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China's High Savings: Drivers, Prospects, and Policies

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Abstract

China's high national savings rate—one of the highest in the world—is at the heart of its external/internal imbalances. High savings finance elevated investment when held domestically, or lead to large external imbalances when they flow abroad. Today, high savings mostly emanate from the household sector, resulting from demographic changes induced by the one-child policy and the transformation of the social safety net and job security that occurred during the transition from planned to market economy. Housing reform and rising income inequality also contribute to higher savings. Moving forward, demographic changes will put downward pressure on savings. Policy efforts in strengthening the social safety net and reducing income inequality are also needed to reduce savings further and boost consumption.

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## China's High Savings: Drivers, Prospects, and Policies

I. INTRODUCTION

China has one of the highest national savings rate in the world. Historically, national savings have been high since the 1980s, at around 35–40 percent of GDP. After China's entry into the WTO in 2001, savings surged to a peak of 52 percent of GDP in 2008. After the Global Financial Crisis (GFC), savings gradually declined to 46 percent in 2017. However, despite the moderation, China still stands apart with one of the world's highest savings rates, compared to the global average of 20 percent, and 15 percent for emerging economies.

National Savings Rate (2017)
(In percent of GDP)

Source: WEO, authors' estimates.
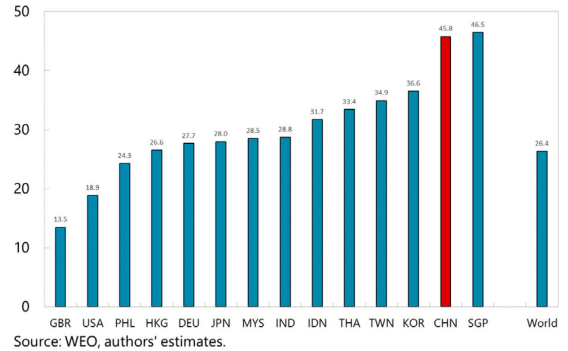
High savings are at the heart of China's external and internal imbalances. While low national savings can pose financing constraints for economic development, high savings can also potentially distort the economic structure and contribute to unsustainable growth as well as external imbalances. On the other hand, high savings, when held domestically, are often intermediated through the financial system and can fuel credit-based investment booms. China's external imbalance has been much reduced (with the current account surplus down to 2 percent of GDP) since the GFC, but has been replaced by a growing internal imbalance. Savings have been absorbed by elevated investment, which is subject to decreasing returns.

Rotation from External to Internal Imbalance

Sources: CEIC Data Company Ltd.; and IMF staff calculations.
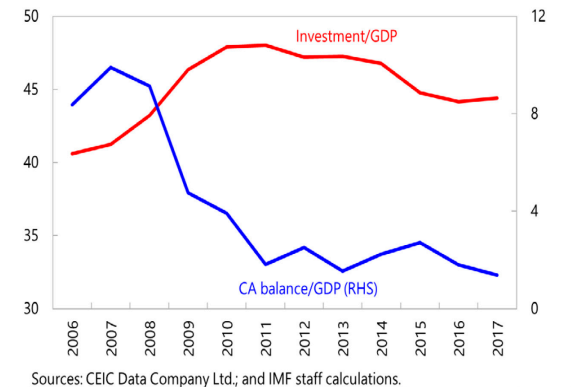
High savings also contain consumption growth. The flip side of high savings is low consumption. Despite recent rebalancing efforts, China remains a global outlier in its demand structure, with the investment ratio elevated at 43 percent of GDP, while private consumption accounts for only 38 percent of GDP (compared to the global average of 60 percent). With GDP per capita in PPP terms being similar to Brazil's, consumption per capita in China is only comparable to Nigeria. If Chinese households consumed comparably to Brazilian households, their consumption levels would be more than double. While households could potentially contain current consumption in return for higher future consumption via investment, the resulting massive investment, which could be beyond the economy's absorption capacity, can potentially lead to lower returns which might not

Slowly Switching from Investment to Consumption
(Industrial Countries and Emerging Markets; average, 2008-17)

Source: World Economic Outlook and IMF staff calculations.
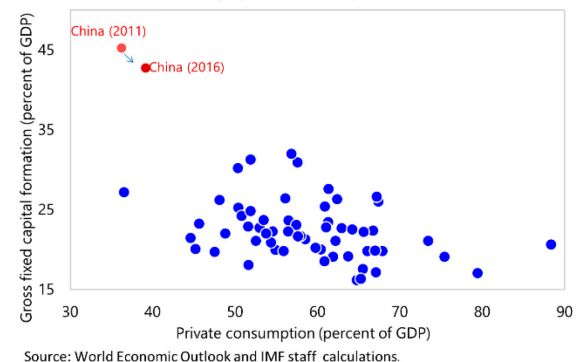
fully compensate the loss of current consumption growth.

The composition of national savings in China has changed overtime, and households are now the main drivers. Understanding savings' sectoral distribution is crucial, as each sector often has different drivers, and the necessary policy responses also vary.[2] While global national savings (in percent of GDP) have been broadly stable over the past three decades, there has been a substantial compositional shift from household savings to corporate savings. Against this backdrop, the evolution of sectoral savings in China has displayed a different pattern, with the gap largely reflecting in household sector:


National Savings Rate
(in percent of GDP)

Sources: Flow of funds, IMF staff estimates.
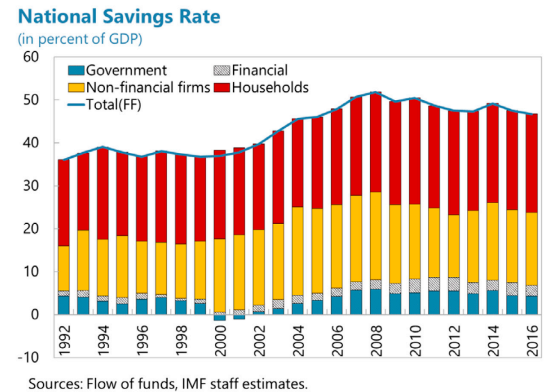
- **Households:** Household savings in China have been trending up since the early 1990s and peaked at 25 percent in 2010 and moderated slightly in recent years. Globally, household savings have been falling (from 14 percent of GDP in 1980 to about 7 percent today). The diverging trend has led to an increasing gap between China and the rest of the world. At 23 percent of GDP, today China's household savings are 15 percentage points higher than the global average and constitute the main drivers of higher national savings in China. As discussed later, this gap reflects a confluence of factors, ranging from demographic structure, and developmental stage, to rising income inequality and housing affordability.

- **Corporates:** In the 1990s. China's corporate savings were relatively low and comparable to the global average. They surged in the 2000s, resulting in an increasingly large gap compared to those of other countries. After the GFC, this gap narrowed significantly, reflecting both the decline in China's corporate savings and the rise elsewhere. Currently, China's corporate savings are in line with the global average.

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[2] Note sectoral savings are based on flow of funds data. For some years, the sum of sectoral savings is slightly different from national savings based on national account data.

- • **Government:** Fiscal savings have been volatile over time, and, on average, constitute only a small portion of national savings. In the past, the fiscal savings level was similar to those of other countries, but in recent years, China's fiscal savings[3] have been higher than the global average, reflecting high capital spending.

Sources: CEIC and Chen et al (2017)
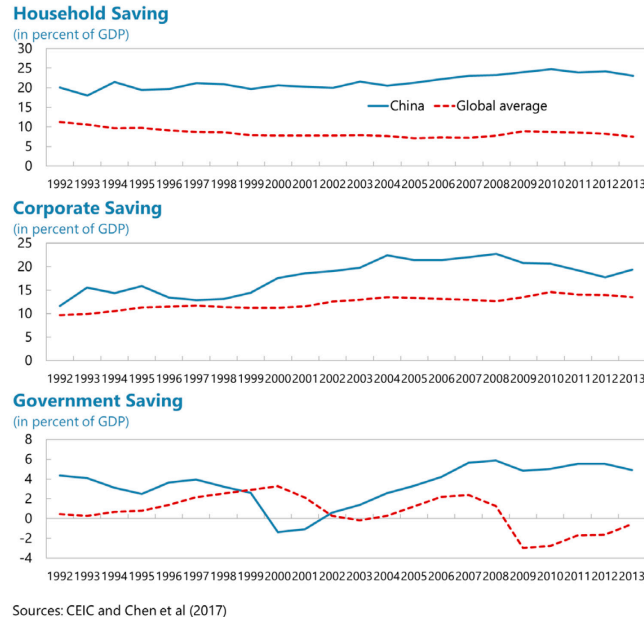
The future trajectory of savings will shape the rebalancing path for China. In the future, should the needed slowdowns in investment and credit materialize, an accompanying decline in savings could maintain the external balance, while continued high savings would lead to a resumption of large current account surpluses. As investment slows, lower savings could also boost consumption as the new engine of growth. Moreover, the evolution of savings has important implications for capital flows. With sustained high savings and the increasing need for portfolio diversification by households and firms, capital outflows might increase as the capital account is further liberalized, which would complicate exchange rate management.

Our paper provides a *comprehensive* study on the drivers of Chinese savings rate. We investigate savings rate for all three sectors (household, corporate, and government) and we study the past evolutions and future projections of savings rate. In terms of methodology, we employ both model simulations and empirical analyses based on the household-/firm-level microdata, as well as city-level macro data. In addition, we also use cross-country microdata to examine income inequality and savings, which have not been thoroughly studied in the literature. Finally, we also provide a comprehensive package for policy recommendation to further reduce Chinese savings rate.

This paper is organized as follows: Section II, III, IV analyze the drivers of household, corporate, and government saving behaviors, respectively. Section V provides savings rate

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[3] In this paper, fiscal or government savings equate to budgetary government savings, the same concept used by the authorities.

projections over the medium term. Section VI considers savings' interaction across different sectors and the state's overarching role, and provides policy recommendations to reduce savings in the future.

II. HOUSEHOLD SAVINGS

This section reviews the historical evolution of household savings and analyzes the possible drivers: demographic changes, the social safety net, income inequality, housing reforms, and financial repression.

