Developing by borrowing? Inter-jurisdictional competition, land finance and local debt accumulation in China

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Abstract: Although the investment-oriented development model for economic growth adopted by Chinese governments has generated spectacular results, the risks of debt-financed urbanization and economic development have recently become evident in mounting local debts that are undermining the financial system, triggering concerns with respect to local governments' indebtedness, financial stability and sovereign risk in China. In this paper, we portray the uneven spatial and temporal dynamics of local government debt in China, and examine the ways in which it is intertwined with institutional, political and economic factors. Our analysis shows that while global and national economic conditions have resulted in a dramatic increase of local government debt, particularly in the late 2000s and the early 2010s, the spatial variation of local debt accumulation in China could be partly explained by two institutional factors: land finance and inter-jurisdictional competition. We argue that the behavior of local governments may harm the long-term future of Chinese cities.

Keywords: Local debt accumulation; inter-jurisdictional competition; land finance; local financing platforms; China

1. Introduction

The dawn of a new era of planetary urbanization, with the majority of the human race living in cities, has directed attention towards urban growth and the subsequent social, economic and political transformation—a subject which increasingly takes up the central position in the research agenda of geography, planning and urban studies (Lin et al. 2014). While geography has persistently endeavored to understand urban issue and its articulation with other aspects of society from a variety of perspectives, more recently, particularly after the Global Financial Crisis and financial collapse of cities such as Detroit, one strand of enquiry is to examine the role of local debt and infrastructure investment in cities and their articulation with urbanization. Research points to a strong association between infrastructure investment and the economic performance of cities (Démurger 2001, Munnell 1992). A strong positive relationship also exists between the development of urban infrastructure, especially water and sanitation, and productivity, employment growth and per capita GDP (Wu 2010). However, in some capitalist economies, local authorities have been compelled to shoulder a greater share of the burden of developing urban infrastructure (Rutland 2010, Theurillat and Crevoisier 2012, Pagano and Perry 2008). For instance, in the US, under the conditions of neoliberalism, local governments have pursued this local infrastructural imperative by increasingly relying on speculative and risky financing strategies. After the financial crisis, such strategies have been challenged by the "reverse infrastructural trap" and growing conflicts between municipal bondholders and municipal employees (Kirkpatrick and Smith 2011). Weber (2010) has referred to the present financialization of urban development as "selling city futures".

The financialization of urban development and debt-driven infrastructure development is also remarkable in transition economies like China, but unfolds in a different way. People who visit China's major cities are likely to be astonished by the ever-changing skylines and the dramatic transformation of their urban structure. However, lurking behind the impressive economic boom and rapid pace of infrastructure development and urbanization is China's high dependence on government-led investment, even though China's leadership has pledged to move toward a more consumption-driven economy in the 12th Five-Year Plan (2011-2015) (Tsui 2011, Peck and Zhang 2013). In recent years, this model of development and urbanization has engendered a series of risks. Rapid local debt accumulation is one of them (Tsui 2011, Zhang and Barnett 2014, Lu and Sun 2013). According to the Nationwide Audit of Local Government Debts (*Quanguo Zhengfuxing Zhaiwu Shenji Jieguo*) conducted by the China's National Audit Office (NAO) in 2013, by the end of June 2013 China's local governments were liable for a total direct debt of nearly RMB 10.88 trillion. In addition, debt guaranteed by local governments amounted to nearly RMB 2.66 trillion; and debt indirectly guaranteed by local governments totals a further RMB 4.34 trillion (NAO 2013). Local government debt, as a double-edged sword, plays a crucial role in upgrading China's infrastructure and promoting economic growth (Wu 2010), but its rapid expansion in recent years should trigger concerns with respect to local governments' indebtedness, financial stability and sovereign risk in China (Lu and Sun 2013).

Existing studies have pointed out that the boom of local government debt have been largely attributed to the rapid pace of urbanization and infrastructure development (Wang et al. 2011). This view is also supported by empirical studies conducted in other developing countries (Lewis 2003). Local debt accumulation in China has been further accelerated after the outbreak of the 2008 global financial crisis. When the world economy was plunging into the crisis, the

Chinese government announced a sizable RMB 4 trillion stimulus package on November 9, 2008. In order to shield the domestic economy from the crisis, the Chinese government adopted a loose monetary policy and started a number of fiscal stimulus measures, providing a strong impetus for local governments to promote infrastructure investment (Lu and Sun 2013, Tsui 2011, Azuma and Kurihara 2011). In sum, the year 2009 witnessed the determination of China's central government to stave off a domestic recession on the one hand and intrepid behavior of China's local governments to spend on infrastructure to generate economic growth and create employment on the other (Fardoust, Lin and Luo 2012, Lu and Sun 2013).

However, the current local debt issue is not a temporary anomaly triggered merely by the global financial crisis, but rather should be understood within China's institutional, historical, social, political and economic contexts (Tsui 2011). Local government debt was partly driven by financial motivations, as a consequence of China's central-local power reshuffling, especially the introduction of the tax-sharing system (*fenshuizhi*) in 1994 when the liabilities and responsibilities of urban development were decentralized, while the power of tax revenue collection was recentralized (Azuma and Kurihara 2011, Liu and Lin 2014, Lu and Sun 2013, Tsui 2011, Wu 2010, WorldBank 2009). In the meantime, China's legal framework governing the operations of local governments did not allow the latter to engage in market borrowing, deficit financing and issuing municipal bonds. To deal with a growing gap between income and expenditure, local governments have been 'forced' to establish Local Financing Platforms (LFPs) as off-budget entities of local governments (Azuma and Kurihara 2011, Lu and Sun 2013, WorldBank 2009).

LFPs are often treated as municipal corporations under the Company Law of China, providing local governments a corporate platform to borrow from the market to invest in infrastructure. They were created to circumvent the no-borrowing constraint imposed on local governments by the central government. LFPs are able to obtain financial resources through various means including bank loans, urban investment bonds (*chengtouzhai*, also known as quasi-municipal bonds) and the so-called *yinxinzheng*, i.e. investment from investment trust companies. At first, liabilities of LFPs were mainly in the form of bank financing, and bank loans accounted for the lion's share of the total (Tsui 2011). After the State Council in June 2010 issued measures to strengthen the management of LFPs and supervision of bank loans to LFPs, urban investment bonds surpassed bank loans and became the major financial resource for LFPs[1]. As LFP has become a popular financing vehicle for local governments, skeptics have also pointed out that its lack of transparency and accountability may put the entire financial system into jeopardy (Azuma and Kurihara 2011, Lu and Sun 2013, Tsui 2011).

In this study, we argue that global and national economic circumstances, including the 2008 global financial crisis, central government's loose monetary policy and fiscal stimulus measures, and China's tax-sharing system, have triggered the boom of local government debt in China. Furthermore, local government debt accumulation in China is geographically uneven. Such unevenness and spatial variation can be partly explained by two institutional factors. First, our analysis indicates that inter-jurisdictional competition could be a driving force for the excessive borrowing by local government. Fiscal decentralization and political centralization have pushed local governments to compete with each other to achieve better economic performance (Chen, Li and Zhou 2005, Li and Zhou 2005, Oi 1992, Zhang 2006, Guo 2009).

