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## Discussion Paper

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# URBAN INFRASTRUCTURE FINANCING IN CHINA

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Shuanglin Lin



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**Shuanglin Lin**

Professor and Director  
China Center for Public Finance  
National School of Development  
Peking University, China 100871  
& Noddle Distinguished Professor  
Department of Economics, CBA  
University of Nebraska Omaha, USA



For more information, contact:

**Macroeconomic Policy and Financing for Development Division (MPFD)**

Economic and Social Commission for Asia and the Pacific  
United Nations Building, Rajadamnern Nok Avenue, Bangkok 10200, Thailand  
Email: [escap-mpdd@un.org](mailto:escap-mpdd@un.org)

Dr. Aynul Hasan  
Director  
Macroeconomic Policy and Financing for Development Division

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**Discussion Paper**

Macroeconomic Policy and Financing for Development Division

**Urban Infrastructure Financing in China**

by

Shuanglin Lin\*

March 2016

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**Abstract**

This paper introduces the ways in which urban infrastructure investment has been financed in China. It explains the main source of urban infrastructure financing in China's development since the 1980s and the rationale behind such development and its evolution; highlights the policy actions, fiscal reforms in particular, taken by the Chinese government at both central and local levels to meet the infrastructure investment needs at different development stages since the 1980s and explain the policy thinking behind these decisions; and provides an analysis on the achievements as well as pros and cons of these policy actions and fiscal reforms, and highlights the lessons learnt. The paper finally provides a discussion on China's recent fiscal reform agenda and how it would affect urban infrastructure and public services financing in future. It focuses on fiscal reforms at the local/municipal level and fiscal federalism reforms, highlighting the pros and cons of tax (property tax in particular) versus other public revenues as sources of urban infrastructure financing in the case of China and the policy concerns of the Chinese government in this area.

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**Authors' e-mail address:** shuanglin@pku.edu.cn or slin@mail.unomaha.edu.

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## I. Introduction

The positive role of economic infrastructure in economic development has been emphasized in economics. Ashauer (1989) argued that public expenditures are quite productive and the slowdown of the US productivity was related to the decrease in investment on public infrastructures. Munnell (1990) showed that those states that have invested more in infrastructure tended to have greater output, more private investment and higher employment growth. Canning, Fay, and Perotti (1994) found significant impacts of physical infrastructures on economic growth based on the international data. Easterly and Easterly and Rebelo (1993) showed that public investment in transportation and communication is consistently correlated with economic growth. Eisner (1991) argued that public infrastructures are not only an input in physical goods production, but also final consumption goods for the general public. For instance, water and sewage systems benefit environment; better transportation saves time spent on traveling; public parks give people pleasure, etc. Based on a cross-country analysis, Esfahani and Ramírez (2002) found that the contribution of infrastructure services to GDP is substantial and, in general, exceeds the cost of the provision of those services. Clearly, infrastructures are vital to a nation's prosperity.

Infrastructure development has played a crucial role in China's economic development after the 1978 economic reforms. Under the centrally planned system before the economic reform, infrastructures were mainly financed by government revenues, profits of state enterprises engaged in infrastructure development, and rural resources controlled by the people's communes (such as cheap labor). The traditional ways of financing the infrastructures vanished and infrastructure development was slow in the first twenty years (1978-1998) after the economic reforms. The major reasons for the slower infrastructure growth include low government spending on infrastructures caused by low government revenues, decreased investment incentives of state enterprises for infrastructures, and the diminished ability of governments in mobilizing rural resources (Lin, 2001). In 1994, China reformed its tax system dramatically, introducing new taxes and expanded the tax base for the value-added tax and business tax; as a result, government revenue began to increase rapidly. After the 1997 Asian financial crisis, the Chinese government adopted expansionary fiscal policy, leading the local governments to borrow aggressively from the banks, resulting in rapid infrastructure development and economic growth.

Recently the Chinese economy has slowed down recently. The GDP grew 10.6% in 2010, 9.5% in 2011, 7.7% in 2012, 7.7% in 2013, 7.3% in 2014, and 6.9% in 2015, compared to an average of 12% during the period of 1990-2010.<sup>1</sup> A major reason for China's slowing economy is the slowdown of infrastructure development which is caused by the central government's restriction on bank borrowing by local governments and the slow growth of local government revenues. The Chinese government is making great efforts to stimulate economic growth by emphasizing infrastructure development and discovering new ways for local infrastructure financing, including local government bond issuing and increasing local government revenues. The government has decided to reform its tax system, and introduce new

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<sup>1</sup> Calculated based on real GDP adjusted by the retail price index. The data is from National Bureau of Statistics of China (2015).

taxes, such as personal property taxes and environmental taxes, and allocates more tax revenue to local governments.

This paper analyzes infrastructure financing in China. It explains the ways in which urban infrastructure investment has been financed in China, including land leasing, domestic and foreign debt, taxes, fees and user charges, and various infrastructure development funds. It overviews China's rural infrastructure development and financing. It outlines China's recent fiscal reform agenda, including tax reforms and local government finance reforms, and discusses how these fiscal reforms would affect urban infrastructure and public services financing in future.

Section II briefly describes China's urban infrastructure development. Section III discusses alternative methods financing infrastructures. Section IV describes China's recent fiscal reforms and their implication for infrastructure financing. Section V presents some conclusion remarks.

## **II. China's Urban Infrastructure Development**

Great progress has been made in infrastructure development in China. The growth rates of some key infrastructures are shown in Table 1. The growth rate of electricity was 7.6% from 1978 to 1998, and 10.8% from 1998 to 2013. The growth rate of roads was 1.8% from 1978 to 1998 and 8.1% from 1998 to 2014. Petroleum and gas pipelines grew at 5.1% from 1978 to 1998 and 10% from 1998 to 2014!

Local infrastructures also grew rapidly. Local infrastructures include local roads, streets, water supply, gas supply, sewage system, transit, garbage cleaning, etc. Table 2 shows some local infrastructures from 1981 to 2014. The length of paved roads per person was 95,000 kilometers in 1990, 160,000 kilometers in 2000, 294,000 kilometers in 2010, and 352,000 kilometers in 2014, growing at 5.2% annually from 1990 to 2000, and at 5.6% annually from 2000 to 2014. The area of paved roads per person was 1.8 square meters in 1981, 3.1 square meters in 1990, 6.1 square meters in 2000, 13.2 square meters in 2010, and 15.3 square meters in 2014, 8.5 times as much as that in 1981.

The natural gas supply increased from 6.42 billion cubic meters in 1990 to 96.44 billion cubic meters in 2014, increasing at an annual rate of 11.3%! The length of gas pipelines increased from 24,000 kilometers in 1990 to 475,000 kilometers in 2014, increasing at an annual rate of 12.4%! The urban population with access to gas increased from 11.6% in 1981 to 19.1% in 1990, 45.2% in 2000, 92.0% in 2010, and 94.6% in 2014.

The length of city sewage pipes increased from 58,000 kilometers in 1991 to 511,000 kilometers in 2014, increasing at an annual rate of 9.5%! Urban water treatment rate increased from 14.9% in 1991 to 89.3% in 2013.