A. Overview

From the late 1970s on, savings have increased dramatically amid massive structural transformations. The surge in household savings can be categorized into three phases:

Household Savings Rate
(in percent of disposable income)

Sources: Household Survey and Modigliani and Cao (2004)

- *The first phase* was in the 1980s, following the introduction of the one-child policy and de-collectivization of agriculture in rural areas. The savings rate rose from 5 to 20 percent of disposable income (albeit with a temporary dip in the late 1980s, possibly due to growth slow down).
- *The second stage* was in the 1990s, after Deng's southern tour reaffirmed China's policy to reform and open-door, SOE reform took center stage and was accompanied by the transformation of the social safety net and job security, leading to savings' rising further to 25 percent of disposable income.
- *The third stage* came after China's WTO entry in 2001, when savings rose further to 30 percent of disposable income during an export-driven boom. Notably, since 2012, household savings have plateaued and gradually begun to decline.
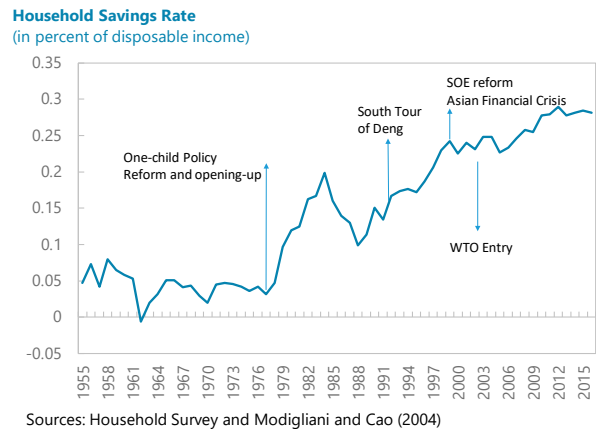
Household savings, in percent of GDP, have increased less, reflecting an overall decline in household income as a share of GDP. Despite the steady increase in the household savings rate, when scaled by disposable income, aggregate household savings, measured in percent of GDP, showed a less increase, as households received smaller shares of GDP over time. The ratio of household disposable income to GDP fell from 67 percentage points in the late 1990s to 58 percentage points in 2008, and only gradually increased to 61 percentage points in 2014. There are mainly two factors contributing to the pattern. First, in early 2000s, large surplus labor in rural areas capped wage growth during the initial stage of industrialization. In addition, the massive lay-off resulting from the state-owned enterprises (SOE) reform in the late 1990s also put downward pressure on wage growth. As labor productivity was higher than wages, capital owners received excess returns, while the labor income share has fallen over time. This trend has reversed in recent years, as China has gradually reached the "Lewis turning point."[4] Also, repressed deposit rates (about 4 percent) during the high-growth period (nominal GDP growth of 20 percent) were essentially a subsidy from households to financed investment (Pettis 2014). With financial liberalization, however, this factor has diminished in recent years.

Household Saving and Disposable Income
(in percent of GDP)
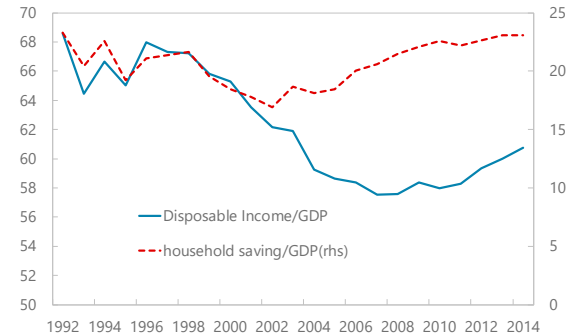
Sources: Flow of Funds, NBS.

The literature on the potential drivers of high household savings in China is rich. One strand of the literature focuses on demographic factors (Modigliani and Cao, 2004; Choukhmane et al., 2014; Curtis, Lugauer, and Mark, 2015), arguing that the changing demographic structure resulting from the one-child policy has led to high household savings. Another strand focuses on the role of precautionary (Blanchard and Giavazzi, 2005; Chamon and Prasad, 2010; and He et al., 2017, 2018). This strand argues that the transformation of the social safety net and job security during China's transition from a centrally-planned economy to a market economy was the main contributor to the increase in savings. In addition, financial repression (i.e., excessively low returns on household deposits) is also considered a potential driver of high savings, although empirical evidence has been scant. The literature also includes studies on the impact of housing prices and housing ownership on savings (Wang and Wen, 2011; Chen, Yang, and Zhong, 2016), but generally finds mixed evidence.[5]

In the following sections, we analyze the potential drivers of household savings rate one by one.

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[4] The Lewis turning point refers to the exhaustion of the supply of surplus laborers from rural areas that are employed in cities.

[5] Some literature also argues that gender imbalance is a key contributor to high savings (Wei and Zhang, 2011).
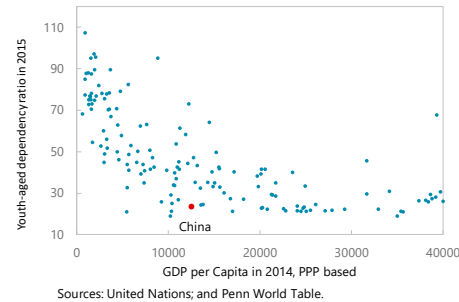
B. Demographics

China has undergone dramatic demographic changes over the past several decades.
During the 1950s and 1960s, the fertility rate was very high, partly reflecting the policy direction that "a large population and labor force translate into greater economic power." Facing an increasing population burden, in the 1970s, a voluntary campaign was launched to encourage people to get married and have children at an older age, also limiting the number of children to two. Such policies led to a rapid decline in the fertility rate from 6 to below 3, which then fell to below 2 after the introduction of the one-child policy in 1980. The fall in fertility led to a rapid decline in the youth-dependence ratio, or the number of young people below 15 to the number of people aged 15–64, and a rising share of the working-age population. As shown in the chart, China has one of the lowest youth-dependence ratios in the world.

Youth Dependence Ratio and GDP Per Capita

Youth-aged dependency ratio in 2015 / GDP per Capita in 2014, PPP based

China

Sources: United Nations; and Penn World Table.

Demographic changes affect household savings behaviors through both expenditures on children and expected inter-generational support. On the expenditure side, having fewer children requires less spending, especially as regards education, which contributes to an increase in savings. On the income/transfer side, having fewer children leads to a decline in old-age support, which is the elderly's main livelihood in China.[6] This phenomenon creates greater incentive to save more for retirement (Imrohoroglu and Zhao, 2017). Indeed, microdata show the strong impact of the number of children on household savings. Using Urban Household Survey data, Choukhmane et al. (2014) find that households with twins tend to save about 10 percentage points less than households with one child, and this pattern holds across income levels. In addition to behavioral changes at the household level, aggregate savings would rise further, as a larger share of the population is of working age and would tend to save more, based on the life-cycle theory.

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[6] The 2005 Chinese census shows that family support accounted for 50 percent of the elderly's average income.

Quantitatively, demographic shifts alone account for half of the rise in household savings, suggesting that it has been the most important driver. We analyze the impact of demographics based on the overlapping generations model developed by Curtis et al. (2015), which captures both the expenditure and the transfer channel by including children's consumption in parents' utility function, and old-age support as a constant share of children's wages.[7] Model simulations show that demographics alone can explain about half of the increase in the household savings rate, holding

Household savings rate: model, historical data
(percent of disposable income)

Sources: Following Curtis and others (2017), CEIC, staff estimates.

income growth and interest rates constant. By adding income and interest rates, the full model can explain the broad savings trend.[8] However, it cannot account for the savings trends in the 1980s and 1990s, likely reflecting the large role of precautionary savings, which resulted from the gradual dismantling of the social safety net during these decades.[9]

C. Social Safety Net

The early years of China's transition from centrally-planned to market-based economy was accompanied by the transformation of the social safety net and a rise in precautionary savings. Before the early 1980s, 90 percent of the rural population had access to low-cost basic health care under the Cooperative Medical Scheme, which then collapsed with the de-collectivization of agriculture. In urban areas, SOE reform in the 1990s led to large-scale layoffs (over 27 million during 1997–2002. See He et al., 2018) and much-reduced social benefits and job security. For example, the health care coverage of urban workers declined by 17 percentage points between 1990 and 2000. Furthermore, the average replacement rate for urban workers (pension benefits in percent of wages) dropped sharply from close to 80 percent to below 50 percent (He at al., 2017). Nationwide, individuals have

Share in total health expenditure
(in percent)

Sources: China Health Statistics Yearbook.

been paying increasingly larger shares of healthcare expenditures out of pocket, rising from 20 percent in 1978 to a peak of 60 percent in 2000. In addition, households also began paying

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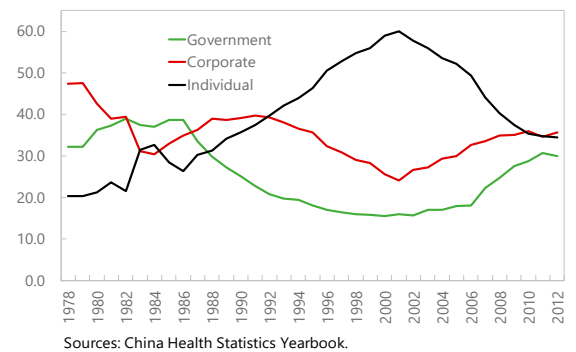
[7] See Appendix I, which explains details of the model.

[8] These are introduced exogenously to the model, and thus the model does not capture potentially important general equilibrium effects of savings on interest rates or wages. The improvement in model fit mostly reflects income dynamics, while the interest rate does not contribute significantly to savings variations.

[9] Using a heterogeneous agent overlapping generations model, He et al. (2017) show that precautionary motives, caused by the dramatic reduction of pension generosity in urban China, contributed to a 5.2 percentage point increase in the household savings rate from 1995 to 2009.

more for education out of their own pocket, rising from 2 percent in 1990 to 13 percent in 2001.

Recently, significant policy efforts have been made to rebuild the social safety net. For *rural* areas, the government introduced a new health care scheme (New Rural Cooperative Medical Scheme) in 2003, and a pay-as-you-go pension system (New Rural Social Pension Scheme) in 2009. Both schemes are heavily subsidized by direct government transfers. For *urban* areas, a mandatory insurance scheme for formal sector workers was established, mostly funded via social security contributions from employers and employees. An insurance scheme for non-working residents was also established in 2009, requiring a minimum household contribution, with a significant government subsidy. A basic pension scheme was introduced to them in 2010 as well. As of today, China has broadly achieved universal coverage for old-age pensions, although the benefits level remains low for rural households (Jain-Chandra et al., 2018). Access to health care remains an issue for migrant workers, reflecting only gradual progress in "Hukou reform."[10] While government social spending accelerated after the establishment of these new schemes, it remains low compared to international standards, as we will discuss in Section IV.

