China from Sample						
(Estimation method: Two-step System GMM; P-values are below coefficient estimates)						
Variable	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**
Lagged Saving	**0.502**	**0.493**	**0.530**	**0.484**	**0.506**	**0.520**
	0.000	0.000	0.000	0.000	0.000	0.000
Log(Real GDP Per Capita)	**0.037**	**0.034**	**0.030**	**0.035**	**0.035**	**0.034**
	0.000	0.000	0.000	0.000	0.000	0.000
Growth of Real GDP Per Capita	**0.072**	**0.069**	**0.085**	**0.042**	**0.137**	**0.133**
	0.000	0.000	0.000	0.055	0.000	0.000
Domestic Credit/GDP	**-0.033**	**-0.016**	**-0.038**	**-0.035**	**-0.004**	**-0.021**
	0.000	0.004	0.000	0.000	0.542	0.000
Adjusted Growth	**0.006**	**0.007**	**0.003**	**0.003**	**0.006**	**0.007**
	0.000	0.002	0.160	0.053	0.000	0.000
Old Dependency	**-0.525**	**-0.519**	**-0.320**	**-0.519**	**-0.586**	**-0.532**
	0.000	0.000	0.000	0.000	0.000	0.000
Young Dependency	**-0.176**	**-0.152**	**-0.103**	**-0.128**	**-0.171**	**-0.165**
	0.000	0.000	0.000	0.000	0.000	0.000
Urbanization	**-0.050**	**-0.062**	**-0.043**	**-0.059**	**-0.054**	**-0.072**
	0.006	0.000	0.007	0.009	0.001	0.000
Social Spending	**-0.149**	**-0.084**	**-0.116**	**-0.021**	**-0.129**	**-0.050**
	0.006	0.046	0.000	0.586	0.046	0.281
Inflation		**0.014**				
		0.192				
Real Interest Rate			**-0.130**			
			0.000			
Government Saving				**0.304**		
				0.000		
Change in Real Exchange Rate					**0.030**	**0.032**
					0.000	0.000
log(undervaluation)					**0.011**	**0.007**
					0.000	0.049
East Asia Dummy						**1.756**
						0.598
P values of Wald test of joint significance and other tests for consistency of estimators:						
Wald test	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test	1.00	1.00	1.00	1.00	1.00	1.00
1st-order serial correlation	0.01	0.01	0.02	0.02	0.01	0.01
2nd-order serial correlation	0.19	0.19	0.26	0.31	0.18	0.18
3rd-order serial correlation	0.16	0.16	0.20	0.23	0.15	0.14
# Observations	1170	1170	1074	1096	1152	1152
# Countries	69	69	68	66	68	68

Table 3. Comparisons of Short-term and Long-term coefficients Estimates						
				Implied long-term estimates		
Dependent Variable: Saving rate	This paper	IMF	LHS	This paper	IMF	LHS
Lagged saving rate	0.564	0.62	0.38			
Growth rate of per capita GDP (GNDI in LHS)	0.213	0.17	0.45	0.489	0.45	0.73
Real per capita GDP (GNDI in LHS)	0.030		0.102	0.069		0.16
Domestic credit/GDP (GNDI in LHS)	-0.013	-3.47	-0.36	-0.030	-9.13	-0.58
Old Dependency	-0.470	-0.44	-0.77	-1.078	-1.16	-1.24
Young Dependency	-0.148		-0.16	-0.339		-0.26
Urbanization	-0.049		-0.5	-0.112		-0.81
Real interest rate	-0.146		-0.136	-0.335		-0.22
Government saving	0.283	0.27		0.649	0.71	
Real Exchange Rate Change	0.031	0.08	0.057	0.071	0.21	0.09
Inflation	0.001		0.18	0.002		0.29
Note: The comparison needs to be taken in perspective mainly for the following reasons:						
1. LHS (2000)'s data were from 1965-1994, the IMF's from1972-2004, while this paper's were from 1980-2007.						
2. Both LHS (2000) and IMF (2005) include terms of trade growth, not real exchange rate change.						
3. This paper's estimators are taken from Table 2A. Estimators of inflation, real interest rate, and government saving are taken from columns A2, A3, and A4 respectively. Other coefficients are from column A5.						
4. The dependent variable in LHS (2000) is private saving/gross national disposable income (GNDI); while it is national saving/gross national income (GNI) in this paper and national saving/GDP in IMF (2005).						