[1]State Council, June 13 2010, Notification on Strengthening the Regulation of Local Financing Platforms. Retrieved on September 28 2014 at: http://www.gov.cn/zwgk/2010-06/13/content_1627195.htm.

Second, commodification of land and rising land lease fees resulting from the booming real estate market have become a major source of revenue for local governments, and provided them with a collateral against which to borrow from financial markets via LFPs (Lin et al. 2014, Lin and Yi 2011, Lin and Zhang 2014, Liu and Lin 2014). However, the financial resources obtained from land sales are unsustainable given the constrained land supply in the medium term. Consequently, the short-term financing behavior of local governments may harm the long-term future of the cities.

Due to the unavailability of data, most of the research done on local government debt has employed either qualitative, descriptive analyses or quantitative methods using macroeconomic data (Tsui 2011) and failed to uncover the underlying mechanisms at the micro level. By using a dataset on urban investment bonds issued by LFPs, this paper studies the spatial distribution of China's local debt at the prefecture level and analyzes its relationship with institutional, political and economic factors. As such, to the best of our knowledge, this is the first paper that analyzes local government debt and LFPs at the subnational level.

2. China's fiscal system, local government debt and local financing platforms

Before the 1980s, China's fiscal system was characterized by centralized revenue collection and fiscal transfers. All taxes and profits were collected by local governments, remitted to the central government and then transferred back to local governments according to their needs approved by the central government (Wu 2010, Jin, Qian and Weingast 2005). Due to the bias toward industrial production, infrastructure development was a low priority for local governments and capital outlays for urban construction often did not exceed one-tenth of total local expenditure

(Wu 1999). This fiscal system was altered significantly in the 1980s, as the central government introduced a new decentralizing fiscal arrangement that treated each local government as a "separate kitchen" (*fenzao chifan*) for fiscal purposes (Wang 2010, Zhang 2006). This institutional transition allowed many local governments to obtain higher rates of revenue and to have access to more financial resources and capital.

A new set of reform measures (tax-sharing system) were introduced in 1994, which enabled the central government to rapidly re-centralize the most lucrative sources of revenue, including value-added tax, resource tax, and personal and enterprise income tax (Liu and Lin 2014, Tsui 2011, Wu 2010, Naughton 2011). Since then, the central government's share of total fiscal revenue increased from less than 30 percent to around 50 percent in 2012 (Zhang and Barnett 2014). In the meantime, responsibilities for urban development were decentralized. Specifically, local governments became responsible for much of infrastructure investment, service delivery, and social spending, which in total accounted for approximately 85 percent of their expenditure. In addition, to shield the domestic economy and employment from external shocks, the central government issued a fiscal stimulus package (RMB 4 trillion) in late 2008. However, the central government only offered 1.18 trillion, while local governments were required to provide the rest of the package. The increased fiscal pressures, triggered by the 1994 fiscal reform and further compounded by the fiscal stimulus package, led local governments to resort to additional financial resources, as the fiscal gap increased drastically in the 2000s (Lu and Sun 2013).

Local governments in China are explicitly prohibited from resorting to market borrowing (Azuma and Kurihara 2011). LFPs were therefore created to circumvent the no-borrowing

constraints imposed on local governments. In effect, local governments created companies that could borrow from banks, trust companies and the bond market. Since then local governments became increasingly reliant on off-budget mechanisms to finance priority spending, in particular infrastructure investment.

Public assets have been pooled together and injected into LFPs to build strong balance sheets, smoothing the way to external financing (Figure 1). Specifically, local governments provide capital to LFPs through budget revenue injection, transfer of land use rights and existing assets, such as roads and bridges (Azuma and Kurihara 2011, Lu and Sun 2013, Tsui 2011, WorldBank 2009). Once LFPs meet the capital requirements, they finance the rest through bank loans or rising funding from equity or bond markets. Basically, LFPs act as the main financing agents for local governments, given the fact that the latter are legally prohibited from engaging in direct market borrowing, including bank loans. The creation of LFPs is not peculiar to mainland China; Hong Kong government has created a public corporation similar to an LFP to raise funds for construction and operation of its subway system (Tsui, 2011). As LFPs have become an important financing vehicle for local governments to fund infrastructure development and promote employment, rapid local debt accumulation related to LFPs has raised concerns over "whether there is sufficient transparency and accountability to ensure that the heightened appetite for bank loans does not undermine the financial system" (Tsui, 2011: 699).

[Figure 1 about here]

Before the 2008 global financial crisis, the volume of local government debts had already reached RMB 5.57 trillion, mainly in the form of bank loans (NAO 2011). The problem of local

debt accumulation was further aggravated by the stimulus package introduced by the central government that opened the floodgates in 2008 and 2009 and pumped massive liquidity into the economy. LFPs were well positioned to tap such easy credit, giving rise to an unprecedented local debt explosion in 2009. First, these stimulus measures triggered a mushrooming number of LFPs as well as local debt accumulation. The estimated number of LFPs rose from 360 in 2007 (WorldBank 2009), to 8,221 in 2009, with 3,314 established by provincial and prefectural governments and 4,907[2] by county-level governments. A statement made by the People's Bank of China, China's Central Bank, and China Banking Regulatory Commission on March 2009, indicated that they support the efforts of local governments to diversify investment financing channels for example through the establishment of LFPs and the issuance of bonds through LFPs[3]. Local governments responded to this announcement by creating even more LFPs. Second, in the past LFPs were mainly established by provincial and prefectural governments, whereas, recently, the majority of new LFPs were established by county-level governments. Third, as the State Council in 2010 issued measures to strengthen the regulation of LFPs and bank loans to LFPs, urban investment bonds surpassed banks loans, becoming the major financial resource for LFPs[4]. Finally, in addition to bank loans and bonds, other financing channels include trusts, entrusted loans, and wealth management products. This does not only drive up the debts, but also makes it more difficult to measure the debt exposure and related risks.

3. Research Hypotheses

[2]Man Zhang, March 2 2013, Re-evaluating the Risk of Local Financing Platforms. Retrieved on September 28 2014 at: http://www.caijing.com.cn/2010-03-12/110394746.html.
[3]Financial Market Department of the People's Bank of China, March 23 2009, Guide on How to Adjust Credit Structure and to Boost Economic Growth and Development. Retrieved on September 28 2014 at: http://www.pbc.gov.cn/publish/jinrongshichangsi/1024/2010/20100910132936732224408/20100910132936732224408_.html.
[4]State Council, June 13 2010, Notification on Strengthening the Regulation of Local Financing Platforms. Retrieved on September 28 2014 at: http://www.gov.cn/zwgk/2010-06/13/content_1627195.htm.

3.1. Inter-jurisdictional competition and local debt accumulation

The introduction of the tax-sharing system in 1994 and the accompanying central-local power restructuring have had fundamental effects over China's local debt accumulation. Facing a fiscal gap caused by increasing expenditure and decreasing revenue, local governments increasingly resorted to market borrowing and/or became reliant on transfers from the central government to finance expenditures (Chen 2006). The former gave rise to local debt accumulation while the latter contributed in an implicit way. The fact that the central government can pay off local government debts with financial transfers potentially leads to vertical fiscal imbalance and thereafter results in the so-called "common-pool resource" and "soft budget constraints" problems (Ostrom 1990, Kornai 1986), since local governments tend to overspend and rely on central transfers to pay off their debts (Singh and Plekhanov 2005).