Government Spending
(in percent of GDP)

Sources: CEIC and IMF staff estimates.
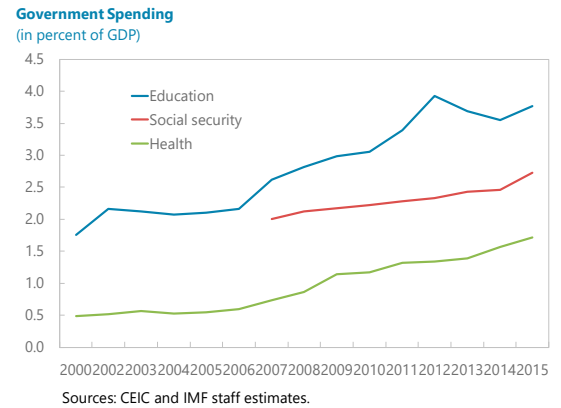
Our analysis finds that higher social spending is significantly associated with household savings, with differing impacts on urban and rural areas, suggesting a targeted policy focus. We study the impact of precautionary motives by observing regional variations in government spending on education, health, and social security. Using a cross-sectional analysis for the 287 prefectural municipalities, we find a significant positive relationship between social spending and urban and rural consumption (see appendix II for detailed empirical analysis).[11]

- *In urban households*, social security spending has a stronger relationship with consumption than other types of social spending, with a 1 percent increase associated with a 0.04–0.07 percent increase in household spending (see Table 2.1 in appendix II). The magnitude of impact at each variable's median suggests that a 100 yuan increase in social security spending (about 13 percent of median monthly social

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[10] In China, residents with rural "Hukou" have very limited access to public services in cities, such as education, health care, etc.

[11] Notice that all empirical analysis throughout the paper are not trying to infer causality but rather capture association between endogenous variables.

security per capita in 2013) is associated with an increase in urban consumption by about 40 yuan in 2013.

- *In rural households*, on the other hand, government spending on health care is most effective (see Table 2.2 in appendix II), with a 1 percent increase associated with a rise in rural consumption by 0.11 to 0.19 percent. Assessing impact at the median suggests a 100 yuan increase in health spending per capita (about 19 percent of the median of 532 yuan per capita spending in 2013) is associated with an increase in rural consumption by about 35 yuan in 2013.

- The differences in urban and rural results may indicate that the healthcare system is largely in place in urban areas, but still needs improvement in terms of access and benefits in rural areas. Pension payment may be less of an issue in rural areas, reflecting self-sufficient agriculture, but is a larger concern for urban households due to persistent increases in living expenses. Such differentiated effects also call for better targeting of social spending in both urban and rural areas.

D. Income Inequality

Rapid economic growth has been accompanied by rising income inequality. Over the past three decades, China's economic growth has averaged over 10 percent, which lifted 600 million out of poverty; and dramatically reduced the poverty headcount ratio (the proportion of a population that lives below international poverty line) from 66.6 percent in 1990 to 1.9 percent in 2013. However, income inequality has worsened dramatically; the income Gini index rose from 0.3 in the 1980s to about 0.5 in 2010, one of the largest increases in the world. The income Gini index has moderated only gradually since then (Jain-Chandra et al 2018; Ding and He 2018). In addition, the top 10 percent's income share rose from 27 to 41 percent between 1978 and 2015, while bottom 50 percent's share dropped from 27 to 15 percent (Piketty et al., 2017).

Income inequality translates into savings inequality. Household-level microdata suggest that savings behavior differs substantially across income deciles. Based on Chinese Household Income Project (CHIP) data, the difference between the savings rates of the richest and poorest deciles is often as large as 20 percentage points, reflecting the different propensities to consume out of income. For example, in 2013, the top earners saved close to 50 percent of their incomes, while households in the bottom 10 percent saved about 20

Urban Household Saving Rate by Income Percentile
(saving in percent of disposable income)

Sources: CHIP.

percent. The slope of the "saving inequality curve" also changed over time. From 2002 to 2007, the curve became steeper, consistent with rising income inequality. From 2007 to 2013, the curve shifted upward in a parallel manner as income inequality plateaued. In
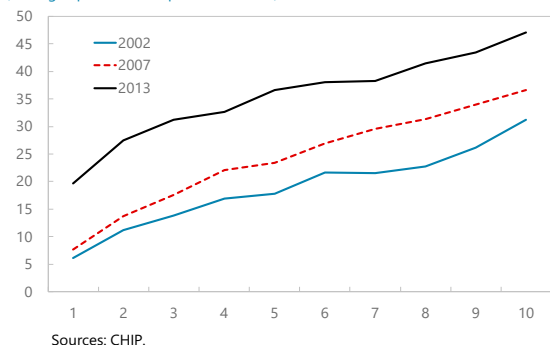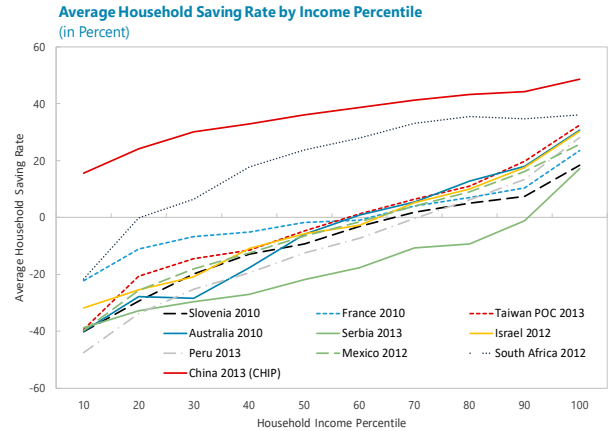
addition to a higher savings rate at each decile, the aggregate savings rate would increase further, reflecting the composition effect, as a larger share of income goes to the top. From 1978 to 2015, the simple composition effect contributed about 3 percentage points to the increase in the aggregate savings rate.

**Chinese households save more at every income decile, but the gap is largest at the bottom.** Compared to other countries, the household savings rate is higher at every income decile, but the gap is particularly large for the poor.[12] In many countries, the savings rates for the bottom 10–20 percentiles are often negative, indicating that substantial social transfers are used to support the basic consumption. In China, however, the savings rate for the poor is still positive and quite high at 20 percent. This points to inadequate social transfers, a lack of progressivity in taxation, and a limited social safety net.

Average Household Saving Rate by Income Percentile
(in Percent)

Source: Luxembourg Income Study (LIS), and Chinese Household Income Project (CHIP).

E. Housing

Housing ownership increased dramatically after the 1990s housing reform. Two major housing reforms in the past three decades have transformed China's housing market. The 1988 reforms fostered housing privatization, and much of the rental housing stock of was sold to SOE workers at low prices. The 1995 reforms ended enterprise-supplied housing and moved to a comprehensive market-based housing provision (Man 2011). Due to these reforms, housing ownership surged from 20 percent in 1988 to 90 percent in 2007 and has been stable ever since.[13]

Rising Homeownership and Saving Rate
(in percent)

Sources: Various waves of CHIP survey.
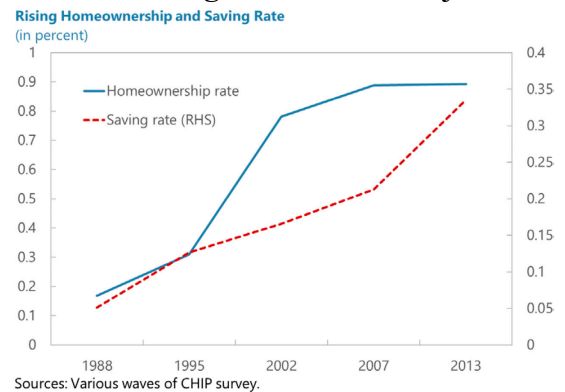
Housing ownership could affect savings behavior through various channels. These include the *down payment effect*, *mortgage effect*, and *wealth effect*. The down payment channel implies that a tenant would save more if she decided to buy a house, and rising housing prices would make that incentive even stronger. The mortgage channel suggests that homeowners would need to save more to pay mortgages. The wealth effect implies that, with

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[12] Based on harmonized country-level household survey data by Luxemburg Income Studies (LIS).

[13] One caveat is that the high ownership ratio also reflects the purchase of low-quality public housing during the housing reforms. While overall ownership has been stable in recent years, the share of commodity housing has been rising to replace old public housing. This, together with upgrades in commodity housing, continues to generate a strong housing demand.

rising housing prices, homeowners would also increase consumption and reduce saving as they would feel wealthier. The overall impact of housing ownership on savings, interacted with rapidly rising housing prices, will depend on the relative strength of these offsetting channels.

Empirical analysis shows that the overall impact of household ownership on savings was positive in earlier years and turned negative in recent years.[14] Prior to the 1995 housing reform, there was no systematic difference in savings rates between tenants and homeowners. After the reform, homeowners began saving more than tenants, as shown in the 2002 and 2007 CHIP. However, by 2013, this trend had reversed, with homeowners saving marginally less than tenants. These patterns are confirmed by household-level regressions (see Table 3), which control for households' other characteristics (age, sex, education, occupation, income, household size). The regression results suggest that homeownership increased the savings rate significantly by 3 percentage points during the first 10 years of the 2000s, indicating that the mortgage effect for homeowners dominated. However, this effect dissipated by 2013, with homeowners saving 2 percentage points less, likely reflecting the housing wealth effect on the homeowners' side; and surging housing prices increased tenants' savings to cover ever rising down payments. Hence, in the past, increasing homeownership probably contributed to rising household savings, but the effect may have peaked at this point. Nonetheless, elevated housing prices may continue to contain household consumption growth via substantial mortgage or down payment needs.

Save Rate by Home Ownership
(in percent)

Sources: Various waves of CHIP survey.

F. Financial Repression

Repressed interest rates could theoretically lead to high household savings rates, though empirical evidence has been scant. The "target savings" hypothesis suggests that a household chooses a certain consumption level in order to reach some targeted wealth-to-income ratio (Carroll, 2001). When deposit rates are repressed, households save more to compensate for the lower returns on their wealth. Excessively low deposit rates in China may have contributed to higher savings (the average real deposit rate in the past two decades has been below 3 percent when GDP growth was 10 percent). Empirical support for this hypothesis has been limited (Chamon and Prasad, 2010; Ding and He, 2018). However, using cross-provincial regression, Nabar (2011) finds that a 1 percent interest rate decline increases the household savings rate by a percentage point of about 0.5. We find that, however, once cross-region income differences are controlled for in the regression, even this small quantitative effect disappears.

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[14] See Appendix III for details on the empirical analysis.

Financial repression has become less relevant due to interest rate liberalization. In the past, the central bank had set a cap on commercial banks' deposit rates. By 2015, the cap was removed, and, in principle, banks could set their own deposit rates. In the meantime, other financial products, notably wealth management products (WMP) and private lending, have proliferated in China. These products offer more market-based higher returns (about 5 percent for WMP, and typically over 10 percent for private lending). Thus, an increasing share of household savings has been flowing to non-deposit investment products. In 2016, the WMP stock has risen to 120 percent of GDP. Therefore, financial repression is arguably no longer a driver of household savings today.