Public transportation vehicles per 10,000 persons increased from 2.5 units in 1986 to 2.2 units in 1990, 5.3% in 2000, 11.2 units in 2010, and 13.1 units in 2014.

Per capita area of parks and green land increased from 1.5 square meters in 1981 to 1.8 square meters in 1990, 3.7 square meters in 2000, 11.2 square meters in 2010, and 13.0 square meters in 2014.

However, Infrastructures are still insufficient to support the rapidly growing urban economy and population. Per capita water consumption for residents increased from 67.9 tons to 95.5 tons in 2000, and then declined to 63.4 tons in 2014, though urban population with access to tap water decreased 53.7% in 1981 to 48% in 1990, and then increased to 63.9% in 2000, 96.7% in 2010, and 97.6% in 2014. Also, public toilets declined from 3.8 units per thousand persons to 2.8 units per thousand persons from 1981 to 2014.

Traffic jam also proves to be a serious problem. It was estimated that in 2015, the average speed of vehicles during rush hour was to 22.6 km per hour in Beijing, 21.2 km per hour in Jinan of Shandong province and Hangzhou of Zhejiang province, 21.6 km per hour in Dalian of Liaoning province.<sup>2</sup> Many cities in China have water supply shortages (particularly in the North). According to the Beijing water authority, the available per capita water usage in Beijing had dropped to 100 cubic meters in 2012, much lower than the internationally acknowledged warning line of 1,000 cubic meters per capita.<sup>3</sup> Urban facilities for sewage and garbage disposal are in urgent need of improvement.

Another issue relating to urban infrastructure is air pollution in the Chinese cities, which poses a threat to Chinese public health. A particulate matter with diameter of 2.5 micrometers or less, called PM 2.5, generated mainly by coal combustion, can cause asthma, bronchitis, and acute and chronic respiratory symptoms. WHO set a standard for PM 2.5 not being higher than 10  $\mu\text{g}/\text{m}^3$  of the annual mean. In a number of northern cities in China, PM 2.5 sometimes went over 500  $\mu\text{g}/\text{m}^3$ ! According to China's Ministry of Environmental Protection, such standard of air quality is not attainable for 96% of Chinese cities.<sup>4</sup>

A widely neglected issue is the quality of the infrastructures and the maintenance of existing infrastructures. The problems include crumbling roads and damaged streets. The low quality and the lack of maintenance shorten the life of infrastructures and result in higher expenditures in the future for repair or replacement. Many constructions (e.g., buildings, equipment, facilities, etc.) become obsolete quickly due to low quality and lack of maintenance.

In addition, the infrastructure development is quite uneven across regions, with the western regions lagging behind the eastern coastal regions. In many regions, local infrastructures, such as public transportation, roads, streets, water supply, waste treatment, need to be improved.

### **III. Infrastructure Financing in China**

Over the years, China has reformed its fiscal system significantly to stimulate economic growth and infrastructure development. This section overviews China's fiscal reforms and discusses the main source of infrastructure financing.

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<sup>2</sup> Gaode Corporation, China Transportation Report 2015, Available from <http://tech.163.com/16/0119/16/BDN2PL7G000915BF.html>.

<sup>3</sup> *China Daily*, May 1, 2012.

<sup>4</sup> China Ministry of Environmental Protection, *Report on China's Environmental Situation*, 2013.

## A. Overview of fiscal reforms

Before 1978, the basic budgetary policy was *tongshou tongzhi*, or uniformly collecting and uniformly spending, i.e., the central government controlled all revenues and covered all the costs of state-owned enterprises (SOEs) and local governments. The central government and provincial governments were mainly responsible for the construction of the national, inter-provincial and provincial infrastructures; the local governments (city, county, and people's commune) were responsible for local infrastructures development.

Market-oriented economic reforms and fiscal decentralization started in 1978. The central government no longer covered all of the expenditures of local governments and state enterprises. People's communes were dismantled and replaced by township governments. In the early 1980s the government completed a *tax-for-profit* reform, i.e., state enterprises no longer submitted all their profits to the government, instead they were required to pay taxes to the government. This reform caused a decline in government revenue since many SOEs suffered a loss (Lin, 2000). In the late 1980s, the government established a "fiscal responsibility system (*caizheng baogan*)."<sup>5</sup> Under this system, each SOE after contributing a fixed amount of taxes to the government, could keep the remaining profits, and each local government could pursue more revenues and dispose all the revenue they collected.

These reforms were accompanied by the slow growth of government budgetary revenue. In 1978, government revenue share in GDP was 31.0% in 1978, down to 22.2% in 1985, 15.6% in 1990, and 12.2% in 1993.<sup>5</sup> Meanwhile, the share of central government revenue in total government revenue had declined to 19.8% in 1993! The slow growth of government revenue, along with the decrease in the incentive of SOEs to investment in infrastructures and the diminished power of governments in mobilizing rural resources, has caused a slow growth of infrastructures, such as roads and petroleum and gas pipelines (see Table 1).

The central government could not tolerate this trend any longer. In 1994, the government launched a new tax reform called "separating the central and local taxes (*fenshui zhi*)."<sup>5</sup> Taxes were classified into central government taxes, local government taxes, and central and local government shared taxes. Tax base was largely expanded; new taxes were introduced; and some tax rates were raised. Value-added tax became the main tax in China, followed by business tax. This tax reform laid the foundation for the rapid growth in tax revenue in the past twenty years. From 1995 to 2014, government tax revenue increased from 603.8 billion yuan to 11917.53 billion yuan, growing at an annual rate of 14.52% at the constant 1978 retail price index! The high growth rate of tax revenue greatly stimulated the infrastructure development in the past twenty years including roads and petroleum and gas pipelines (see Table 1).

It should be mentioned that, for a long time in China, extra-budgetary revenue (mainly including fees and charges) was extraordinarily high. As mentioned before, in the late 1980s, the central government granted local governments the right to pursue revenue and spend them. Many local governments started to establish township enterprises for

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<sup>5</sup> Calculated based the data from National Bureau of Statistics of China, *China Statistical Yearbook*, Beijing: China Statistics Press, 2015.

revenues. However, facing the competition from individual enterprises and due to poor management, many lost money. They finally figured out their comparative strategy, i.e., using their administrative power to collect fees and charges. In some years in China, extra-budgetary revenue was even higher than budgetary revenue. For example, the ratio of extra-budgetary revenue to budgetary revenue was 110.7% in 1992 and 52.56% in 1996 (see Table 6). The extra-budgetary revenue was out of the central government's control and supervision. In the late 1990s, the fees and charges were so widely spread, causing growing resentment from the general public. Premier Zhu Rongji started a fiscal reform, called tax-for-fee (*fee gai shui*). Starting from the new century, fees and charges, as well as extra-budgetary revenue had declined, and extra-budgetary revenue was eventually terminated in 2011.

