Public Finance and High Savings Rate in China

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Abstract: The paper examines the role of public finance in the high savings rate in China. We find that the self-interest incentive of the government is important in the rising savings rates since 2000. The improved SOE profitability has enhanced the government incentive to saving for the investment. This has crowded out public expenditure on technology, education, medicare and social safety net. As a result, the private sector has to increase precautionary savings. The empirical study based on panel data of 30 provinces from 1996 to 2006 demonstrates that saving rate of the public sector is positive related to SOE profitability, and the private sector saving rate is negative related to the ratio of public expenditure to the disposable income of the public sector.

Keywords: savings rate, public expenditure, self-interest of government

I. Introduction

The issue of high savings rate in China has been a focus of many academic studies, and the international financial crisis makes it more urgent for China to explore the root causes of high savings and means to reduce savings rate for sustaining economic growth.

Ample literature has noted China’s high savings rates. According to a study by the People’s Bank of China (1999), national savings rate in China during 1978 and 1997 has averaged more than 10 percentage points higher than those of the developed countries. In Wu (1999), the average national savings rates were estimated at 37.1% during 1978-1997, and stabilized at around 40% after 1993. Kraay (2000) pointed out that the average national savings rate in China during 1978-1995 was 37%, comparing to 21% in other countries in the same period. Kuijs (2005) also noted that China’s savings rate in 2003 was higher than those in the US, France, Japan and Korea in 2002 by 28.2%, 21.8%, 17% and 11.5% respectively.

However, it should be noted that different statistical methods used in China and other countries may have exaggerated the differences in their savings rates. Ren and Qing (2006) suggested that 30% of the savings rate gap between China and U.S. were caused by statistical methods on savings and income. After adjusting for statistical methods, China’s savings rate

averaged 22.69% between 1992 and 2001, far less than 40% as estimated by other studies. Moreover, the gap between the two countries’ savings rates was only 15.87 percentage points.

Many researchers have tried to explore reasons for different savings rates in different countries. These include, among others, economic growth, economic development stages, economic cycle, income distribution, demographic structure, institutional set-up as well as preventive savings incentive due to uncertainties. The first type of explanation is based on traditional Keynesian theory. It holds that the savings rate depends on dispensable income and marginal savings propensity. That is, \( S/Y = s_0/Y + s \), of which \( S \) stands for savings, \( s \) means marginal savings propensity, \( Y \) is income. Life cycle theory states that given relatively stable growth of dispensable income, savings rate depends on the growth rate of income. That is, \( s/Y = s_0 + sg + e \), of which \( s_0 \) is close to 0, \( s > 0 \), \( g \) is the growth rate of income and \( e \) the random error. Modigliani and Cao (2004) found positive relationship between household savings rate and economic growth rate, dependence ratio and inflation using data from 1953 to 2000. Chen (2005) introduced rational consumption comparison, and found that marginal utility of current consumption and future consumption can increase simultaneously, and high savings and high growth rates can generate each other. Wang and Gong (2007) showed that China’s high savings rates were mainly caused by high economic growth, high capital-output flexibility, high discount rate and myopic expectation.

The second type of explanation is based on demographic factors. That is, demographic premium resulting from faster growth rate of the proportion of working population can add to income increase, and thereby, higher savings rates (Modigliani and Cao, 2004; Li, et. al., 2007). In China, weak pension system has pushed up marginal savings propensity and reduced marginal consumption propensity, which in turn raised savings rates (Yuan and Song, 2000). Horika and Wan (2007) identified high correlation between China’s high savings rate and age structure, especially child dependence ratio\(^\circ\), real interest rate and past savings rates using provincial data from 1995-2004. Wei and Zhang (2009) found that the movements of China’s savings rates were similar to those of gender ratio with 20 years time lag during 1975-2005. Their empirical results from provincial level data showed that gender ratio

\(^\circ\) The ratio of population aged 0-14 to those aged 15-64.
powerful in explaining the savings rates, with higher parameter in the rural areas than that in the urban areas.

