Financing Urbanization in China*

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Abstract

China has experienced a boom of public-private partnership (PPP) investments in its recent urbanization, yet the economic impact remains unclear. I study China's first and only national plan on urbanization that conducts a pilot program to encourage local governments' adoption of PPP financing. Leveraging novel policy variation and assembling millions of linked administrative records, I find the pilot-induced PPP investments generate short-term, revenue-driven economic gains but lead to long-term economic losses. I identify three mechanisms. First, pilots are more likely to use PPP as a new debt-financing vehicle, with suggestive evidence of government-firm collusion. Second, the adopted number of PPP projects, but not the investment scale, is distorted by officials' promotion incentives. Third, the introduction of PPP fails to reduce local governments' reliance on traditional, inefficient land-based financing, reinforcing the classic soft budget-constraint problem. This study provides new insights into fiscal federalization in China by offering the first comprehensive evaluation of fiscal expansion under the country's recent urbanization scheme.

Keywords: Urbanization, Public–Private Partnership, Land Finance, Fiscal Expansion, Fiscal Federalism, China Economy
JEL Classification: H30, H77, O23, P21, R14, R51

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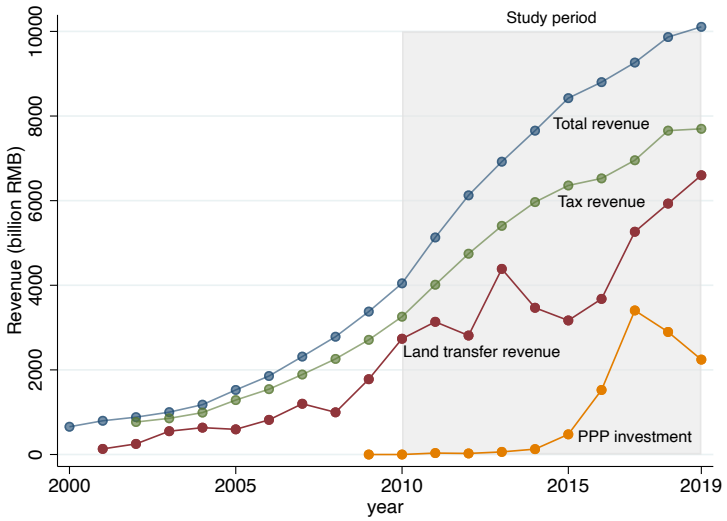
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1 Introduction

China has experienced a boom in public-private partnerships (PPPs) in its recent urbanization since 2014. Between 2014 and 2021, local governments initiated 10,082 projects with an expected total capital value of US $2.18 trillion. From the perspective of economics, the PPP model provides two distinct advantages. First, the PPP model addresses the market failure of infrastructure provision while mitigating local government fiscal constraints. In addition, by introducing competition through public procurement auctions, the PPP model selects competent private companies to provide public infrastructure efficiently. Both features provide a rationale for the central government in China to adopt PPP finance during its urbanization, where local governments are fiscally constrained in providing infrastructure, and the traditional land-based finance has led to inefficient infrastructure investment. Figure 1 highlights the significance of budgetary (or off-the-balance) finance, such as land and PPP finance, in the past decades for local governments in raising revenues for urban infrastructure.

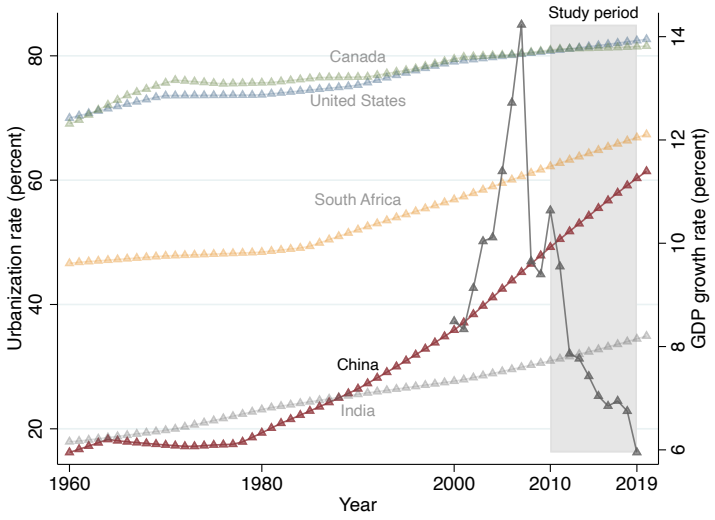
China's dramatic urbanization transition also creates a huge demand for the adoption of PPP financing. As Figure 2 indicates, China's urbanization rate more than tripled from 1980 to 2020, topping other countries (e.g., the US, Canada, South Africa, and India) during the same period. However, the economic effect of PPP adoption remains unclear. On the one hand, PPP have the advantage of relaxing fiscal constraints and improving project efficiency, on the other hand, China may have its own institutional constraints that distort the adoption of PPP. Also indicated by Figure 2, dramatic urbanization and sluggish economic growth coexist in the 2010s, raising a puzzle about why state-led urbanization failed to become an economic growth engine. This pattern also concerns the economic impact of PPP adoption in China's recent urbanization scheme.

Figure 1: The Significance of Extrabudgetary Revenue



Notes: The y-axis plots the revenue (in billion RMB) of local government in China between 2000 and 2019, for total revenue (navy), tax revenue (green), land transfer revenue (maroon), and PPP investment (orange). The total and tax revenue indicate the budgetary revenue of local governments in China, while the land transfer revenue and PPP investment present the extrabudgetary revenue. All revenues are re-scaled and deflated to 2019 RMB.
Sources: China Statistical Yearbook (2001-2020); China National Land Resource Yearbook (2002-2018); China Natural Resource Yearbook (2019-2020); and Ministry of Finance China Public Private Partnerships Center.

Figure 2: Urbanization and GDP Growth Rate in China



Notes: The left y-axis plots the urbanization rate between 1960 and 2020, measured as the percentage of total population living in urban areas, in China (maroon), Canada (green), United States (navy), South Africa (orange), and India (gray). The urbanization rate in China rises from 16.20% in 1960 to 61.43% in 2020. The right y-axis plots China's GDP growth rate between 2000 and 2019, measured by the annual percentage growth rate of the GDP at market prices based on constant local currency. The GDP growth rate in China drops from 10.64% in 2010 to 5.95% in 2019.
Sources: World Bank Open Data at https://data.worldbank.org/indicator.

China's central government has long believed that urbanization is a powerful engine for economic development and has promoted urbanization as a national strategy since 2001. In 2014, the Central Committee and State Council jointly issued the "China's New Urbanization Plan (NUP), 2014-2020", with the goal of further pushing forward state-led urbanization. The top-down national urbanization plan conducts a pilot program where selected localities are assigned with specific reform agendas on using PPP financing to raise revenues for urban infrastructure projects. The pilot program featured a three-wave implementation scheme from 2015 to 2017, involving areas covering over 841 counties—approximately 29% of all counties nationwide—and resulting in an 854-page reform document. Through carefully constructing a balancing treatment and control group, I identify novel variation in the county-level roll-out that allow me to study the impact on PPP adoption, the economic effect, and underlying mechanisms.

To study the PPP adoption and the economic effect, I assemble millions of unique linked administrative data between 2010 and 2019. First, I collected a comprehensive PPP project database from the Ministry of Finance (MOF) that covers all MOF-approved projects from the 2010s. I manually encoded the bid documents for these projects to understand how firms from the private sector participate in the PPP projects. Second, I investigate the satellite nightlight intensity at highly granular community-level administrative divisions, using a self-compiled dataset from the National Bureau of Statistics of China, to estimate the impacts on economic growth. Lastly, to study whether the introduction of PPP reduces local governments' reliance on traditional land finance, I use the universal land transaction records from the Ministry of Natural Resources to study land finance. In addition, I link a complete list of local government financing vehicles (LGFVs), maintained by the China Banking Regulatory Commission (CBRC), to the land transaction records to further examine land financialization.

I find that pilot localities adopt more PPP projects to raise revenues. Pilot localities, on average, adopt 0.076 more PPP projects and raise 113 million RMB more investment,

which respectively represents 50% and 93% increases relative to the mean of the associated dependent variable, respectively. The average investment per PPP in pilots is also 73 million RMB larger than that in control units, an 88% increase relative to the dependent variable mean. Next, I investigate the economic effect of pilot-induced PPP investment. Using nightlight intensity as a proxy for economic conditions, I formally estimate that pilot localities experienced an overall economic loss of 2.5% to 2.9% compared to the control group. Event study estimates reveal that economic conditions improved in the first year following the pilot program but showed statistically significant declines in the third and fourth years. This pattern suggests that, while pilot localities experienced short-term revenue-driven shocks, they directed investments toward projects with lower long-run returns.

I identify three mechanisms. Firstly, I document evidence concerning the efficiency of PPP adoption. I find that pilots are more likely to use PPP as a new debt-financing vehicle, and there is suggestive evidence of government-firm collusion. Pilot localities are also more likely to use "government payment" or "viability gap funding", but not "user charges", as the payment scheme. The choice of payment scheme suggests treated localities are more likely to adopt PPP projects that feature a "nominal equity but actual debt" issue (Wang et al., 2020), raising the concern that PPP projects were used as additional local government financing vehicles. To further examine the efficiency of PPP finance, I manually encode the bid documents to understand how private sector firms are involved in the PPP bid process. In the spirit of Chassang et al. (2022), collusion tests reveal that the winning firm often achieves a significantly higher evaluation score compared to the second-highest score, while the scores of the second and third-highest bidders are notably closer. This pattern suggests potential collusion between winning firms and local governments, where the winning firms may gain access to privileged information about the evaluation criteria, giving them unfair advantages over other participants.

Secondly, I provide evidence showing the adoption of PPP projects was distorted by the local officials' promotion incentives. More PPP projects were adopted in the pilots that had

the main party secretaries who had higher promotion potential. Pilots do not adopt more PPP projects if the main official closes retirement who has a low chance of being promoted. However, the career incentives do not affect the scale of PPP investment.

Lastly, I investigate whether the introduction of PPP finance reduces local governments' reliance on traditional land-based finance, which is also one target of the pilot program. The findings indicate that, while pilots indeed decrease the number of transacted land parcels, there is no evidence that pilot localities reduce their reliance on land finance. The results show that there are no significant differences between treated and control counties on land conversion rate, land revenues, land area, or the likelihood of using LGFVs for land transactions. When investigating the efficiency of land finance, transacted land parcels in pilot counties have a lower floor-area-ratio (FAR) limit, a higher likelihood to be commercial land, and a lower likelihood to be residential land. The results on lower FAR use suggest a lower efficiency use of transacted lands in the pilot localities.

The contributions of this paper are fourfold. First, this study directly speaks to the literature on urbanization in developing countries (for review, see Bryan, Glaeser and Tsivanidis (2020) and Henderson and Turner (2020)), and specifically, urbanization in China (for review, see Henderson (2009)). Most studies in the literature focus on China's urbanization in the 2000s, while the discussion related to China's new urbanization scheme remains limited. Despite its significance, little is known about the performance of the New Urbanization Plan.[1] This study provides the first investigation of the fiscal adoption by local governments for urban public goods provision under China's new urbanization scheme, with novel identifying policy variation and new linked administrative data, adding to the literature where we know very little about urbanization in developing countries.

Second, this paper contributes to the public finance literature regarding the adoption of land-based (Gyourko et al., 2022) and PPP finance (Wang et al., 2018; Fabre and Straub,

[1]The few existing studies that have evaluated the NUP are from Urban Studies, which are qualitative, correlative, and regionally specific (Chen et al., 2018, 2019; Chu, 2020; Peng et al., 2021). In addition, case-based studies might put a higher weight on experiences of urbanized regions (e.g., Chen et al. (2019)), potentially leading to non-generalizable conclusions.

2023). Many studies have discussed the land finance model for urbanization in China.[2] As Glaeser (2022) (pg. 14) notes, "The Chinese model includes an unusual combination of limited property rights (the government technically owns all land) with implicit public subsidies of new development through a combination of eminent domain and public lending". However, the adoption of PPP finance in China's urbanization is less studied. By providing a detailed investigation using comprehensive PPP projects, this study provides new insights regarding how local governments adopt PPP finance and how the private sector is involved in government procurement through PPP projects during China's recent urbanization.

Third, this study offers new insights into the literature on fiscal federalism in China.[3] Previous studies have used fiscal federalization to explain China's economic growth following the reform and opening-up in 1978, emphasizing the role of intergovernmental competition in improving factor allocation. This study adds new discussion on how political officials' promotion competition could also distort the adoption of PPP projects, echoing the political literature that highlights the role of China's fiscal federalism in generating the expansion of extrabudgetary finance Tsai (2004). More recently, (Song and Xiong, 2024) propose a theoretical framework that incorporates the element of short-termism within the framework of fiscal federalization, where the overall welfare effect is unclear. This study provides a direct empirical investigation of the overall economic impact when local governments face relaxed budget constraints.

Lastly, this study speaks to recent macroeconomic research on the slowdown of the Chinese economy (Bai, Hsieh and Song, 2016; Zilibotti, 2017; Chen et al., 2023). By examining urbanization-induced fiscal expansion, I provide evidence indicating that the newly introduced PPP finance has its own issues when adopted in China, and the

[2]For example, see studies on how fiscal reform affects land finance and investment behaviors of local governments (Kung, Xu and Zhou, 2013; Han and Kung, 2015; Fu, 2015), or land use and urban sprawl during China's urbanization (Becker and Morrison, 1999; Lichtenberg and Ding, 2009; Anglin et al., 2014; Wang, Zhang and Zhou, 2020). More broadly, this paper adds new perspectives to urbanization in transforming economies (Becker and Morrison, 1999).