Local debt accumulation has been driven partly by fiscal reform, as local governments were forced to engage in market borrowing to deal with the growing fiscal gap caused by the tax-sharing system (Gong, Wang and Jia 2011). We also expect that it has been affected by China's peculiar promotion scheme for officials, the so-called "cadre evaluation system", within which the criteria for evaluating the performance of local government officials links their upward career trajectories to how well they promote economic growth, employment generation, industrialization and urbanization during short terms in office (Guo 2009, Chen et al. 2005, Li and Zhou 2005). Cities are embedded in China's complex, top-down administrative hierarchy. City officials' careers are predicated on fulfilling a range of top-down mandates and satisfying their superiors. On the other hand, China's central government operates a comprehensive multi-year reporting system, which monitors progress based on the five-year plans. The five-year plans

define targets for infrastructure development as well as economic growth benchmarks, such as GDP growth rates, which are thereafter passed downward, become increasingly specific and are decomposed meticulously among subordinate governments. The targets are taken seriously at the lower level of the government whose progress is monitored by the higher levels of the government. City officials are incentivized by the goals and targets of the national plans, as they will get rewarded or promoted for reaching or exceeding the goals (Li and Zhou 2005). Infrastructure development and economic growth is often viewed as one of the most prominent indicators of the success of local leadership (Tsui 2011). City governments driven by the career concerns of local officials compete with each other in terms of infrastructure and economic development, increasingly with the help of financial resources gathered through LFPs.

Even though some studies have not found significant association between "cadre evaluation system" and local officials' political promotion (Shih, Adolph and Liu 2012), other scholars have provided empirical evidence on the relationship between the turnover of local officials and their economic performance (Chen et al. 2005, Li and Zhou 2005, Feng et al. 2012, Guo 2009, Lu and Landry 2014). In addition, local cadres often serve five-year terms in China, and officials tend to "polish" their resumes within five years in order to be rewarded or promoted at the end of their terms. If local officials are promoted, new officials sometimes bring in new investment and development plans that may be entirely different from their precursors'. Such an incentive system and "cadre evaluation system" foster a myopic cost-benefit calculus: long-term losses may be dramatically discounted, while short-term gains are drastically exaggerated. Debt-driven investment and infrastructure development are well suited to accommodate such incentives, boosting short-term economic growth and employment generation, but with debt burden being left to future administrations.

In short, we expect that peer pressure arising from China's unique promotion scheme for officials has contributed to a head-to-head, myopic inter-jurisdictional contest in terms of short-term economic and infrastructure development, with the help of debt financing. The scope of inter-jurisdictional competition could be wide. On the one hand, cities may compete with and imitate their neighbors, as it is easy to obtain information about competitors in the vicinity (*geography-based competition*). On the other, cities that are geographically distant but reach similar stages of development and are at the same administrative level may benchmark against each other (*administration-based competition*). For instance, a provincial capital city may not necessarily compete with neighboring cities, but directly benchmarks against other provincial capital cities. These two types of competition are not mutually exclusive; instead they may co-shape China's local debt accumulation together. This leads to the following hypothesis:

Hypothesis 1: Peer pressure arising from China's peculiar promotion scheme for officials has created a myopic, geography-based and administration-based inter-jurisdictional benchmarking in terms of short-term economic and infrastructure development, which may affect local debt accumulation, as local governments seek to boost economic growth and employment generation with the help of debt financing.

3.2. Land finance and local debt accumulation

Even though LFPs provide one of few avenues for city governments to circumvent the no-borrowing constraints, they still need to prove their debt servicing ability in order to obtain funding in the first place. It is here that land finance enters the scene (Zhou 2011). Since 2002

when the state issued the Regulation on Transferring the Use Right of State Owned Land by Tender, Auction, and Listing (*zhaobiao paimai guapai churang guoyou tudi shiyongquan guiding*) and mandated land conveyance to be undertaken through the market track of public tender, auction, and listing, land premiums have quickly become a major source of revenue (Lin et al. 2014, Lin and Yi 2011, Lin and Zhang 2014, Liu and Lin 2014, Tao et al. 2010). China runs a dualistic land management system. The Land Management Law (*tudi guanli fa*) states that village collectives rather than individual peasant households own rural land. In the process of urbanization, local governments requisition rural land. Compensation for the requisitioned farmland is not linked to its market value, since the land is originally owned by village collectives and the state. The land requisitioned by local governments, mostly at below market prices, is sold through tender, auction and listing, often at market prices. In addition, local governments are also able to appropriate state-owned urban land and uproot hundreds of people, according to the Regulations Governing the Demolition of Urban Residential Buildings and Resettlement. Since the state is the only land supplier on the market, local governments can also easily reap monopoly rents. As a result, land sales have become the major source of revenue for local governments to finance urbanization and infrastructure development, particularly after the fiscal reform in 1994 when the central government agreed to hand over land premiums to local governments (Wang 2010, Zhang and Barnett 2014). Land finance and the head-to-head, myopic inter-jurisdictional contest discussed above intertwine with each other and result often in a bizarre competition of selling land among local governments (Wu and Li 2010, Tsui 2011, Tao et al. 2010).

Land finance has enabled local governments to “develop by borrowing” in two ways. First, local governments usually transfer land as collateral to help LFPs secure loans. Second,

land can also provide future operating revenue for LFPs when the land use rights are sold in the future (Yu and Fan 2012). In some cases, local governments set aside future revenues to provide subsidies for LFPs. However, the financial resources obtained from land sales are unsustainable given the constrained land supply in the medium term (Tao et al. 2010). In addition, since the receipts from the sale of land lease rights are the main sources for debt repayment, a potential decline in land value may hurt the debt servicing ability of local governments and LFPs, and in consequence even impair banks' asset quality. In a word, the rapid development of the articulation between land finance, local government debt and LFPs has increasingly made local governments, banks, and the local and national economy become vulnerable to the volatility of the real estate market. To sum up, ideas developed in this section leads to the following hypothesis:

Hypothesis 2: Since land finance has enabled local governments to "develop by borrowing", the amount of local governments' land premiums is positively related to the magnitude of their debts.

4. Spatial and temporal dynamics of urban investment bonds

4.1. Temporal dynamics of urban investment bonds

We use a dataset on urban investment bonds issued by LFPs to investigate the spatial and temporal dynamics of China's local debt and analyze its relationship with inter-jurisdictional

competition and land finance[5]. Urban investment bonds are enterprise bonds issued by financing vehicle companies (LFPs) and approved by the National Development and Reform Commission. The first urban investment bond was issued in Shanghai in 1992 to raise money for the development of Pudong district. Urban investment bonds basically meet the standards for municipal bonds, but are not tax free. In this sense, they can be regarded as quasi-municipal bonds, raised mainly for the building of public infrastructure (Feng 2013). Local governments provide hidden guarantees. If there is a risk of defaulting, local governments will step in and offer assistance and bailouts. One dataset on urban investment bonds issued by LFPs is used to test our arguments: Wind Database (2002-2013)[6]. Based on this database, we have identified all urban investment bonds' issuance dates and redemption dates, as well as their usage and the relevant LFPs and local governments.