Table 4. Unexplained Saving Rates by Model (percent; average of sample period)

(unexplained saving = national saving - long-term forecast)

(% forecast error =long-term forecast/national saving -1)

	China		OECD		All Countries	
Regression	Unexplained Saving	% forecast error	Unexplained Saving	% forecast error	Unexplained Saving	% forecast error
Models Estimated with the Full Dataset						
Table 2A						
A1	18.5	-43%	0.7	-3%	-0.7	3%
A2	16.2	-37%	0.6	-3%	-0.9	4%
A3	17.3	-40%	-0.4	2%	-1.1	5%
A4	19.4	-45%	0.5	-2%	-1.1	5%
A5	14.0	-32%	-0.6	3%	-1.0	4%
A6	6.3	-14%	0.5	-2%	0.1	-1%
Table 2B (models include adjusted-growth as regressor besides those in corresponding model in 2A)						
B1	16.1	-37%	-0.1	0%	-1.1	5%
B2	13.7	-32%	-0.3	1%	-1.1	5%
B3	15.8	-36%	-0.3	1%	-1.4	6%
B4	19.8	-45%	-0.3	1%	-1.3	6%
B5	10.3	-24%	-0.1	0%	-0.8	3%
B6	3.7	-8%	1.1	-5%	0.5	-2%
Models Estimated without Chinese Data						
Table 2A' (models in Table 2A estimated without China in dataset)						
A1	19.5	-45%	1.1	-5%	-0.1	1%
A2	18.9	-44%	0.2	-1%	-0.5	2%
A3	18.8	-43%	-0.5	2%	-0.6	3%
A4	21.2	-49%	0.9	-4%	-0.3	1%
A5	15.6	-36%	-0.4	2%	-0.5	2%
A6	11.8	-27%	0.4	-2%	0.5	-2%
Table 2B' (models in Table 2B estimated without China in dataset)						
B1	17.6	-41%	0.1	0%	-0.5	2%
B2	16.5	-38%	-0.3	1%	-0.6	3%
B3	19.1	-44%	-0.3	1%	-0.3	1%
B4	21.3	-49%	0.3	-1%	-0.6	3%
B5	12.2	-28%	0.4	-2%	-0.3	1%
B6	11.9	-27%	0.5	-2%	-0.1	0%

Table 4A. Actual and Model Forecasts of National Saving Rates (percent)							
(unexplained saving = national saving - long-term forecast)							
(% deviation = national saving rate/long-term forecast -1)							
Model = Model A5 inTable 2A							
Country	**Saving Rate**	**Unexplained Saving**	**% deviation**	**Country**	**Saving Rate**	**Unexplained Saving**	**% deviation**
Bhutan	49.07	20.03	69%	Korea, Rep.	34.30	-1.23	-3%
China	43.34	13.98	48%	Nicaragua	12.37	-1.57	-11%
Honduras	24.31	9.89	69%	United Kingdom	16.15	-1.61	-9%
Japan	30.08	9.34	45%	Czech Republic	25.19	-1.89	-7%
Mongolia	29.86	8.68	41%	Chile	23.84	-1.94	-8%
Singapore	46.57	8.04	21%	Guatemala	12.86	-1.95	-13%
Sweden	20.74	7.40	56%	Peru	21.87	-2.01	-8%
Papua New Gui	26.47	6.72	34%	Portugal	21.97	-2.10	-9%
Switzerland	30.18	6.71	29%	Tonga	15.32	-2.24	-13%
Norway	28.04	6.51	30%	Ireland	23.31	-2.39	-9%
Nepal	22.25	6.26	39%	Paraguay	15.92	-3.14	-16%
India	30.50	6.13	25%	Fiji	21.62	-3.16	-13%
Philippines	24.78	5.80	31%	Georgia	18.27	-3.70	-17%
Brunei Darussal	49.87	5.21	12%	New Zealand	18.88	-3.72	-16%
Bangladesh	23.61	5.14	28%	Australia	21.40	-4.00	-16%
Luxembourg	34.15	4.42	15%	Mexico	20.74	-4.10	-16%
Belgium	22.23	4.27	24%	Hungary	19.68	-5.00	-20%
Venezuela, RB	28.69	3.81	15%	Greece	17.22	-5.98	-26%
Jamaica	23.72	3.10	15%	Iceland	16.62	-6.45	-28%
Panama	24.88	1.57	7%	Taiwan	26.98	-6.71	-20%
Denmark	21.06	1.01	5%	El Salvador	13.92	-6.85	-33%
Hong Kong, Chir	31.48	0.70	2%	Slovak Republic	23.30	-6.85	-23%
Indonesia	27.17	0.43	2%	Canada	20.17	-6.89	-25%
Germany	20.42	0.42	2%	Poland	18.61	-7.23	-28%
Spain	21.94	0.16	1%	Vanuatu	11.91	-7.88	-40%
Netherlands	25.28	0.06	0%	Cambodia	12.84	-8.11	-39%
France	19.42	-0.08	0%	Colombia	16.86	-8.43	-33%
Thailand	32.47	-0.21	-1%	Brazil	15.34	-8.57	-36%
Bolivia	14.92	-0.36	-2%	United States	15.95	-8.98	-36%
Austria	22.46	-0.38	-2%	Sri Lanka	21.15	-9.44	-31%
Uruguay	13.56	-0.38	-3%	Tajikistan	11.77	-9.84	-46%
Finland	23.90	-0.66	-3%	Turkey	16.08	-10.28	-39%
Dominican Repu	21.63	-0.74	-3%	Trinidad and Tob	26.56	-11.40	-30%
Argentina	17.81	-1.08	-6%	Kyrgyz Republic	10.61	-11.82	-53%
Italy	21.25	-1.12	-5%	Costa Rica	15.01	-12.13	-45%
OECD					22.31	-0.64	-3%
All 70 Countries in Sample					22.25	-0.99	-4%