[3]See Qian and Weingast (1997); Qian and Roland (1998); Roland (2000); Zhuravskaya (2000), among others.

introduction of PPP finance does not reduce local governments' reliance on traditional, inefficient land-based finance. These results provide potential mechanisms — the low efficiency of local governments' infrastructure finance — that explain the recent slowdown of the Chinese economy.

The paper proceeds as follows. Section 2 provides background on urbanization and local government financing in China. Section 3 describes the data, and section 4 presents the empirical strategy. Sections 5.1 and 5.2 investigate the impact on PPP adoption and economic growth, following the New Urbanization Plan pilot program. Section 6 investigates the underlying mechanisms. Section 7 concludes.

2 Urbanization and Local Government Financing

China experienced a dramatic urbanization transition during the past two decades, with the urban population shares rising from 35.88% in 2000 to 61.43% in 2020. A significant feature of China's urbanization is that it takes a top-down approach. On the one hand, the central government has long believed in the role of urbanization in driving economic development and promoted urbanization as a national strategy in the Tenth Five-Year Plan in 2001, noting that urbanization "can provide a broader market and lasting engine for economic development."[4] On the other hand, local governments play a major role in providing urban infrastructure to attract industries and high-skilled migrants.

Local governments in China have long relied on land-based finance to fund urban infrastructures since 2000. The historical roots trace back to the 1994 tax-sharing reforms when the central government claimed a substantive share of tax revenues that belonged to the local governments and the 1998 Land Management Law that authorized local governments to raise revenues through selling the use right over the urban land in their jurisdictions.

Later, in 2009, in response to the dramatic export reductions caused by the Great Recession, the central government implemented a 4 trillion RMB stimulus package to expand domestic demand by investment in infrastructure. However, most of the financing was passed to local governments, forcing local governments to initiate Local Government Financing Vehicles (LGFVs) to raise revenues. LGFVs provide a financing platform that allows local governments to further use land as collateral to leverage debt. With the involvement of banking sectors, land fiance is then transferred to the so-called land financialization. LGFVs become a growing issue for the fiscal revenue of local governments, leading to shadowing banking and increasing off-the-sheet government debts issues (Bai, Hsieh and Song, 2016; Huang and Du, 2018; Chen, He and Liu, 2020; Wu, 2022).

[4]The Tenth Five-Year Plan: https://www.gov.cn/gongbao/content/2001/content_60699.htm.

2.1 The New Urbanization Plan (2014-2020)

Believing that urbanization could be a new economic driver, in March 2014, the Central Committee and State Council jointly launch *"China's New Urbanization Plan, 2014-2020"*, which is the first national plan on urbanization.[5] The NUP covers comprehensive dimensions of urbanization issues.[6] Among them, one reform agenda concerns the establishment of diversified and sustainable financing mechanisms for urbanization (Chapter Seven of the NUP).

2.1.1 The Pilot Program

To facilitate the policy learning, the National Development and Reform Commission (NDRC) join with other 10 ministries conducted a 3-wave pilot scheme in areas ranging over 841 counties (about 30% of total counties) across the entire nation between 2014-2016.[7] Figure 3 visualizes the roll-out variance.

Each pilot was assigned to a tailored reform agenda, where the "Diversification of Financing" is a common context. An analysis of the reform documents for all pilots reveals that 89% (208 out of 234) of the pilots have a reform agenda related to adopting diversified financing.[8] Among the new financial instruments, PPP is the most commonly mentioned.[9] Figure A3 presents a reform agenda example from the Tongzhou district in Beijing.

[5]China's New Urbanization Plan (2014 - 2020), issued on March 16, 2014, http://www.gov.cn/zhengce/2014-03/16/content_2640075.htm. Also see the press briefing from the State Council Information Office, March 19 2014, http://www.scio.gov.cn/ztk/xwfb/2014/30634/30639/Document/1366872/1366872.htm.

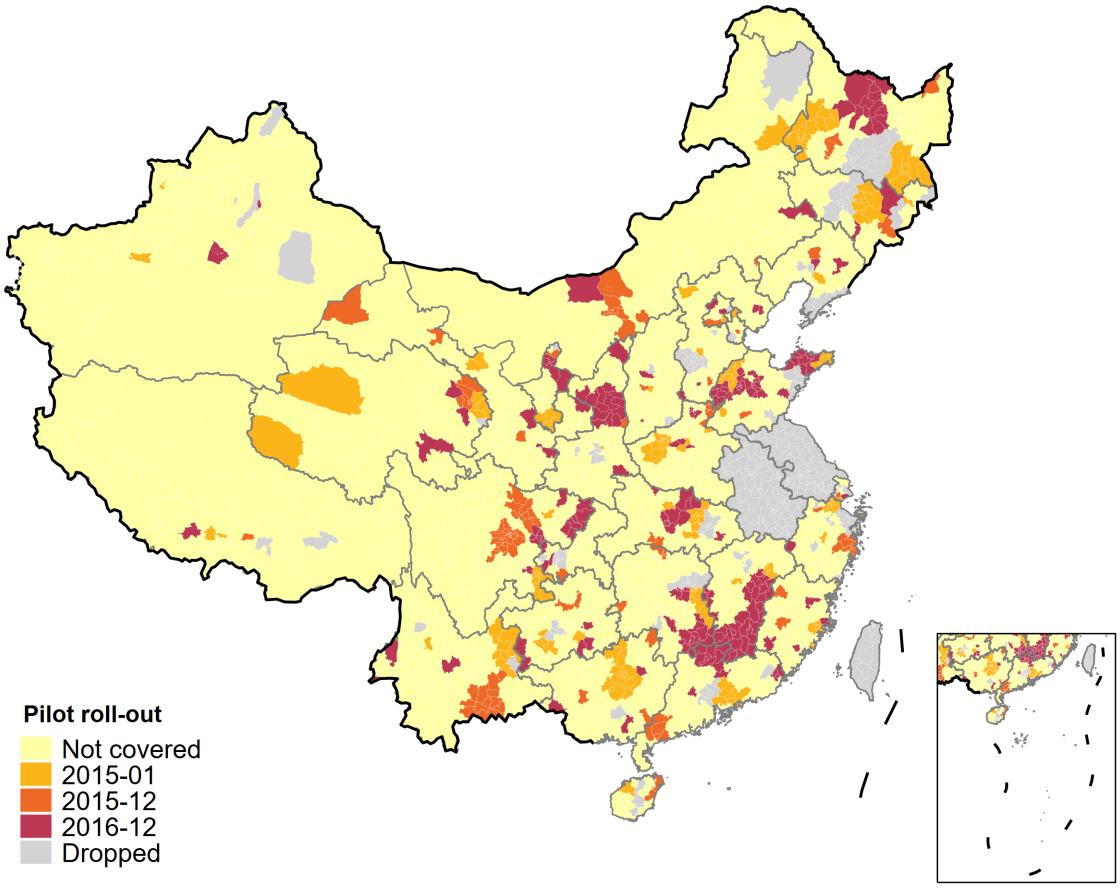
[6]In November 2013, the guiding principles of the NUP were mentioned in the Third Plenum of the 18th Central Committee of the CCP, also highlighting the economic role of this new urbanization plan. Note that the CCP Central Committee holds seven plenums (or plenary sessions) every five years. Each plenum has its own conventional goal, with the third one focusing on the major economic reforms.

[7]See *"Notice on the Comprehensive Pilot Program of National New Urbanization"*, issued in June 2014, at https://www.gov.cn/xinwen/2015-02/04/content_2814341.htm. Table A1 lists all the documents for the New Urbanization Plan and the pilot program, and Figure A4 displays the list of the pilots by roll-out wave.

[8]Of the 26 pilots that do not have a "Diversification of Financing" agenda, 10 are township-level pilots, which might not have a great demand for infrastructure projects.

[9]keywords for PPP finance include PPP, concession, social capital, and private capital. Other tools include special funds, policy-oriented or development finance institutions, intergovernmental transfers, and financial subsidies or support (from upper governments).

Figure 3: The New Urbanization Plan Pilot Scheme Roll-Out



Notes: The map shows the roll-out variance in three waves (2015-01, 2015-12, and 2016-12) for localities of the New Urbanization Plan's pilot program. "Not covered" counties are localities not selected in the pilot program, and "Dropped" counties are those excluded from the estimation sample (see the main text for details).

2.1.2 Identifying Pilot-Program Variation

The selection procedure of pilot localities was not random. Taking wave one as an example, 169 localities applied for the pilot program following a call-for-application announcement in June 2014, and 64 pilot localities were selected by the National Development and Reform Commission based on their background, application, location region, and administrative hierarchy.[10] Selection bias is a concern when the winners, applicants, and non-participating localities systematically differ. An ideal identification would come from comparing selected winners and runners-up who are similar to each other. However, information on the runners-up is not available. Therefore, potential endogeneity concerns such as selection bias should be addressed before exploiting the variation.

I first argue that a locality was selected for the program due to multiple considerations. However, almost all chosen localities are assigned a reform agenda of adopting diversified financing, regardless of their baseline extrabudgetary condition. While the rationale of not having a single selection criterion might mitigate selection issues, the administrative hierarchy of pilot localities could generate different incentives and constraints. For example, provincial pilots generally face fewer financial constraints, as they have a large tax base and more financing tools (e.g., issuing bonds). In addition, some special prefecture (i.e., the separately listed prefectures and sub-provincial prefectures in wave one) pilots that have greater capacities to undertake policy experiments and acquire policy learning may have greater chances of being chosen (Wang and Yang, 2021).[11] As a result, I exclude these localities from the analysis. I also dropped all counties containing piloted townships because the most disaggregated level of the employed data is at the county level. The spatial

[10] See news from the 21st Century Business Herald: https://m.21jingji.com/article/20150108/herald/da7ff518b8e1cff42db08e4e314101ef.html.

[11] Separately listed prefectures in China have a special status in regard to planning and budget, and they are economically independent of their provincial government. There are currently five separately listed cities in China: Dalian, Ningbo, Qingdao, Shenzhen, and Xiamen. Dalian, Ningbo, and Qingdao were selected for the pilot program in wave one. The seven selected sub-provincial prefectures in wave one are Shijiazhuang, Changchun, Harbin, Wuhan, Changsha, Guangzhou, and the nine main districts in Chongqing. They hold certain independent authority in their fiscal management. See Figure A4 for a detailed list of the pilot localities across waves.

distribution of the excluded pilots is plotted in gray in Figure 3.

Table 1 provides supporting evidence for this argument, which presents the determinants of being selected for the pilot program, using both the full and restricted sample. Column (1) presents the determinants of selection into the pilot program for all pilot units ("full sample"). Column (2) replicates the determinant exercise using only the pilot prefectures and counties as treated units, excluding the pilot provinces, separately listed prefectural cities, and capital cities in wave one ("restricted sample"). The results in Column (1) show that counties with a higher share of employees in the secondary (i.e., manufacturing) industry, more fiscal spending, and a more substantial reliance on agriculture were more likely to be chosen. Comparisons with results in Column (2) reveal, however, that most of the significant associations vanish, except for "investment in fixed assets". Fixed asset investment could reflect local governments' expenditures and experiences with urbanization-related projects, indicating the pilot program indeed favors localities with more experience in infrastructure investment. Overall, the comparisons across the two columns show that the treated and control counties in the "restricted sample" are balanced. The joint-test p-values also indicate that, after excluding "investment in fixed assets", determinants in the restricted sample cannot predict the likelihood of being selected into the pilot program (p-value = 0.7844). As a result, counties in the "restricted sample" are used as the analyzed units throughout this study. Although the policy variation is not as-good-as-random among the restricted sample, I will present evidence on balancing pre-trends when examining the impacts of the pilot program to further mitigate endogeneity concerns.

Table 1: Determinants of Being Selected into the Pilot Program

	Pr(Pilot program = 1)	
	Full sample	Restricted sample
	(1)	(2)
Basic information		
Administrative area (km^2)	-0.0000	-0.0000
	(0.0000)	(0.0000)
Hukou Population (10,000)	0.0016*	0.0001
	(0.0010)	(0.0010)
Employees in the secondary inductry (10,000)	0.0062***	0.0034
	(0.0024)	(0.0025)
Employees in the third inductry (10,000)	-0.0011	0.0001
	(0.0022)	(0.0022)
Economics conditions		
GDP (billion RMB)	-0.0035	-0.0049
	(0.0031)	(0.0036)
Value added of the first inductry (billion RMB)	-0.0061	0.0042
	(0.0109)	(0.0119)
Value added of the second inductry (billion RMB)	0.0025	0.0087
	(0.0048)	(0.0055)
Fiscal Expenditure (billion RMB)	0.0269**	0.0168
	(0.0110)	(0.0113)
Agriculture and industry		
Area of agricultural facilities (km^2)	0.0008***	0.0002
	(0.0003)	(0.0003)
Total grain production (1,000 tonne)	0.0001**	-0.0000
	(0.0001)	(0.0001)
Total value of output of above-scale industries (billion RMB)	0.0003	-0.0005
	(0.0005)	(0.0006)
Investment in fixed assets (billion RMB)	0.0070***	0.0061***
	(0.0015)	(0.0017)
Education and social security		
Number of students in elementary school (10,000)	-0.0318***	-0.0094
	(0.0090)	(0.0094)
Number of social welfare programs	0.0001	0.0000
	(0.0006)	(0.0006)
P-value of joint significance:		
Determinants	0.0000	0.0000
Determinants (excluding "investment in fixed assets")	0.0000	0.7844
R-squared	0.1303	0.0425
Observations	1,701	1,547

Notes: The table shows the determinants of a county being selected into the NUP pilot program, using county characteristics in 2014. The dependent variable 'Pr(Pilot program = 1)' is an indicator equals to 1 if the county is selected into the NUP pilot program and 0 otherwise. The independent variables are various county characteristics in four dimensions: *basic information*, *economics conditions*, *agriculture and industry*, and *education and social security*. The sample in column (1) uses the full sample, while the sample in column (2) uses the restricted list of counties (See main text for details). $***p < 0.01, **p < 0.05, *p < 0.1$

Sources: China County Statistical Yearbook 2014.