Interest Rates
(In percent, period average; 1 year)

Benchmark deposit rate — WMP — Wenzhou index (rhs)
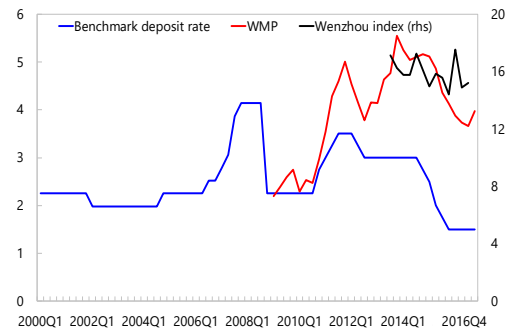
Overall, our analysis suggests that rising household savings have largely been a result of demographic changes. Rising income inequality and the transformation of the social safety net were also major contributors, with housing reform being a minor contributor. Pinning down each factor's contribution is difficult, as the factors often interact with and reinforce each other. For example, the transformation of the social safety net has a stronger impact on precautionary savings when people receive limited old-age support from their only child. Overall, we find that demographic changes likely contributed to half of the saving increase since the 1980s, while housing reform contributed about a quarter of the increase. The transformation of social safety net likely contributed about 17 percent, while rising inequality contributed the rest 8 percent.

III.   CORPORATE SAVINGS

This section analyzes Chinese corporates' savings behaviors using firm-level data. The analysis suggests firms' savings rates today are similar to those of other countries, although they were much higher before the GFC, which partly reflects the undervalued exchange rate. Compared to private firms, SOEs have lower gross savings but higher net savings, possibly due to SOEs' relatively low profitability and low investment rates.

China's corporate savings rate surged in the early 2000s but moderated after the GFC. In line with the macrodata, firm-level data shows a significant increase

Corporate Saving
(in percent of GDP; in percent of total assets)

gross saving rate (listed firms)

corporate saving/GDP (macro data,rhs)
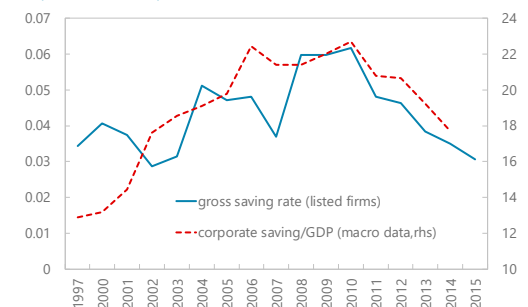
Sources: Flow of Funds, WIND database.

in the gross corporate savings rate[15] during the export boom that occurred after the WTO entry. The rate moderated after the GFC, as the economy slowed, and the exchange rate gradually moved in line with fundamentals. The net savings rate (gross savings minus investment as a ratio to assets) was negative throughout the last decade, reflecting high investment in China. As a result, the corporate sector does not appear to be a driver of China's current account surplus. This stands in contrast with some other eastern Asian countries, where firms' net savings are large and positive, and hence, the main contributors to current account surpluses. Falling corporate savings after the GFC also contrast with the general upward trend of global corporate savings (Chen et al., 2017).

Today, corporate savings in China are comparable to other countries'. Firm-level analysis suggests that corporate savings ratios in China, in both gross and net terms, are comparable to the rest of the world's. The median gross savings ratio is about 4 percent of assets in China, which is slightly lower than the 5–6 percent in the rest of the world. The net savings ratio is about -0.01 percent, also lower than the 0–0.1 percent global average.[16]
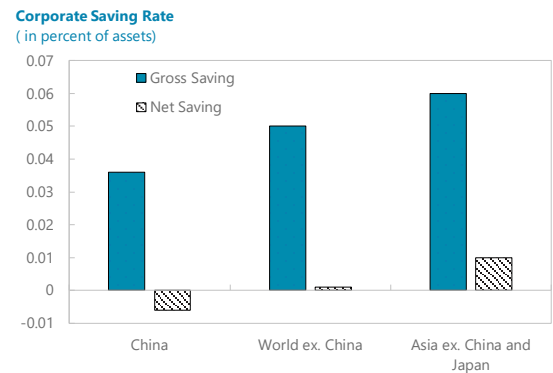
Corporate Saving Rate
(in percent of assets)

Sources: Worldscope.

Firm-level data indicate that, on average, SOEs have lower gross savings, but higher net savings, than private firms. Our empirical analysis (see Appendix IV) of the corporate saving breakdown suggests that SOEs' relatively low gross savings ratios are related to their weaker profits. This result is consistent with Lam et al. (2017), who show that—controlling for industries—SOEs' average productivity is about 25 percent lower than that of private firms. We also found that, at 22 percent, Chinese SOEs' average dividend payout ratio (dividends as a share of profits) is about 10 percentage points below that of private firms, which is comparable to the global average. This further indicates that the SOEs' low gross savings come from lower profits compared to their POE counterparts. However, SOEs' net savings (gross saving minus investment), on average, are higher than those of private firms. This could be due to lower investment among SOEs than their POE counterparts (see Table 4). The firm-level evidence illustrates the need for more decisive SOE reforms and policies that encourage larger transfers of SOE dividends to the budget. This would reduce SOE savings and help support government spending for strengthening the social safety net.

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[15] Following previous literature (Bayoumi et al., 2010), we define the firm-level gross savings rate as GS = (Profits - Dividends)/Assets.

[16] While the macro data still indicate higher corporate savings levels in China, this could be the result of two factors: the first is sample bias, as non-listed firms might have much higher savings rates due to financing constraints. The second is that, while the savings-to-asset ratio is similar to other countries, China has a much larger assets-to-GDP ratio caused by rapid investment, which translates into a higher savings-to-GDP ratio.

The decline in corporate gross savings rates varied across industries. The agriculture and
mining industries observed the sharpest decline
in the savings rates since the GFC, reflecting the
global commodity cycles. The labor-intensive
non-tradable industries such as construction and
financial and real estate also saw a sizable
decline in the savings rates, perhaps due to the
rising labor cost in China which tend to put
downward pressure on corporate profitability.
On the other hand, the savings rates have been
relatively stable in the labor-intensive tradable
industries such as manufacturing, and retail and
wholesale trade.

Average Gross Saving Rate by Industries
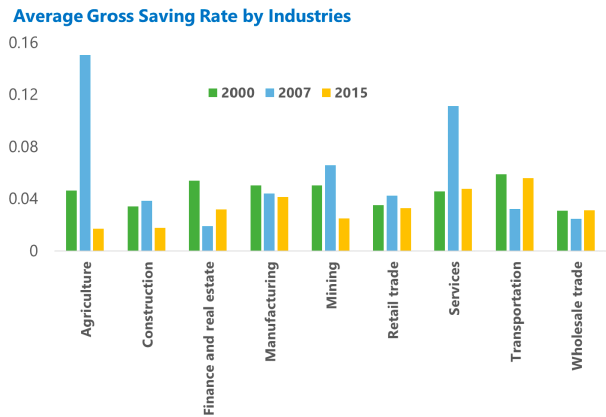
Source: Datastream and Worldscope.

**The exchange rate's level indeed played an
important role in driving high corporate
savings.** The regression analysis (Table 4) shows
the exchange rate's significant impact on
corporate savings, which tends to be even larger in
the tradable sector. During 2005–2008, the RMB
was found to be undervalued, which contributed to
the export boom and large corporate savings,
especially for the export-oriented private sector,
and the savings-to-asset ratio surged from 0.01 in
2005 to 0.15 in 2008. In recent years, as the RMB
has gradually moved in line with the equilibrium,
the export sector's high savings have largely been
unwound.

Corporate Savings Ratios: SOEs vs. Private Companies
(sample mean)
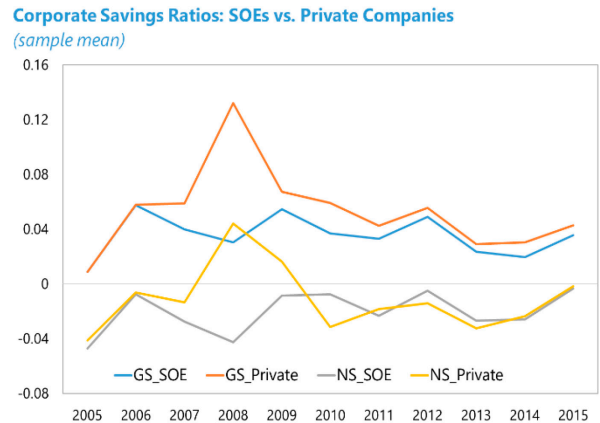
Source: Worldscope, authors' estimates.

IV.   GOVERNMENT SAVINGS

*Higher government savings today mostly reflect lower current expenditures, while revenues
are broadly in line with those of other countries.
Further improvements in the social safety net and
public services provisions are likely to decrease
fiscal savings.*

Government savings (percent of GDP)

Sources: FFA.

Government savings[17] **have stabilized since 2008
at around 5 percent of GDP, but varied
significantly before then.** Three separate periods
can be identified when observing the evolution of

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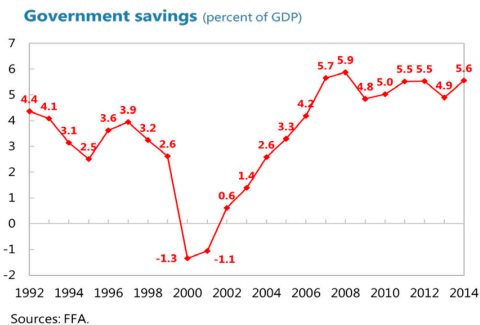
[17] We follow the definition of government savings in China's fund of flows accounts. There, savings are
equating to disposable income minus final government consumption expenditure, where disposable income is

China's government savings. Pre-2000, savings were very volatile, reflecting large business cycle swings and structural transformations, and averaged around 3 percent of GDP. Since 2000, fiscal saving has been on a steady upward trend and peaked near 6 percent in 2008. After the GFC, fiscal savings have moderated and stabilized at around 5 percent in recent years.

The fiscal savings volatility was mostly driven by tax revenues. The decline of savings in 2000 can be explained by the abrupt fall in tax revenues resulting from the Asian Financial Crisis and the large-scale SOE reform. The 2000–08 savings surge reflects the higher corporate tax income resulting from the export boom after the WTO entry, as well as the falling government consumption expenditures that arose from the transformationof social safety net. After the GFC, higher fiscal revenues from capital income were broadly

Decomposing the changes in government savings (percent of GDP)

1/ Net taxes on production and current taxes. 2/ Incl. net social security payments and allowances. 3/ Value added and compensation. Sources: Flow of Funds, staff estimates.

offset by larger social transfers aiming to rebuild the social safety net, and hence overall savings have stabilized.