During 2002 and 2013, 1,807 urban investment bonds (with a value of RMB 2,291.59 billion) have been issued by Chinese local governments, including 720 issued by LFPs directed by provincial-level governments (RMB 1,079.79 billion), 889 by LFPs directed by prefecture-level governments (RMB 1,014.55 billion), and 198 by LFPs directed by county-level governments (RMB 197.25 billion). The time period of 2002-2013 can be roughly divided into two stages based on the development of urban investment bonds (See Figure 2). First, although local debt accumulation in the form of urban investment bonds started to gather momentum

[5] We acknowledge that bonds issued by LFPs account for less than 25% of all direct local debt. However, this study only focuses on bonds for three reasons. First, urban investment bond is the second largest source of local debt. Even though there are various types of local debt (e.g., bank loan, urban investment bond, trust and entrusted loan), no official data has ever been publicized except for urban investment bonds. In addition to data unavailability for other types of local debt, we focus on urban investment bond because after the State Council issued measures to strengthen the regulation of LFPs and bank loans to LFPs, urban investment bonds became the major financial resource for LFPs and grew much faster than other types of local debt. Finally, all types of local debt accumulation are not only driven by local governments' ambition to boost economic development and invest in infrastructure, but also supported by land finance. Consequently, their relationship with inter-jurisdictional competition and land finance should be similar.

[6] In this study, the bond data of year 2013 is only collected from January to October.

before 2009, the increment was relatively small and total local debts remained at a low level. After 2009, local government debts exploded. The number of bonds issued in 2009 alone reached 143 (RMB 250.9 billion), an increase of 572% and 581% from 2008 in terms of issue quantity and value respectively. While the number of urban investment bonds issued in 2010 and 2011 remained, more or less, stable, it surged to 701 (RMB 829.84 billion) in 2012.This two-stage development of urban investment bonds reflects the transformation of China's fiscal system discussed in the preceding sections.

[Figure 2 about here]

Due to the rapid expansion of urban investment bonds during 2009-2013, the vast majority of local debts are due between 2013 and 2028 (Figure 3). Specifically, redemption will peak during 2013-2020, with 2014 (RMB 280.1 billion), 2016 (RMB 280.0 billion), 2017 (RMB 281.2 billion), 2018 (RMB 374.8 billion) and 2019 (RMB 386.6 billion) to bear huge redemption pressure. The collective maturity of urban investment bonds will test the financing capability of local governments.

[Figure 3 about here]

Amid this explosive growth, various kinds of LFPs that belonged to lower administrative authorities came into being, lowering the overall quality of issuers. In the past, urban investment bonds were mainly issued by LFPs of provincial governments, whereas recently the majority was still issued by LFPs of provincial and prefecture level governments, and a growing number of urban investment bonds were issued by LFPs of county-level governments. Specifically, before

2005, all urban investment bonds were issued by LFPs of provincial governments. However, their share quickly decreased from 100% to 33.2% by 2012. On the other hand, the share of prefecture-level urban investment bonds soared from 18.9% to 50.0% during 2005-2012. LFPs of county-level governments started to issue urban investment bonds from 2007, but its share increased drastically from 0.6% in 2007 to 16.8% in 2012. Due to financial restraints, local governments have limited ability to repay; LFPs are often not very profitable and find it hard to pay back urban investment bonds by themselves. Some local governments have to borrow more in order to repay existing debts or seek extension of their debts.

4.2. **Spatial dynamics of urban investment bonds**

Geographically, developed areas are likely to issue more urban investment bonds than less developed areas; eastern provinces tend to issue more than central and western provinces (Figure 4a). For instance, LFPs directed by various levels of local governments in Jiangsu have issued 299 urban investment bonds, with a value of RMB 331.7 billion. LFPs in Zhejiang and Guangdong have issued RMB 155.3 billion and 118.9 billion's worth of urban investment bonds respectively. In contrast, LFPs in Qinghai, Ningxia and Xinjiang have issued RMB 19.8 billion, 3.8 billion and 23.6 billion's worth of urban investment bonds respectively. Finally, the vast majority of urban investment bonds have been issued by LFPs directed by prefecture-level governments. From 2002 to October 2013, LFPs from 236 prefecture-level cities had issued 889 urban investment bonds (RMB 1,014.6 billion). Similarly, prefecture-level cities with the largest value of urban investment bonds concentrate in China's developed, coastal regions, with primary concentrations in Jiangsu, Zhejiang and Guangdong provinces and some outliers in regional centers, such as those in central China along the Yangtze River (Figure 4b).

[Figure 4 about here]

As shown in Table 1, the average value of bonds in prefecture-level cities in wealthy East China has also been much higher than that in the rest of the country and the national total during 2008-2012. The percentage of cities with new bond issuance also varies across regions in this time period. Even though East China ranked first in 2008, it was surpassed by Middle and Northeast China in 2012. This indicates the growing prevalence of bond issuance not only in developed coastal region, but also their diffusion to less developed inland China, even though the average and total value of bonds in the latter is still lower than that in the former.

[Table 1 about here]

Table 2 compares urban investment bonds in different types of cities. The average value of bonds in cities of higher administrative levels tends to be larger. For instance, the average value of urban investment bonds in China's four directly-controlled, provincial-level municipalities reached RMB 32.67 billion in 2012, much ahead of other cities. All four directly-controlled, provincial-level municipalities issued bonds throughout the entire time period and 93.33% of sub-provincial cities had new bonds in 2012, whereas the percentages of provincial capital and prefectural-level cities with new bond issuance were lower. In general, bonds issuance became increasingly prevalent in all four types of cities in this time period.

[Table 2 about here]

To summarize, urban investment bonds concentrate in China's developed, coastal regions, with primary concentrations in Jiangsu, Zhejiang and Guangdong provinces and some outliers in regional centers, such as those in central China along the Yangtze River. At the city level, cities of higher administrative levels tend to have more bonds. This may be because cities of higher administrative levels or in China's developed, coastal regions may not only have more financial expertise and have better access to capital markets, but are also likely to have larger on-budget and off-budget revenues and thereafter possess better repayment capabilities. More importantly, land price is higher in these regions. Huge amount of land lease fee also provides adequate capacity and credit for local government to borrow from the market via LFPs. Second, the 2000s also witnessed the increasing prevalence of bond issuance in Chinese cities, which may be due partly to the inter-regional contest in terms of infrastructure development and debt financing. In the next section, we will test these hypotheses.