2.1.3 Public-Private Partnership

Public-private partnership (PPP) refers to the investment by the private sector in the public sector, especially on projects that require large investments. The PPP financing model often requires governments to contract out projects to the private sector for long-term operation. In a common Build-Operate-Transfer (BOT) model, companies from the private sector are responsible for financing and finishing the construction of the infrastructure project, operating the project for usually 20-30 years, and eventually transferring the project back to the government.

The use of PPPs in China goes back to the Shajiao B power plant in Shenzhen in 1988. Since then, there have been two rounds of PPPs. The first round was in the 1990s, directed mostly at the water and power sectors, while the second wave happened in the 2000s, focusing on toll roads, water and sewerage projects, and city gas (Engel, Fischer and Galetovic, 2014).

The post 2014 wave of large-scale PPP adoption, following the Third Plenum of the 18th CCP Central Committee, explicitly encouraged the usage of capital from the private sector in urban infrastructure investment and operation through concession. In 2014, the Ministry of Finance issued two notes to encourage local governments to adopt PPP for infrastructure projects, parallel to the calling off of LGFVs.[12] The Budget Law was also revised in 2014, mandating that "local governments shall establish multi-year budget balancing mechanisms," and providing a foundation for local governments to adopt PPP financing. The new wave of PPP has been widely used for transportation projects, and it has increasingly been used in water, energy, communications, medical services, education, among other project types.

In the NUP pilot program documents, one reform agenda is diversified financing. In many cases, local governments from the pilot program were encouraged to finance their infrastructures using the public-private partnership. Via PPP, the government and private sector jointly establish a project company, functioning as a special purpose vehicle

[12]See *"Notice on Issues Related to Promoting the Public-Private Partnership (PPP) Model"* (No. 76 [2014], MOF) and *"Notice on Issuing the Operational Guidelines for the Public-Private Partnership (PPP) Model (Trial)"* (No. 113 [2014], MOF).

(SPV). The governments then purchase services from the SPV, while firms in the SPV participate in funding, building, operating, and eventually transferring infrastructures to local governments.

From the perspective of the public sector, contracting out projects to the SPV potentially improves project efficiency, and more importantly, isolates financial risks and mitigates fiscal pressure. However, recent studies point out that many local governments use PPP as an additional financial vehicle. This gives rise to an "equity in name, debt in reality" (minggu shizhai) issue, which disguises PPP projects as equity but corresponds to real debt for local governments (Wang et al., 2020).

3 Data

I assemble millions of administrative records from multiple sources and build three unique main datasets to investigate the PPP finance of local governments between 2010 and 2019 under China's recent urbanization scheme. First, I obtain all public-private partnership (PPP) projects and collect their bidder documents to study PPP adoption. Next, I assign nighttime light intensity to highly granular committee-level administrative divisions to study the impact on economic growth. Lastly, I link the universal land transaction records with a complete list of LGFVs to study whether the introduction of PPP finance reduces local governments' traditional land finance.

3.1 PPP Finance

PPP Project Data.— I obtain a comprehensive list of public-private partnership (PPP) projects from the China Public Private Partnerships Center housed by the Ministry of Finance (MOF).[13] Local governments need approval from the MOF to initiate a PPP project, and all approved projects are included in the China Public Private Partnerships Center database. The database contains 10,082 PPP projects between 2009 and September 2021. The dataset includes basic information for each PPP, as well as the bid evaluation documents and contracts. The basic information includes project identifier, project name, province, city, county, first industry code, second industry code, total investment, current stage (preparation, sourcing, or implementation), project initiation time, payment mechanism, project description, the scope of cooperation, terms of cooperation, contract type, procurement method, value-for-money evaluation assessment, and financial affordability assessment. I manually digitize bidding documents and collect information regarding the

[13]Following the encouragement of PPP finance, Ministry of Finance established the China Public Private Partnerships Center (CPPPC) per *"Notice on the Operation of the Comprehensive Information Platform for Public-Private Partnerships (PPP)"* (No. 166 [2015], MOF). According to the notice, all new PPP projects should be listed in the CPPPC. Later in 2017, MOF issued an information disclosure act, *"Interim Measures for Information Disclosure of the Comprehensive Information Platform for Public-Private Partnerships (PPP)"* (No. 1 [2017], MOF), that made the CPPPC information public available online. The CPPPC website (https://www.cpppc.org/maintain.html), however, has been under maintenance since 2023.

participating firms, the winner, and their evaluation scores. Figure A8 presents a bidding document example from Taishan city in Guangdong province.

3.2 Economic Growth

Rural-Urban Division Codes.— To measure economic conditions at a precisely granular region level, I first collect the Urban-Rural Division Codes (RUDC) data from the National Bureau of Statistics (NBS).[14] The RUDC data includes all NBS-designated administrative division records of China, issued by the NBS in 2008.[15] The dataset includes the name and ID of all divisions and an urbanicity code for each community, the lowest level documented in the statistical-used administrative divisions in China. The RUDC analyzed in this study includes 6,789,166 communities from 2010 to 2019. In the end, I geocode the communities using the Baidu Map API to obtain their coordinates.

Satellite Nighttime Lights.— To measure economic growth, I assign the nighttime light intensity to the geocoded communities from the RUDC data. The nighttime light intensity data are from the Visible Infrared Imaging Radiometer Suite (VIIRS) satellite of the National Oceanic & Atmospheric Administration (NOAA). I use the VIIRS Nighttime Lights V2 data produced by the Earth Observation Group, which provides a consistently processed time series of annual measures produced from monthly cloud-free average radiance grids spanning 2012 to 2020 (Elvidge et al., 2021).[16] Relative to China's yearbook-based GDP statistics, the nighttime light intensity is a better measure for local economic situations (Martinez, 2022). I assign the nighttime light to the geo-referenced communities between 2013 and 2019 to get

[14]The data is obtained from NBS at: http://www.stats.gov.cn/tjsj/tjbz/tjyqhdmhcxhfdm, which is currently not available. Internet Archive provides archives of the website with one example at: https://web.archive.org/web/20210619071650/http://www.stats.gov.cn/tjsj/tjbz/tjyqhdmhcxhfdm/.

[15]See "No. 60 [2008] of the State Council": https://www.stats.gov.cn/sj/pcsj/rkpc/6rp/html/fu11.htm. As pointed out by Gan et al. (2019), this new standard for rural-urban division is mainly for statistical accounting use and is solely based on land contiguity. Thus, the rural-urban division is likely not capturing local integrated labor markets such as commuting zone areas measured by the commuting flows in developed countries (Duranton, 2015), night-light-based approach in developing countries (Dingel, Miscio and Davis, 2021), or the cellphone location data in China (Chen, Gu and Zou, 2024).

[16]The annual VIIRS Nightttime Lights V2 is available at https://eogdata.mines.edu/nighttime_light/annual/v20/.

a precise and comprehensive measure of local economic circumstances in China.[17]

3.3 Land Finance

Land Transaction Records.— The land transaction records are obtained from the Ministry of Natural Resources (formerly the Ministry of Land and Resources), which is available at www.landchina.com. The data include every land transaction record in China's primary land market.[18] Each record includes information about the transacted land parcel, including its location, area, sale price, use purpose, land source, sale method, quality level, land use right holder, floor-area ratio, issued authority, and contract time. I drop a few extreme cases with a transaction price of over 300 billion RMB and crosscheck statistics with those from the statistical yearbooks. Although some outlier prices exit in years prior to 2008, the aggregated annual transactions match well with those from the yearbooks for my study period (2010-2019), as Figure A5 indicates. Following Chen and Kung (2019), I include records that are in the following sales methods: bilateral agreement, English auction, invited bidding, and listing auction, accounting around 70% of all land transaction records.I further winsorize prices at the 1% and 99% percentiles to mitigate potential outlier effects. In the end, the land data analyzed in this study includes 1,885,255 transaction records from 2010 to 2019.

List of LGFVs.— To study land financialization, where local governments use local government financing vehicles (LGFVs) to leverage funding via the land mortgage and land-secured loan from the banking sectors, I link the land transaction data with a complete list of LGFVs. The LGFV list is managed and maintained by the China Banking Regulatory Commission (CBRC), which is shared with the banks in China and updated quarterly.[19] The

[17]Figure A6 presents the average nightlight intensity across communities with different urbanicity.

[18]The primary land market consists of most land transactions in China. According to the calculation of Liu and Xiong (2018), the payment in the secondary land market only accounted for 3.75% of all land transactions from 2000 to 2015.

[19]There are two advantages of this LGFV list: First, this list includes the broadest LGFVs in China. Second, the list contains information on LGFVs even after these LGFVs became inactive or transformed into operating companies. An alternative for the LGFVs list is from the WIND database, a database that

LGFV list I obtained was updated through the second quarter of 2019, which should include the majority of LGFVs for the year 2019, as the increase in LGFVs has been extremely small in recent years due to policy regulations. The list includes various types of LGFVs, regardless of whether they issue bonds or not, that can be linked to land transaction data to determine whether an LGFV purchased the land transaction. Land purchased by the LGFVs is more likely to be used to finance mortgages for raising local government revenue. The list includes 11,714 LGFVs as of June 2019.

3.4 Auxiliary Data

China County Statistical Yearbook.— I use China County Statistical Yearbook 2014 to study the determinants of being selected for the NUP pilot program. The yearbook data include various county characteristics, including basic information, economic conditions, agriculture and industry, and education and social security. In 2014, the data includes 2,079 counties.

is widely used in finance studies provided by the Wind Information Company. However, the list from the WIND database only covers the LGFVs that issue bonds. As many LGFVs do not issue bonds and they tend to be very undetectable, the list of LGFVs from the CBRC provides better coverage.

Table 2: Summary Statistics

	Wave 1	Wave 2	Wave 3	Control
	(1)	(2)	(3)	(4)
Panel A. PPP finance				
Number of PPP	0.153	0.200	0.186	0.147
	(0.504)	(0.672)	(0.590)	(0.561)
Total investment (million RMB)	122.222	121.961	85.241	75.455
	(653.044)	(543.313)	(333.433)	(444.950)
Average investment per PPP (million RMB)	169.609	190.469	126.292	111.614
	(868.030)	(885.320)	(532.009)	(628.848)
Observations	1,850	1,250	2,220	19,500
Panel B. Economic growth				
Nightlight intensity	3.898	4.529	2.816	3.427
	(8.760)	(9.158)	(6.937)	(9.031)
Observations	344,181	259,339	480,800	3,672,642
Panel C. Land finance				
Land finance (county level)				
Log of number of land	3.432	3.575	3.434	3.210
	(1.092)	(1.059)	(0.971)	(1.094)
Land conversion	0.648	0.636	0.629	0.606
	(0.282)	(0.301)	(0.268)	(0.305)
Log of land revenue (million RMB)	10.389	10.610	10.409	9.768
	(1.618)	(1.607)	(1.434)	(1.783)
Log of land area (hectare)	4.155	4.193	4.102	3.681
	(1.184)	(1.197)	(1.175)	(1.397)
LGFVs	0.018	0.015	0.016	0.013
	(0.061)	(0.055)	(0.058)	(0.053)
Observations	1,340	1,020	1,670	13,740
Land use (parcel level)				
Floor-area-ratio (FRA) limit	2.110	2.123	2.027	2.140
	(1.460)	(1.606)	(1.518)	(1.614)
Commercial land	0.158	0.142	0.173	0.181
	(0.365)	(0.349)	(0.378)	(0.385)
Residential land	0.508	0.599	0.465	0.537
	(0.500)	(0.490)	(0.499)	(0.499)
Observations[#]	74,928	35,994	51,664	411,879

Notes: The table reports summary statistics of outcome variables of PPP finance, land finance, and economic growth by NUP pilot program roll-out wave. The mean is in the cell, and the standard deviation is in parentheses. Plane A includes county-year level PPP finance from 2,482 counties between 2010 and 2019, while Panel B consists of 4,286,786 community-year nightlight intensity measures between 2013 and 2019. Panel C includes 1,040,963 land parcel transaction records from 1,944 counties between 2010 and 2019.
[#]The observations for 'FRA limit' are smaller (49,864, 32,681, 51,045, and 523,483, for each Column) due to missing variables.
Sources: PPP project database 2010-2019 (Panel A), nightlight intensity and rural-urban division code (Panel B) 2012-2020, and land transaction records 2010-2019 (Panel C).