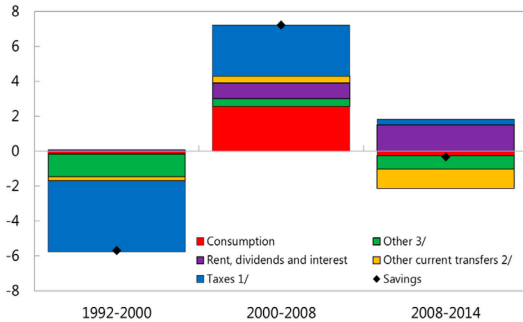**In a cross-country context, China's higher government savings mostly reflect lower current expenditure.** In 2014, at 5.6 percent of GDP, Chinese government savings were among the highest in major economies. This reflects lower government consumption. Fiscal revenues are broadly in line with other countries, though below the OECD average.

Government gross savings: major economies and other select asian economies in 2015 (percent of GDP)
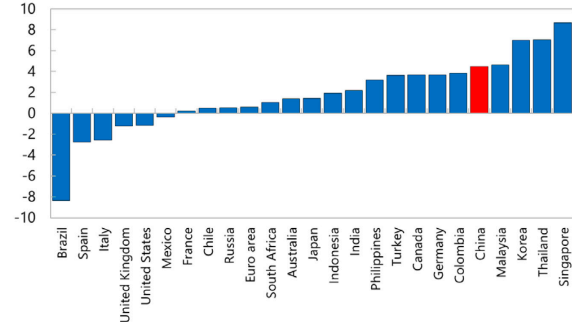
Sources: WEO.

The relatively low government consumption is mainly driven by the following factors:

composed of income from primary distribution and net current transfers. This definition is similar to equating gross savings to the overall government balance, adding back in capital expenditure.

- **Greater focus on public investment than public service.** China stands out with one of the highest government-investment-to-GDP ratios (4 percent on-budget and 12 percent off-budget investments). Hence, despite a large "augmented" fiscal deficit[18] of 10 percent, fiscal savings remain higher than other countries', resulting from the biased composition of spending towards investment.

Government investment for major economies and other select asian economies in 2013 (percent of GDP)
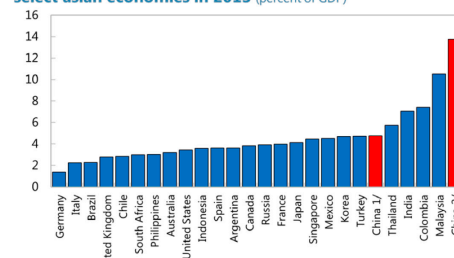
1/ On-budget only. 2/ Also incl. off-budget and investment financed by land sales.
Source: WEO, "Estimating Public, Private, and PPP Capital Stocks", staff estimates.

- **Lower social spending.** Despite a significant increase in past years, China's social spending rates are still lower than those of other emerging markets, especially as regards public education, public health, and social assistance. Strengthening the social safety net further would align China's social spending more closely with its peers'.

China Spends Less On Consumption-enhancing Areas
(In percent of GDP)
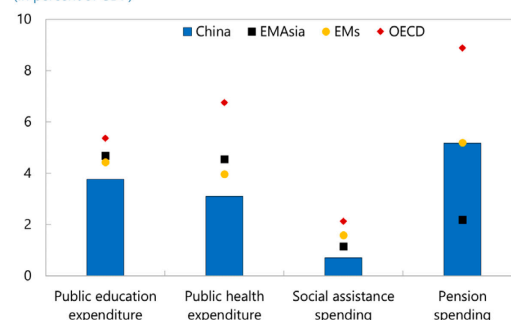
Sources: IMF Expenditure Assessment Tool.

- **Early stages of social security system.** The social security system once was an engine for government savings throughout the 1990s and early 2000s, but became a deficit in 2013 as payments outpaced contributions, a shift that signals the change in demographic structure. However, China's social security system is still at an early stage compared to those of most advanced economies, reflecting a relatively low old-age dependence ratio. Envisaged rapid aging will put significant pressure on pension spending (expected to rise from 4 percent of GDP in 2015 to 10 percent in 2050).

V. PROSPECTS FOR SAVINGS

This section projects China's savings rate in the medium term to assess its likely evolutions and possible roles of policies. Structural forces and policy support should lead to a continued decline in household and government savings, while corporate savings are also likely to fall with lower capital returns and rising labor income shares. Overall, the national savings-to-GDP ratio is expected to fall by 4.5 percentage points by 2022, and by close to 10 percentage points by 2030. A proactive scenario, with a quicker increase in social spending and reduction in income inequality, could reduce the savings rate further and boost private consumption by an extra 2 percent of GDP by 2022.

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[18] For a recent discussion of the IMF's augmented fiscal estimates, see Mano and Stokoe (2017).

Rapid aging will have a substantial impact on household savings going forward. China is expected to undergo rapid aging, with the old-age dependency ratio rising from 15 percent in 2015 to 50 percent in 2050.[19] Model simulations show that the projected demographic changes would reduce the households' savings rates (in percent of disposable income) by 6 percentage points by 2030. Aging would also put pressure on fiscal expenditure and lower fiscal savings in the future.

Old age dependency ratio across UN scenarios
(65+ over 20-64 population, percent)
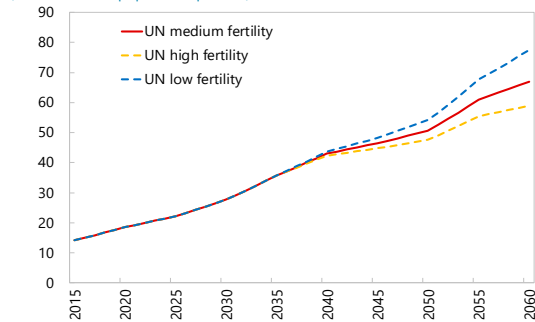
Sources: UN, staff estimates.

Household savings rate: Projection sensitivity to demographic assumptions (percent of disposable income)
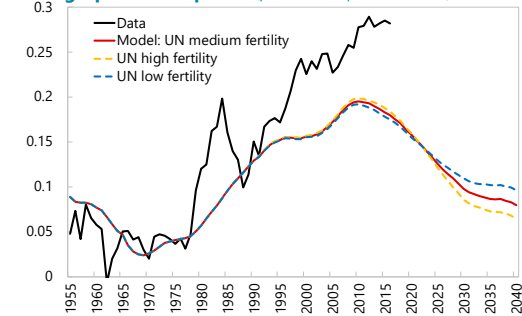
Sources: CEIC, staff estimates.

Continued increases in social spending would also reduce household and fiscal savings. Our baseline projections assume that government budget health expenditure to GDP would continue the upward trend, increasing from 1.7 percent in 2016 to 2.4 percent by 2022, which would lower household savings by about 1 percentage point. We predict that, together with the aging effect, household savings, in percent of GDP, will fall by 3 percentage points by 2022.

Household Saving Rate to Fall
(In percent of GDP)
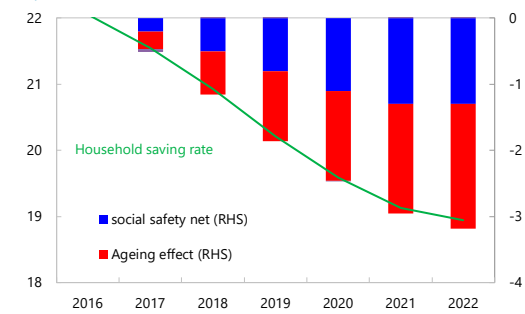
Source: IMF staff estimates and projections.

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[19] Defined as the portion of the population above the age of 65 to the portion aged 15–64.

Changing younger cohorts' consumer behavior may put more downward pressure on household savings. Historically, savings behavior has often differed dramatically across generations, reflecting their different consumption preferences. For example, in the U.S., the falling household savings in the past three decades were mostly driven by young people, with the share of borrowers increasing from 10 percent in 1988 to 25 percent in 2008 (Choukhmane et al., 2014). In China, the younger generations (especially those born after 1990) already have much lower savings

Sharp Fall in Youth Saving Rate
(in percent of disposable income)
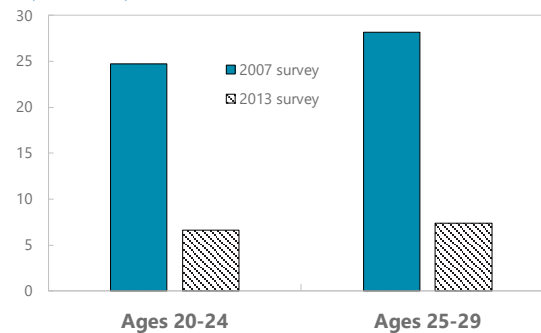
Sources: 2007 and 2013 CHIP data.

rates than previous cohorts at similar ages. Having grown up during China's economic boom, the younger generations have higher propensities to consume, compared to their more frugal parents, who lived througheconomic hardship. A more developed financial system would also give youth easier access to credit for consumption. As the younger cohorts reach middle age, China's aggregate savings rate will likely see a substantial decline.

East Asian economies experienced a rapid decline in household savings after the peak.
Japan's household savings rate peaked in 1974 at about 25 percent and has fallen to almost zero. In Korea, household savings peaked in the early 1990s at 27 percent, and are at about

15 percent today. Similarly, household savings in Taiwan POC also fell rapidly after peaking in 1993 at about 30 percent, although they stabilized a decade later at about 20 percent. Household savings in these countries or areas peaked at income levels similar to China's, suggesting that the stage of development plays an important role in savings dynamics. In addition, microdata suggest that the decline in aggregate

Table: Peak of household saving rate

	year	income level (1990 US$)
Taiwan POC	1993	11950
Japan	1974	11145
Korea	1991	10610
China	2010	9558

Sources: Haver and Madison Database.

household savings in those countries or areas was driven by lower savings rates across all income deciles, although the drop was much more pronounced for low-income households, likely reflecting the improvement in social safety nets. With the aging population and strengthening of the social safety net[20], China is likely to follow the regional trend.

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[20] Population aging will inevitably put pressure on the sustainability of the social pension scheme, to address this issue, the government has announced to transfer SOE assets to cover the future funding gap.

Household Saving Rate
(in percent of disposable income)

t=0 is defined as the year when household saving rate peaked, 1974 for Japan, 1991 for Korea and 1993 for Taiwan POC. Source: Haver, Maddison database.