5. Variables, model specifications and statistical results

The dependent variable is measured as the total value of urban investment bonds issued by city *i* in year *t* ($Debt_{i,t}$)[7]. The adoption of a 1-year lag stems from the recognition that the impacts of inter-jurisdictional competition and land finance take time. The first key independent variable focuses on the effects of inter-jurisdictional competition over local debt accumulation. To account for China's peculiar geography-based and administration-based benchmarking, we develop three variables. First, $Competition1_{i,t-1}$ is calculated as the average value of urban investment bonds issued in year *t-1* by city *i*'s neighboring cities. $Competition2_{i,t-1}$ is calculated as the average value of urban investment bonds issued in year *t-1* by all other cities located in the

[7] This variable refers not only to bonds issued by LFPs directed by city government, but also to bonds issued by LFPs directed by various levels of local governments within city *i* (e.g. county- and town-level governments).

same province. For China's four directly-controlled municipalities, $Competition2_{i,t-1}$ is calculated as the value of urban investment bonds issued in year *t-1* by a neighboring city in a relatively similar size in terms of GDP, population and land area. Specifically, Tianjin, Beijing, Suzhou and Chengdu have been chosen as the neighboring city for Beijing, Tianjin, Shanghai and Chongqing, respectively. $Competition1_{i,t-1}$ and $Competition2_{i,t-1}$ are designed to capture the impact of geography-based inter-jurisdictional benchmarking over local debt accumulation. Second, $Competition3_{i,t-1}$ is calculated as the average value of urban investment bonds issued in year *t-1* by other cities at the same administrative level as city *i*. In this research, we take into account four administrative levels for Chinese cities: directly-controlled, provincial-level municipalities, sub-provincial cities, other provincial capital cities, and prefectural-level cities[8]. It is expected that $Competition_{i,t-1}$ is positively correlated with the dependent variable.

To test Hypothesis 2, the total value of contracted gross land premiums from land transfers (*tudi churangjin*) in city *i* and year *t-1* is included ($Land_{i,t-1}$). Since land finance has enabled local governments to "develop by borrowing", $Land_{i,t-1}$ and the dependent variable are likely to be positively correlated.

We also control for several variables that are likely to affect local debt accumulation. First, $Debt_{i,t-1}$ is introduced to control the dependence of local debt accumulation on the initial debt value. Some local governments that already have a large amount of debts tend to borrow more, in order to repay existing debts. Therefore, its coefficient is likely to be positive. Second, regional dynamics (e.g., regional plans and policies, local development projects, regional economic performance, etc.) also have effects over local debt accumulation. To control such

[8] There are 4 directly-controlled, provincial-level municipalities (Beijing, Shanghai, Tianjin and Chongqing), 15 sub-provincial cities, 17 other provincial capital cities, and 252 other prefectural-level cities.

effects, several control variables are included. $GDP_{i,t-1}$ is a proxy of regional economic performance and the magnitude of on-budget (or budgetary) fiscal revenue of city *i* in year *t-1*. Since on-budget (budgetary) fiscal revenues are also main sources for debt repayment besides the receipts from off-budget or extra-budgetary revenues (e.g., the sale of land lease rights), we expect that cities with better economic performance and higher level of on-budget fiscal revenues are likely to have higher level of local government debts. Finally, we add three dummy variables to control for region-specific effects and the impact of regional policies and development plans—$Northeast_i$, $Middle_i$, and $West_i$, taking the value of 1 if city *i* is located in Northeast, Middle or West China, otherwise 0.

The following model is estimated:

$$Debt_{i,t} = \beta_0 + \beta_1 Debt_{i,t-1} + \beta_2 GDP_{i,t-1} + \beta_3 Northeast_i + \beta_4 Middle_i + \beta_5 West_i + \beta_6 Land_{i,t-1} + \beta_7 Competiton1_{i,t-1} + \beta_8 \quad (1)$$

Where *i* and *t* denote city and year, respectively. In the estimation equation, a 1-year lag for all independent variables is applied. $Debt_{i,t}$ is calculated by using data from Wind dataset; $GDP_{i,t-1}$ and $Invest_{i,t-1}$ are calculated based on the China Statistical Yearbook for Regional Economy (*Zhongguo Quyu Jingji Tongji Nianjian*); finally, data on land finance ($Land_{i,t-1}$) is from China Land and Resources Statistical Yearbook (*Zhongguo Guotu Ziyuan Nianjian*).

Table 3(a)-(d) report the results of the estimations of equation (1). $Competition1_{i,t-1}$, $Competition2_{i,t-1}$, and $Competition3_{i,t-1}$ are correlated with each other. To avoid the multi-collinearity problem, we only include one of these three variables in Table 3(a)-(c) and then report the empirical results for the model that includes all three variables (see Table 3(d)). We

run two sets of regressions to test our hypotheses. The first set uses Tobit model for each year of the study period 2009-2012. Because not all cities issued bonds in each year of 2009-2012 (see Table 1 and 2), there is a left-censoring in the dependent variable, and values that fall at or below a threshold (i.e. 0) are censored. The Tobit model uses a maximum likelihood estimation method to generate a censored regression equation, and has been designed specifically to solve problems when the dependent variable has been censored to a range from 0% to 100%. In addition, since the lagged dependent variable is included, the simple OLS model will fail to generate unbiased estimates. We thus use the Robust Regression method. Finally, since there were only a small number of cities issuing a small amount of urban investment bonds before 2009, sample size was too small to run regression for years 2002-2008 (Figure 2). Therefore only years after 2008 have been included in our analysis. The second set uses Tobit model for the entire time period 2009-2012.

[Table 3 about here]

The first finding is related to the dependence of local debt accumulation on the initial value. In most models, the amount of urban investment bonds issued by local governments in a specific year is positively related to the magnitude of urban investment bonds issued in the previous year, with a significance level not lower than 1%. The significance of the coefficient of $Debt_{i,t-1}$ implies local debt accumulation persistence, suggesting that cities that already have a large amount of local debts are more likely to have more debts in the future. It appears that local governments that already have a large amount of debts tend to keep borrowing, in order to keep investing heavily or repay existing debts.

In most models, the control variable $GDP_{i,t-1}$ shows a relationship with local debt accumulation that is consistent with our predictions. In particular, the regressions confirm that on-budget fiscal revenues and regional economic performance positively affect cities' propensity to keep borrowing, as cities with better economic performance and higher level of on-budget fiscal revenues have better debt servicing capability and are therefore able to have higher level of local government debts.

Moving on to the results connected more closely with the central argument, note that in Table 3(a) and (d) the coefficient of $Competition1_{i,t-1}$ is insignificant, while in almost all models in Table 3(b) and (d) $Competition2_{i,t-1}$ has a statistically significant, positive effect on local debt accumulation, suggesting that the amount of urban investment bonds issued by local government in a city is positively related to the magnitude of urban investment bonds issued by its neighboring cities within the same province. This is consistent with the fact that China's local officials mainly compete with their counterparts from other cities within the same province for political promotion, rather than with local officials from neighboring cities in a different province. The impact of $Competition3_{t,i-1}$ over local debt accumulation is unstable throughout this time period: its coefficient is significant and positive in some models in Table 3(c), but becomes insignificant in all models in Table 3(d). This inconsistency can be reconciled by the following explanation. On the one hand, empirical results in Table 3(c) suggest that administration-based inter-jurisdictional benchmarking could affect local debt accumulation. It means cities that are geographically distant but at the same administrative level may benchmark against each other. On the other hand, the effect of administration-based competition becomes negligible once geography-based competition variables are added to the model, suggesting the latter plays a more important role in the process of local debt accumulation. In addition, the vast majority of Chinese

cities are prefectural level cities, for which competition with other prefectural level cities within the same province (geography-based competition) is much more critical than that with other geographically distant cities at the same administrative level (administration-based competition). Even though administration-based competition may be of central importance for cities at high administrative levels (e.g. directly-controlled, provincial-level municipalities and sub-provincial cities), such cities only account for a small share of Chinese cities. In summary, China's peculiar geography-based and administration-based benchmarking both have impacts on China's local debt accumulation and the former appears more important than the latter.