The greatest fiscal policy change is the adoption of the expansionary fiscal policy after the Asian financial crisis in 1998. The Chinese government has run a budget deficit every year except for 2007 when the economy was overheated. China's government budget deficit accounted for 2.3% of GDP in 2009, 1.7% in 2010, 1.1% in 2011, 1.7% in 2012, 1.9% in 2013, 2.1% in 2014 and 2.3% in 2015. China's central government debt-to-GDP ratio was 17.5% in 2009, 16.7% in 2010, 15.1% in 2011, 14.8% in 2012, 14.6% in 2013 and 14.9% in 2014.

In addition to the central government deficits and debt, the local governments have run budget deficits and accumulated huge amount of debt since the Asian financial crisis. Including local government fiscal deficits, China's budget deficit had been very high in the past twenty years. High government budget deficits and high government spending have driven enormous infrastructure investment and very high economic growth.

Local government debt has mainly come from bank borrowing through the local government investment companies or financing vehicles. There are various reasons for the increase in local government debt. First is the shortfall in local government revenues and the expansion of local government fiscal responsibility. In 2014, local governments were allocated 54% of total government revenue but had to undertake 85% of total government expenditure. Second is the large percentage of transfers in the form of appropriations for special projects (matching grants), which local governments cannot dispose off freely. Third is that local governments can no longer rely on administrative and operation fee collections for revenue, and revenues from land leasing will not be adequate too. Fourth, the global financial crisis and the central government's expansionary policy have speeded up local governments' debt accumulation. Fifth is the high demand for local infrastructure development. With government-guaranteed loans and contingent liabilities included, local government debt-to-GDP ratio was 7.9% in 2000, 15.2% in 2005, 17.7% in 2008, 26.1% in 2009, 26.1% in 2010, 25.8% in 2011, 29.8% in 2012, 30.4% in 2013 and 37.7% in 2014.<sup>6</sup> Apparently, the size of local government debt has been increasing.

The new administration came to power in 2013 at the time when investors, scholars, and policymakers all over the world were worried about China's local government debt and fiscal sustainability. The new administration announced the adoption of non-stimulating

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<sup>6</sup> Calculated based on *Auditing Report on Local Governments' Debt* by the National Auditing Administration of China, 2011, 2013, and 2015.

policies, and intensified the control of local government borrowing. However, the government still runs high budget deficit, with budget deficit-GDP ratio being 2.3% in 2015, as high as 2009 when China launched a 4 trillion yuan stimulus package. The key difference between the fiscal policy adopted by this administration and the previous administration is that local government debt is much less and the fiscal system is more transparent now.

## **B. Infrastructure financing**

The main source of urban infrastructure financing in China since the 1980s include revenue from public land leasing, domestic debt (including bank borrowing), taxes, and fees and user charges.

### **1. Revenue from and leasing (sale of land use right)**

Revenue from land leasing (or sale for a fixed period of time) is a key source for infrastructure financing. In China no land is privately owned. Urban land is owned by government at various levels, and rural land is collectively owned by a village or a village union.<sup>7</sup>

All cities and counties have relied heavily on land leasing for financing urban infrastructure investment. They have leased land to enterprises or real estate developers for 40-70 years at very high fees. Enterprises pay various taxes to a local government, while real estate developers build apartments or houses and sell them to the public at high prices. The fees for land have been very high, contributing to a high urban housing price in China.

In addition to leasing the state-owned urban land, local governments also expand the urban area by acquiring farmland from rural villages and village unions. They purchase land from a village or a village union at a low price and lease it to real estate developers at a very high price to obtain profits (revenues). Villages or village unions sold their land to local governments usually under local government pressures and sometime with corruption involved, such as kickbacks to village leaders, etc.

As government-owned urban land becomes scarce, many local governments began to free up land for leasing by moving the administrative building to a new location usually in the newly purchased farmland. In doing so, the government can lease the vacated land in the central area to developers at a high price. In doing so, it can also create a new urban center where the new administrative offices are re-located, raising the value of surrounding land, which the government can continue to lease.<sup>8</sup>

The revenue from land leasing is rather large (see Table 3). Based on official statistics,

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<sup>7</sup> Usually each village, with about 300 people, owns about 300 mu (50 acres) of farmland. Normally, about five villages form a village union which owns a small amount of farmland. About ten village unions form a town (called people's commune before the early 1980s).

<sup>8</sup> There are limits to such operations. First, as administrative offices moved out of the urban center, it becomes difficult for people to access government services. Second, urban population size may not be large enough to occupy a large urban area. Thus, empty newly built government administrative buildings in the remote suburb of some cities or counties.

the revenue from land leasing was 2,819.77 billion yuan in 2010, accounting for 69.4% of total local government revenue and 7% of GDP; 3,114.04 billion yuan in 2011, accounting for 59.3% of local government revenue and 6.6% of GDP; 2669.15 billion yuan in 2012, accounting for 43.7% of local government revenue and 5.1% of GDP; 3,907.3 billion yuan in 2013, accounting for 56.6% of local government revenue and 6.6% of GDP!<sup>9</sup> In addition, local governments have also obtained revenues from the return of state-owned land, which is also quite substantial.

The local governments also borrow money from the commercial and policy banks against the value of land on their balance sheets to finance infrastructures. The large stock of local government debt is a result of this type of borrowings.

As sellable land in the city area becomes less, city expansion has reached a limit; farmers also began to ask for higher price for their farmland, leading to a decline in government revenues from land sales. As the supply of land available for leasing will eventually run out, land-leasing public finance is not sustainable.

This phenomenon could also be found in other countries/regions. In the past, Hong Kong relied heavily on land-leasing to finance its infrastructures. In 2000, revenue from land leasing accounted for 105% of expenditures on public works, and 14% of total government expenditures in Hong Kong (Hong, 2003). India and Ethiopia have also used public land to finance urban infrastructure development (Peterson, 2006).

## 2. Government debt

Debt financing allows the government to acquire large funds in a short period of time. Unlike taxes, fees and user charges, debt financing can spread production cost of infrastructures over successive generations of service users or beneficiaries. In the U.S., federal, state and local governments have issued bonds to finance public capital projects, including schools, roads, and water and sewer systems.<sup>10</sup> In Japan, since the early 1970s, bond issuance for public works has become an important financing instrument, especially during periods of economic recessions.

From 1958 to 1978, China did not issue new debt. Since the economic reform in 1978, government debt has been increasing. Nevertheless, the debt-GDP ratio is still not high compared to many developed countries. The central government debt accounted for 17.4% of GDP in 2005, 20.2% of GDP in 2007, 16.7% of GDP in 2010, and 14.9% of GDP in 2014.

<sup>9</sup> Ministry of Finance of China, *Finance Yearbook of China 2014*, Beijing: China Fiscal Press.

<sup>10</sup> From 1790 to the 1840s, state governments were the most active in borrowing and investment in transportation and financial infrastructures (such canals and as banks). From 1842 to 1933, local infrastructure investments steadily rose relative to state investments (such as water, sewage, curb, and paving projects), as indicated by the rise in local government debt. After 1933, the federal government has been most active in debt issue [See Wallis (2000)]. But the state and local government continued to play an important role in infrastructure financing. For example, in 1967, of total state government long-term debt, 27.2% was for education and 36.1% for highways; of total city government long-term debt, 15.2% was for water, 9.2% for sewerage, 5.4% for electricity, and 12.2% for transit [See Fisher (1996), p. 244]. At moment, the debt level of the US state and local governments is low.