Average Household Saving Rate by Income Decile, Taiwan POC
(in Percent)

Source: Luxembourg Income Study (LIS).
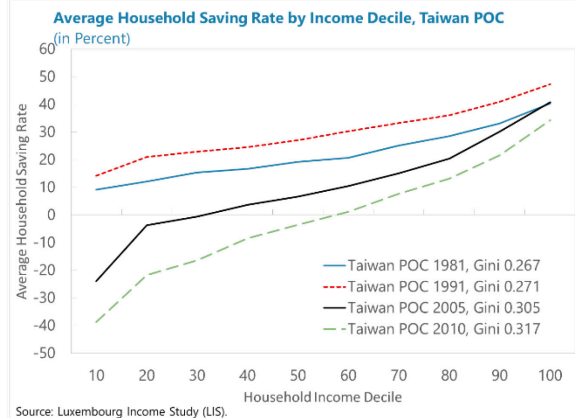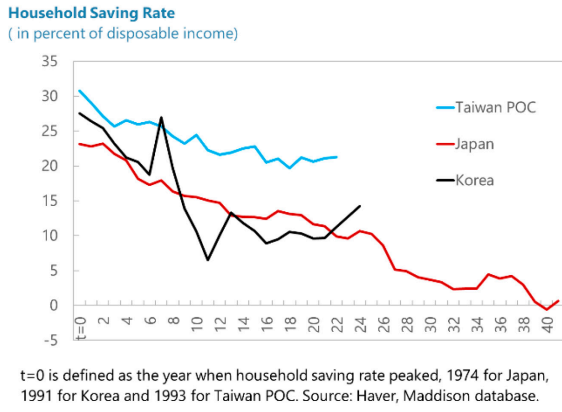
National savings are expected to fall, a trend driven mostly by households and the government. Lower household and fiscal savings are expected to reduce overall national savings by 5 percentage points. As the economy shifts more towards services and the labor share of income rises, corporate savings are likely to fall moderately by 2020, reflecting falling capital returns as growth slows and the labor intensity of output rises.

National Saving Rate to Fall
(in percent of GDP)

Sources: Flow of funds, IMF staff estimates and projections.
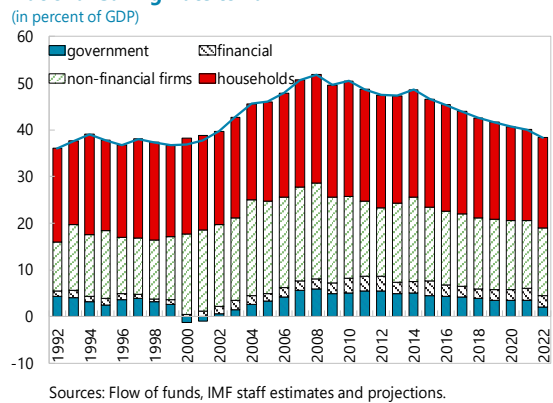
A proactive scenario with higher social spending and less income inequality would lead to a faster decline in savings and higher consumption. Household savings would be reduced by 5 percent of GDP by 2022 if the government were to adopt policies that increased healthcare spending to 3 percent of GDP (compared to 2.5 percent in the baseline) and moderately reduced the top 10 percent's income share by redistributing income to those at the bottom. Such policies would also boost household consumption by an additional 2 percent of GDP compared to the baseline.

Household Saving Rate to Fall -- Proactive
(In percent of GDP)

Source: IMF staff estimates and projections.
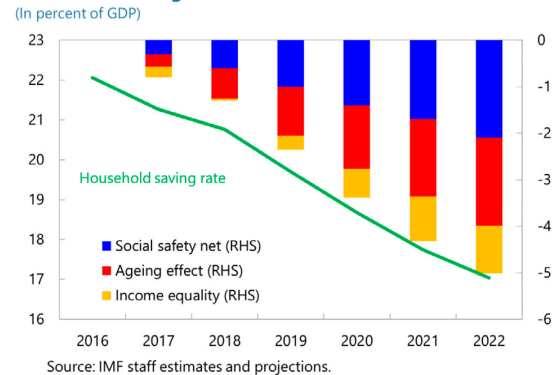
Risks to the projected savings trajectory mainly arise from corporate savings. While corporate savings are projected to decline with the rising labor share of national income and the decreasing capital returns in the medium term, short-term dynamics may be complicated by large swings in PPI inflation and cyclical factors. Household savings may not fall as dramatically as predicted if the social safety net remains weak and the impact of aging is less than expected. However, they may also fall more rapidly if the younger generations' consumption behavior remains geared toward spending, even as they reach middle age.

VI.   THE ROLES OF THE STATE AND POLICY RECOMMENDATIONS

This section summarizes the state's role in driving high national savings based on previous findings and provides policy recommendations for reducing savings rate in the future.

Policy-induced structural changes have been pivotal in shaping China's exceptionally high savings and low consumption. While high, rising savings are often observed in economies during growth take-offs, unique policy settings and the changing economic structure have played important roles in shaping China's high savings rates:

- The one-child policy implemented in the late 1970s dramatically reduced the fertility rate and raised the savings rate.
- During the 1990s, the transition from centrally-planned to market economy transformed the social safety net and led to higher household precautionary savings.
- In the 2000s, the WTO entry led to an export-oriented growth surge, with a significant rise in corporate savings, partly owing to an undervalued exchange rate.
- Inadequate social spending and high public investment led to high government savings.
- Housing reform and rapidly rising housing prices led households to save more in order to make either down payments or mortgage payments.
- Rising income inequality—partly attributable to limited income redistribution—led to higher savings. This is because richer households have higher propensities to save.

More broadly, given the high household savings rate, the falling household share of the national income further contained household consumption growth, with the consumption-to-GDP falling sharply since the early 2000s. Boosting household consumption still essentially depends on a more even distribution of growth benefits between households and the state, including greater income-earning opportunities for the private sector.

Policy efforts to lower savings should focus on strengthening the social safety net and reducing income inequality. Specific measures include the following:

- **Making income tax more progressive and family friendly** (Lam and Wingender, 2015)**.** The current tax structure is regressive, especially for the very poor. While personal income tax has a relatively high exemption threshold, the flat nominal amount of social contribution at the bottom puts a heavy burden on poor households, with an effective tax rate of over 40 percent. Furthermore, tax allowance should be based on family size in order to boost fertility, which would not only reduce savings by increasing dependents, but would also increase the future labor force.

Comparison of Average Tax Wedge by Income Level
(in percent of gross income)

China
OECD - Single person, 0 children
OECD - One-earner married couple, 2 children

Percent of average gross wage earnings

Sources: Lam and Wingender, 2015.
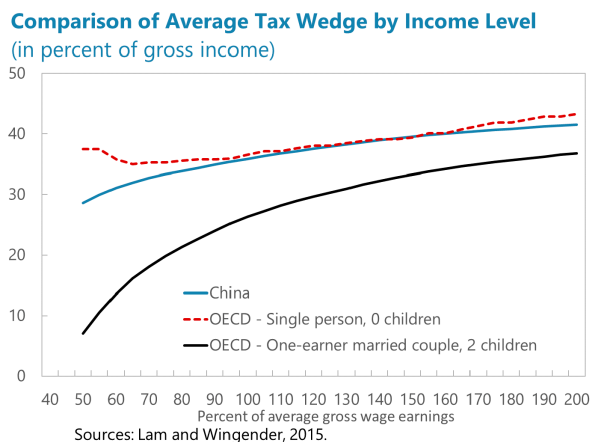
- **Increasing social transfers to poor households** (Jain-Chandra et al., 2018)**.** As shown in an earlier analysis (Section II.D), the gap in household savings is notably larger for poor households. In many countries, bottom-income earners tend to have negative savings rates, reflecting various social transfers, including in kind. Further increasing social assistance spending in China, will not only make China be in accord with international norms, but also help reducing the poor's saving rates and hence contributes to the reduction of the national saving rate.

- **Increasing expenditure on health care, pensions, and education.** While the government has made substantial progress on this front, further effort is needed. As shown in the previous analysis (Section II.C), higher health care and pension spending have significant impacts on increasing consumption and reducing precautionary household savings. In addition, continued Hukou reform is needed to ensure that migrant workers have the same access to the social safety net (Lam and Wingender, 2015). While spending on education does not appear to have a direct impact on household savings, it would help reduce income inequality in the future by providing equal education access to the poor.

  Increasing general spending on public services. While the government's focus on public investment in the past has built a world-class infrastructure in China, government should focus more on "soft infrastructure" in terms of policy framework and the delivery of public services, which require higher spending levels in order to attract talent and solve staffing shortages in various agencies (Lam, Rodlauer, and Schipke, 2017).

- **Higher social spending needs could be financed through larger dividend payments or asset transfers from SOEs.** The government has announced its goal to increase the SOE dividend payment ratio to 30 percent by 2020, but the de facto payment ratio is still very low at below 10 percent. Raising the payment ratio to the announced target could increase budget revenues by 30 percent of GDP per year, which could fund greater social spending. In addition, transferring SOE shares to social security funds could help address the system's actuarial imbalance.

Transfer of SOE Dividend to Fiscal Budget
(In percent of aggregate SOEs' profit)
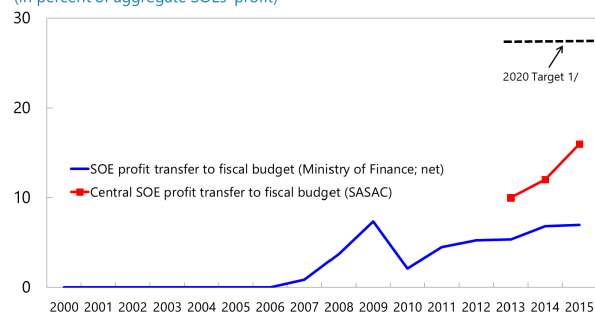
Sources: Ministry of Finance; Unirule Institute of Economics; and IMF staff estimates.
1/ SOEs were required to contribute their profits to the fiscal budget since 2007. Data for 2007 did not cover all SOEs. The third plenum reform required the transfer 30 percent of SOE profits to the fiscal budget by 2020.

- **Improving access to formal financing of private firms.** While SOEs contribute about 20 percent of GDP today, they account for 50 percent of credit, which is often invested inefficiently. To improve the financing access of private firms, the government should remove the "implicit guarantee" for SOEs and redirect credit to the private sector. With improved financing access, private firms will rely less on internal savings for investment, which could help lower corporate savings while containing economy-wide financial risks.

- **Service sector liberalization.** Providing private and foreign sectors with access to restricted service sectors could boost productivity and enhance households' income-earning opportunities.

APPENDIX I: OVERLAPPING GENERATIONS MODEL SIMULATIONS

Model

The model presented in figures in this appendix is from Curtis et al. (2015, hereafter CLM15) and further explored in Curtis et al. (2017, hereafter CLM17).[21] This is an overlapping generations model with Barro-Becker (1989) households that has three key features: (i) children are dependent on parents up to a certain age, and parents value their children's consumption. Thus, as the ratio of parents to children rises, consumption falls and savings increase. (ii) The demographic composition of the population matters, since the savings rate depends on whether an agent is a dependent child, a working adult, or retired adult. Savings are larger if the share of working adults in the population is higher. (iii) Family transfers, or

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[21] We thank Chad Curtis for sharing data and codes.

transfers between working and retired adults beyond those provided by the pay-as-you-go pension system, are important. Savings are expected to be higher if working adults who are single children need to support their parents. In the past, intrafamily transfers were an important cultural feature in China.