The third type of theory is based on the assumption that people make preventive savings in the process of institutional changes. Most studies considered that social safety net, pension, health insurance and unemployment insurance can reduce uncertainties in future income and expenditures, and thereby, reduce savings rates. Song (1999) argued that significant uncertainties in residents’ income had raised China’s savings rate. A number of empirical studies also found that pension reform and pension wealth had notable impacts on household savings rates (Xie, 2000; Shi & Zhu, 2004; He, 2004).

The main contribution of this paper is to study the role of public finance in the rising savings rate in China since 2000. Although the traditional theories such as absolute income hypothesis and life-cycle hypothesis had enabled international comparison of savings rates, they can’t explain why savings rate in China has been increasing from 1992, especially the rapid increase post 2000. No previous studies have considered the importance of the SOE performance and the public finance functions, neither do they have empirical supports. This paper makes a public finance hypothesis stating that high savings rates in China are mainly affected by the government’s behavior. To test the hypothesis, we segregate SOE from the enterprise sector, and merge it with the government sector to become the public sector. And the private sector includes non-SOE enterprises and residents. This enables the examination of micro-mechanisms of China’s rising national savings rate.

The paper is organized as follows. The section II presented stylized facts on China’s savings rates, which is followed the public finance hypothesis. Through analyzing the transmission mechanism among the performance of SOEs, public expenditures, public sector savings and private sector savings, the paper identified strong impact of government behavior on savings rates (section III). This hypothesis is then tested using 30-province panel data from 1992-2006 in section IV. The last section concludes.

II. Stylized Facts

National savings rate is normally divided into savings rates of the government, enterprises and residents sectors. In China, such data are available from 1992 to 2007 (figure 1). Due to data constraints, early studies normally define government savings rates as the ratio of government savings to GDP, while the government savings are the differences between its current income and current expenditures. The calculation underestimate the government savings rate because the current income doesn’t include off-budget income, and the current expenditures usually include investment expenditures. He and Cao (2000), Kuijs (2005a), and Li and Yin (2007) used the flow of fund statements to estimate the savings rates of different sectors. In the flow of fund statements, the government income includes budgetary and off-budget income, and government consumption is “consumption expenditure of public services and the net expenditure of goods and services provided to the residents for free or at relatively low prices by the government. The former equals to the gap between output value of public services and income of government agencies, and the later equals to the market value minus actual collecting prices of goods and services provided by the government to the residents for free or at relatively low prices.” The two main uses of government savings are capital transfer and investment.

Figure 1 shows national savings rates from 1992 to 2007, and the savings rates of enterprises, government and resident. The following features are note-worthy. First, national, resident, enterprises and government savings rates averaged 42.48%, 19.69%, 16.13% and 6.66%, respectively, and their standard errors are 3.79%, 1.8%, 2.42% and 1.64%, respectively. Although resident savings accounted for around half of national savings, their standard error is lower than those of national and enterprises savings. During 1992—2000,

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© China started to compile the Flow of Fund Statement in 1992. The Statement has two parts: physical transaction and financial transaction, which are compiled by the National Statistics Bureau and the People’s Bank of China respectively. In the statements, the domestic sectors include non-financial sector, financial sector, government sector and resident sector. When calculate savings rate, the first two sectors are normally combined as enterprise sector. In this paper, the main transaction items in the Statement include disposable income and consumptions of residents and government. Savings equal to disposable income minus consumption. In Kuijs (2005, 2006), Li and Yin (2007), sector savings rate = (sector disposable income – sector consumption) / national disposable income, sector marginal savings propensity = (sector disposable income – sector consumption) / sector disposable income, and national savings rate = (aggregate disposable income – aggregate consumption) / aggregate disposable income.