Table 4B. Actual and Model Forecasts of National Saving Rates (percent)							
(unexplained saving = national saving - long-term forecast)							
(% deviation = national saving rate/long-term forecast -1)							
Model = Model B5 in Table 2B							
Country	**Saving Rate**	**Unexplained Saving**	**% deviation**	**Country**	**Saving Rate**	**Unexplained Saving**	**% deviation**
Bhutan	49.07	21.16	76%	Guatemala	12.86	-1.16	-8%
Honduras	24.31	10.63	78%	Ireland	23.31	-1.30	-5%
China	43.34	10.31	31%	Portugal	21.97	-1.48	-6%
Mongolia	29.86	10.13	51%	Hong Kong, China	31.48	-1.55	-5%
Sweden	20.74	9.98	93%	Peru	21.87	-1.56	-7%
Norway	28.04	8.40	43%	Tonga	15.32	-1.61	-9%
Singapore	46.57	6.49	16%	Chile	23.84	-1.92	-7%
Belgium	22.23	6.07	38%	Hungary	19.68	-2.21	-10%
Papua New Guinea	26.47	6.04	30%	Paraguay	15.92	-2.46	-13%
Luxembourg	34.15	5.95	21%	Thailand	32.47	-2.49	-7%
Nepal	22.25	5.14	30%	Nicaragua	12.37	-2.55	-17%
India	30.50	5.00	20%	Georgia	18.27	-2.73	-13%
Switzerland	30.18	4.98	20%	New Zealand	18.88	-2.93	-13%
Philippines	24.78	4.98	25%	Korea, Rep.	34.30	-3.04	-8%
Japan	30.08	4.78	19%	Fiji	21.62	-3.75	-15%
Brunei Darussala	49.87	4.44	10%	Australia	21.40	-3.92	-15%
Venezuela, RB	28.69	4.07	17%	Poland	18.61	-4.15	-18%
Jamaica	23.72	3.96	20%	Mexico	20.74	-4.79	-19%
Bangladesh	23.61	3.52	18%	Greece	17.22	-4.89	-22%
Denmark	21.06	3.05	17%	Slovak Republic	23.30	-4.94	-17%
Uruguay	13.56	2.37	21%	Iceland	16.62	-6.63	-29%
Panama	24.88	1.89	8%	El Salvador	13.92	-6.67	-32%
France	19.42	1.73	10%	Vanuatu	11.91	-7.40	-38%
Finland	23.90	1.70	8%	Canada	20.17	-7.61	-27%
Argentina	17.81	1.41	9%	Brazil	15.34	-7.68	-33%
Germany	20.42	1.31	7%	Colombia	16.86	-7.87	-32%
Spain	21.94	0.98	5%	Sri Lanka	21.15	-9.07	-30%
Austria	22.46	0.84	4%	Taiwan	26.98	-9.90	-27%
Bolivia	14.92	0.74	5%	Turkey	16.08	-10.12	-39%
Netherlands	25.28	0.43	2%	Cambodia	12.84	-10.40	-45%
Italy	21.25	0.38	2%	Kyrgyz Republic	10.61	-10.43	-50%
Czech Republic	25.19	0.28	1%	Costa Rica	15.01	-10.46	-41%
Indonesia	27.17	-0.61	-2%	Tajikistan	11.77	-11.10	-49%
United Kingdom	16.15	-0.77	-5%	United States	15.95	-11.13	-41%
Dominican Republ	21.63	-0.87	-4%	Trinidad and Tob	26.56	-11.38	-30%
OECD					22.31	-0.10	0%
All 70 Countries in Sample					22.25	-0.77	-3%