Under the 1995 budget law, China's local governments are banned from issuing bonds directly, or running budget deficits. However, local governments established local investment companies to borrow a large amount of money from commercial and policy banks for infrastructure development. It is estimated, including contingent debts, that local government debt-GDP ratio was 7.9% in 2000, 15.2% in 2005, 17.7% in 2008, 26.1% in 2009, 26.1% in 2010, 25.8% in 2011, 29.8% in 2012, 30.4% in 2013, and 37.7% in 2014. Apparently, the size of local government debt has been increasing. Under the 2014 budget law, provincial governments have limited right to issue bonds.<sup>11</sup>

Foreign borrowing is also a way of infrastructure finance. International organizations (such as the World Bank, International Monetary Fund, regional development banks) and the governments of developed countries have provided low interest rate loans to China. Most of the loans have been used for poverty relief and for infrastructure development.<sup>12</sup> The ratio of China's foreign debt to GDP is still low, and most of the debt is long-term. The ratio of foreign debt to GDP was 8.4% in 2014. Thus, the degree of risk of China's foreign debt is still lower than that of many other developing countries.

Debt must be eventually repaid with interest, and thus, it is postponed taxes and fees and user charges. The efficient use of revenue from bond issues is the key for economic development.

### 3. Taxes

Employing tax finance can help countries avoid the transfer of the burden of infrastructure finance to future generations. In China, funds for infrastructure finance are largely from general tax revenues. China's major taxes are value-added tax (VAT), business tax, corporate income tax, and consumption tax (similar to the excise tax in the United States). The standard for VAT, business tax and corporate income tax rates is 17%, 5% and 25%, respectively, while consumption tax varies from 1% to 40% (some are based on quantity instead of value). China's tax revenue has grown at an extraordinary rate, at an average annual growth rate of 14% from 1994 to 2014, based on retail price index! In 2014, VAT accounted for 25% of total tax revenue, business tax 15%, corporate income tax 21%, consumption tax 7.5%, and individual income tax only 6%.<sup>13</sup>

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<sup>11</sup> Bond issues must be approved by the State Council, and the revenue must be used for public infrastructure construction.

<sup>12</sup> "Since the start of the first loan in 1981 supporting development of Chinese universities, the World Bank's cumulative lending to China by June 30, 2006 was US\$40.534 billion for a total of 274 development projects. Seventy-five of these projects are under implementation, making China's portfolio one of the largest in the Bank. World Bank-supported projects can be found in almost all parts of China and in many sectors of the economy, with the current portfolio concentrated in transportation, urban development, rural development, energy, and human development. Transport projects focus on connecting the poorer inner provinces to the dynamic coast; urban projects focus on urban transport, sustainable water supply, and sanitation; and energy projects on meeting the economy's growing power needs (The World Bank Group in China, 2006)." See The World Bank Group in China, *Facts and Figures*, The World Bank Office, Beijing, July 2006.

<sup>13</sup> National Bureau of Statistics of China, *China Statistical Yearbook*, Beijing: China Statistics Press, 2010 and 2015.

For many years, Chinese governments at various levels have spent a large portion of its revenues on economic construction. Before 1995, government expenditure on economic construction accounted for more than 40% of total government expenditures. In recent years, government expenditures on economic construction have declined. Figure 1 shows the composition of local governments' expenditure in 2014.

China has also established earmarked taxes and fees for infrastructure development. One of the taxes is called city construction and maintenance tax, which is an overhead on VAT, consumption tax, and business tax. The tax base is the sum of VAT, consumption tax, and business tax. The tax rate is 7% for businesses in cities, 5% for businesses in county and towns, and 1% for businesses in elsewhere.<sup>14</sup> Another is refined oil consumption taxes in 1994, and part of the revenue is used for highway construction and maintenance. In recent years, the government has raised the tax rates several times.<sup>15</sup>

Many countries finance infrastructures by special taxes. In the United States, the Highway Trust Fund was created whereby proceeds from a federal tax on gasoline, tires, and other motor vehicle parts would be deposited with the government to be used solely for highway construction. In Japan, the government established several special accounts to finance major projects by user fees and earmarked taxes.

#### **4. Fees and User Charges**

Fees and user charges have been used by the local governments at various levels to finance infrastructures, such as toll ways, water, gas, electricity, sewage, and city transportation. For example, fees are used to finance the construction and maintenance of the airport operation system and highways. For some infrastructures, such as running water, the government sets a low price for the purpose of subsidizing low-income households. For other infrastructures, such as airport highways, fees are overly collected.

In the 1990s, many government agencies, government institutions, and local governments engaged in fee collections, and fees are excessive and arbitrary, not closely related to costs of public good provisions. Fees and charges were included in extra-budgetary revenue. It can be seen from Table 6 that extra-budgetary revenues were extremely large, higher than budgetary revenues in 1992! A part of the extra-budgetary revenue was used for infrastructure development. The government launched a reform called substituting taxes for fees (or *tax-for-fee*) at the end of the 1990s, and extra-budgetary revenue was eliminated in 2011. Now fees and charges are included in government budgetary revenue.

Fees and user charges relate benefits to costs. However, since the rich and the poor users pay fees, such as highway tolls, the government cannot redistribute income through collecting fees and user charges. Nevertheless, using fees and user charges to

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<sup>14</sup> The State Council of China, *Temporary Regulations on City Maintain and Construction Tax*, Document 19, February 8, 1985.

<sup>15</sup> China State Council, Notice on Reforming the Refined Oil Prices, Taxes, and Fees, Document 37, December 28, 2008.

finance public infrastructures is necessary for China, and fees and user charges will continue to play an important role in infrastructure construction and maintenance.

## 5. Other sources

*State-owned enterprises.* SOEs have been involved in China's public infrastructure construction and maintenance. For example, China Railroad Corporation established in 2013 has been responsible for railroad construction, operation, and maintenance. By the end of 2015, it employs two million workers, operates railroads of 120,000 kilometers, the second longest in the world, of which high-speed railroads of 19,000 kilometers constitute the longest in the world.<sup>16</sup> It charges low prices for passengers and undertakes some government emergent transportation tasks. The corporation has a large amount of debt, 2,295 billion yuan at the end of June in 2013, accounting for over 4.3% of GDP.<sup>17</sup> Other SOEs involved in public infrastructure development include China National Electric Engineering Corporation, and local government owned water, natural gas, and mass transit corporations.<sup>18</sup>

*Village and township enterprises.* The village-township enterprises (VTEs) played an important role in including rural- and town- level infrastructure financing in the 1980s and early 1990s. The VTEs have been active in agricultural product processing, articles of daily use, local transportation, natural resource exploitation, etc. In the beginning, VTEs are owned by township governments and villages, and now many have become corporations. In 2007, the value added from the VETs accounted for 28.5% of GDP, while the exports of the VETs accounted for 34% of total exports and taxes paid by the VETs accounted for about 20% of total tax revenue.<sup>19</sup> They used a part of their profit to finance rural roads, bridges, and streets. However, the fast infrastructure development in the rural areas is a recent phenomenon and it is largely dependent on local government financing.