resident savings rate had reduced from 21.08% to 16.5%, while the national savings rate remained around 40%. After 2000, resident savings rate returned to 21.82% in 2007, while during the period, national savings rate jumped from 38.5% to 50.88%. Moreover, prior to 2000, the savings rates of government and enterprises had been stabilized around 5.5% and 14.8% respectively; from 2000 to 2007, the government savings rate increased from 6.4% to 10.6%, and enterprise savings rate from 15.6% to 18.4%. This means that changes of resident savings rate cannot explain the changes in national savings rate. Kuijs (2005) argued that the increased profitability capacity had boosted enterprise savings rate, while the capital transfer of the government to support SOEs had heightened the savings rate of the government sector. Li and Yin (2007) regarded the government sector as the main driver of increasing savings rate after 2000. They disagreed with Kuijs (2005) in that they considered the rising savings rate of the enterprise sector come from low wage and interest rate costs, not profitability capacity, and the rising government savings rate came from the government investment into SOEs, not capital transfer. These studies failed to explore relationship of the enterprises and the government sectors, as well as the unique role of SOEs in the changes of savings rate.

Figure 1. Segregation of national savings rates (1992—2007)

Source: Statistics Almanac, various years, National Statistics Bureau (Beijing: China Statistics Publishing house).

Note: National savings rate = (national disposable income – aggregate consumption) / national disposable income; savings rates for different sectors equals to sector disposable income minus sector consumption, and then divided by national disposable income.
After tax reforms in 1983, 1984 and 1994, the financial independence of the SOEs have significantly enhanced. However, the segregation of government from management of state-owned assets only regulated the profit sharing relationship between government and SOEs, not changed the relationship of SOEs and the public sector. SOEs have supplied large amount of taxes. During the period of 2003—2007, SOE had contributed to 5.97 trillion yuan in taxes; in 2007 alone, SOE taxes reached 1.57 trillion yuan, 30% of fiscal income of the year.

This paper divides national savings rate into savings rates of the public sector and the private sector. In computing public sector and private sector savings, the paper adjusted the SOE profits during the period of 1992 and 2007. That is, the disposable income of the public sector equals to government disposable income plus SOE profits, while that of the private sector equals to enterprise disposable income plus residents’ disposable income and minus SOE profit. As the enterprises have no consumption, there is no need for adjustment. That is, the consumption of the public and private sector equals to the consumption of the government and residents. The calculation of the savings rate is similar (figure 2). Besides, total fiscal (public) expenditures include expenditures by central and local governments on culture and education, science, health, social security and administration, and total fiscal revenue includes fiscal revenue and off-budget revenue.

Figure 2. National, public sector and private sector savings rates (1992—2007)
In Kuijs (2005) and Li & Yin (2008), national savings rates are divided into resident, government and enterprise savings rates, which ignored the co-movement of government and SOE savings and led to the conclusion that national savings rate had been pushed by the increases of government and enterprise savings rates (figure 3). According to the segregation of national savings rate in this paper, the changes of national savings rate slightly lagged that of the public sector savings rate, but with the same trend. Meanwhile, the private sector savings rate had been mostly stable, and its changes lagged that of the public sector savings rate, but in the different direction.

Figure 3. Standardized savings rates

Note: For comparison, figures 3-6 use standardized value, computed as the original value minus average value, and then divided by the standard error.

III. Public Finance Hypothesis

1. Public sector savings rate and government profitability incentive

Government profit-seeking incentive means that the government makes decisions with regards to supply of public goods and services as well as selection of investment and consumption structure according to whether it will be benefited from such decisions. Since the tax system reform in 1994, the average annual growth rate of budgetary income is 19.3%, 1.39 times of that of GDP growth, while the average annual growth rate of expenditures on culture and education, science and health is 15.8%. During the same period, the annual average growth rate of the government investment is 18.7%, while that of the government consumption is 15.16%. As the government investment comes from government savings,
higher government investment growth rate has pushed up public savings rates.