4 Identification Strategy

In this section, I present the baseline empirical specification investigating the impacts of the New Urbanization Plan pilot program on extrabudgetary finance and economic growth.

To identify the effects of the New Urbanization Plan's pilot program and verify the parallel pre-trends assumption of the DD framework, I first employ the following event study model:

$$\mathrm{Y}_{i,s,t} = \sum_{k=-5, k\neq -1}^{k=3} \beta_k \cdot \mathrm{Pilot}_{s,t} \times \mathbb{1}\left(t = t^* + k\right) + \delta_s + \delta_t + \epsilon_{i,s,t} \tag{1}$$

where Y_{ist} is the outcome i in county s and year t. The $\mathrm{Pilot}_{s,t} \times \mathbb{1}$ is an indicator that is 1 if county s implements the pilot program and zero otherwise, δ_s is the county fixed effect, and δ_t is the year fixed effect. $\epsilon_{i,s,t}$ is the error term, which is clustered at the county level. The central requirement for identification in DD strategy is the parallel-trend assumption: the adoption of PPP and land finance and economic conditions would have experienced a similar trend in the absence of the NUP pilot program.

I use the associated DD model, which shares the same setting with equation (1), but replaces the timing dummy group with a treatment indicator $\mathrm{Pilot}_{s,t}$. $\mathrm{Pilot}_{s,t}$ is 1 if county s implements the NUP and is zero otherwise. Formally, I employ the following DD model:

$$\mathrm{Y}_{i,s,t} = \beta \cdot \mathrm{Pilot}_{s,t} + \delta_s + \delta_t + \epsilon_{i,s,t} \tag{2}$$

The DD model is first estimated with traditional two-way fixed effects (TWFE) estimator. I then re-estimate it using the stacked DD estimator proposed in Cengiz et al. (2019) to address potential issues of the TWFE estimator when estimating dynamic treatment effects (See Roth et al. (2022) for an overview).

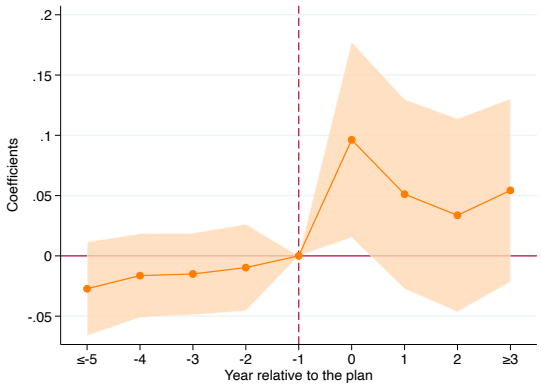
5 Main Findings

5.1 Impacts on PPP Adoption

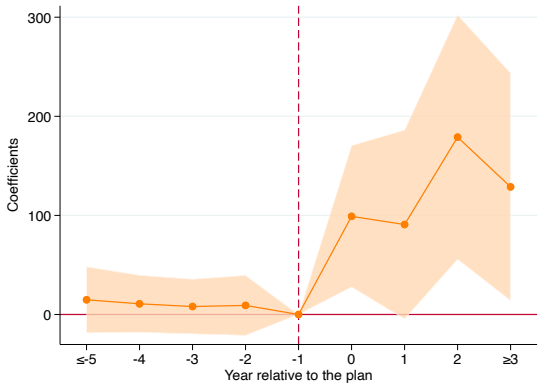
Figure 4 presents the event study estimates of the impact of the pilot program on the adoption of PPP finance. The adoption of PPP finance is measured using three outcomes for each county-year cell: the number of PPP projects, total investment (million RMB), and average investment per PPP project (million RMB). The results first show balancing pre-trends for all three outcomes, supporting the identifying assumption. In addition, the results indicate that pilots experience increased adoption of PPP finance in the post-period. The significant increase in investment from PPP finance lasts for four years after the pilot program.

Table 3 presents the average treatment effects. Columns (1)-(3) in Panel A shows the estimates of the impact on PPP finance. Pilot localities on average adopt 0.076 more PPP projects, about a 50% increase relative to the mean of the dependent variable. Pilot localities raise 113 million RMB more investment from the increased PPP projects, a 93% increase relative to the dependent variable mean. The average investment per PPP in pilots is also 73 million RMB larger than that in control units, an 88% increase relative to the dependent variable mean. Panel B provides robust results using the stacked DD estimators to estimate the dynamic treatment effects. The results indicate a dramatic increase in PPP adoption in the treated localities following the pilot program.

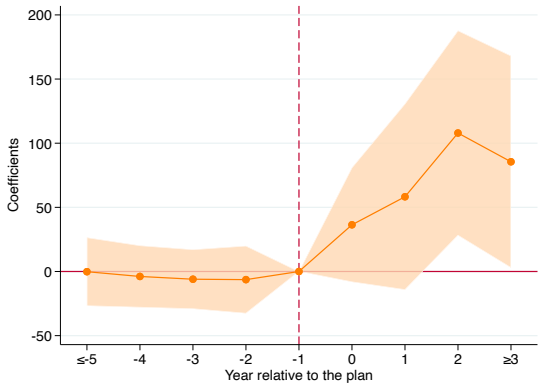
Figure 4: Event Study Figure on PPP Finance



(a) Number of PPP



(b) Total investment



(c) Average investment

Notes: The figure shows event study estimates of the impact of the pilot program on PPP finance, using two-way fixed effects estimators. The dependent variables are the number of PPP projects, total investment (in million RMB), and average investment (in million RMB) per PPP project at the county-by-year level. Event period -1 is normalized to 0. The figures show the 95% confidence interval with standard errors clustered at the county level.
Sources: PPP project database 2010-2019.

Table 3: Impacts of Urbanization on PPP Finance

	PPP finance					
	PPP adoption			Payment scheme		
	Number of PPP (1)	Total investment (2)	Average investment (3)	Government payment (4)	Viability gap funding (5)	User charges (6)
Panel A. TWFE						
Pilot	0.076***	113.497***	72.623***	0.023***	0.025***	0.002
	(0.025)	(29.319)	(18.948)	(0.008)	(0.009)	(0.003)
Mean of dep. var.	0.154	121.221	82.159	0.041	0.052	0.006
R-squared	0.178	0.093	0.078	0.122	0.128	0.019
Observations	24,820	24,820	24,820	24,820	24,820	24,820
Panel B. Stacked DD						
Pilot	0.077***	117.922***	76.736***	0.024***	0.026***	0.001
	(0.024)	(28.857)	(18.626)	(0.008)	(0.009)	(0.003)
R-squared	0.174	0.090	0.074	0.120	0.125	0.015
Observations	63,820	63,820	63,820	63,820	63,820	63,820
County FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Notes: The table shows the estimates of the impact on county-level PPP finance, including PPP adoption (columns 1-3) and payment scheme (columns 4-6). The dependent variables in columns (1)-(3) are the number of PPP projects, total investment (million RMB), and average investment (million RMB) per PPP project. The dependent variables in columns (4)-(6) are the ratio of PPP projects that are funded using different payment schemes: government payment, viability gap funding, and user charges. Panel A shows estimates using the traditional Two-Way Fixed Effects (TWFE) model, while Panel B shows estimates using the stacked DD model proposed by Cengiz et al. (2019). All regressions include county and year fixed effects, with standard errors clustered at the county level. $***p < 0.01, **p < 0.05, *p < 0.1$
Sources: PPP project database 2010-2019.

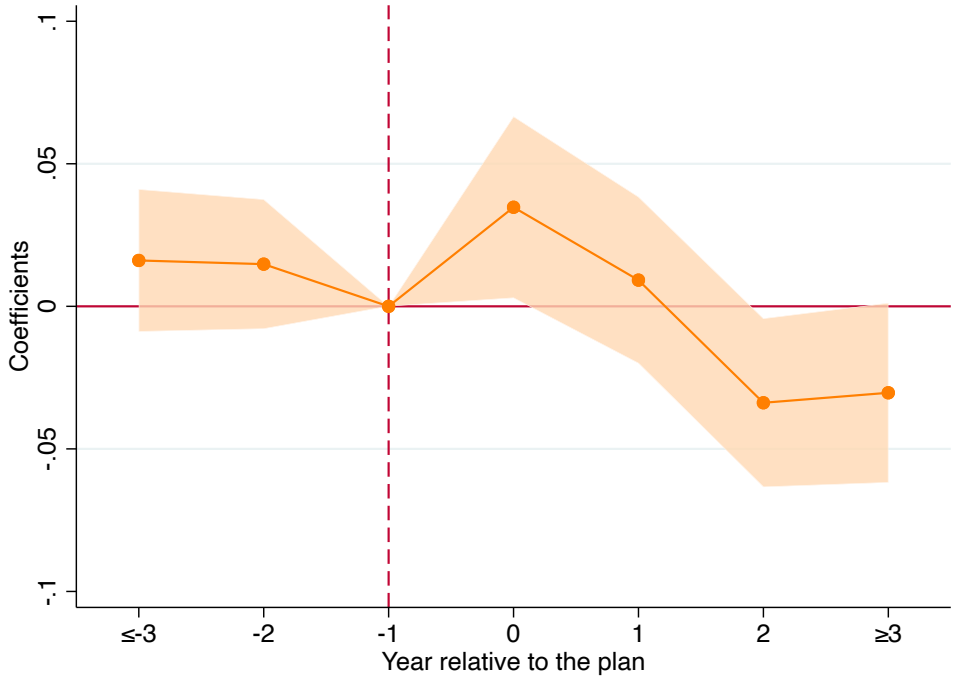
5.2 Impacts on Economic Growth

To formally examine the economic effect of the pilot program on economic growth, I use the satellite nighttime lights between 2013 and 2019 as the outcome. The estimated average treatment effects are -0.025 (0.013) using the TWFE estimators and -0.029 (0.012) using the stacked DD estimators, where the standard deviations are in parentheses. Results indicate that the treated counties experience a 2.53% ($e^{0.025} - 1$) to 2.92% ($e^{0.029} - 1$) decrease in the nighttime light intensity, indicating an overall negative impact on economic growth among the NUP pilot counties.

The event study estimates in Figure 5 provide more informative evidence. Figure 5 shows an increase in nighttime light intensity in the first year following treatment, potentially driven by the investment shock. However, the economic effect is followed by significant declines in the third and fourth years, indicating that pilot localities are investing in projects with lower long-term returns.[20]

[20] Appendix Section B provides anecdotal evidence of showy projects financed by two pilot localities: Danzhou City in Hainan Province and Dushan County in Guizhou Province. Danzhou City embarked on the construction of the "Ocean Flower Island," the largest artificial archipelago project to date, while Dushan County accumulated a debt exceeding 40 billion RMB despite having an annual GDP of only 1 billion RMB. Both cases were marked by significant unfinished construction projects and instances of governmental corruption.

Figure 5: Event Study Figure on Night Light Intensity



Notes: The figure shows event study estimates of the impact of the pilot program on economic growth, using two-way fixed effects estimators. The dependent variables are the log value of night light intensity. Event period -1 is normalized to 0. The figures show the 95% confidence interval with standard errors clustered at the county level.
Sources: Urban-Rural Division Codes and satellite nighttime lights 2012-2020.

6 Mechanisms

6.1 PPP as Additional Financing Vehicle

PPP has experienced waves of regulation by the Ministry of Finance since 2017, where the MOF is concerned that PPP projects become additional local government financing vehicles[21] A PPP project functions as an equity investment for local governments, where the private sector finances the construction and operation of the project while local governments purchase back the project later. However, local governors might use PPP finance to raise revenues as a debt investment, leading to the "equity in name, debt in reality" (minggu shizhai) issue. Analyzing PPP projects between 2014 and 2016, Wang et al. (2020) find that almost all PPPs funded by "government payment" and "viability gap funding" are nominal equity, and those financed by "user charge" are real equity. Building on findings of Wang et al. (2020), I examine what payment schemes are more likely to be used for the PPP adopted in the pilot units. Columns (4)-(6) in Table 3 examine the ratio of PPP projects that are funded with different payment schemes. The results indicate that a higher percentage of PPP projects in the pilot localities are funded using "government payment" or "viability gap funding" payment schemes, but not "user charges". These findings indicate that pilots adopt more PPP projects that are likely to have the "equity in name, debt in reality" issues, raising concerns about the efficiency of these PPP projects.

6.2 Government-Firm Collusion

Another way to examine the efficiency of PPP finance is to look at whether local governments have contracted the infrastructure projects to firms from the private sector through public procurement auctions. Firms participate in PPP projects via scoring auctions, where contracts are awarded to bidders with the highest scores. Figure A7 documents the basic

[21]For example, see MOF 2018 (No.23) at https://www.gov.cn/zhengce/zhengceku/2018-12/31/content_5439339.htm.

process of a procurement auction, where local governments first make public announcements to the market, and firms (applicants) follow to submit their bids. Governments then organize a review committee to screen out unqualified applicants in the pre-qualification stage, with the qualified applications continuing to participate in bidding. In the next stage, the review committee evaluates the bidding documents using rubrics and then recommends at least three candidates, ranked by the evaluation scores, to local governments. Local governments follow the recommendation and award the bidder with the highest score as the winner.