*Labor services.* Requiring citizens to provide labor services for infrastructure construction is a way for rural infrastructure financing. In China, historically, bridges, roads, and canals were all built by requiring citizens to provide labor services. This approach of infrastructure construction was seldom used by the Chinese government after the abolishment of the people's communes.<sup>20</sup> In the recent year, most villages have paved the roads to their villages and the village streets with the cooperation of the local government and the village residents. Usually, village residents prepared the roadbed for the roads to their house or around their houses, a self-financed undertaking, and then the government paved the road with cement or asphalt. At the moment, an overwhelming majority of the villages have paved roads.

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<sup>16</sup> [www.gov.cn/xinwen/2015-12/30/content\\_5029552.htm](http://www.gov.cn/xinwen/2015-12/30/content_5029552.htm).

<sup>17</sup> National Auditing Administration of China *Auditing Report on Local Governments' Debt*, 2013.

<sup>18</sup> In the U.S., state and local governments are in water, sewer and local mass transit, while privately regulated production is in electricity, natural gas and inter-metropolitan transit. It was reported that cities in 46 out of the 50 states operate electric utilities, and cities in 34 states were operating gas utilities in 1996 [see Fisher (1996)].

<sup>19</sup> Feng, Ke, Summary of the Achievements of Village- and Township Enterprises in 30 years, *Farmers' Daily*, December 19, 2008.

<sup>20</sup> In North America, from the beginning of the first permanent settlement, landholders were "taxed" three days a year to maintain the roads, i.e., kept the roads in front of one's property safe for the movement of man and beast (see Cain, 1997).

*Public and Private Partnership (PPP)*. The Chinese government has promoted PPP in infrastructure development with much progress. For example, the Beijing Subway Line 4 is a public–private joint venture with the Hong Kong MTR and Beijing Capital Group, a state-owned enterprise under the Beijing municipality, and it is profitable so far. Facing the slowdown of the economy, increasing local government debt, and slow growth of government revenue, the government has tried to attract more private capital for infrastructure development. In 2015, the government issued a document asking local governments to encourage private enterprises to participate in infrastructure projects. However, the progress has been slow. There are two reasons. First, after many years of infrastructure development, the profitable projects, such as the highway to airports, have already been completed. What is left are the inner city infrastructures, such as roads, streets, water system, sewage system, and local public transportation system. These mostly government-subsidized projects serve the general public and are not profitable. Second, private enterprises worry about the change of local leadership, as well as the change in government policy concerning PPP.

#### **IV. Current Fiscal Reforms and the Implications for Infrastructure Development**

The Chinese government has implemented or will implement several fiscal reforms recently, including allowing local governments to issue municipality bonds, substituting valued-added tax for business tax, allocating more revenue to local governments, and the experiment on establishing a private property tax. These reforms would significantly affect urban infrastructure and public services financing in future.

##### **A. Allowing local governments to issue municipal bonds**

Based on the previous budget law, for example, the Budget Law in 1995, local governments did not have the right to issue bonds. The government revised the budget law in 2014, allowing local governments to issue bonds for public infrastructure development.

For many years, local governments had established investment companies to borrow funds from commercial and policy banks, and they rely on new borrowing to repay the mature debt. As mentioned earlier, including contingent debt, the local government debt is about 24 trillion yuan in 2014, accounting for more than 30% of GDP! Many local governments are concerned that the banks would not loan to them anymore, while the banks are worried that the local governments do not have the ability to repay the debt. The large government debt to the banks is a threat to the financial system.

To solve the problem, China revised the budget law in 2014, allowing local governments to issue bonds for public infrastructure financing. The quantity of local government bonds should be proposed by the State Council and approved by the National People’s Congress or its Standing Committee. A specific amount of bonds is allocated to each province by the State Council, and should be approved by the

People's Congress of the province. The State Council and Ministry of Finance are responsible for supervising local government bonds issuing.<sup>21</sup>

In 2015, the local government issued bonds of 3.2 trillion yuan, repaying the loans borrowed from the banks. To have a growth rate of 6.5-7% in 2016, the government decided to have a deficit of 2.18 trillion yuan, accounting for 3% of GDP. Of the figure, central government deficit is 1.4 trillion yuan while local government deficit is 0.78 trillion yuan. Meanwhile, the central government allows the local governments to issue additional bonds of 0.4 trillion yuan to repay the bank loans.<sup>22</sup>

The large local government bonds issuing will no doubt stimulate local infrastructure development. However, the effective use of the revenue from debt issuing is crucial, and how to put local governments under the supervision of local public is still an unsolved problem.

## **B. Substituting VAT for business tax**

VAT and business tax are the two largest taxes in China, with VAT from manufacturing industries and business tax from service industries. The standard rate for VAT is 17% and the standard rate for business tax is 5%. VAT is shared by the central and local governments with the central government receiving 75% and local governments receiving 25%. Business tax is a local government tax. The revenue of VAT accounted for 45% of total tax revenue in 1994 and 25% in 2014, while business tax accounted for 13% in 1994 and 15% in 2014.<sup>23</sup>

The government has started the experiment of substituting VAT for business tax for several years. The advantages of VAT compared to business tax include the following: (1) Avoid double taxation. For example, at 5% business tax rate, a house sold at 1 million yuan yields a business tax of 50,000 yuan; when the owner sells the house at 1.1 million, a business tax of 55,000 yuan has to be paid. With VAT, only the value added will be taxed. (2) Promote specialization. For example, with VAT, a firm using other firms' services, e.g., accounting or legal services, will deduct the VAT paid by these firms. Thus, firms are willing to use specialized services. (3) Stimulate capital accumulation. Similar to the VAT in most European countries, China's VAT is consumption-type, i.e., investment is excluded from the tax base. Thus, with VAT, firms have more incentives to invest. (4) Reduce tax evasion. It is well-known that VAT is self-policing. (5) Easy to collect. Compared to sales tax, VAT is collected from the producers, instead of sellers, and it is easy to collect. Starting May 1, 2016, the reform will be extended to industries including construction, real estate, financial and banking, and services for everyday life.

The central government promised to give the VAT revenue from service industries back to local governments. However, the VAT revenue is significantly smaller than the previous business tax revenue because of the smaller tax base. The reform has decreased local governments' revenue significantly. The central government has

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<sup>21</sup> National People's Congress, *Budget Law of the People's Republic of China*, 2014.

<sup>22</sup> Li, Keqiang, *Report on the Work of the Government*, March 5, 2016.

<sup>23</sup> National Bureau of Statistics of China, *China Statistical Yearbook*, 2015, Beijing: China Statistics Press.

decided to increase the share of VAT to the local governments (Li, 2016). After the completion of the reform, there will be no business tax in China.