Table 4A'. Actual and Model Forecasts of National Saving Rates (percent)							
(unexplained saving = national saving - long-term forecast)							
(% deviation = national saving rate/long-term forecast -1)							
Model: Model A5 in Table 2A'							
Country	**Saving Rate**	**Unexplained Saving**	**% deviation**	**Country**	**Saving Rate**	**Unexplained Saving**	**% deviation**
Bhutan	49.07	21.37	77%	Italy	21.25	-0.69	-3%
China	43.34	15.59	56%	Czech Republic	25.19	-0.92	-4%
Honduras	24.31	10.14	72%	Georgia	18.27	-1.25	-6%
Mongolia	29.86	9.16	44%	United Kingdom	16.15	-1.26	-7%
Singapore	46.57	8.93	24%	Chile	23.84	-1.28	-5%
Japan	30.08	8.86	42%	Peru	21.87	-1.35	-6%
India	30.50	7.38	32%	Portugal	21.97	-1.39	-6%
Sweden	20.74	7.36	55%	Guatemala	12.86	-1.50	-10%
Nepal	22.25	7.21	48%	Nicaragua	12.37	-1.69	-12%
Norway	28.04	6.84	32%	Ireland	23.31	-1.79	-7%
Switzerland	30.18	6.58	28%	Tonga	15.32	-1.84	-11%
Papua New Guin	26.47	6.57	33%	Paraguay	15.92	-2.69	-14%
Philippines	24.78	6.30	34%	Fiji	21.62	-2.82	-12%
Bangladesh	23.61	6.06	35%	New Zealand	18.88	-3.57	-16%
Brunei Darussala	49.87	5.87	13%	Australia	21.40	-3.66	-15%
Luxembourg	34.15	5.18	18%	Mexico	20.74	-3.69	-15%
Belgium	22.23	4.42	25%	Hungary	19.68	-3.94	-17%
Venezuela, RB	28.69	4.16	17%	Greece	17.22	-5.33	-24%
Jamaica	23.72	3.90	20%	Slovak Republic	23.30	-5.77	-20%
Panama	24.88	1.53	7%	Taiwan	26.98	-6.21	-19%
Indonesia	27.17	1.50	6%	Poland	18.61	-6.33	-25%
Hong Kong, Chin	31.48	1.15	4%	Iceland	16.62	-6.34	-28%
Denmark	21.06	1.07	5%	El Salvador	13.92	-6.47	-32%
Thailand	32.47	0.63	2%	Cambodia	12.84	-6.64	-34%
Spain	21.94	0.61	3%	Canada	20.17	-6.80	-25%
Germany	20.42	0.33	2%	Vanuatu	11.91	-7.51	-39%
Uruguay	13.56	0.24	2%	Colombia	16.86	-7.96	-32%
Netherlands	25.28	0.06	0%	Tajikistan	11.77	-8.02	-41%
France	19.42	-0.05	0%	Sri Lanka	21.15	-8.09	-28%
Dominican Repu	21.63	-0.06	0%	Brazil	15.34	-8.68	-36%
Korea, Rep.	34.30	-0.30	-1%	United States	15.95	-8.96	-36%
Austria	22.46	-0.32	-1%	Turkey	16.08	-9.78	-38%
Bolivia	14.92	-0.32	-2%	Kyrgyz Republic	10.61	-10.30	-49%
Finland	23.90	-0.46	-2%	Trinidad and Tob	26.56	-10.48	-28%
Argentina	17.81	-0.56	-3%	Costa Rica	15.01	-11.63	-44%
OECD					22.31	-0.38	-2%
All 70 Countries in Sample					22.25	-0.52	-2%

Table 4B'. Actual and Model Forecasts of National Saving Rates (percent)							
(unexplained saving = national saving - long-term forecast)							
(% deviation = national saving rate/long-term forecast -1)							
Model = Model B5 of Table 2B'							
Country	**Saving Rate**	**Unexplained Saving**	**% deviation**	**Country**	**Saving Rate**	**Unexplained Saving**	**% deviation**
Bhutan	49.07	22.01	81%	Hong Kong, China	31.48	-0.69	-2%
China	43.34	12.22	39%	Ireland	23.31	-0.85	-4%
Honduras	24.31	10.65	78%	Portugal	21.97	-0.96	-4%
Mongolia	29.86	10.64	55%	Peru	21.87	-1.22	-5%
Sweden	20.74	10.27	98%	Guatemala	12.86	-1.26	-9%
Norway	28.04	8.75	45%	Chile	23.84	-1.31	-5%
Singapore	46.57	7.33	19%	Georgia	18.27	-1.42	-7%
Luxembourg	34.15	6.68	24%	Tonga	15.32	-1.46	-9%
Belgium	22.23	6.47	41%	Thailand	32.47	-1.47	-4%
Papua New Gu	26.47	6.27	31%	Hungary	19.68	-1.71	-8%
India	30.50	6.10	25%	Korea, Rep.	34.30	-2.19	-6%
Nepal	22.25	5.73	35%	Nicaragua	12.37	-2.25	-15%
Japan	30.08	5.70	23%	Paraguay	15.92	-2.41	-13%
Switzerland	30.18	5.59	23%	New Zealand	18.88	-2.59	-12%
Philippines	24.78	5.31	27%	Fiji	21.62	-3.44	-14%
Brunei Darussa	49.87	5.00	11%	Australia	21.40	-3.48	-14%
Bangladesh	23.61	4.48	23%	Poland	18.61	-3.71	-17%
Venezuela, RB	28.69	4.26	17%	Slovak Republic	23.30	-4.36	-16%
Jamaica	23.72	4.24	22%	Greece	17.22	-4.44	-20%
Denmark	21.06	3.36	19%	Mexico	20.74	-4.61	-18%
Uruguay	13.56	2.62	24%	Iceland	16.62	-6.27	-27%
Panama	24.88	2.24	10%	El Salvador	13.92	-6.51	-32%
France	19.42	2.09	12%	Canada	20.17	-7.03	-26%
Finland	23.90	2.04	9%	Brazil	15.34	-7.31	-32%
Germany	20.42	1.79	10%	Vanuatu	11.91	-7.33	-38%
Argentina	17.81	1.73	11%	Colombia	16.86	-7.56	-31%
Spain	21.94	1.50	7%	Sri Lanka	21.15	-8.23	-28%
Austria	22.46	1.32	6%	Cambodia	12.84	-8.82	-41%
Netherlands	25.28	0.99	4%	Taiwan	26.98	-9.16	-25%
Bolivia	14.92	0.87	6%	Tajikistan	11.77	-9.35	-44%
Italy	21.25	0.82	4%	Kyrgyz Republic	10.61	-9.56	-47%
Czech Republic	25.19	0.78	3%	Turkey	16.08	-9.87	-38%
Indonesia	27.17	0.20	1%	Costa Rica	15.01	-10.14	-40%
UK	16.15	-0.34	-2%	United States	15.95	-10.44	-40%
Dominican Rep	21.63	-0.46	-2%	Trinidad and Tob	26.56	-10.80	-29%
OECD					22.31	0.39	2%
All 70 Countries in Sample					22.25	-0.26	-1%