Among the above-mentioned studies, we agree with Li and Yin (2007) that government investment is more important than fund transfer in pushing up public sector savings rate. If the profitability of SOEs declines, the share of the government direct investment will drop, which will lead to declining marginal savings propensity and savings rate. On the other hand, with increased profitability of SOEs, the government is more likely to invest in SOEs for profit\(^\text{①}\), which will cause simultaneous increases in marginal savings propensity and savings rates of the public sector and government.

Figures 2 and 4 show that as ROA of SOEs reduced from 3.8% to 0.14% during the period of 1994-1998, the marginal propensity to savings of the public sector reduced from 29.86% to 19.4%, and the savings rate of the public sector declined from 7.9% to 5.5%. During the period of 1998-2007, the profitability of SOEs has increased substantially with ROA skyrocketed from 0.14% to 4.9%. This has brought up marginal public sector propensity to savings from 19.4% to 56.4%, and the sector savings rate from 3.5% to 17.4%. This shows high correlation between public sector savings rate and SOE profitability.

Figure 4. Standardized public sector savings rate, marginal propensity to savings, & SOE performance (1992-2007)

\[\text{公共部门储蓄率} \quad \cdots \quad \text{公共部门边际储蓄倾向} \quad - - - - \quad \text{国有企业资产负债率} \quad \cdots \cdots \quad \text{国有企业利润/GDP}\]

\(\text{① After tax system reform in 1994, SOEs (except financial institutions and some listed companies) can keep most of the profits after paying taxes. Internationally, average dividends to profit ratio is around 1/3 (Tang Min [2006] “Reducing savings of enterprises and government is critical to re-balancing economic structure”, China Development Observer, 2006-9).}\)
2. **Government profitability incentive and public finance function**

The public finance function means the government role in providing public goods and services through public expenditure. Public goods and services feature non-exclusiveness and non-competitiveness, and can induce free riding and reverse selection if provided by the private sector only. Typical public goods and services include culture and education, science and health, social security, national defense, etc. If the government plays its role to maximize welfare of the society, then it should provide sufficient public goods and services; otherwise, there may be shortages in public goods and services if the government is affected by the profit-seeking incentive in economic decision-making. As compared to the provision of culture and education, science and health and social security, investment in infrastructure such as railway, highway, commercial center and industry base may carry more externality. Such investment will help attract foreign capital in the short-term, promote economic growth, and enhance the government performance (Ding & Deng, 2008). Besides, those implement large projects are normally SOEs, which contribute to tremendous amount of taxes while adding value to their own assets.

Under the budget constraint, the government is more inclined to invest in SOEs, and its searching for profitability is likely to crowd out enforcement of fiscal functions. Figure 5 shows that the changes of the ratio of public expenditures to total fiscal expenditures lag the changes of SOE profitability, and at the different direction. During the period of 1993-1998, SOE profitability and public sector savings rate had reduced, while the expenditures on culture and education, science and health care as well as social security had increased. However, such expenditures stabilized around 2000, before drastically declined after 2002. This came after the rapid increasing of SOE profits. After 2000, the SOE profit has increased by a whopping 34% per year, and the ROA of SOE has increased from 1.5% to 4.6%. From 2002 to 2006, the ratio of public expenditures to total fiscal revenue reduced from 41% to 38.6%. It shows that when the government pursued profit, its public finance functions, especially expenditures on culture and education, science and health care as well as social security have weakened, which affected private sector savings rates.
3. Public function and private sector savings