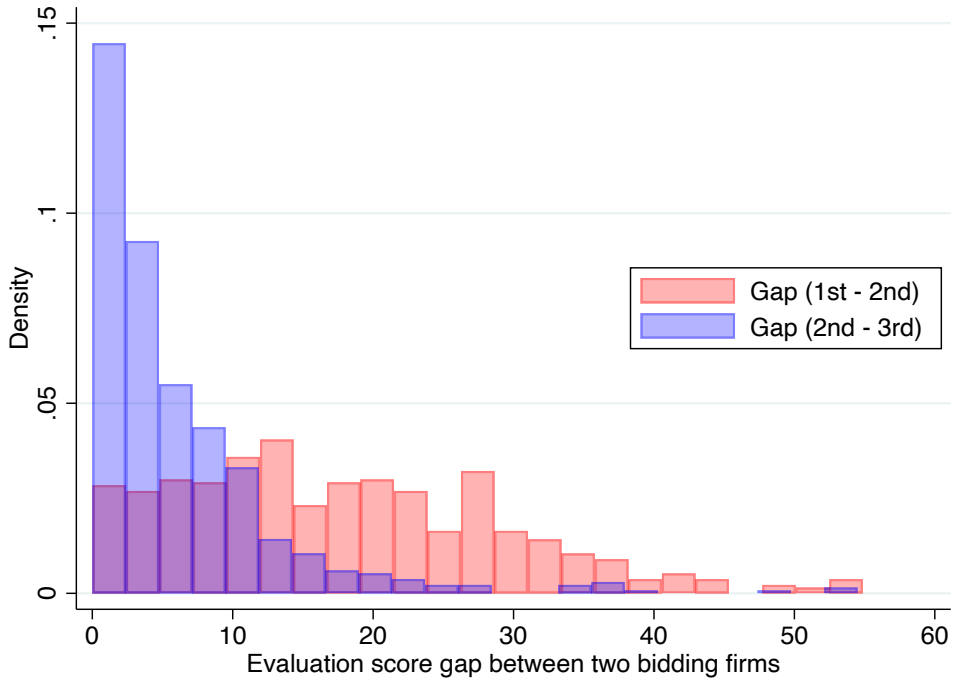
I use water and sewerage PPP projects as an example to document how firms participate in the bidding process.[22] Building and upgrading wastewater treatment plants (WTTPs) is the most common demand for local government in the use of PPP projects over this period. About 12% of the PPP projects relate to WTTPs between 2014 and 2019. Among the 943 WTTP PPP projects, I manually collected information from 560 projects with documents on the evaluation process, including recommended firms and their evaluation scores. Following the insights of Chassang et al. (2022)' tests on detecting noncompetitive bidding in procurement auctions, I examine the evaluation score gap between bidders with the two highest scores, and the gap between bidders with the second and third scores. The intuition is straightforward: under competitive bidding, both gaps should be similar and close to zero, as bidders with the first three highest scores bid competitively to minimize the gaps. However, when the bidding is noncompetitive, insider firms colluding with the government could obtain internal information before the bidding, leading to the result that the winner has a higher evaluation score and the other two candidates have similar scores.

Figure 6 directly tests the collusion hypothesis. The results reveal that the score gap between the first and second highest scores is distributed evenly across ranges between zero and 30, suggesting the winning bidder wins the bid with a stronger application profile. However, the gap between the second and third highest scores skews toward zero, indicating that firms at the second and third rank share similar information when participating in the

[22]The full sample of documents is still under digitization.

bidding. These patterns suggest collusion between firms and local governments, at least for water and sewerage PPP projects.[23] These findings concern the efficiency of using PPP finance to raise investment for infrastructure.

Figure 6: Collusion Tests on PPP Bidding Firms



Notes: The figure shows the distributions of the gap between firms with first and second evaluation scores, and the gap between firms with the second and third evaluation scores from the PPP bidding process. The evaluation scores are encoded from bidding documents of all water and sewerage PPP projects between 2014 and 2019.
Sources: PPP project database 2010-2019.

[23] Lu and Wang (2023) documents three specific ways of manipulation by local governments on procurement: 1) manipulating procurement methods, 2) setting up restrictive requirements, and 3) intervening in the process of expert evaluation.

6.3 Officials' Promotion Incentives

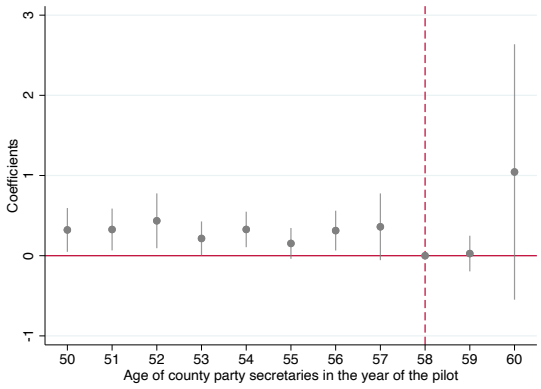
Recent studies by Wei, Yuan and Jiameng (2025) document a local favoritism pattern among public procurement in China, where local officials perform a strong bias in allocating contracts towards local bidders. They highlight the role of career incentives, rather than information friction, in leading to this local favoritism. Following their findings, I examine whether the adoption of PPP projects is also affected by local officials' promotion incentives.

I exploit local officers' age as a plausibly exogenous measure of career incentives, following the strategy in Xi, Yao and Zhang (2018) and Axbard and Deng (2024). Mayors and party secretaries of counties are required to retire at age 60, and they are supposed to serve for normally three years before being promoted. Therefore, local officials aged 58 and above at the time of the National People of Congress (NPC) are unlikely to get promotions. To conduct the exercise, I first obtain the resumes of county government officers in the Chinese Local Government Officials Database (CGOD) compiled by the Chinese Research Data Services. I identify the main party secretary in the office in the year when the pilot was implemented and use 2014 as the year for the control group. I then calculate their age at the 13th NPC in March 2018 when the political promotions are made. I interact the age of the main county party secretary with the treatment dummy in equation (2), which yields the following specification:

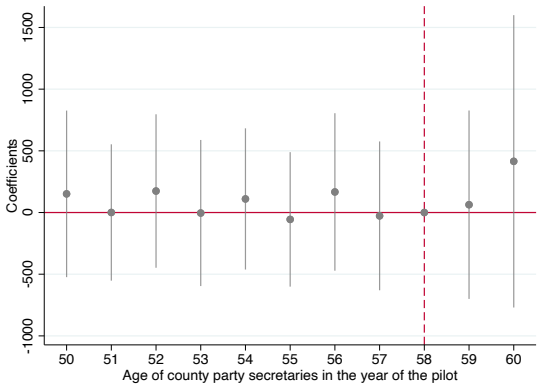
$$\mathrm{Y}_{c,t} = \beta_0 + \beta \cdot \mathrm{Pilot}_{c,t} \times \sum_{k=50, k\neq 58}^{k=60} \mathrm{Age}_c + \delta_c + \delta_t + \varepsilon_{c,t} \tag{3}$$

Figure 7 indicates a clear pattern that the local official's promotion incentives affect the adopted number of PPP projects but not the scale of investment. Local officials with a higher promotion incentive, as measured by age below 58 at the time of the 13th NPC, adopt more PPP projects. The results show that political incentives distort the PPP adoption, highlighting the political considerations behind the PPP adoption.

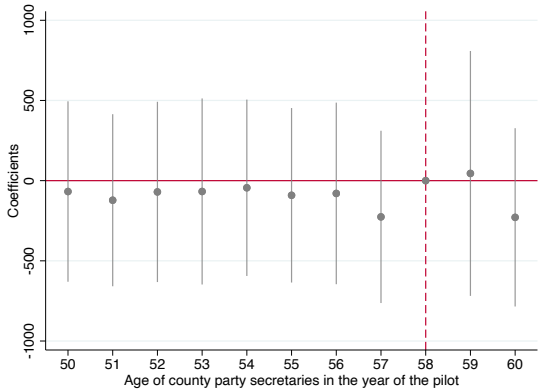
Figure 7: Impacts on PPP Finance by Promotion Incentives



(a) Number of PPP



(b) Total investment



(c) Average investment

Notes: The figure shows event study estimates of the impact of the pilot program on PPP finance interacting with the age of the local official (58 omitted as the reference group), using two-way fixed effects estimators. The dependent variables are the number of PPP projects, total investment (in million RMB), and average investment (in million RMB) per PPP project at the county-by-year level. Event period -1 is normalized to 0. The figures show the 95% confidence interval with standard errors clustered at the county level.
Sources: PPP project database 2010-2019.

6.4 Reliance on Land Finance

The central government introduced PPP financing with the aim of reducing local governments' reliance on land finance and gradually phasing out LGFVs to mitigate rising government debt issues. Lastly, I investigate whether the pilot localities do, in fact, reduce their reliance on land finance.

Table 4 shows that, compared to the control group, pilot localities indeed have 8.44% ($e^{0.081} - 1$) fewer land parcel transactions (column 1) but have no significant changes on land conversion (column 2). At the intensive margins, the pilot program has no significant impact on local governments' land revenue (columns 3 and 4). Column 5 also indicates no evidence that treated localities are less likely to have land transactions through Local Government Financing Vehicles. The results in Panel B show robust evidence using stacked DD estimators, and the event study figures in Figure A9 support the identifying assumption. These results suggest that pilot localities do not reduce their reliance on land finance to provide urban infrastructure projects. The results that PPP adoption does not substitute traditional land-based financing echo the soft budget-constraint issue where local governments believe the central government would bail out the debts raised by the off-the-balance financing (e.g., PPP and land finance) (Kornai, 1986).

When studying land use efficiency, column (6) indicates that the floor-area-ratio (FAR) limit is lower in pilots than in the controls, suggesting less efficient land use. In addition, pilot counties have more commercial land transactions (column 7) and fewer residential land transactions (column 8). These government-led investments may be associated with long-term inefficiency, similar to the consequences following investment stimulated by the 2008 fiscal expansion (Bai, Hsieh and Song, 2016).

Table 4: Impacts of Urbanization on Land Finance

	Land finance (county level)					Land use (parcel level)		
	Log(number of land parcel) (1)	Land conversion (2)	Log(land revenue) (3)	Log(land area) (4)	LGFVs (5)	FAR limit (6)	Commercial land (7)	Residential land (8)
Panel A. TWFE								
Pilot	-0.076**	-0.002	0.006	-0.031	0.002	-0.176***	0.024***	-0.036***
	(0.037)	(0.010)	(0.047)	(0.039)	(0.002)	(0.065)	(0.008)	(0.012)
Mean of dep. var.	3.400	0.586	9.881	3.941	0.012	2.126	0.178	0.524
R-squared	0.638	0.556	0.701	0.585	0.142	0.289	0.134	0.311
Observations	17,770	17,770	17,770	17,770	17,770	547,465	871,211	871,211
Panel B. Stacked DD								
Pilot	-0.080**	-0.002	0.005	-0.036	0.002	-0.184***	0.025***	-0.037***
	(0.036)	(0.010)	(0.045)	(0.037)	(0.002)	(0.053)	(0.007)	(0.011)
R-squared	0.635	0.557	0.699	0.581	0.138	0.294	0.141	0.320
Observations	45,250	45,250	45,250	45,250	45,250	1,371,223	2,174,957	2,174,957
County FE	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The table shows estimates of the impact on county-level land finance (columns 1-5) and parcel-level land use (columns 5-8). The dependent variables for "land finance" include total number/value/area of transacted land parcels, and percentage of transacted land as the rural-urban conversed land. The dependent variables for "land use" contain floor-area-ratio (FAR) limit, a dummy indicating if the parcel is a commercial land or a residential land. Panel A shows estimates using the traditional Two-Way Fixed Effects (TWFE) model, while Panel B shows estimates using the stacked DD model proposed by Cengiz et al. (2019). All regressions include county and year fixed effects, with standard errors clustered at the county level. $***p < 0.01, **p < 0.05, *p < 0.1$

Sources: Land transaction records 2010-2019.

7 Conclusion

I study the PPP adoption of local governments and the economic effect in the context of China's New Urbanization Plan during the 2010s. I conduct the study by identifying novel policy variations from the pilot program roll-out and assembling millions of linked administrative records. I find that, while pilots adopt more PPP projects, the PPP-induced investments generate short-term, revenue-driven economic gains but lead to long-term economic losses. I identify three mechanisms. First, pilots are more likely to use PPP as a new debt-financing vehicle, with suggestive evidence of government-firm collusion. Second, the adopted number of PPP projects, but not the investment scale, is distorted by officials' promotion incentives. Third, the introduction of PPP fails to reduce local governments' reliance on traditional, inefficient land-based financing, reinforcing the classic soft budget-constraint problem. This study provides new insights into fiscal federalization in China by offering the first comprehensive evaluation of fiscal expansion under the country's recent urbanization scheme.

This study provides the first comprehensive evaluation of local governments' fiscal adoption under China's New Urbanization Plan. It contributes to the literature by adding new perspectives on urbanization in China and the use of PPP projects for infrastructure investment in developing countries. In addition, it provides insights into fiscal federalization in post-socialist economies and complements recent macroeconomic research on China's economic slowdown, highlighting the classical soft-budget issues faced by local governments among post-socialist economies.

The policy implications of this study are particularly significant given that China's central government has continued to promote the use of PPP financing since 2022, following multiple rounds of regulatory adjustments between 2017 and 2021. While the efficiency of future rounds of PPP financing remains underexplored, this study represents an important first step in understanding how local governments utilize PPP financing for the provision of public goods. In addition, possibly due to the limited success of the National Urbanization

Plan, the NUP was not fully adopted nationwide. However, the central government extended its principles to rural areas, integrating them with the Rural Revitalization Plan during the 2021–2025 Five-Year period. The efficiency of urbanization efforts in rural villages remains uncertain, yet the lessons from the NUP pilot program could offer valuable insights.