Table 5 Determinants of Saving in China and OECD			
	(Annual average over 2001-2006; in percentage terms)		
Explanatory Variable	China	OECD Average	China-OECD Gap
Log(Real GDP Per Capita)*100	818.0	1025.3	-207.3
Growth of Real GDP Per Capita	9.2	2.2	7.1
Adjusted Growth Rate	120.0	3.8	116.2
Domestic Credit/GDP	138.4	132.2	6.2
Old Dependency	10.6	22.1	-11.6
Young Dependency	32.4	26.3	6.1
Urbanization	39.0	75.1	-36.1
Social Spending	4.1	20.8	-16.7
Inflation	1.3	2.6	-1.2
Real Interest Rate	2.3	3.9	-1.6
Government Saving	-1.8	-0.8	-1.0
Real Exchange Rate Depreciation	0.7	-1.0	1.7
Log (undervaluation)*100	47.4	-55.7	103.1
East Asia Dummy	1.0	0.1	0.9
	(Annual average over 1990-2000; in percentage terms)		
Explanatory Variable	China	OECD Average	China-OECD Gap
Log(Real GDP Per Capita)*100	748.1	1007.8	-259.7
Growth of Real GDP Per Capita	8.6	2.2	6.4
Adjusted Growth Rate	197.1	4.2	192.8
Domestic Credit/GDP	99.7	106.3	-6.6
Old Dependency	9.0	20.7	-11.7
Young Dependency	39.3	28.7	10.6
Urbanization	31.5	74.1	-42.6
Social Spending	1.8	20.3	-18.5
Inflation	7.1	4.2	2.9
Real Interest Rate	1.9	6.3	-4.3
Government Saving	-2.5	-2.8	0.2
Real Exchange Rate Depreciation	3.6	0.7	2.9
Log (undervaluation)*100	47.1	-55.0	102.1
East Asia Dummy	1.0	0.1	0.9
Note: OECD comprises of 27 countries, including two East-Asain countries (Japan and S. Korea).			

Table 6A Marginal Contributions of Explanatory Variables to the China-OECD Saving Gaps						
			(2001-2006)			
Explanatory Variable	(A1)	(A2)	(A3)	(A4)	(A5)	(A6)
Log(Real GDP Per Capita)	-15.2	-15.7	-14.3	-14.5	-14.3	-12.0
Growth of Real GDP Per Capita	1.6	1.8	2.3	1.4	3.5	2.8
Domestic Credit/GDP	-0.5	-0.3	-0.5	-0.4	-0.2	-0.3
Old Dependency	12.3	13.3	10.9	11.0	12.5	11.5
Young Dependency	-2.0	-1.9	-1.6	-1.3	-2.1	-1.9
Urbanization	2.9	5.6	0.1	6.1	4.1	0.2
Social Spending	6.6	4.8	7.5	1.6	2.0	1.1
Inflation		0.0				
Real Interest Rate			0.5			
Government Saving				-0.5		
Change in Real Exchange Rate					0.4	0.3
Log (undervaluation)					3.3	2.9
East Asia Dummy						13.3
Total contribution to saving gap	5.7	7.6	5.0	3.3	9.1	17.9
China-OECD saving rate gap	23.6	23.6	23.6	23.6	23.6	23.6
			(1990-2000)			
Explanatory Variable	(A1)	(A2)	(A3)	(A4)	(A5)	(A6)
Log(Real GDP Per Capita)	-19.1	-19.7	-17.9	-18.2	-17.9	-15.0
Growth of Real GDP Per Capita	1.4	1.7	2.1	1.3	3.1	2.5
Domestic Credit/GDP	0.5	0.3	0.6	0.4	0.2	0.3
Old Dependency	12.5	13.6	11.1	11.2	12.7	11.6
Young Dependency	-3.5	-3.3	-2.7	-2.3	-3.6	-3.2
Urbanization	3.5	6.5	0.1	7.2	4.8	0.2
Social Spending	7.3	5.3	8.3	1.7	2.2	1.2
Inflation		0.0				
Real Interest Rate			1.4			
Government Saving				0.1		
Change in Real Exchange Rate					0.2	0.1
Log (undervaluation)					3.3	2.9
East Asia Dummy						13.3
Total contribution to saving gap	2.7	4.5	3.0	1.5	4.9	14.0
China-OECD saving rate gap	18.4	18.4	18.4	18.4	18.4	18.4
Note: Narginal contribution of X= difference of X * 1/(1-coefficient of lag saving); the coefficents used are taken from regressions presented in Table 2A, which include China's data in the sample.						