Preventive savings hypothesis denotes that, given uncertainties in expectation of future income and expenditures, households will smooth current consumption and future consumption through savings. As strong education, public health and social security system can help to reduce future uncertainties, it can thereby reduce the current savings of the private sector. In China, reforms in SOE, education, health and public health, real estate as well as social security have been frequent since late 1990s. These have enhanced the relationship between private sector savings behavior and uncertainties. Many empirical studies have found that income uncertainty is one of the main causes for resident savings in China (Song, 1999; Yi, 2008). In fact, future expenditure uncertainties are also very important for their savings behavior. Li and Wen (2005)① noted that residents have to make preventive savings as a result of differentiated schooling fees and uncertainties in future education expenditures, as well as weakness in medicare and social security system. Yang and Chen (2009)② found that expenditures for high education significantly crowded out residents’ consumption. The high education reform in 1999 had not only significantly increased needed education expenditures, but also affected related expectations for future higher education, and therefore, enhanced the residents’ incentive for preventive savings. He et. al. (2008) also found that pension had

strong substitution effects on household savings.

Figure 6 shows the standardized private sector savings rate, marginal propensity to savings of the private sector and ratio of public sector expenditures to total fiscal revenue. Prior to 1999, the relationship between the three variables was unstable because of a series of economic reform. After 1999, the first two variables move in the different direction from public expenditures, with slight time lag. When the demographic structure and consumption pattern stabilized, the insufficient investment in culture and education, science and public health will force residents to increase savings to meet expenditures in these areas. When the government increases investment in culture and education, science and public health, residents can reduce inputs in these areas. In addition, changes in social security have similar impacts on non-state-owned enterprises. If the government reduces social safety expenditures, the social security functions will be transferred to non-SOEs, forcing them to increase savings.

Figure 6. Standardized private sector savings rate, marginal propensity to savings, & public expenditure ratio (1992-2007)

4. Public finance hypothesis for high savings rate

The above analysis brings us to the public finance hypothesis: the rising savings rate in China is prompted by the government’s profit-searching behavior and thereby the crowd-out impact of such behavior on the fiscal function. That is, with the improving profitability of
SOEs and state-owned commercial banks after 2000, the government has invested more into these entities, and reduced fiscal expenditures on culture and education, health care and social security. Insufficient fiscal expenditures have two impacts: (i) higher savings rates of government and SOEs, i.e., public sector savings rate; and (ii) more preventive savings by the residents and non-public enterprises, i.e., higher private sector savings rate. These two impacts combined have sustained China’s rising savings. The hypothesis is built on three assumptions:

**Assumption 1.** The government is self-benefiting in the short-term;

**Assumption 2.** The government behavior is subject to budget constraints; and

**Assumption 3.** The private sector has incentives for preventive savings.

Here, the government includes central government, central government agencies (mainly fiscal authorities) and local governments. Although the central government is for the public interests, the local governments and government agencies are likely to be self-benefiting in the short-term. The self-benefiting feature of the government means that the government makes decision targeting at maximizing its own welfare, not social welfare. Over the long-run, the public interest of the central government can play an important role; however, the self-benefiting of the local governments and central government agencies can be significant in the short-run. In fact, such self-benefiting feature has distorted some critical decisions, especially when the welfare of the governments is in line with their performance. In China, such short-run self-benefiting feature can be a result of government performance evaluation, fiscal power sharing by the central and local governments, promotion of officials, changes of governments and difficulties in monitoring government expenditures. Moreover, the self-benefiting feature of the government is also subject to budget constraints.

Based on the above-mentioned three assumptions, we have the following two lemmas:

**Lemma 1.** When the performance of SOEs increases, the short-run profit-seeking incentive of the government will raise public sector savings rate.

**Lemma 2.** The profit-seeking incentive of the government can undermine the enforcement of fiscal function, which will raise private sector savings rate.

**Lemma 1** means strong correlation between public sector savings rate and SOE
performance. That is, with the increasing SOE performance, the government is more likely to invest in SOEs. Lemma 2 states that under the budget constraints, the government’s direct investment in SOEs will crowd out public expenditures, which will push up private sector’s preventive savings, and thereby the private sector savings rates.