Several additional questions remain unanswered: How can alternative financing tools for public goods provision be used more efficiently while reducing local governments' reliance on land finance in China? How can public policies better align incentives between central and local governments within the fiscal federalization framework of transition economies? What are the impacts of China's recent urbanization scheme on economic performance in a longer run and on other dimensions, as well as the potential crowding-out effect of to the private sector? I see these explorations as promising avenues for future research.

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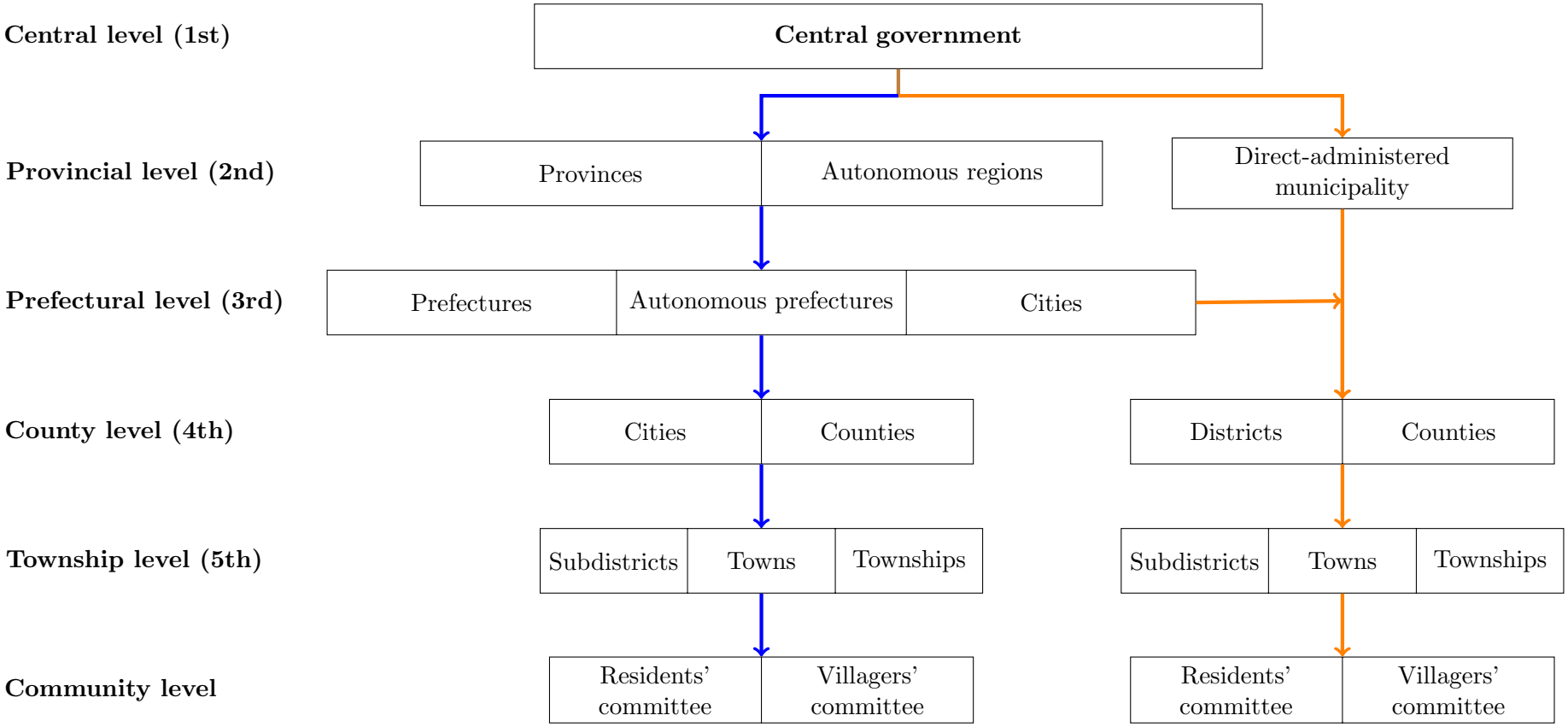
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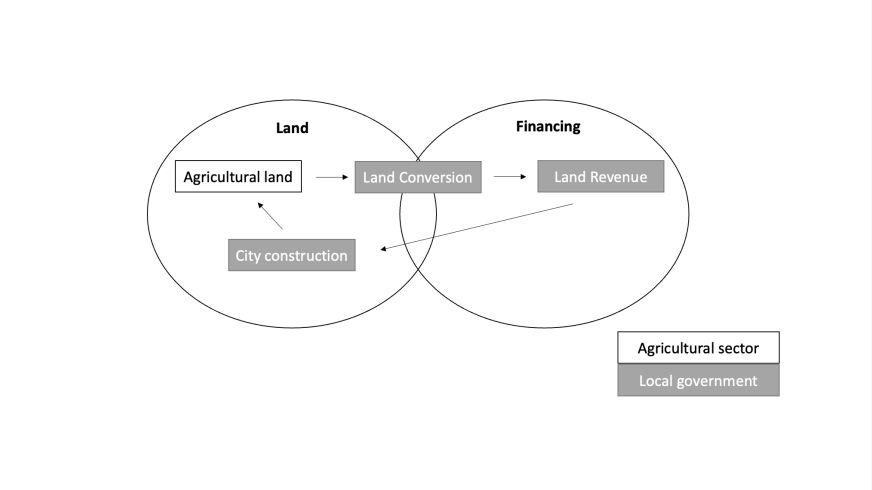
Appendix Figure and Table

Figure A1: China's Administrative Hierarchy in the 2010s: A Simplified Framework

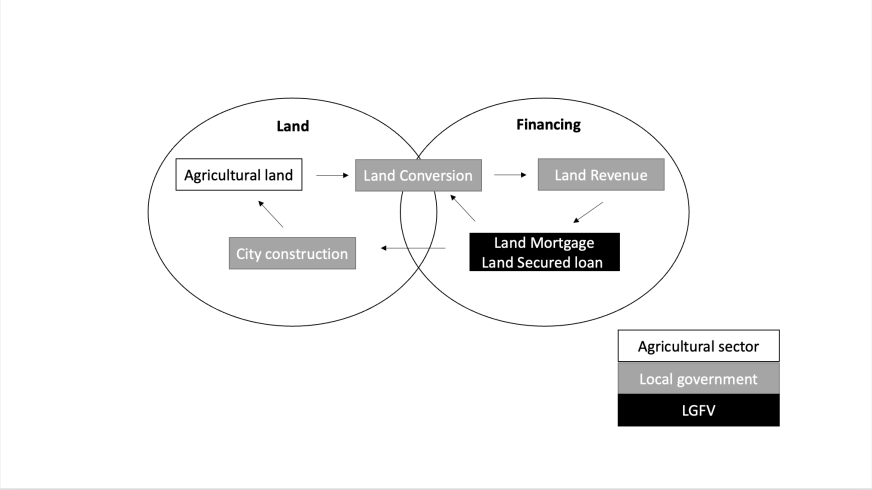


Notes. The figure plots a general framework for the administrative hierarchy of the People's Republic of China in 2010, based on the Urban-Rural Division Code 2010 and Census 2010, which includes all 31 provincial-level administrative regions in mainland China. China's official administrative division consists of five levels: central, provincial, prefectural, county, and township level. Under township-level jurisdictions, there are additional administrative units at the community level. The administrative hierarchy structure remains largely the same according to the Urban-Rural Division Code 2010-2019.

Figure A2: Land Financing of Local Governments in China



(a) Land finance



(b) Land financialization

Notes: The figure depicts the conceptual framework for local government land finance behaviors in China, based on the models proposed in Zhou (2012) page 237. Subfigure a depicts the land fiance pattern, whereas subfigure b presents land financialization when banking sectors are involved. The agricultural, local government, and LGFV sectors are highlighted in white, gray, and black, respectively.

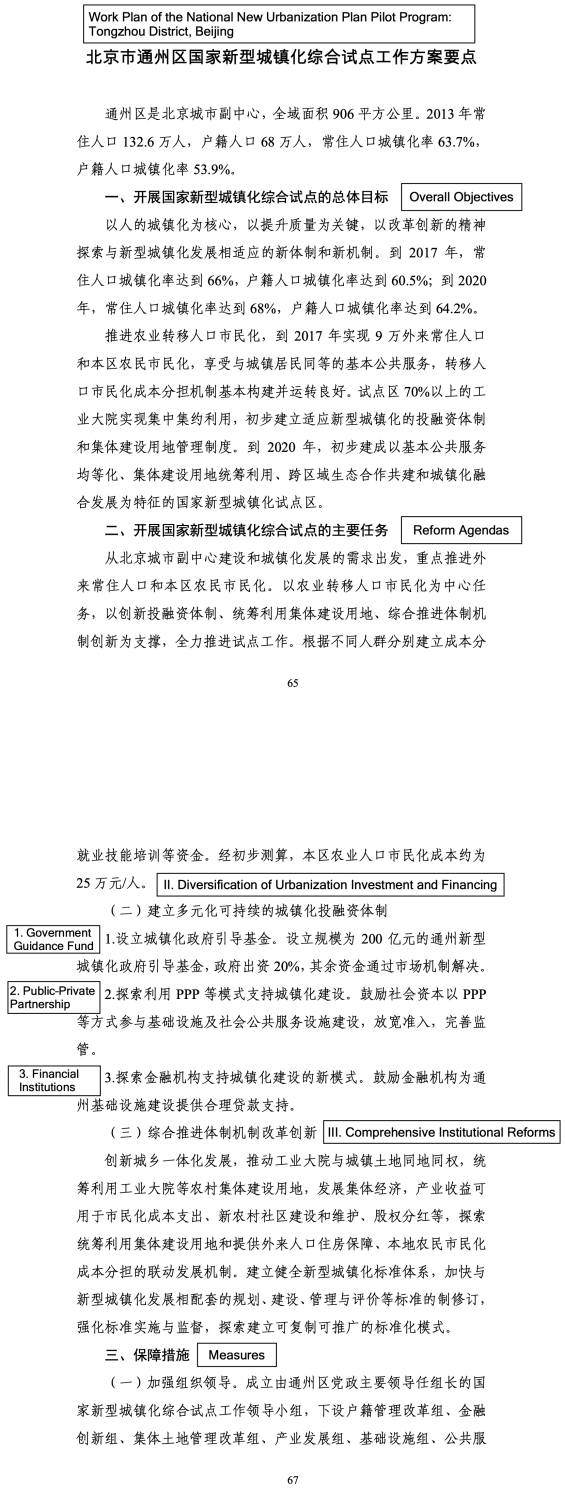
Table A1: Major Policies Concerning the New Urbanization Plan

Issued Date (yy-mm-dd)	Issuer#	Document	Link
	A. The New Urbanization Plan		
2013-11-15	CCP Central Committee (in the Third Plenum)	The Decision on Major Issues Concerning Comprehensively Deepening Reforms	Link
2014-03-16	CCP Central Committee, State Council	National New Urbanization Plan (2014 - 2020)	Link
	B. The Pilot Program		
2014-12-29	NDRC, SCOPSR, MPS, MCA, MOF, MOHRSS, MOHURD, MOA PBOC, CBRC, SAC	Circular on issuing the Pilot Scheme of the National New urbanization Plan (The attached: the 1st Pilot Scheme)	Link (The attached)
2015-11-16	NDRC, SCOPSR, MPS, MCA, MOF, MOHRSS, MOHURD, MOA PBOC, CBRC, SAC	Circular on issuing the 2nd Pilot Scheme of the National New urbanization Plan (The attached: the 2nd Pilot Scheme)	Link (The attached)
2016-11-29	NDRC, SCOPSR, MPS, MCA, MOF, MOHRSS, MOHURD, MOA PBOC, CBRC, SAC	Circular on issuing the 3rd Pilot Scheme of the National New urbanization Plan (The attached: the 3rd Pilot Scheme)	Link (The attached)

Notes: The table lists information of major policy reforms that are related to the New Urbanization Plan and its pilot program, including the issued date, issuer, document name, and document link.

For issuers: CCCPC is Central Committee of the Chinese Communist Party. NDRC is National Development and Reform Commission (formerly State Planning Commission and State Development Planning Commission). SCOPSR is State Commission Office for Public Sector Reform. MPS is Ministry of Public Security. MCA is Ministry of Civil Affairs. MOF is Ministry of Finance. MOHRSS is Ministry of Human Resources and Social Security. MOHURD is Ministry of Housing and Urban-Rural Development. MOA is Ministry of Agriculture. PBOC is People's Bank of China. CBRC is the China Banking Regulatory Commission. SAV is Standardization Administration of China.