### C. Establishing personal property tax

In China, only business property is taxed currently. The experiments of collecting personal housing property tax started in 2011 in two municipalities directly under the central government, Shanghai and Chongqing. However, due to low tax rates and small tax bases, the revenue from personal property tax is negligible. For example, the revenue from personal house property tax accounted for only 0.5% of total tax revenue in Chongqing in 2011.<sup>24</sup>

Scholars and policymakers in China have argued for the establishment of housing property tax to finance local infrastructures and to redistribute income (e.g., Lin, 2005). However, at the moment, the government faced challenges. (1) In the short term, a personal property tax may lead the housing market to crash. China's economic growth is slowing down, and the real estate market is vulnerable at the moment. The government is concerned that a personal property tax may hurt the housing market and further slow down economic growth. Right now, the government is reducing taxes for housing purchase.<sup>25</sup> (2) Some challenge the legal ground for a housing property tax. It is argued that the Chinese people do not own a house, since the land is only rented to the developers for 40-70 years; and house owners have already paid the land use tax when making the house purchase, and there is no reason to pay taxes again. (3) It is difficult to assess the value of a house and determine the tax base. Housing price has increased dramatically in the past twenty years. In some regions, housing price bubbles exist. The government has to establish a system to assess the value of the houses (or apartments), and set up appropriate tax rates. (4) A tax on housing property will dampen the incentives to save. Housing is an important investment for many Chinese families. In China, land is publically owned; individuals cannot buy land; stock market is vulnerable and not well developed; and rate of return to bank savings is very low. Thus, many people invest in housing as a way of saving. There is thus a necessity for the government to provide more investment channels to the people.

Nevertheless, it is expected that personal property tax will be established in the whole country in the near future.

## V. Lessons from China's Infrastructure Development and Financing

China has made impressive progress in infrastructure development. Infrastructure build-up has contributed to China's fast economic growth in the last two decades. China has

<sup>24</sup> Estimated based on the data from Chongqing Municipal Bureau of Statistics NBS Survey Office in Chongqing, *Chongqing Statistical Yearbook 2012*, China Statistics Press, 2012.

<sup>25</sup> Recently, the government has reduced contract tax (deed tax) for first-time house buyers from 3% to 1.5% for houses that are larger than 144 square meters; and reduced the tax for second house buyers from 3% to 1% for houses that are smaller than 90 square meters. Meanwhile, business tax is exempted for all provinces except Beijing, Shanghai, and Guangzhou. See Ministry of Finance, National Bureau of Taxation, and Ministry of Urban and Rural Housing Construction, *Notice on the Adjustment of Preferential Taxes for Real Estate Exchanges*, February 17, 2016.

used both budgetary revenues and extra-budgetary revenues for infrastructure financing.

The reasons for the fast infrastructure build-up in China are as follows:

First, the government has paid overwhelming attention to economic development. In 1992, during his visit to the eastern coastal areas of China, Deng Xiaoping clearly announced that “[d]evelopment is the absolute principle,” and development is the key for solving all problems in China. Since then, economic growth has been the main objective of the government; local government officials’ promotion have relied on their economic achievements; and the infrastructure development has been a key area of investment.

Second, China has established a solid tax system, with rapid growth of tax revenue, and large government expenditures on economic construction. China’s tax system is dominated by consumption-type taxes, such as VAT and consumption tax. In 2014, the revenue from consumption-type taxes, VAT, business tax (which will be converted to VAT soon), consumption tax, and VAT and consumption tax on exports (minus tax rebates on exports), accounted for 55% of total tax revenue! It is well-known that consumption tax encourages savings and capital accumulation. In addition, VAT is self-policing and easy to collect. China’s tax revenue has grown at an extraordinary rate in the past twenty years, with an average annual growth rate of 14% from 1994 to 2014! Also, China spend a large proportion of the tax revenue on infrastructure development. In 2007, the share of government expenditure on economic affairs in total government expenditure was 37.7% for China, 5.4% in France, 7.2% in Germany, 9.8% in Singapore, and 10% for the United States.<sup>26</sup>

Third, expansionary fiscal policies and the increase in government debt have been essential for nationwide infrastructures financing. China adopted expansionary fiscal policy after the Asian Financial Crisis, and government debt has been used for infrastructure finance. Infrastructures such as highways, rail roads and speedy trains have increased very fast in the past twenty years.

Fourth, local governments’ revenues from land leasing, bank borrowings, and fees and charges have played an important role in urban infrastructure financing. In the 1980s and the early 1990s, local governments relied on extra-budgetary revenues (e.g., fees and charges) to finance infrastructures. Since the late 1990s, local governments have relied on the leasing of government-owned urban land and confiscated farmland. Local governments are still heavily dependent on land leasing for infrastructure financing now.

Lessons from China’s infrastructure development and financing include the following:

First, urban planning should be emphasized. China’s urban infrastructure development lacks long-run planning. Urban areas occupy too much good farmland in China since urban land owned by the government, farmland is collectively owned, and thus, government can confiscate farmland at a low cost. In almost all cities, streets are extremely wide, and commercial areas are not concentrated. Meanwhile, green areas and trees are very limited. In countries with land being private property, land in the areas is very expensive, and urban areas are highly concentrated, with tall buildings and narrow streets; also, many residential areas are in poor-quality land for farming (e.g.,

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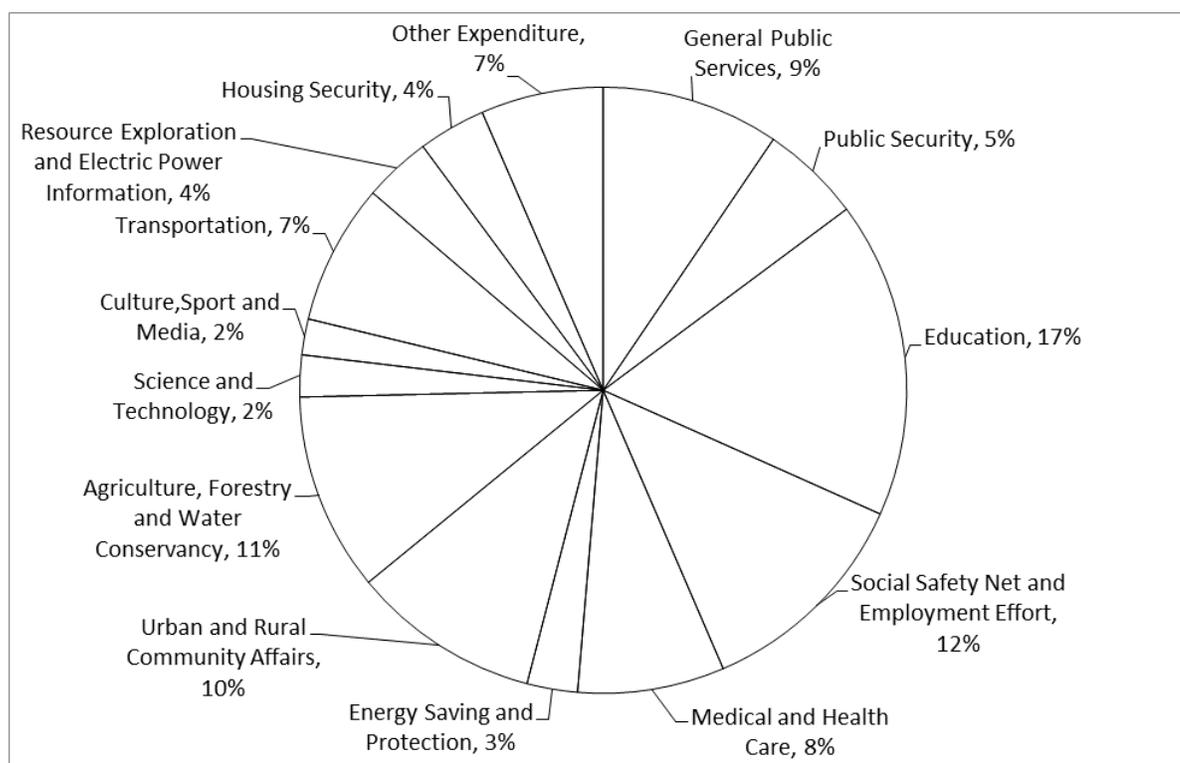
<sup>26</sup> See International Monetary Fund, *Government Finance Statistics Yearbook*, 2007.