As expected, land finance variable ($Land_{i,t-1}$) also shows a relationship with local debt accumulation that is consistent with traditional understanding: the amount of local governments' land premiums and the magnitude of their debts are positively correlated.

As a robustness check, equation (1) is estimated by incorporating an alternative lag of two years and by using alternative proxies (e.g., using fiscal revenue to replace GDP). Compared with the results presented above, these changes produce only minor effects.

6. Conclusion and discussion

Although the investment-oriented development model for economic growth adopted by Chinese governments has generated spectacular results, the risks of debt-financed urbanization and economic development have recently become evident in mounting local debts that are undermining the financial system, triggering concerns with respect to local governments' indebtedness, financial stability and sovereign risk in China. Using a dataset on urban investment

bonds, we have portrayed the uneven spatial and temporal dynamics of local government debt. Although local debt accumulation started to gather momentum before 2009, the increment was relatively small and total local debts remained at a low level. After 2009, local government debts exploded. While global and national economic conditions have definitely paved the way for this explosion of debt, the spatial variation of local debt accumulation in China could be partly explained by two institutional factors: land finance and inter-jurisdictional competition.

The financialization of urban development has provided a large amount of capital for infrastructure development, however, the new financial instruments can also jeopardize the sustainable development of cities (Weber 2010). In China, the development of capital market is still at its early stage and there is no well-functioned municipal bond market, compelling China's local governments to adopt financial vehicles and products that lack transparency and accountability. China's peculiar institutional landscape, including cadre evaluation system, dualistic land management system and myopic inter-jurisdictional competition, have played an important role in promoting the dramatic growth of local government debts (Tusi, 2011).

Two policy implications can be derived from the empirical findings. First, in the short-term, the regulators should address the fiscal revenue and expenditure mismatches caused by the tax-sharing system issued in 1994 and consider levying property taxes to reduce reliance on land sales. In addition, a comprehensive framework to regulate and supervise local government budget and financing is essential. In order to efficiently monitor and supervise local governments' financing activities, it is crucial to have a complete picture of their finances, including both budgetary and extra-budgetary resources. Second, in the long-term, it should be pointed out that the current issue of rapid local debt accumulation is not a temporary anomaly

triggered merely by the global financial crisis, but rather should be understood within China's institutional, historical, social, political and economic context. Without changing China's idiosyncratic institutional, political and economic landscape, it is impossible for China to escape from the unsustainable debt-driven development paradigm as well as a vicious cycle of investment supported by easy credit, rapid expansion of local debt, real estate booms and ultimately bailouts as LFPs and local governments assume too much debt.

We realize the potential limitations of our analysis. For example, the Wind statistics only provide information on urban investment bonds, and do not enable us to examine the geographical and temporal dynamics of other types of local debts, which may vary systematically across regions. Due to data unavailability, we leave these questions for future research.

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Table 1 Average Value of bonds in prefecture-level cities and percentage of cities with new bond issuance in China's big regions in 2008-2012

		2008	2009	2010	2011	2012
Average value (RMB 100 million)	West China	0.73	3.09	3.92	4.79	14.90
	Middle China	0.19	3.24	4.42	4.06	13.78
	East China	2.06	14.06	8.35	15.69	35.27
	Northeast China	0.47	2.74	3.09	6.74	12.71
	National total	1.00	6.94	5.53	8.62	21.44
Percentage of cities (%)	West China	4.69	10.94	17.19	20.31	45.31
	Middle China	1.12	25.84	24.72	24.72	69.66
	East China	7.92	24.75	27.72	43.56	61.39
	Northeast China	5.88	20.59	20.59	44.12	79.41
	National total	4.86	21.53	23.61	32.64	62.50

Table 2 Average Value of bonds in different types of cities and percentage of cities with new bond issuance in China's big regions in 2008-2012

		2008	2009	2010	2011	2012
Average value (RMB 100 million)	Directly-controlled municipalities	42.00	231.55	119.5	203	326.62
	Sub-provincial cities	0.67	14.00	8.73	20.63	66.80
	Other provincial capital cities	1.59	6.19	12.47	4.12	28.09
	Other prefectural-level cities	0.33	3.01	3.06	5.12	13.45
	National total	1.00	6.94	5.53	8.62	21.44
Percentage of cities (%)	Directly-controlled municipalities	100.00	100.00	100.00	100.00	100.00
	Sub-provincial cities	6.67	73.33	40.00	73.33	93.33
	Other provincial capital cities	11.76	41.18	52.94	23.53	64.71
	Other prefectural-level cities	2.78	15.87	19.44	29.76	59.92
	National total	4.86	21.53	23.61	32.64	62.50

Note: There are 4 directly-controlled, provincial-level municipalities (Beijing, Shanghai, Tianjin and Chongqing), 15 sub-provincial cities, 17 other provincial capital cities, and 252 other prefectural-level cities.

Table 3(a) Estimation Results for Local Debt Accumulation

	2009	2010	2011	2012	2009-2012
$GDP_{i,t-1}$	-0.005	0.002	0.006***	0.007***	0.009***
$Debt_{i,t-1}$	2.07***	0.268**	0.902***	0.607***	0.285
$Northeast_i$	2.174	5.517	9.663	2.799	9.765**
$Middle_i$	10.909*	10.855*	-1.28*	10.693**	13.038***
$West_i$	-10.234	5.165	-2.597	6.609	5.56
$Land_{i,t-1}$	0.468***	0.059*	0.054**	0.08***	0.101***
$Competition1_{i,t-1}$	0.307	0.225	0.151	0.182	0.225
Constant	-42.563***	-39.646***	-35.342***	-19.759***	-46.402***
No. of observations	275	280	282	285	1122
Pseudo R^2	0.1937	0.0784	0.1365	0.1616	0.1118

Table 3(b) Estimation Results for Local Debt Accumulation

	2009	2010	2011	2012	2009-2012
$GDP_{i,t-1}$	-0.001	0.003	0.006***	0.007***	0.009***
$Debt_{i,t-1}$	1.961***	0.165	0.573***	0.557***	0.188
$Northeast_i$	4.523	5.063	10.204	2.108	9.398**
$Middle_i$	11.905**	8.408	-0.727	10.02**	12.312***
$West_i$	-2.326	5.8	-0.315	6.667	6.022
$Land_{i,t-1}$	0.271***	0.034	0.048**	0.08***	0.096***
$Competition2_{i,t-1}$	4.874*	0.415***	0.504	0.184***	0.329***
Constant	-38.79***	-32.693***	-35.118***	-18.359***	-44.795***
No. of observations	275	280	282	285	1122
Pseudo R^2	0.2105	0.1062	0.1406	0.1643	0.1158