Table 6B Marginal Contributions of Explanatory Variables to the China-OECD Saving Gaps						
			(2001-2006)			
Explanatory Variable	**(B1)**	**(B2)**	**(B3)**	**(B4)**	**(B5)**	**(B6)**
Log(Real GDP Per Capita)	-14.9	-15.6	-14.4	-13.7	-15.0	-13.0
Growth of Real GDP Per Capita	1.4	1.1	1.7	1.0	2.2	1.9
Adjusted Growth	2.6	3.0	1.3	2.0	2.0	1.6
Domestic Credit/GDP	-0.5	-0.3	-0.5	-0.4	0.0	-0.2
Old Dependency	12.8	13.7	12.2	11.8	13.9	10.4
Young Dependency	-2.2	-2.3	-1.4	-1.5	-2.2	-1.9
Urbanization	2.4	4.4	2.3	3.6	4.0	5.0
Social Spending	4.7	4.1	4.3	0.1	4.5	1.4
Inflation		0.0				
Real Interest Rate			0.5			
Government Saving				-0.6		
Change in Real Exchange Rate					0.4	0.4
Log (undervaluation)					2.5	2.6
East Asia Dummy						12.0
Total contribution to saving gap	6.3	8.1	6.1	2.3	12.3	20.2
China-OECD saving rate gap	23.6	23.6	23.6	23.6	23.6	23.6
			(1990-2000)			
Explanatory Variable	**(B1)**	**(B2)**	**(B3)**	**(B4)**	**(B5)**	**(B6)**
Log(Real GDP Per Capita)	-18.7	-19.6	-18.0	-17.2	-18.8	-16.3
Growth of Real GDP Per Capita	1.3	1.0	1.5	0.9	2.0	1.7
Adjusted Growth	4.3	5.0	2.2	3.3	3.4	2.7
Domestic Credit/GDP	0.5	0.3	0.5	0.4	0.0	0.2
Old Dependency	13.0	13.9	12.5	12.0	14.1	10.6
Young Dependency	-3.7	-3.9	-2.4	-2.6	-3.8	-3.2
Urbanization	2.8	5.2	2.7	4.3	4.7	5.9
Social Spending	5.2	4.6	4.7	0.1	5.0	1.5
Inflation		0.1				
Real Interest Rate			1.4			
Government Saving				0.2		
Change in Real Exchange Rate					0.1	0.1
Log (undervaluation)					2.5	2.6
East Asia Dummy						12.1
Total contribution to saving gap	4.7	6.6	5.1	1.4	9.2	17.9
China-OECD saving rate gap	18.4	18.4	18.4	18.4	18.4	18.4
Note: Narginal contribution of X= difference of X * 1/(1-coefficient of lag saving); the coefficents used are taken from regressions presented in Table 2B, which includes China's data in the sample.						

Table 6A'. Marginal Contributions of Explanatory Variables to the China-OECD Saving Gaps						
			(2001-2006)			
Explanatory Variable	A1	A2	A3	A4	A5	A6
Log(Real GDP Per Capita)	-14.1	-14.1	-13.2	-13.8	-13.8	-12.3
Growth of Real GDP Per Capita	1.2	1.3	2.2	0.9	2.6	2.5
Domestic Credit/GDP	-0.4	-0.3	-0.5	-0.4	-0.2	-0.3
Old Dependency	11.1	12.4	10.5	9.7	12.9	10.6
Young Dependency	-1.8	-1.9	-1.5	-1.2	-2.0	-1.9
Urbanization	1.7	2.6	-0.8	6.5	4.0	1.2
Social Spending	7.1	4.7	6.5	0.7	1.4	1.9
Inflation		0.0				
Real Interest Rate			0.5			
Government Saving				-0.5		
Change in Real Exchange Rate					0.4	0.3
Log (undervaluation)					2.6	2.2
East Asia Dummy						8.0
Total contribution to saving gap	4.7	4.7	3.6	1.8	7.9	12.2
China-OECD saving rate gap	23.6	23.6	23.6	23.6	23.6	23.6
			(1990-2000)			
Explanatory Variable	A1	A2	A3	A4	A5	A6
Log(Real GDP Per Capita)	-17.7	-17.7	-16.6	-17.2	-17.3	-15.4
Growth of Real GDP Per Capita	1.1	1.2	2.0	0.8	2.4	2.2
Domestic Credit/GDP	0.4	0.3	0.5	0.4	0.2	0.3
Old Dependency	11.3	12.6	10.6	9.8	13.1	10.7
Young Dependency	-3.1	-3.2	-2.6	-2.2	-3.5	-3.3
Urbanization	2.0	3.1	-0.9	7.6	4.7	1.4
Social Spending	7.9	5.2	7.2	0.8	1.6	2.2
Inflation		0.0				
Real Interest Rate			1.5			
Government Saving				0.1		
Change in Real Exchange Rate					0.1	0.1
Log (undervaluation)					2.6	2.2
East Asia Dummy						8.0
Total contribution to saving gap	1.9	1.5	1.7	0.3	3.8	8.5
China-OECD saving rate gap	18.4	18.4	18.4	18.4	18.4	18.4
Note: Narginal contribution of X= difference of X * 1/(1-coefficient of lag saving); the coefficents used are taken from regressions presented in Table 2A', which exclude China from the sample.						