In each period, there are 95 overlapping cohorts, with a new cohort born every year. Only those above 20 years old make savings and consumption decisions. Agents of the same age are identical, and take the current and future age distribution as given. Agents face a cohort and age specific probability of death which rises to 1 when agents turn 95. Retirees receive the above-mentioned family transfers and a pension in a pay-as-you-go system. The social security contribution falls on wages and is adjusted period-by-period to fund a constant replacement rate pension, specified as a percentage of the wage in the last working year.

Finally, we note that the model is partial equilibrium since wages and interest rates are exogenous to the model and taken from the data (see below). We refer the reader to the cited papers for full details on the models.

In the following sections, we focus on the changes made to the data and calibration in our paper as compared to the results in CLM17's baseline calibration (see the figure in Section II.B).

Data
The actual household savings rate was updated between 2013–2016 using the per capita disposable incomes and consumption expenditures of all residents from the NBS household survey.

Demographics: The baseline scenario uses the medium-variant scenario found in the July 2015 update of the UN Population Prospects database, as did CLM. The figure titled "Household savings rate: Projection sensitivity to demographic assumptions" in Section VI shows alternatives using the low- and high-variant scenarios from the same UN database.

Interest rates in either CLM15 or CLM17 are Hodrick-Prescott filtered to remove high-frequency movements that are not relevant to a long-term OLG model. However, the input series used in the two papers is somewhat different, and we preferred the one CLM15 constructed to capture returns to national capital stock (not merely savings instruments available to households). Note that marginal returns to capital have been considerably higher than deposit rates since the mid-1990s. Therefore, using the interest rate series in

Interest rate assumptions (in percent)

Sources: CEIC, Curtis et al (2015).

CLM15 results in a larger equilibrium savings rate than simply using deposit rates. More recently, there has been an explosion of other types of widely available savings vehicles in
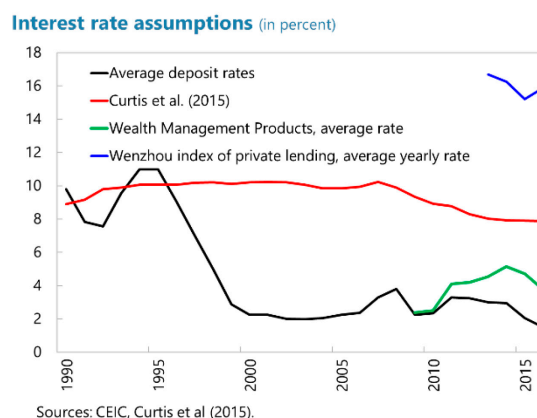
the forms of wealth management products and private lending. These generally pay larger interest rates than bank deposits do and are probably better proxies for returns to cash.

Wage growth is also taken from CLM15 rather than CLM17. Note that the wage series in CLM15 is quite different from real wage or real disposable income growth and is estimated using survey data—excluding capital income and family transfers—to match the model's wage concept.

Sensitivity to assumptions about future wages and interest rates:
Despite households' forward-looking behaviors, scenarios with higher future interest rates lead to slower declines in savings rates as expected, without significantly affecting the CLM15 model's implied savings rates. Higher future wages depress both the future path of savings and the CLM15 model's implied savings rates considerably.

Household savings rate: Different interest rate projections
(percent of disposable income)
Sources: CEIC, staff estimates.
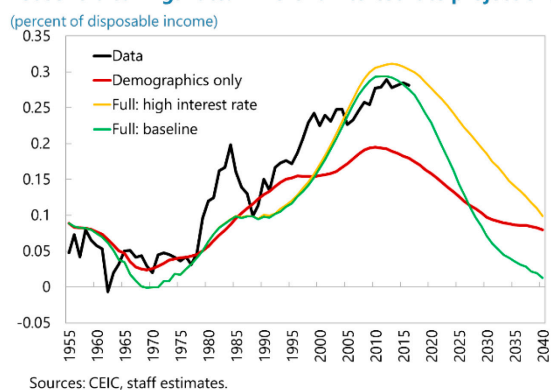
Household savings rate: Different wage projections
(percent of disposable income)
Sources: CEIC, staff estimates.
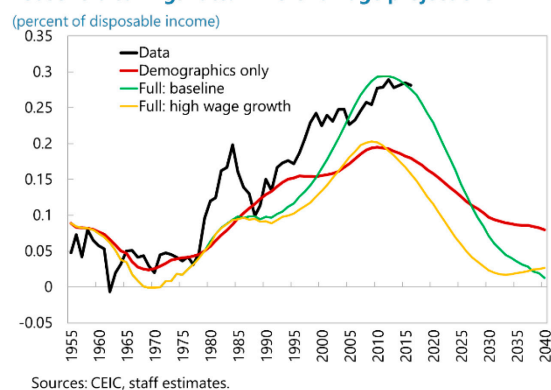
Parameters
We use the same parametrization as the one in CLM17's Table 1, except that (i) we set the retirement age at 59 rather than 64 (the latter seems too high, historically speaking); and (ii) we use the age-earning profile estimated in CLM15.

APPENDIX II: SOCIAL SPENDING AND HOUSEHOLD SAVING RATE: EMPIRICAL ANALYSIS

This section explores the role of precautionary motives, focusing on government spending on education, health and social security. The findings suggest that there is a significant positive relationship between government social spending and urban and rural consumption, based on analysis of the revamped household survey for 287 prefecture-level municipalities. For urban households, government spending on social security has a stronger positive relationship with consumption than other social spending. For rural households, in contrast, government spending on health has a stronger positive relationship with consumption than other social spending.

We specify a simple consumption equation based on the life cycle hypothesis approach as follows:

$$\log(C_{it}) = \alpha + \beta\log(Y_{it}) + \gamma\log(W_{it}) + \delta\log(X_{it}) + \mu$$

where C is household consumption

      Y is current household household income (a proxy for permanent income)

      W is household wealth (proxied by household saving deposits and residential property prices)

      X various measures of government social spending

      i is prefecture (or province)

      t is year

The government social spending (specifically on health, education and pensions) can be interpreted as proxies that reduce uncertainty about future income and expenditure. We first run the regression at the prefecture level, where we analyze the variation of consumption behavior across the 287 prefectures using a cross-section of data for each year in 2013-15, and separately for urban and rural households (we use Eviews least squares for the estimation). See Tables 2.1 and 2.2 below.

We supplement the above analysis by running the same regressions at the provincial level for a cross-section from the new household survey using an average of data for 2013-15 (expressed in real terms using the provincial level consumer price index data as the deflator). We also run a pooled time series regression on the old household survey data for two sub-periods (1995-2012 and 2007-2012) as social security spending data is not available prior to 2007. The results are summarized in Tables 2.3 and 2.4.

Table 2.1. Urban Households: Consumption and Government Spending, Prefecture Level

		2013		2014		2015
Disposable Income per capita		0.84		0.90		1.01
(Standard error)	▸	(0.04)	▸	(0.07)	▸	(0.04)
[P-val]		[0.00]		[0.00]		[0.00]
Gov. Social Security Spending per capita		0.07		0.04		0.05
(Standard error)	▸	(0.02)	▸	(0.02)	▸	(0.02)
[P-val]		[0.00]		[0.04]		[0.01]
Residential Property Prices		0.06		0.07		…
(Standard error)	▸	(0.03)	▸	(0.04)		…
[P-val]		[0.04]		[0.05]		…
Constant		0.38		-0.01		-0.54
R-squared		0.74		0.80		0.83
Jarque-Bera test of normality		1.35		2.87		0.14
[P-val]		[0.50]		[0.24]		[0.93]
# Obs.		220		147		127

Source: Authors' estimates
Note: All variables are in logs. The dependent variable is household expenditure per capita.
The 2013 sample excludes 2 outliers; 2014 sample excludes 2 outliers, and the 2015 sample excludes 6 outliers.

Table 2.2. Rural Households: Consumption and Government Spending, Prefecture Level

		2013		2014		2015
Disposable Income per capita		0.86		0.78		0.77
(Standard error)		(0.03)		(0.04)		(0.04)
[P-val]		[0.00]		[0.00]		[0.00]
Gov. Social Security Spending per capita		...		0.10		0.11
(Standard error)		...		(0.03)		(0.03)
[P-val]		...		[0.00]		[0.00]
Gov. Health Spending, per capita		0.10		0.19		0.12
(Standard error)		(0.04)		(0.06)		(0.06)
[P-val]		[0.01]		[0.00]		[0.04]
Constant		1.02		1.81		1.87
R-squared		0.82		0.81		0.83
Jarque-Bera test of normality		0.21		0.77		1.24
[P-val]		[0.90]		[0.68]		[0.54]
# Obs.		169		131		92

Source: Authors' estimates

Note: All variables are in logs. The dependent variable is household expenditure per capita.
The 2013 sample excludes 2outliers; 2014 sample excludes 2 outliers, and the 2015 sample excludes 4 outliers.

Table 2.3. Households: Consumption and Government Spending, Provincial Level, 2013-15

		Urban		Rural		Total
Disposable Income per capita, real		0.91		0.76		0.92
(Standard error)		(0.05)		(0.05)		(0.03)
[P-val]		[0.00]		[0.00]		[0.00]
Gov. Social Security Spending per capita, real		0.07		...		0.11
(Standard error)		(0.03)		...		(0.03)
[P-val]		[0.04]		...		[0.00]
Gov. Health Spending per capital, real		…		0.22		…
(Standard error)		…		(0.08)		…
[P-val]		…		[0.01]		…
Gov. Education Spending per capita, real		0.11		...		…
(Standard error)		(0.05)		...		…
[P-val]		[0.04]		...		…
Constant		-0.24		0.45		-0.13
R-squared		0.95		0.92		0.97
Jarque-Bera test of normality		2.11		0.59		0.72
[P-val]		[0.35]		[0.74]		[0.70]
# Obs.		29		30		29

Source: Authors' estimates

Note: All variables are in logs and are an average for the period 2013-15, in real terms using the provincial CPI as the deflator.
The dependent variable is real household expenditure per capita.

