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## **Discussion Paper**

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# **URBAN INFRASTRUCTURE FINANCING IN CHINA**



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#### **Discussion Paper**

Macroeconomic Policy and Financing for Development Division

### **Urban Infrastructure Financing in China**

by

Shuanglin Lin\*

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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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### 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 Rami'rez (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.

<sup>&</sup>lt;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  $10 \ \mu g/m^3$  of the annual mean. In a number of northern cities in China, PM 2.5 sometimes went over  $500 \ \mu g/m^3$ ! 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.

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

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

<sup>&</sup>lt;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*)." 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*)." 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

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