Table 6B'. Marginal Contributions of Explanatory Variables to the China-OECD Saving Gaps						
			(2001-2006)			
Explanatory Variable	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**
Log(Real GDP Per Capita)	-15.4	-13.9	-13.2	-14.1	-14.7	-14.7
Growth of Real GDP Per Capita	1.0	1.0	1.3	0.6	2.0	2.0
Adjusted Growth	1.4	1.6	0.7	0.7	1.4	1.7
Domestic Credit/GDP	-0.4	-0.2	-0.5	-0.4	-0.1	-0.3
Old Dependency	12.2	11.8	7.9	11.6	13.7	12.8
Young Dependency	-2.2	-1.8	-1.3	-1.5	-2.1	-2.1
Urbanization	3.6	4.4	3.3	4.1	3.9	5.4
Social Spending	5.0	2.8	4.1	0.7	4.4	1.7
Inflation		0.0				
Real Interest Rate			0.4			
Government Saving				-0.6		
Change in Real Exchange Rate					0.3	0.3
Log (undervaluation)					2.3	1.4
East Asia Dummy						3.4
Total contribution to saving gap	5.2	5.6	2.7	1.1	11.2	11.7
China-OECD saving rate gap	23.6	23.6	23.6	23.6	23.6	23.6
			(1990-2000)			
Explanatory Variable	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**
Log(Real GDP Per Capita)	-19.3	-17.4	-16.6	-17.6	-18.4	-18.4
Growth of Real GDP Per Capita	0.9	0.9	1.2	0.5	1.8	1.8
Adjusted Growth	2.3	2.7	1.2	1.1	2.3	2.8
Domestic Credit/GDP	0.4	0.2	0.5	0.4	0.1	0.3
Old Dependency	12.4	12.0	8.0	11.8	13.9	13.0
Young Dependency	-3.7	-3.2	-2.3	-2.6	-3.7	-3.6
Urbanization	4.3	5.2	3.9	4.9	4.7	6.4
Social Spending	5.5	3.1	4.6	0.8	4.8	1.9
Inflation		0.1				
Real Interest Rate			1.2			
Government Saving				0.1		
Change in Real Exchange Rate					0.1	0.1
Log (undervaluation)					2.3	1.4
East Asia Dummy						3.4
Total contribution to saving gap	2.8	3.5	1.7	-0.6	7.9	9.1
China-OECD saving rate gap	18.4	18.4	18.4	18.4	18.4	18.4

Note: Narginal contribution of X= difference of X * 1/(1-coefficient of lag saving); the coefficents used are taken from regressions presented in Table 2B', which exclude China's data from the sample.

REFERENCES

Aart Kraay (2000), "Household Saving in China," World Bank Economic Review.

Arellano, M., and S. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," Review of Economic Studies 58, pp: 277-297.

Arellano, M., and O. Bover (1995), "Another Look at the Instrumental Variable Estimation of Error-Component Models, Journal of Econometrics 68, pp: 29-51.

Aziz, Jahangir, and Li Cui (2007), "Explaining China's Low Consumption: The Neglected Role of Household Income," IMF Working Paper No. 07/181.

Blanchard, Olivier, and Francesco Giavazzi (2006), "Rebalancing Growth in China: A Three-Handed Approach," China and World Economy, vol. 14, No.4.

Blundell, R., and S. Bond (1997), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models," University College London Discussion Paper 97-07.

Caballero, Ricardo (2009), "The "other" Imbalance and the Financial Crisis," NBER Working Paper No. 15636.

Chamberlain, G., "Panel Data," in Z. Griliches and M. D. Intriligator (Eds.), Handbook of Econometrics, Vol. 2 (Amsterdam: Elsevier, 1984), 1247-1313.

Chamon, Marcos, and Eswar Prasad (2008), "Why are Saving Rates of Urban Households in China Rising?"Forthcoming in American Economic Journal: Macroeconomics.

Dorrucci, Ettore, Meyer-Cirkel (2009), Alexis and Santa Bárbara, Daniel, "Domestic Financial Development in Emerging Economies: Evidence and Implications," ECB Occasional Paper No. 102.