IV. Empirical Test of the Public Finance Hypothesis

This paper tests the public finance hypothesis using 30 province panel data for the period of 1997-2006. The testing focuses on the impact of public expenditures on savings rates of different sectors. The models are as follows:

\[ \text{PUBSR}_{it} = \alpha_1 + \alpha_2 \text{SOEPERF}_{it-1} + \theta X_{it} + \mu_{it} \]  
\[ \text{PUBEXP}_{it} = \beta_1 + \beta_2 \text{SOEPERF}_{it-1} + \lambda Y_{it} + \epsilon_{it} \]  
\[ \text{PRISR}_{it} = \gamma_1 + \gamma_2 \text{PUBEXP}_{it} + \varphi Z_{it} + \omega_{it} \]

Of which, PUBSR means public sector savings rate, PUBEXP means the ratio of public expenditure to GDP, PRISR means private sector savings rate, SOEPERF means the ratio of SOE profits to GDP. In addition, X, Y and Z are the controlling variables in three models. Moreover, \( \mu_{it}, \epsilon_{it} \) and \( \xi_{it} \) are residuals, and \( \alpha_1, \beta_1 \) and \( \gamma_1 \) are constant vectors, \( \alpha_2, \beta_2, \gamma_2 \) are parameter vectors for key variables, \( \theta, \lambda \) and \( \varphi \) are respective parameter vectors for controlling variables.

According to the assumption 2, the main cause for the changes of public sector savings rate is the profit-seeking incentive of the government. The government will increase investment into SOEs when their performance improves. This will in turn raise public sector savings rate and crowd out public expenditures, raising the marginal propensity to save. This means that \( \alpha_2 \) should be positive and significant, while \( \beta_2 \) should be negative and significant. At the same time, public expenditures affect private sector savings rate. Given income and demographic structure, when the government reduces public expenditures, private sector savings rate will increase. This means that \( \gamma_2 \) should be negative and significant.
1. About the variables

(i) **Savings rate**\(^\circ\). Due to lack of provincial level flow of funds statements, the national savings rate is calculated as the ratio of GDP minus final consumption to GDP. For each province, the public sector savings rates are the ratio of fiscal revenue plus off-budget income plus SOE profits minus government consumption to provincial GDP. The private sector savings rates are the gap between national savings rate and public sector savings rate. Of which, local government income include budgetary income, central government subsidies, provincial subsidies, residual of the previous year income from turning national treasury into loans, and residual from local income of the previous year. The data for GDP and government consumption are from the Statistics Almanac, while the data for fiscal revenue, off-budget revenue and SOE profits are from Fiscal Statistics Yearbook for various years.

(ii) **Ratio of public expenditures to GDP, and SOE performance.** Public expenditures include expenditures on infrastructure, education, social security, health and medicare, science and culture, administration, and the like. As this paper focuses on the impact of public expenditures on private savings, the public expenditures on infrastructure are the direct investment in SOEs. Thus, the public expenditures in the paper is defined as expenditures on culture, education, science and health, social security and administration. Ratio of public expenditures corresponds to the enforcement of public functions. When the ratio of public expenditures to GDP declines, the fiscal function is transferred to the private sector. As a result, the private sector has to increase savings to cover expenditures on education and health. Note that data on culture and education, science and health, social security and administration are from Fiscal Statistics Yearbook. SOE performance (ROA of SOEs) also comes from the Fiscal Statistics Yearbook.

(iii) **Other controlling variables.** Absolute income hypothesis states that savings rate should be the ratio of savings to income of the current period. Life-cycle hypothesis holds that a family arranges consumption and savings according to its expected life-time income in