Figure A3: Pilot Program Reform Agenda Example: Tongzhou District, Beijing



Work Plan of the National New Urbanization Plan Pilot Program: Tongzhou District, Beijing

北京市通州区国家新型城镇化综合试点工作方案要点

通州区是北京城市副中心，全域面积 906 平方公里。2013 年常住人口 132.6 万人，户籍人口 68 万人，常住人口城镇化率 63.7%，户籍人口城镇化率 53.9%。

一、开展国家新型城镇化综合试点的总体目标 Overall Objectives

以人的城镇化为核心，以提升质量为关键，以改革创新的精神探索与新型城镇化发展相适应的新体制和新机制。到 2017 年，常住人口城镇化率达到 66%，户籍人口城镇化率达到 60.5%；到 2020 年，常住人口城镇化率达到 68%，户籍人口城镇化率达到 64.2%。

推进农业转移人口市民化，到 2017 年实现 9 万外来常住人口和本区农民市民化，享受与城镇居民同等的基本公共服务，转移人口市民化成本分担机制基本构建并运转良好。试点区 70%以上的工业大院实现集中集约利用，初步建立适应新型城镇化的投融资体制和集体建设用地管理制度。到 2020 年，初步建成以基本公共服务均等化、集体建设用地统筹利用、跨区域生态合作共建和城镇化融合发展为特征的国家新型城镇化试点区。

二、开展国家新型城镇化综合试点的主要任务 Reform Agendas

从北京城市副中心建设和城镇化发展的需求出发，重点推进外来常住人口和本区农民市民化。以农业转移人口市民化为中心任务，以创新投融资体制、统筹利用集体建设用地、综合推进体制机制创新为支撑，全力推进试点工作。根据不同人群分别建立成本分

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担机制。 I. Cost-Sharing for the Urban Integration of Rural Migrants

（一）建立农业转移人口市民化成本分担机制

1.加快户籍制度改革。一是推进积分落户政策，制定通州区积分落户试行管理办法。面向通州副中心建设，统筹考虑城市运营管理保障及产业发展方向，以具有合法稳定就业和合法稳定住所（含租赁）、参加城镇社会保险年限、连续居住年限等为主要指标，合理设置积分分值，达到一定分值的可以申请落户，为北京及国内其他特大城市户籍制度改革提供经验。二是强化居住证积分与公共服务待遇挂钩。

2.建立农业转移人口市民化成本分担机制。一是外来常住人口市民化成本。主要针对未参加基本养老保险、未享受教育等基本公共服务的外来常住人口提供与城镇居民同等化的基本公共服务。按照统筹推进、分步实施的原则，试点期内拟推进 6 万外来人口市民化。政府承担由于外来人口市民化带来的教育、医疗、保障性住房等公共服务资源的扩容以及基础设施新建和改扩建等方面的支出。企业负担社会保险、职业培训等成本。个人承担社会保险、保障性住房租金等成本。经初步测算，外来常住人口市民化成本约为 10 万元/人。二是本区农业转移人口市民化成本，在全区范围内，选择典型乡镇，试点期内解决 3 万农村剩余劳动力的农转居问题。通州区政府主要承担交通、市政设施、义务教育、医疗等设施建设费用以及就业培训支出等。企业或村集体承担农转居人口的社会保险、就业补助费用等成本。个人承担医疗保险、养老保险、子女教育、

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就业技能培训等资金。经初步测算，本区农业人口市民化成本约为 25 万元/人。 II. Diversification of Urbanization Investment and Financing

（二）建立多元化可持续的城镇化投融资体制

1. Government Guidance Fund 1.设立城镇化政府引导基金。设立规模为 200 亿元的通州新型城镇化政府引导基金，政府出资 20%，其余资金通过市场机制解决。

2. Public-Private Partnership 2.探索利用 PPP 等模式支持城镇化建设。鼓励社会资本以 PPP 等方式参与基础设施及社会公共服务设施建设，放宽准入，完善监管。

3. Financial Institutions 3.探索金融机构支持城镇化建设的新模式。鼓励金融机构为通州基础设施建设提供合理贷款支持。

（三）综合推进体制机制改革创新 III. Comprehensive Institutional Reforms

创新城乡一体化发展，推动工业大院与城镇土地同地同权，统筹利用工业大院等农村集体建设用地，发展集体经济，产业收益可用于市民化成本支出、新农村社区建设和维护、股权分红等，探索统筹利用集体建设用地和提供外来人口住房保障、本地农民市民化成本分担的联动发展机制。建立健全新型城镇化标准体系，加快与新型城镇化发展相配套的规划、建设、管理与评价等标准的制修订，强化标准实施与监督，探索建立可复制可推广的标准化模式。

三、保障措施 Measures

（一）加强组织领导。成立由通州区党政主要领导任组长的国家新型城镇化综合试点工作领导小组，下设户籍管理改革组、金融创新组、集体土地管理改革组、产业发展组、基础设施组、公共服

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务组等，负责具体落实工作。

（二）落实责任部门。根据试点目标，制定年度实施计划，明确年度工作任务，落实到具体单位。

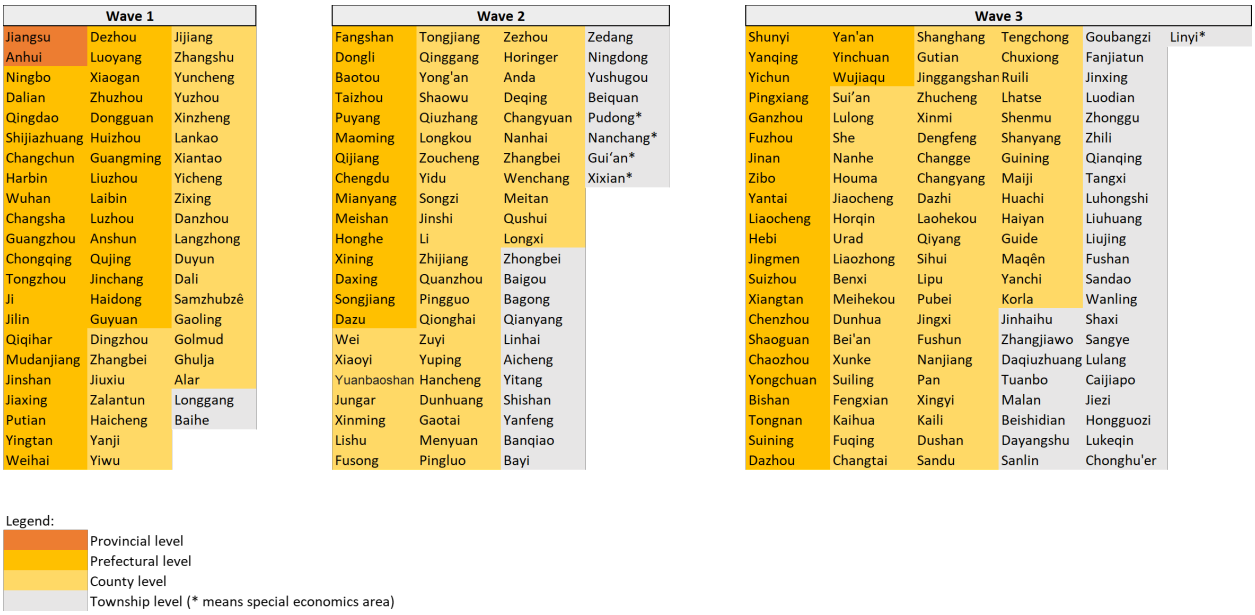
（三）强化监督考核。加强对试点工作的督促检查，将试点工作推行成效纳入到主管领导绩效考核体系，完善奖惩机制。

（四）加强宣传报道。强化宣传意识，加大宣传力度，为新型城镇化的改革发展提供强大的舆论支持、思想保证和精神动力。

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Notes: The figure shows the document of NUP pilot program work plan for Tongzhou district in Beijing. In the second section of "Reform Agendas," the document lists the "diversification of urbanization investment and financing" as the second agenda, and indicates the "public-private partnership" as one of the financing tools for urbanization.

Figure A4: The List of NUP Pilot Units by Roll-Out Wave



Wave 1		
Jiangsu	Dezhou	Jijiang
Anhui	Luoyang	Zhangshu
Ningbo	Xiaogan	Yuncheng
Dalian	Zhuzhou	Yuzhou
Qingdao	Dongguan	Xinzheng
Shijiazhuang	Huizhou	Lankao
Changchun	Guangming	Xiantao
Harbin	Liuzhou	Yicheng
Wuhan	Laibin	Zixing
Changsha	Luzhou	Danzhou
Guangzhou	Anshun	Langzhong
Chongqing	Qujing	Duyun
Tongzhou	Jinchang	Dali
Ji	Haidong	Samzhubzê
Jilin	Guyuan	Gaoling
Qiqihar	Dingzhou	Golmud
Mudanjiang	Zhangbei	Ghulja
Jinshan	Jiuxiu	Alar
Jiaxing	Zalantun	Longgang
Putian	Haicheng	Baihe
Yingtan	Yanji	
Weihai	Yiwu	

Wave 2			
Fangshan	Tongjiang	Zezhou	Zedang
Dongli	Qinggang	Horinger	Ningdong
Baotou	Yong'an	Anda	Yushugou
Taizhou	Shaowu	Deqing	Beiquan
Puyang	Qiuzhang	Changyuan	Pudong*
Maoming	Longkou	Nanhai	Nanchang*
Qijiang	Zoucheng	Zhangbei	Gui'an*
Chengdu	Yidu	Wenchang	Xixian*
Mianyang	Songzi	Meitan	
Meishan	Jinshi	Qushui	
Honghe	Li	Longxi	
Xining	Zhijiang	Zhongbei	
Daxing	Quanzhou	Baigou	
Songjiang	Pingguo	Bagong	
Dazu	Qionghai	Qianyang	
Wei	Zuyi	Linhai	
Xiaoyi	Yuping	Aicheng	
Yuanbaoshan	Hancheng	Yitang	
Jungar	Dunhuang	Shishan	
Xinming	Gaotai	Yanfeng	
Lishu	Menyuan	Banqiao	
Fusong	Pingluo	Bayi	

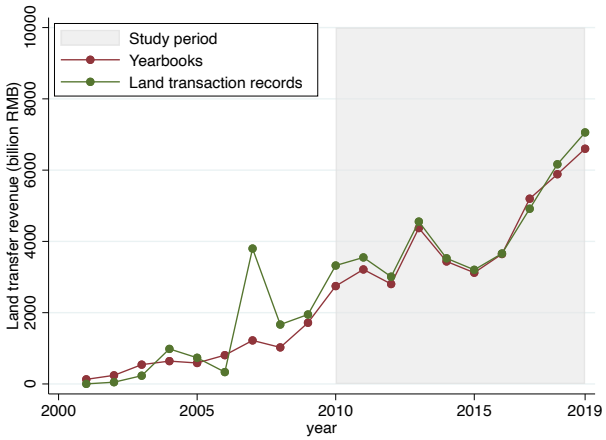
Wave 3					
Shunyi	Yan'an	Shanghang	Tengchong	Goubangzi	Linyi*
Yanqing	Yinchuan	Gutian	Chuxiong	Fanjiatun	
Yichun	Wujiaqu	Jinggangshan	Ruili	Jinxing	
Pingxiang	Sui'an	Zhucheng	Lhatse	Luodian	
Ganzhou	Lulong	Xinmi	Shenmu	Zhonggu	
Fuzhou	She	Dengfeng	Shanyang	Zhili	
Jinan	Nanhe	Changge	Guining	Qianqing	
Zibo	Houma	Changyang	Maiji	Tangxi	
Yantai	Jiaocheng	Dazhi	Huachi	Luhongshi	
Liaocheng	Horqin	Laohekou	Haiyan	Liuhuang	
Hebi	Urad	Qiyang	Guide	Liujing	
Jingmen	Liaozhong	Sihui	Maqên	Fushan	
Suizhou	Benxi	Lipu	Yanchi	Sandao	
Xiangtan	Meihekou	Pubei	Korla	Wanling	
Chenzhou	Dunhua	Jingxi	Jinhaihu	Shaxi	
Shaoguan	Bei'an	Fushun	Zhangjiawo	Sangye	
Chaozhou	Xunke	Nanjiang	Daqiuzhuang	Lulang	
Yongchuan	Suiling	Pan	Tuanbo	Caijiapo	
Bishan	Fengxian	Xingyi	Malan	Jiezi	
Tongnan	Kaihua	Kaili	Beishidian	Hongguozi	
Suining	Fuqing	Dushan	Dayangshu	Lukeqin	
Dazhou	Changtai	Sandu	Sanlin	Chonghu'er	

Legend:

- Provincial level
- Prefectural level
- County level
- Township level (* means special economics area)

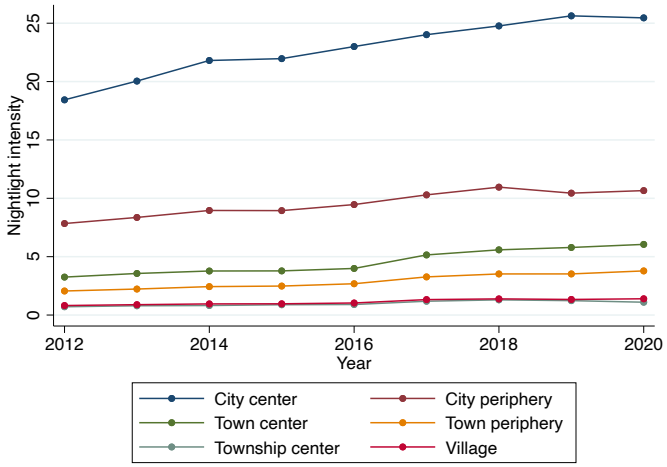
Notes: The figure shows the list of pilot units in the pilot program of the New Urbanization Plan by roll-out wave. "Chongqing" in wave one only includes the central nine districts in Chongqing municipality. "*" indicates special area units: "Pudong*" refers to the Lin-Gang Special Area in Pudong district of Shanghai Municipality; "Nanchang*" refers to the High-Tech Industrial Development Area in Nanchang city of Jiangxi province. "Gui'an*" refers to the Gui'an New Area located across Guiyang city and Anshun city of Guizhou province;"Xixian*" refers to the Xixian New Area located across Xi'an city and Xianyang city of Shaanxi province, and "Linyi*" refers to the Economic and Technological Development Zone in Linyi city of Shandong province.