Edwards, Sebastian (1996), "Why are Latin America's Savings Rates So Low? An International Comparative Analysis," Journal of Development Economics, Vol. 51, no. 1: 5-44.

Easterly, W., N. Loayza, and P. Montiel, "Has Latin America's Post Reform Growth Been Disappointing?" Journal of International Economics 43:3/4 (1997), 287-312.

Eichengreen B (2008), "The Real Exchange Rate and Economic Growth", Commission on Growth and Development, Working Paper No.4.

Holtz-Eakin, D., W. Newey, and H. Rosen, "Estimating Vector Autoregressions with Panel Data," Econometrica 56:6 (1988), 1371-1395.

Hirono, Ryokichi (1988), "Japan: Model for East Asian Industrialization?" Chapter 8 in *Achieving Industrialization in East Asia*, edited by Helen Hughes, Cambridge University Press.

Hughes, Helen (1988), "Achieving Industrialization in East Asia," Cambridge University Press.

International Monetary Fund (2005), "Global Imbalances: A Saving and Investment Perspective", Chapter 2 in *IMF's World Economic Outlook*, 2005; pp: 91-124.

Korinek A and L Serven (2010), "Undervaluation through foreign reserve accumulation: static losses, dynamic gains", Policy Research Working Paper Series 5250.

Kuijs, Louis (2005), "Investment and saving in China," World Bank Policy Research Working Paper 3633.

Kuijs, Louis (2006), "How Will China's Saving-Investment Balance Evolve?", World Bank Policy Research Working Paper 3958.

Levy-Yeyati E and F Sturzenegger (2007), "Fear of Appreciation", World Bank Policy Research Working Paper, No.4387.

Loayza, Norman, Klaus Schmidt-Hebbel, and Luis Serven, "Saving in Developing Countries: an overview," The World Bank Economic Review, vol. 14

Loayza, Norman, Klaus Schmidt-Hebbel and Luis Serven (2000), "What Drives Private Saving across the World?" The Review of Economics and Statistics, Vol. 82, No. 2, pp. 165-181.

Masson, Paul R., Bayoumi, Tamim and Samiei, Hossein (1995), "International Evidence on the Determinants of Private Saving," IMF Working Paper, Vol. , pp. 1-33.

McKinnon, Ronald (2007), "Why China Should Keep Its Dollar Peg: A Historical Perspective from Japan," Stanford University Working Paper No. 323.

Modigliani, Franco (1970), "The life cycle hypothesis of saving and intercountry differences in the saving ratio" in W.A. Eltis, M.F. Scott and J.N. Wolfe, eds., *Induction, growth and trade: essays in honour of Sir Roy Harrod* (Clarendon, Oxford), pp. 197-225.

Modigliani, Franco and Shi Larry Cao (2004), "The Chinese Saving Puzzle and the Life Cycle Analysis,"Journal of Economic Literature, Vol. 42. No.1, pp.145-70.

O'Malley, William J. (1988), "Culture and Industrialization," Chapter 11 in *Achieving Industrialization in East Asia*, edited by Helen Hughes, Cambridge University Press.

Pettis, Michael (2010), "Bad Loans Could Take Their Toll on China's Growth," Financial Times, April 21, 2010, available at http://www.ft.com/cms/s/0/9d2a0448-4d77-11df-9560-00144feab49a,dwp_uuid=9c33700c-4c86-11da-89df-0000779e2340.html

Phelps, Edmund S. (1961), "The Golden Rule of Accumulation: A Fable for Growthmen," American Economic Review, 51(4): 638-43.

Phelps, Edmund S. (1965), "Second Essay on the Golden Rule of Accumulation," American Economic Review, 55(4): 793-814.

Rodrik, Dani, "The Real Exchange Rate and Economic Growth," Brookings Papers on Economic Activity, 2008:2. (2008).

Rodrik, Dani (2009), "Making Room for China in the World Economy," available at http://www.hks.harvard.edu/fs/drodrik/Research%20papers/Making%20room%20for%20China.pdf.

Spence, Michael (2010), "The West Is Wrong To Obsess About The Renminbi," opinion in Financial Times on January 21st, 2010.

Terrones, Marco, Roberto Cardarelli, Enrique Mendoza, Chris Otrok (2005), "Chapter II: Global Imbalances A Saving and Investment Perspective," World Economic Outlook.

Wei, Shang-Jin and Xiaobo Zhang (2009), "The competitive Saving Motive: Evidence from Rising Sex Ratios and Saving Rates in China," NBER Working Paper No. 15093.

Wolf, Martin (2010), "Evaluating the Renminbi Manipulation," A Financial Times column on April 6th, 2010; available at http://www.ft.com/cms/s/0/dbc9fa4c-41af-11df-865a-00144feabdc0.html.

World Bank (1993), The East Asian miracle: economic growth and public policy (Oxford University Press, New York).

Xu, Min (2005), "Resolution of Non-Performing Loans in China," Manuscript, The Leonard N. Stern School of Business, New York University.