\(^\circ\) There are three methods to calculate national savings rate: (1) use GDP and aggregate consumption; (2) use disposable income and consumption in the flow of fund statements, which can divide national savings rate into sector savings rates; and (3) resident or household savings rate which can be obtained using wealth deduction or income and expenditures.
order to maximize lifetime utility. A lifetime can be divided into youth, mid-age and old-age periods. During the youth and old-age period, consumption is greater than income; while in the mid-age period, consumption is less than income. As a result, if the proportion of youth and old-age increases, the savings rate will reduce. Modigliani and Cao (2004) also found that the savings rate in China is a result of economic growth and demographic factors. In model (1), GDP per capita and its growth rate are controlling variables. Considering the differences in the absolute provincial public expenditures, the model introduces public expenditure per capita as control variables. In model (2), while the demographic variables such as YOUNG and OLD are introduced. YOUNG denotes the proportion of population younger than 14 years, and OLD refers to the proportion of population older than 65 years. Besides, the paper discussed the impacts of interest rates, inflation and gender ratio on savings rates. In addition, dummy variables for regions are introduced to define regional differences in China. All data come from Statistics Almanac and Fiscal Statistics Yearbook.

2. About the outputs

This paper applies fix-effect model, random-effect model and seemingly unrelated regression (SUR) to test the hypothesis. First, models 1 and 2 apply fixed-effect and random-effect models to simulate, and then use SUR to estimate the parameters. Considering the relative long time span of the data, and the Wooldridge® and Drukker® vector correlation test shows that direct estimation may bear vector issues. All models use AR(1) error term:

\[ u_{it} = \rho_1 u_{it-1} + \varepsilon_{it} \]
\[ \varepsilon_{it} = \rho_2 \varepsilon_{it-1} + \omega_{it} \]

Of which \( \varepsilon_{it} \) and \( \omega_{it} \) are white noise.

Model (1) shows that (lines 1 and 2, Table 2) the p value of the Hausman test is 0.928, meaning that random effect model is more suitable. With regards to the significant level of parameters, ROA of SOEs, growth rate of public sector dispensable income and interest rate are significant at 1%, while CPI is significant at 5%. With regards to the signs of parameters,

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ROA of SOEs is positive and significant at 1% in both fixed and random effect models, consisting with lemma 1. Besides, parameters for growth rate of public sector dispensable income and interest rates are positive and significant, while parameters for CPI is negative and significant, consisting with the life-cycle hypothesis.

Model (2) resulted in the p value of the Hausman test 0.685(lines 3 and 4, Table 2), meaning that random effect model is more suitable. Analyzing the significances of independent variables showed that lagged SOE performance negatively affects public expenditures, consisting with lemma 2. The improved SOE performance means higher government investment in SOEs, which may crowd out public expenditures. The more uncertain the economics, the higher public expenditures are needed.

Estimations of model (3) are listed in lines (5) and (6) of table 2, of which line (6) is the final regression result of the model after subsequent deleting the least significant variables. The result shows that the ratio of public expenditure to total fiscal revenue is negative and significant at 1%, which is in line with lemma 2. That is, the changes of national savings rates is negatively related to the level of public expenditure, and the increase in the ratio of public expenditure to GDP can effectively reduce private sector savings rate.

Savings rates of the public sector and private sector may also affect each other. Data from 1995-2006 shows that the correlation index of the public and private sector savings rates is -0.215, while that at the provincial level is -0.584. More suitable models are simultaneous use of models (1), (2) and (3). Lines (7), (8) and (9), (10), (11) and (12) are the SUR results of models (1), (2) and (3). The result shows that ROA of SOEs and public expenditure to GDP ratio are both significant at 1%, with the former carry positive sign, and the later negative, consistent with lemmas 1 and 2.

In regression of the public sector savings rate, the growth rate of the public sector dispensable income is significant at 1%, consisting with the results of models (1) and (2), and supporting lemma 1. The results of SUR on public sector savings rate shows that the interest rate is insignificant. In the outputs of line (11), table 2, SOE performance has negative impacts on public expenditures. With regards to private sector savings rate, growth rate of dispensable income per capita of the private sector, Young and Old are all significant,
consistent with life-cycle hypothesis. According to this hypothesis, dispensable income per capita and demographic factors affect the private sector savings rate. As youth and old-aged are the main consumption bodies, those aged 14-64 are the main savers. If the dependence ratios of young and old-age increased, those between 14-64 will be reduced, and thereby reduce savings rates. The parameter of CPI is negative, because for the private sector, the increase of CPI means reduction of actual value of savings, so the private sector inclines to more consumption, not savings.