Table 2.4. Households: Consumption and Government Spending, Provincial Level, 1995-2012

		Urban	Urban	Rural	Rural	
		2007-12	1995-2012	2007-12	1995-2012	
Disposable Income per capita, real 1/	▞	0.93	▞ 0.81	▞ 0.57	▞ 0.26	
(Standard error)		(0.13)	(0.07)	(0.17)	(0.11)	
[P-val]		[0.00]	[0.00]	[0.00]	[0.02]	
Gov. Social Security Spending per capita, real 1/	▞	-0.03	… 2/	▞ -0.07	… 2/	
(Standard error)		(0.02)	...	(0.03)	...	
[P-val]		[0.16]	...	[0.03]	...	
Gov. Health Spending per capita, real 1/	▞	0.04	▞ 0.02	▞ 0.12	...	
(Standard error)		(0.01)	(0.01)	(0.03)	...	
[P-val]		[0.00]	[0.04]	[0.00]	...	
Gov. Education Spending per capita, real 1/	▞	-0.05	...	…	...	
(Standard error)		(0.02)	...	…	...	
[P-val]		[0.01]	...	…	...	
Lagged dependent	▞	0.01	▞ -0.11	▞ -0.21	▞ -0.18	
(Standard error)		(0.06)	(0.03)	(0.20)	(0.08)	
[P-val]		[0.93]	[0.00]	[0.30]	[0.03]	
Constant		0.00	0.01	0.04	0.05	
R-squared		0.62	0.59	0.55	0.53	
# Obs.		151	458	151	507	

Source: Authors' estimates
Note: All variables are in log first difference terms. The dependent variable is household expenditure per capita, and government spending variables are expressed per capita. All equations use fixed effects overtime and for provinces, and use White cross-section s.e..
1/ In real terms, deflated by the provincial consumers' price index
2/ Social security spending data is not available prior to 2007 with a coverage consistent with post 2007 data.

Data Description

Prefectural-level municipality, prefectural-level city or prefectural city is an administrative division of the ranking below a province and above a county. Household survey data is available for most of the 287 prefectural-level municipalities, with consistent data for urban and rural areas available only from 2013.

Disposable income of households: income of households for purpose of final expenditure and savings. It includes income both in cash and in kind. By sources of income, disposable income includes four categories: income from wages and salaries, net business income, net income from properties and net income from transfer. In RMB per capita. The data source is China's National Bureau of Statistics (NBS) based on a sample survey. The NBS notes that since 2013 "the integrated household survey is conducted by selecting sampled houses randomly, deciding surveyed households, with all households in the province as the population, with stratified 16,000 communities of 1,650 counties in the total country are selected, more than 2 million households in them are surveyed comprehensively, and then on this basis, randomly select about 160,000 households for keeping diaries." The data is official obtained from the CEIC database: urban CEIC database identifiers CHAKSB…CHALDA, rural CEIC database identifiers CHBBGQ…CHBBRP

Government spending on education: total government expenditure on education, RMB millions, CEIC database identifiers CFAFPE…CFAGAD. Per capita spending is calculated by dividing by the usually resident population in the prefecture. The sum of government

spending on education for all 287 prefectures is about 85 percent of spending on education at the provincial level. This is explained by the prefectures covering only 92 percent of the total population (as the prefectures do not include some administrative regions) and because some government spending on administration occurs at the provincial government level that is not allocated to the individual prefectures.

Ideally, we should use separate measures of government spending in urban and rural areas. However, the NBS publishes only government spending for rural and urban areas combined at the prefecture and provincial level. For the purposes of this analysis, we assume that spending on education, health, and social security within a prefecture or province is the same on a per capita basis, irrespective of the whether the household is urban or rural. This may overstate spending in rural areas and understate spending in urban areas, as the health and social security systems are less developed in rural areas. This implies that the results need to be interpreted with a degree of caution.

Government spending on health: total government expenditure on health and family planning, in RMB millions, CEIC database identifiers CFAQMD…CFAQXD. Per capita spending is calculated by dividing by the usually resident population in the prefecture. Note that the sum of health spending in the 287 prefectures is almost 90 percent of the provincial total, for the reasons explained above for government education spending.

Government social security spending: total government expenditure on social security and employment, in RMB millions, CEIC database identifiers CFAGLG…CFAGWF. (spending on social security alone is not available by prefecture). Per capita spending is calculated by dividing by the usually resident population in the prefecture. Note that the sum of social security spending in the 287 prefectures is almost 80 percent of the provincial total, for the reasons explained above for government education spending.

Household consumption; consumption expenditure, in both cash and in kind. Includes imputation for owner-occupied housing rental. RMB per capita, from the integrated household survey. Urban CEIC database identifiers CHALDC…CHALOB, rural CEIC database identifiers CHAYMD…CHAYXD.

Population: usually resident population (i.e., resident for more than six months irrespective of household registration). For example, for Beijing the usually resident population was 21.7 million in 2015, much greater than the population with household registration of 13.5 million in 2015. CEIC database identifiers CGAJJB…CGCJAD.

Saving Deposits: saving deposits in RMB by prefecture. No distinction is made between urban and rural saving. CEIC database identifiers CHAKJD…CHAKUC.

Urban Housing Valuation proxies: average residential property price (CEIC database identifiers CRKALBC…CRKALMB) multiplied by average urban floor area floor area of residential buildings per capita (CEIC database identifiers CHALOD…CHALZC).

APPENDIX III: HOUSING AND THE SAVINGS RATE: EMPIRICAL ANALYSIS

In this appendix we study the role of homeownership in determining the urban household savings rate using household-level regressions with survey data from three waves of the Chinese Household Income Project (2002, 2007, and 2013 CHIP).

CHIP data are nationally representative and conducted through questionnaire interviews. The surveys contain detailed information on household characteristics, household compositions, household living conditions, household expenditures, household incomes, and so on. For the sample selection, we drop observations if information on a household head's age, sex, education, and occupation are unavailable. We include observations only if a household head's age is 15 and above. We exclude observations with negative values for disposable income and consumption. Finally, we keep observations only if the households' saving rates are between -1 and 1. The definitions of disposable income and consumption are consistent with those in Ding and He (2018). The household savings rate equals 1-consumption / disposable income.

Our empirical specification is as follows (for household j at time):

$$\text{Savingrate}_{j,t} = b_t + \beta_0 \text{HomeOwnership}_{j,t} + \beta_1 \text{Age}_{j,t} + \beta_2 \text{Sex}_{j,t}$$
$$+ \beta_3 \text{FirmOwnership}_{j,t} + \beta_4 \text{Occupation}_{j,t} + \beta_4 \text{Industry}_{j,t}$$
$$+ \beta_5 \text{Disposable Income}_{j,t} + \beta_6 \text{Household Size}_{j,t}$$
$$+ \beta_7 \text{Provincial Dummies}_{j,t} + \varepsilon_{j,t}$$

For each survey year, we regress households' saving rates against their homeownership dummies. Therefore, β_0 is our most interested coefficient. We also control the observable household characteristics (including age, sex, education, occupation, industry, ownership of firms worked, households' disposable incomes, household size, and provincial dummies).

The regression results suggest that homeownership is associated with a 3 percent increase in the savings rate during the first ten years of the 2000s. However, this effect dissipates by 2013, with homeowners saving 2 percentage points less than renters (see Table 3).

Table 3. Urban Household Level Saving Rate Regressions Results

	2002		2007		2013	
Home Ownership	0.028292	***	0.031934	**	-0.0299	*
Age	0.0026559	***	-0.0000285	***	0.0025434	***
Sex	-0.0378451	***	0.0004276		0.0365774	**
Education			-0.0035275		0.0029986	
Industry			0.0012545		0.0011246	
Occupation			-0.0029358		0.0005956	
Firm Ownership			-0.0031068	*	0.0045248	*
Household Size	-0.0254144	***	-0.0118999	**	Omitted	
Disposable Income	5.09E-06	***	2.47E-06	***	1.05E-06	***
Provincial Dummies	0.0002817		-0.0000897		0.0005672	
_cons	0.0148495		5.776975	***	0.2775932	***
R-squared	0.0522		0.0384		0.0413	
Obs	6834		9998		4058	

Sources: CHIPs

Note: The dependent variable is household saving rate.

***, **, and * denote significance of 1, 5, 10 percent level, respectively.

APPENDIX IV: CORPORATE SAVINGS: EMPIRICAL ANALYSIS

We study the influence of firm ownership on Chinese corporate savings using firm-level regressions. The basic model specification is similar to Bayoumi et al. (2010), with an additional term to represent the possible impact of the exchange rate:

$$\text{Savings}_{i,j,t} = c + \beta_1 \text{size}_{i,j,t} + \beta_2 \text{Qratio}_{i,j,t} + \beta_3 \text{SOE dummy}_{i,j,t} + \beta_4 \text{Sector}_j +$$
$$\beta_5 \text{Year}_t + \beta_6 \text{ER}_t * \text{Tradable Sector Dummy}_{i,j} + \varepsilon_{i,j,t},$$

where size denotes the size of the firm's assets, and Qratio the Tobin's q, following the standard corporate finance literature. Other regressors include the year dummy, which controls for the global trend, and the sector dummy, which is at the standard three-digit level, based on the U.S. Standard Industrial Classification. The SOE dummy allows us to check whether Chinese SOEs and non-SOEs have systematically different gross savings. We also include an interaction term of the bilateral RMB/dollar exchange rate and the dummy for the tradable sectors to check the impact of the exchange rate on firm savings in tradable sector. In addition to the basic specification, we replaced the savings ratio with firm-level profits, dividends, and capex investments (all measured against assets) in separate regressions. This decomposition allows us to analyze the drivers of corporate savings across different dimensions.

Our sample includes Datastream's annual balance sheet data for more than 1,000 publicly listed Chinese firms. We combine it with Worldscope's firm ownership data.

After controlling for corporate size, Tobin's q ratio, and the impacts of sectors and years, we find that Chinese SOEs tend to save less in gross terms, but more in net terms, reflecting the fact that their investment ratios are lower than private firms' (see Table 4). The regression analysis also highlights the exchange rate's impact on corporate investment. It also illustrates the indirect impact of the net savings ratio on tradable sector firms. During 2005–2008, the RMB was found to be undervalued, which contributed to the export boom and large corporate savings, especially for the export-oriented private sector. Although corporate investment also increased during the same period, the investment-to-asset ratio actually declined. In more recent years, however, as the RMB has gradually moved in line with the equilibrium, the export sector's excessive savings have largely been unwound.

Table 4. Corporate Saving Regression Results					
Dependent variable	Gross Saving Ratio	Net Saving Ratio	Profit Ratio	Dividend Ratio	Investment Ratio
Independent variables					
Size	0.4595***	0.1171	0.5495***	0.0672	0.4726***
Q ratio	0.7892***	0.5868***	1.0405***	0.2532***	0.3062***
SOE dummy	-0.4221***	0.7656***	-0.6302***	-0.2128***	-1.0884***
Exchange rate depreciation (interacted with tradable sector dummy)	0.0156	0.1851***	0.0349	-0.0047	-0.1120***
Sector	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y
Constant	-4.8461***	-5.3110***	-5.1614***	-0.1780	-1.6544*
R-sq (overall)	0.1397	0.0734	0.1627	0.0679	0.0923
Number of obs	12,246	12,236	12,252	23,509	23,492
Number of groups	2,508	2,508	2,508	2,536	2,536
***, ** and * denote significance at the 1, 5 and 10 percent level, respectively.					

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