Table 3(c) Estimation Results for Local Debt Accumulation

	2009	2010	2011	2012	2009-2012
$GDP_{i,t-1}$	-0.004	0.001	0.006***	0.006***	0.008***
$Debt_{i,t-1}$	1.82***	0.106	0.949**	0.54***	0.246
$Northeast_i$	1.459	1.052	9.595	-0.26	8.087*
$Middle_i$	9.317	6.651	-1.39	7.549*	11.358***
$West_i$	-12.091	-2.036	-2.455	2.461	3.28
$Land_{i,t-1}$	0.406***	0.059*	0.056**	0.08***	0.104***
$Competition3_{i,t-1}$	1.011	0.357***	-0.103	0.31**	0.134

Constant	-39.896***	-30.638***	-35.067***	-14.934**	-43.817***
No. of observations	275	280	282	285	1122
Pseudo R^2	0.1974	0.0889	0.1364	0.1662	0.1116

Table 3(d) Estimation Results for Local Debt Accumulation

	2009	2010	2011	2012	2009-2012
$GDP_{i,t-1}$	-0.001	0.002	0.007***	0.006***	0.009***
$Debt_{i,t-1}$	1.959***	0.128	0.613***	0.535***	0.217
$Northeast_i$	5.157	4.534	10.657	0.826	10.223**
$Middle_i$	12.564**	8.099	-0.308	8.84**	13.097***
$West_i$	-1.44	4.41	0.701	3.953	7.416*
$Land_{i,t-1}$	0.27***	0.035	0.047**	0.08***	0.094***
$Competition1_{i,t-1}$	0.309	0.052	-0.012	0.1	0.058
$Competition2_{i,t-1}$	5.083**	0.361***	0.515	0.06	0.363**
$Competition3_{i,t-1}$	-0.134	0.1	-0.128	0.248	-0.107
Constant	-39.402***	-31.641***	-35.876***	-16.601***	-45.986***
No. of observations	275	280	282	285	1122
Pseudo R^2	0.2108	0.1071	0.1409	0.167	0.1161

Note: *significant at the 10% level; **significant at the 5% level; and ***significant at the 1% level.

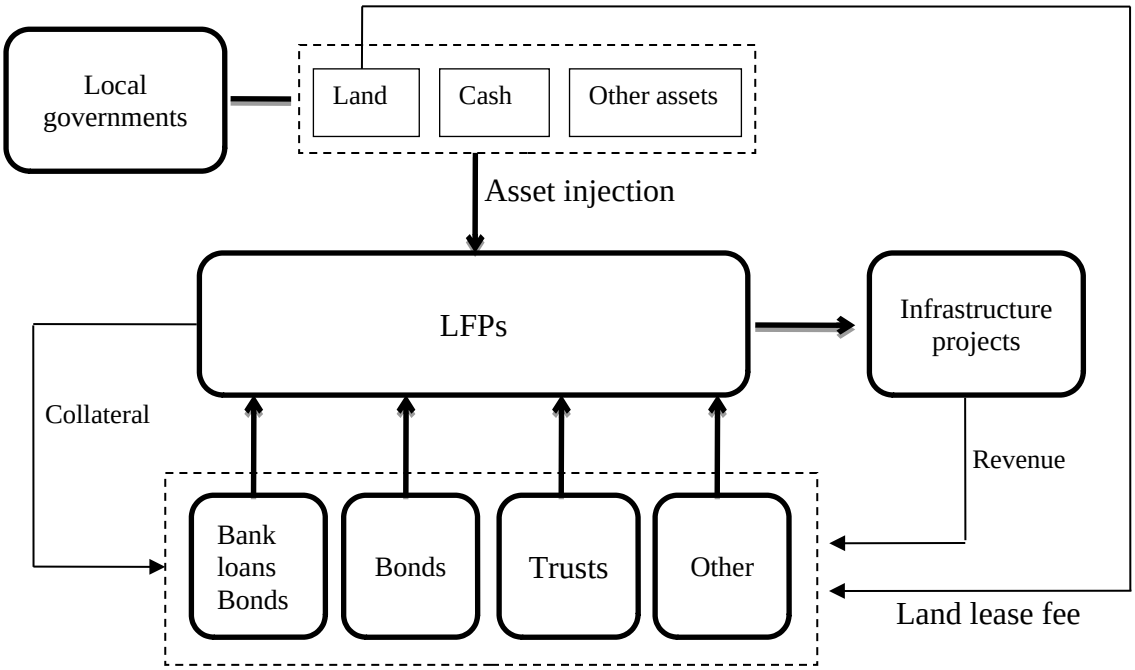

Figure 1 Structure of LFP Financing

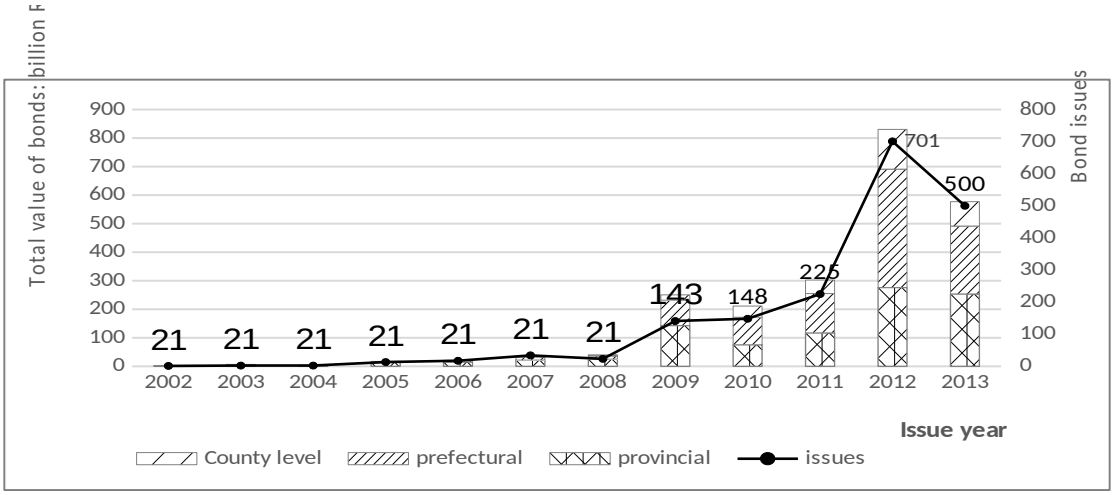

Figure 2 Growth of Urban Investment Bonds issued by LFPs Directed by Different Levels of Governments during 2002-2013