Empirical results in recent years (Kuijs [2005] and Li and Yin [2008]) show that the core factors for the rising savings rates in China are the government and enterprises, but the key is the correlation between government and SOEs. That is, the profit-seeking incentive of the government has crowded out public finance functions, which in turn raised savings rates of both public and private sectors. To reduce national savings rate and increase domestic demand, China needs to pay more attention to the profit-seeking incentive of the government to enable effective resource allocation. In addition, more attention is needed on public finance function, and increasing public expenditures, especially the ratio of public expenditures on education, health, and social security to GDP.

V. Conclusions

The paper set up and tested the public finance hypothesis for China’s public sector savings rates. The increasing profitability of SOEs in China has induced the government to invest directly in these SOEs, which in turn, has increased public sector savings. At the same time, such direct investment has crowded out certain types of public expenditure, which forces the private sector savings to rise. The empirical results have supported our hypothesis.

The hypothesis also shows that the sustainability of high savings rates depends on the control of government’s profitability-searching behavior and the implementation force of public finance. Due to the budget constraint, the profitability-searching behavior of the government conflicts with the implementation force of public finance, making it a key issue to control local government’s profitability-searching behavior and promote the power of public finance. This is the key for reducing national savings rates in China.
Table 1. Variable and data description (30 provinces, 1996-2006)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
<th>Sample</th>
<th>Avg.</th>
<th>Std. Err.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>National savings rate</td>
<td>(GDP – consumption)/ GDP</td>
<td>330</td>
<td>43.28%</td>
<td>9.26%</td>
<td>8.84%</td>
<td>59.55%</td>
</tr>
<tr>
<td>Public sector savings rate</td>
<td>(local government income + off-budget income + SOE profit - government consumption)/GDP</td>
<td>330</td>
<td>5.71%</td>
<td>4.87%</td>
<td>-4.34%</td>
<td>23.40%</td>
</tr>
<tr>
<td>Private sector savings rate</td>
<td>National savings rate – Public sector savings rate</td>
<td>330</td>
<td>37.57%</td>
<td>11.22%</td>
<td>-1.12%</td>
<td>58.06%</td>
</tr>
<tr>
<td>Public sector expenditure ratio</td>
<td>Public sector expenditure / Public sector dispensable income</td>
<td>330</td>
<td>26.60%</td>
<td>6.21%</td>
<td>8.40%</td>
<td>51.58%</td>
</tr>
<tr>
<td>SOE ROA</td>
<td>SOE profit / SOE asset</td>
<td>330</td>
<td>0.21%</td>
<td>1.60%</td>
<td>-4.60%</td>
<td>7.68%</td>
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Note: 1. All data are from Statistical Almanac, various years; and Fiscal Statistics Year Book, various years.

2. Chongqing became a provincial level city in 1996, and the public expenditure statistics was adjusted in 2007. The paper used data from 1996 to 2006 only.

3. Tibet data was not included.

4. The public sector includes government and SOEs, the private sector include residents and non-SOE. Public expenditures include expenditures on culture and education, science and public health, social safety, and administration of the central and local governments.
Table 2. Fixed Effect Model, Random Effect Model and SUR

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Note: Numbers in brackets are HSK Robust standard errors of the parameters; ***, ** and * means 1%, 5% and 10% significant level, respectively.
Reference


### Appendix 1: National Dispensable Income and Savings (in ¥ 10 million) and Savings Rates (%) in China (1992-2007)

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Source: SOE profit data are from Fiscal Statistics Almanac, flow of funds data are from National Statistics Almanac.