hills and ravines). In China, local government officials are appointed by the central government and they are moved from place to place, thus, they only care a short period of time. As for urban planning, Singapore sets an excellent example for the other countries.

Second, sustainable sources of infrastructure finance should be established. China's methods of financing infrastructures is not sustainable. Government owned land is limited and debt finance cannot last forever. The government needs to find sustainable sources for infrastructure finance, such as taxes, fees and user charges. China should establish personal property taxes for local infrastructure financing as soon as possible. It also should consider to set up inheritance tax and capital gains tax.

Third, allow the local people to make their own decisions on urban planning and development, local governments should represent local people, and should be given the right to make their own local economic development decision. The government should give local governments the right make local tax laws. In addition to the construction of the large national infrastructure projects, urban infrastructure development has become more and more important. At moment, the central government should (1) allocate more tax revenue, such as the revenue from VAT, to the local governments.

Fourth, China should emphasize the quality in infrastructure construction and pay more attention to infrastructures maintenance. The quality of infrastructures, such as roads, bridges, buildings and pipelines, is a big issue in China. Some bridges collapsed even before being used (e.g., a bridge in Phoenix county in Hunan province in 2007, a bridge in Xining city of Qinghai province, a bridge in Fushun city of Liaoning province, etc.). Cheating on labor and materials and corruption are the main reasons. China usually does not have funds raised for maintenance when an infrastructure is constructed. Lack of maintenance reduces the life span of an infrastructure.

**Figure 1. Composition of local governments' expenditure in 2014**

Source: National Bureau of Statistics of China, *China Statistical Yearbook* (Beijing, China Statistics Press, 2015).

**Table 1. Annual growth of some key infrastructures in China, 1952-2015**

	1952-1978 (%)	1978-1998 (%)	1998-2014 (%)
Electricity	13.69	7.57	10.80 <sup>##</sup>
Roads	7.50	1.81	8.13
Paved Roads*	9.48	3.02	7.70
Railways	3.13	1.25	3.31
Double-Tracking	6.51	4.74	3.21
Telecommunication Subscribers	6.52	19.08	6.77
Phone	4.50	17.78	6.17
Civil Aviation	9.35	11.57	7.28
Petroleum & Gas Pipelines	24.17 <sup>#</sup>	5.12	9.97

Sources: National Bureau of Statistics of China, *Statistical Yearbook of China*, 1986, 1998, 1999, 2000 and 2008-2015.

Notes: \* Paved roads refer to better roads, i.e., level 4 or above roads.

<sup>#</sup> Growth from 1970 to 1978.

<sup>##</sup> Growth from 1998 to 2013.

**Table 2. Some basic statistics on city public utilities**

	1980	1981	1986	1990	1995	2000	2010	2013	2014
Length of Paved Roads at Year-end (10,000 km)	..	..	..	9.5	13	16	29.4	33.6	35.2
Length of Paved Roads Per 10,000 Persons (km)	..	..	..	3.1	3.8	4.1	7.5	7.8	7.9
Area of Paved Roads at Year-end (100 million sq. m)	..	..	..	10.2	16.5	23.8	52.1	64.4	68.3
Per Capita Area of Paved Roads (sq. m)	..	1.8	..	3.1	4.4	6.1	13.2	14.9	15.3
Natural Gas Supply (100 million cubic meter)	..	..	..	64.2	67.3	82.1	487.6	901	964.4
Consumption of Natural Gas for Residential Use	..	..	..	11.6	16.4	24.8	117.2	185.4	196.9
Length of Gas Pipelines (10 000 km)	0.87	..	..	2.4	4.4	8.9	30.9	43.2	47.5
Urban Population with Access to Gas (%)	..	11.6	15.2	19.1	34.3	45.4	92	94.3	94.6
Length of City Sewage Pipes (10 000 km)	2.19	2.32	4.25	5.8	11	14.2	37	46.5	51.1
Wastewater Treatment Rate (%)	..	..	..	14.9 (1991)	19.7	34.3	82.3	89.3	90.2
Public Vehicles under Operation at Year-end (Buses and Trolley Buses, etc.) (10 000 units)	..	..	..	6.2	13.7	22.6	38.3	46.1	47.6
Public Transportation Vehicles Per 10000 Persons (unit)	..	..	2.5	2.2	3.6	5.3	11.2	12.8	13
Green Land (10 000 hectares)	8.6	11.0	15.3	47.5	67.8	86.5	213.4	242.7	252.8
Per Capita Area of Parks and Green Land (sq. m)	..	1.5	1.84	1.8	2.5	3.7	11.2	12.6	13.1
Annual Volume of Tap Water Supply(100 million cu. m)	88.3	97.0	277.4	382.3	481.6	469	507.9	537.3	546.7
Water Consumption for Residential Use	33.9	36.8	70.7	100.1	158.1	200	238.8	267.6	275.7
Per Capita Water Consumption for Residential Use (ton)	..	..	58.2	67.9	71.3	95.5	62.6	63.3	63.4
Urban Population with Access to Tap Water (%)	81.4	53.7	51.3	48	58.7	63.9	96.7	97.6	97.6
Garbage Disposal (10 000 tons)	3232	2606	5009	6767	10671	11819	15805	17239	17860
Public Toilets per 10 000 Persons (unit)	..	3.8	3.6	3	3	2.7	3	2.8	2.8

*Sources:* The data for 1981 and 1986 as well as the data on wastewater treatment rate are from Ministry of Housing and Urban-Rural Development of China, *China Urban Construction Statistical Yearbook*, 2008, 2011 and 2013, Beijing: China Statistics Press, and Ministry of Finance of China, *60 years of New China*, 1949-2008, Beijing: China Statistics Press; The rest of the data are from National Bureau of Statistics of China, *China Statistical Yearbook*, 2011, 2002, 2008 and 2015, Beijing: China Statistics Press.

*Note:* .. indicates that the data are not available.