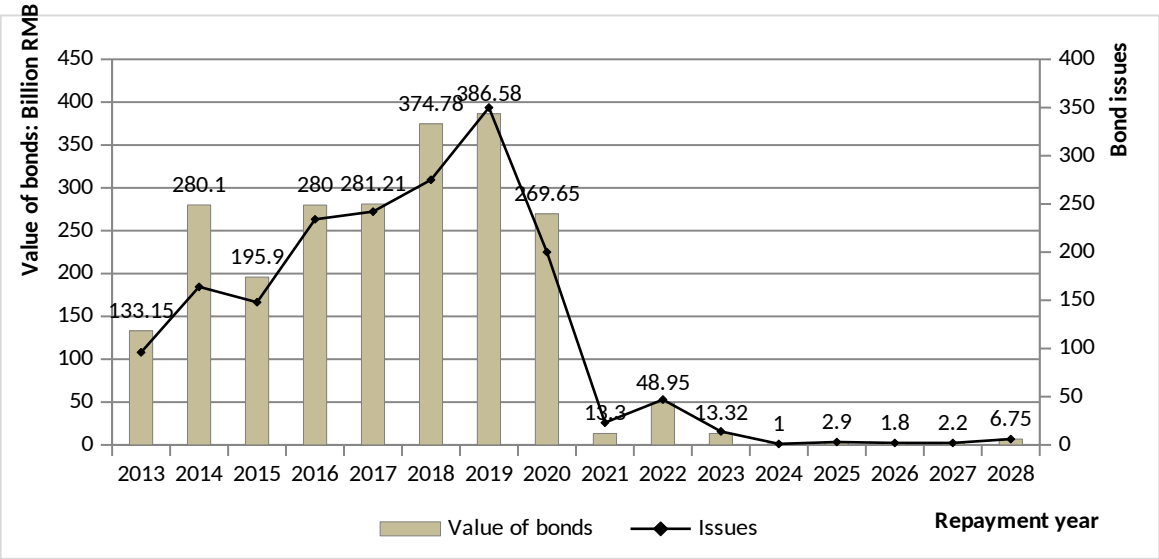

Figure 3 Maturity of China's Urban Investment Bonds

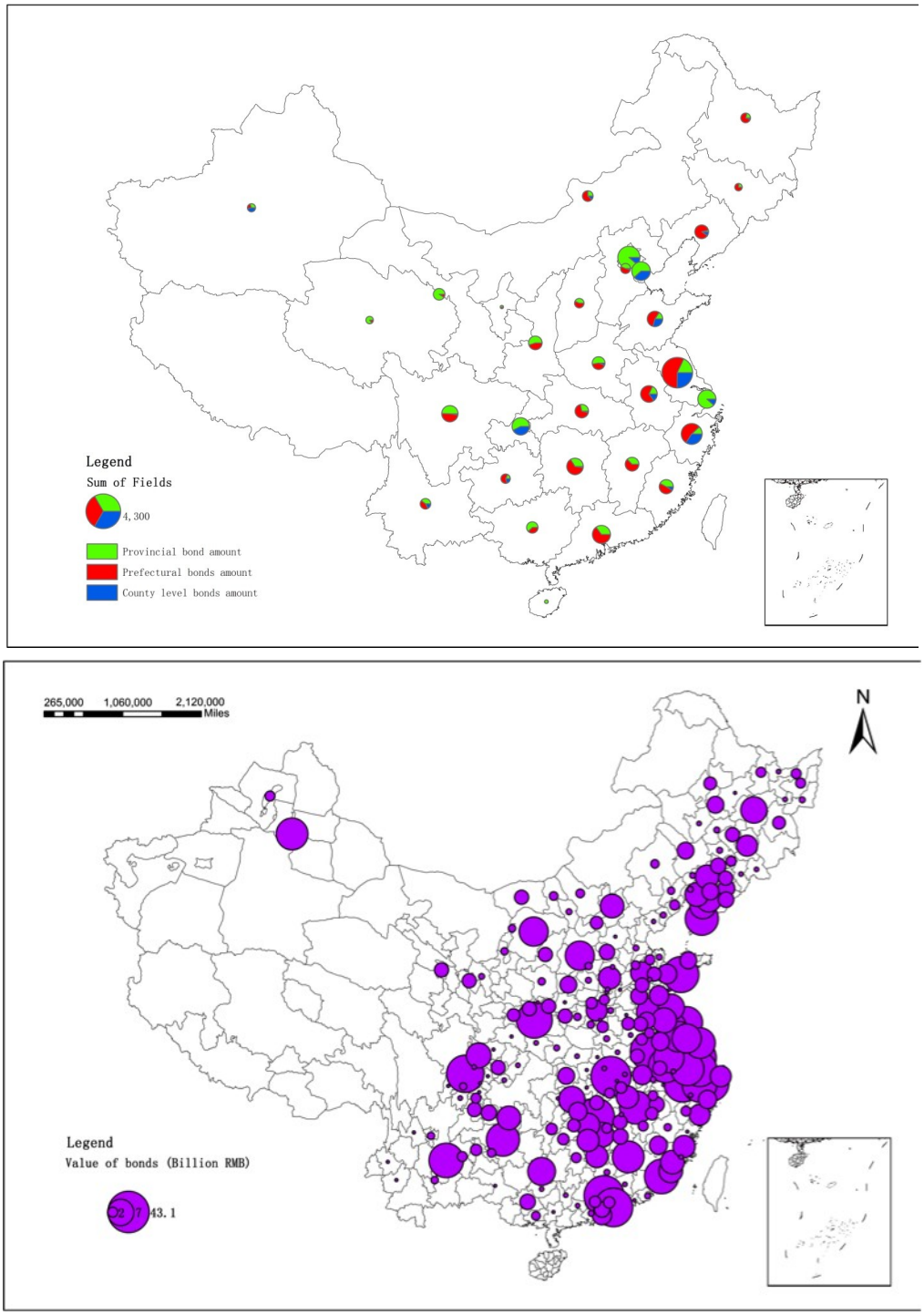

Figure 4a (top) and b (bottom) Total Value of Urban Investment Bonds at provincial (top) and prefecture-level (bottom) during 2002-2013

Appendix

Table 1(a) Estimation Results for Local Debt Accumulation (2-year lag)

	2010	2011	2012	2010-2012
$GDP_{i,t-1}$	0.001	0.003	0.007***	0.008***
$Debt_{i,t-2}$	-0.734	0.550*	1.003***	0.453*
$Northeast_i$	3.984	9.002	2.455	9.711**
$Middle_i$	9.692**	-0.841	6.309	10.309***
$West_i$	3.383	-3.182	3.546	6.354
$Land_{i,t-1}$	0.051**	0.063	0.076***	0.083***
$Competition1_{i,t-2}$	0.680	-0.029	0.188	0.931
$Competition2_{i,t-2}$	3.314**	0.099	0.026	0.251
$Competition3_{i,t-2}$	1.991***	-0.027	0.242	-0.082
Constant	-29.400***	-29.435***	-18.351***	-37.262***
No. of observations	280	287	285	852
Pseudo R^2	0.1184	0.135	0.176	0.1162

Table 1(b) Estimation Results for Local Debt Accumulation (2-year lag)

	2010-2012	2010-2012	2010-2012
$GDP_{i,t-1}$	0.007***	0.007***	0.007***
$Debt_{i,t-2}$	0.494**	0.423	0.478*
$Northeast_i$	9.278**	9.308**	8.642*
$Middle_i$	10.286***	10.009***	9.761***
$West_i$	5.302	5.640	4.558
$Land_{i,t-1}$	0.088***	0.083***	0.089***
$Competition1_{i,t-2}$	0.101		
$Competition2_{i,t-2}$		0.221	
$Competition3_{i,t-2}$			0.051
Constant	-37.025***	-36.731***	-36.145***
No. of observations	852	852	852

Pseudo R^2	0.1146	0.116	0.1146