**Table 3. Revenue for local government from land leasing***(Billion yuan)*

Year	GDP	Local Government Revenue	Total Local Government Funds	Sale Receipt of State-owned Land-use Rights	State-owned Land Returns	Revenue form Land Leasing /GDP (%)	Revenue form Land Leasing /Local Government Revenue (%)	Revenue form Land Leasing /Local Government Funds (%)
2010	40151.3	4061.000	3360.927	2819.770	102.523	7.02	69.44	83.90
2011	47288.2	5254.711	3823.231	3114.042	109.353	6.59	59.26	81.45
2012	51894.2	6107.700	3421.674	2669.152	89.732	5.14	43.70	78.01
2013	58801.9	6901.116	4803.031	3907.299	125.967	6.64	56.62	81.35

Sources: Ministry of Finance of China, *Finance Yearbook of China* 2014, Beijing: China Fiscal Press, 2011-2014.

**Table 4. China's Central Government debt 1993-2015***(100 million yuan)*

Year	Fiscal Revenue	Fiscal Expenditure	Fiscal Deficits	Domestic Debt	Foreign Debt	GDP	Fiscal Deficits /GDP	Domestic Debt /GDP	Foreign Debt /GDP
1993	4349	4642.3	293.4	1540.7	..	35333.9	0.8	4.4	..
1994	5218.1	5792.6	574.5	2286.4	..	48197.9	1.2	4.7	..
1995	6242.2	6823.7	581.5	3300.3	..	60793.7	1	5.4	..
1996	7408	7937.6	529.6	4361.4	..	71176.6	0.7	6.1	..
1997	8651.1	9233.6	582.4	5508.9	..	78973.0	0.7	7	..
1998	9876	10798.2	922.2	7765.7	..	84402.3	1.1	9.2	..
1999	11444.1	13187.7	1743.6	10542	..	89677.1	1.9	11.8	..
2000	13395.2	15886.5	2491.3	13020	..	99214.6	2.5	13.1	..
2001	16386	18902.6	2516.5	15618	..	109655	2.3	14.2	..
2002	18903.6	22053.2	3149.5	19336	..	120333	2.6	16.1	..
2003	21715.3	24650	2934.7	22604	..	135823	2.2	16.6	..
2004	26396.5	28486.9	2090.4	25778	..	159878	1.3	16.1	..
2005	31649.3	33930.3	2281	31849	765.52	183217	1.2	17.4	0.42
2006	38760.2	40422.7	1662.5	34380	635.02	211924	0.8	16.2	0.30
2007	51321.8	49781.4	-1540.4	52075	607.26	257306	-0.6	20.2	0.24
2008	61330.4	62592.7	1262.3	52799	472.22	300670	0.4	17.6	0.16
2009	68518.3	76299.9	7781.6	59737	500.73	340903	2.3	17.5	0.15
2010	83101.5	89874.2	6772.7	66988	560.14	401513	1.7	16.7	0.14
2011	103874	109248	5373.4	71411	633.71	472882	1.1	15.1	0.13
2012	117254	125953	8699.5	76748	817.79	518942	1.7	14.8	0.16
2013	129143	139744	10601	85840	910.86	588019	1.9	14.6	0.15
2014	140370	153870	13500	94676	979.14	636139	2.1	14.9	0.15
2015	155300	171500	16200	..	..	..	2.3	..	..

Sources: National Bureau of Statistics of China, *China Statistical Yearbook*, 2011, 2002, 2008, 2015, Beijing: China Statistics Press.

Note: .. indicates that the data are not available.

**Table 5. China's Local Government debt 1996-2014**

Year	Total Local Debt (billion yuan)	Growth Rate	GDP (billion yuan)	Debt-GDP Ratio
1996	239.931	..	7117.66	3.37
1997	299.482	24.82	7897.30	3.79
1998	443.832	48.2	8440.23	5.26
1999	591.717	33.32	8967.71	6.6
2000	788.877	33.32	9921.46	7.95
2001	1051.730	33.32	10965.52	9.59
2002	1402.167	33.32	12033.27	11.65
2003	1771.217	26.32	13582.28	13.04
2004	2237.402	26.32	15987.83	13.99
2005	2826.286	26.32	18493.74	15.28
2006	3570.164	26.32	21631.44	16.5
2007	4509.831	26.32	26581.03	16.97
2008	5568.740	23.48	31404.54	17.73
2009	9016.903	61.92	34090.28	26.45
2010	10717.490	18.86	40151.28	26.69
2012	15900.000	..	52760.77	30.14
2014	24000.000	..	636139.00	37.73

Sources: Calculated based on National Auditing Administration of China *Auditing Report on Local Governments' Debt*, 2011 and The State Council of China, *Proposal on Local Government Debt in 2015*. See <http://www.chinanews.com/gn/2015/08-29/7496482.shtml>

Note: .. indicates that the data are not available.

**Table 6. Extra-budgetary revenue**

Year	Extra-budgetary Revenue (100 million yuan)							Ratio of Extra-budgetary Revenue to GDP ( % )	Ratio of Extra-budgetary Revenue to Budgetary Revenue ( % )
	Total	Government administrative and operative units	Local Governments	State-owned Enterprises and their Supervision Ministries	City Construction Fees	Government Funds	Others		
1970	1.009	0.28	0.135	0.595	..	..	..	4.48	15.23
1978	3.471	0.634	0.311	2.526	..	..	..	9.52	30.66
1992	38.549	8.855	0.909	28.790	..	..	..	14.32	110.7
1993	14.325	13.178	1.147	..	..	..	..	4.05	32.94
1994	18.625	17.225	1.400	..	..	..	..	3.86	35.69
1995	24.065	22.349	1.717	..	..	..	..	3.96	38.55
1996	38.933	33.958	2.247	..	2.729	..	..	5.47	52.56
1997	28.260	24.143	1.159	..	2.958	..	..	3.58	32.67
1998	30.823	19.819	..	0.547	3.373	4.784	2.300	3.65	31.21
1999	33.852	23.543	..	0.501	3.589	3.965	2.254	3.77	29.58
2000	38.264	26.545	..	0.592	4.033	3.835	3.258	3.86	28.57
2001	43.000	30.900	..	0.600	4.100	3.800	3.600	3.92	26.24
2002	44.790	32.380	..	0.720	2.72	3.760	5.210	3.72	23.69
2003	45.668	33.357	..	0.523	2.931	2.871	5.985	3.36	21.03
2004	46.992	32.084	..	0.641	2.131	3.513	8.623	2.94	17.80
2005	55.442	38.582	..	0.478	1.929	3.593	10.859	3.00	17.52
2006	64.079	42.168	..	0.449	2.213	3.765	15.484	2.96	16.53
2007	68.203	46.811	..	0.402	1.803	..	19.189	2.57	13.29
2008	66.173	48.358	..	0.471	2.207	..	15.136	2.11	10.79
2009	64.147	45.981	..	0.841	2.206	..	15.119	1.88	9.36
2010	57.944	36.918	..	0.581	2.572	..	17.873	1.44	6.97

Sources: National Bureau of Statistics of China, *China Statistical Yearbook*, Beijing: China Statistics Press, 1985-2011.

Note: .. indicates that the data are not available.

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