Figure A5: Comparison of Land Transaction Records and China National Resource Yearbook



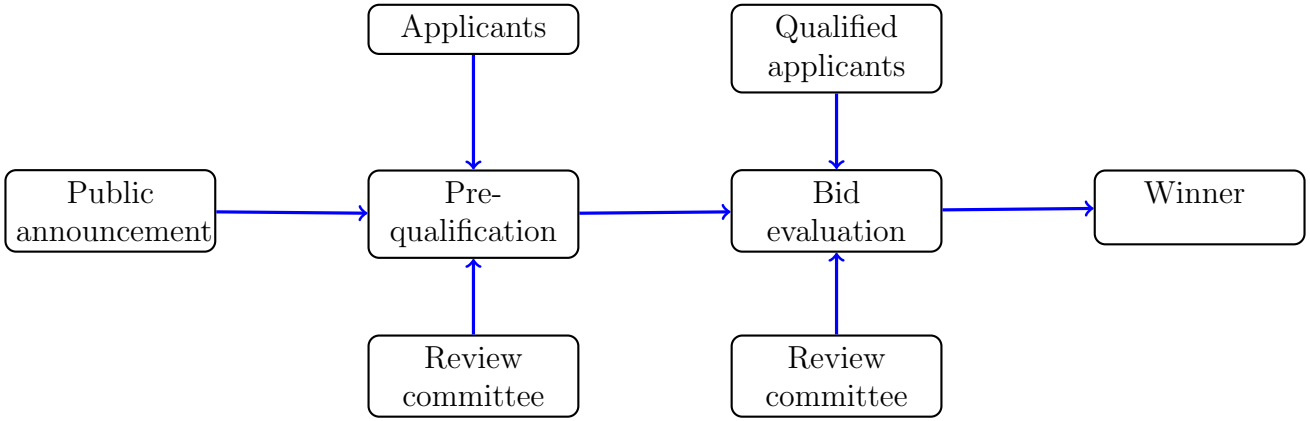
Notes: The figure compares the aggregated annual land transfer revenues between parcel-level land transaction records and annual statistics from yearbooks for the period between 2002 and 2019.
Sources: Land transaction records 2002-2019; China National Land Resource Yearbook 2002-2018; and China Natural Resource Yearbook 2019-2020.

Figure A6: Nightlight Intensity across Urbanicity Between 2012 and 2020



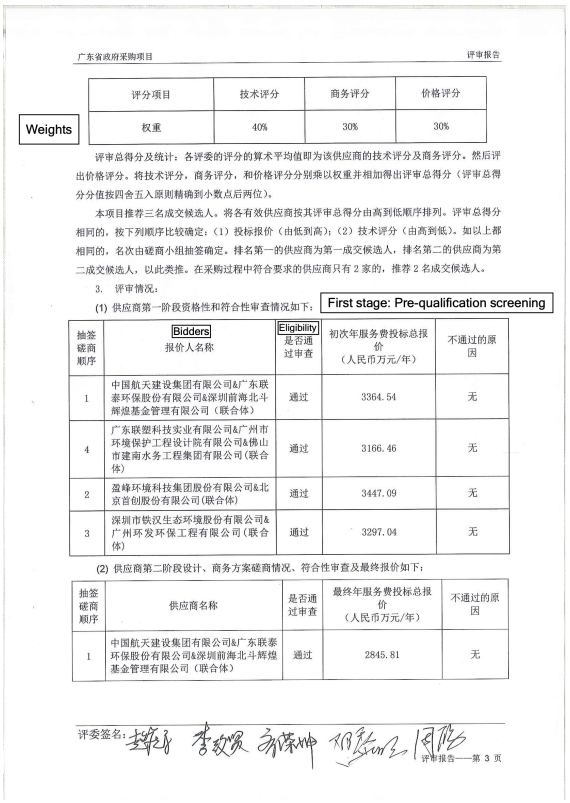
Notes: The figure presents the nightlight intensity across urbanicity for the period between 2012 and 2020.
Sources: Urban-Rural Division Codes and satellite nighttime lights 2012-2020.

Figure A7: Process of an Open Bidding in the PPP Project



Notes. The figure describes the process of a typical bidding process in the PPP project. The process involves four stages: 1) public announcement from governments; 2) a pre-qualification stage to screen out the unqualified applicants; 3) an evaluation process to rank the participating firms; and 4) the firm with the highest evaluation score is selected as the winning of the bid.

Figure A8: PPP Bidding Document Example: Taishan City, Guangdong



广东省政府采购项目　　评审报告

评分项目	技术评分	商务评分	价格评分
权重	40%	30%	30%

Weights

评审总得分及统计：各评委的评分的算术平均值即为该供应商的技术评分及商务评分。然后评出价格评分。将技术评分，商务评分，和价格评分分别乘以权重并相加得出评审总得分（评审总得分分值按四舍五入原则精确到小数点后两位）。

本项目推荐三名成交候选人。将各有效供应商按其评审总得分由高到低顺序排列。评审总得分相同的，按下列顺序比较确定：（1）投标报价（由低到高）；（2）技术评分（由高到低）。如以上都相同的，名次由磋商小组抽签确定。排名第一的供应商为第一成交候选人，排名第二的供应商为第二成交候选人，以此类推。在采购过程中符合要求的供应商只有 2 家的，推荐 2 名成交候选人。

3. 评审情况：

(1) 供应商第一阶段资格性和符合性审查情况如下：

First stage: Pre-qualification screening

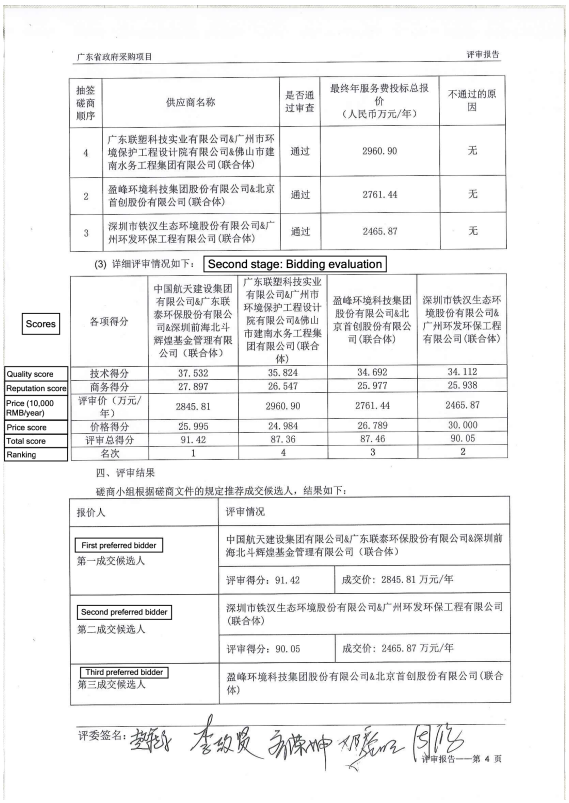
抽签磋商顺序	Bidders 报价人名称	Eligibility 是否通过审查	初次年服务费投标总报价（人民币万元/年）	不通过的原因
1	中国航天建设集团有限公司&广东联泰环保股份有限公司&深圳前海北斗辉煌基金管理有限公司（联合体）	通过	3364.54	无
4	广东联塑科技实业有限公司&广州市环境保护工程设计院有限公司&佛山市建南水务工程集团有限公司(联合体)	通过	3166.46	无
2	盈峰环境科技集团股份有限公司&北京首创股份有限公司(联合体)	通过	3447.09	无
3	深圳市铁汉生态环境股份有限公司&广州环发环保工程有限公司(联合体)	通过	3297.04	无

(2) 供应商第二阶段设计、商务方案磋商情况、符合性审查及最终报价如下：

抽签磋商顺序	供应商名称	是否通过审查	最终年服务费投标总报价（人民币万元/年）	不通过的原因
1	中国航天建设集团有限公司&广东联泰环保股份有限公司&深圳前海北斗辉煌基金管理有限公司（联合体）	通过	2845.81	无

评委签名：

评审报告——第 3 页



广东省政府采购项目　　评审报告

抽签磋商顺序	供应商名称	是否通过审查	最终年服务费投标总报价（人民币万元/年）	不通过的原因
4	广东联塑科技实业有限公司&广州市环境保护工程设计院有限公司&佛山市建南水务工程集团有限公司(联合体)	通过	2960.90	无
2	盈峰环境科技集团股份有限公司&北京首创股份有限公司(联合体)	通过	2761.44	无
3	深圳市铁汉生态环境股份有限公司&广州环发环保工程有限公司(联合体)	通过	2465.87	无

(3) 详细评审情况如下：

Second stage: Bidding evaluation

Scores	各项得分	中国航天建设集团有限公司&广东联泰环保股份有限公司&深圳前海北斗辉煌基金管理有限公司（联合体）	广东联塑科技实业有限公司&广州市环境保护工程设计院有限公司&佛山市建南水务工程集团有限公司(联合体)	盈峰环境科技集团股份有限公司&北京首创股份有限公司(联合体)	深圳市铁汉生态环境股份有限公司&广州环发环保工程有限公司(联合体)
Quality score	技术得分	37.532	35.824	34.692	34.112
Reputation score	商务得分	27.897	26.547	25.977	25.938
Price (10,000 RMB/year)	评审价（万元/年）	2845.81	2960.90	2761.44	2465.87
Price score	价格得分	25.995	24.984	26.789	30.000
Total score	评审总得分	91.42	87.36	87.46	90.05
Ranking	名次	1	4	3	2

四、评审结果

磋商小组根据磋商文件的规定推荐成交候选人，结果如下：

报价人	评审情况	
First preferred bidder 第一成交候选人	中国航天建设集团有限公司&广东联泰环保股份有限公司&深圳前海北斗辉煌基金管理有限公司（联合体）	
	评审得分：91.42	成交价：2845.81 万元/年
Second preferred bidder 第二成交候选人	深圳市铁汉生态环境股份有限公司&广州环发环保工程有限公司(联合体)	
	评审得分：90.05	成交价：2465.87 万元/年
Third preferred bidder 第三成交候选人	盈峰环境科技集团股份有限公司&北京首创股份有限公司(联合体)	

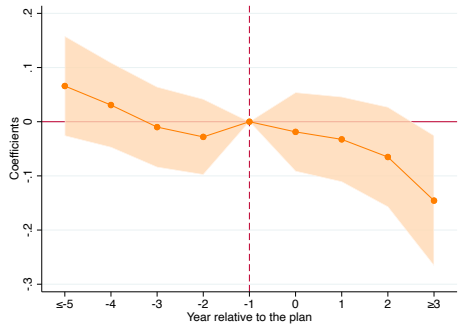
评委签名：

评审报告——第 4 页

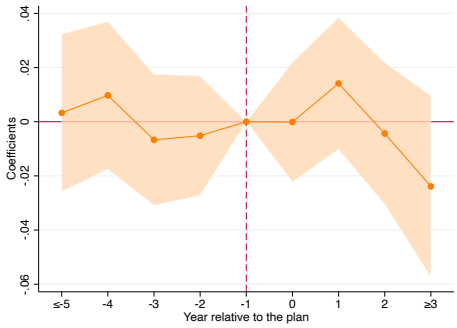
(a) First stage: Pre-qualification screening　　**(b)** Second stage: Bidding evaluation

Notes: The figure shows the bidding document of a PPP project in Taishan city in Guangdong. In the second stage of "bidding evaluation" (subfigure b), the document lists the participating bidders and their evaluation scores.

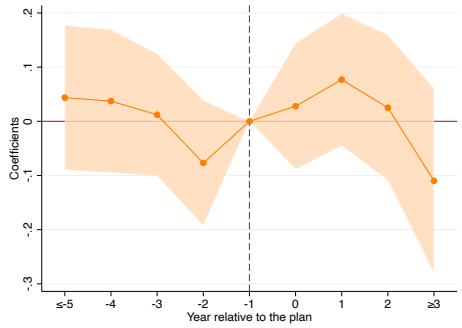
Figure A9: Event Study Figure on Land Finance and Use



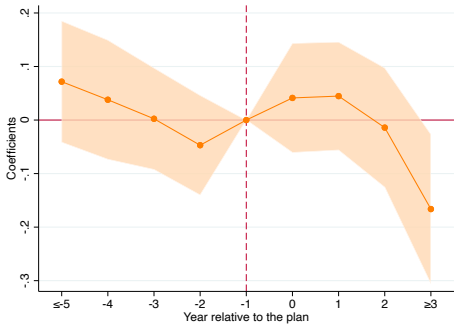
(a) Number of land



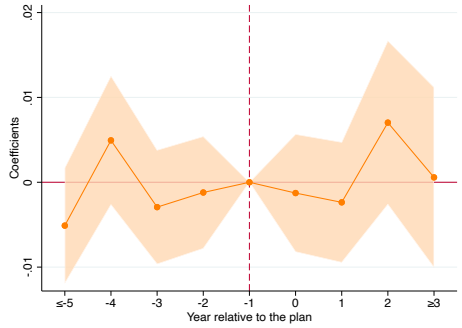
(b) Land conversion



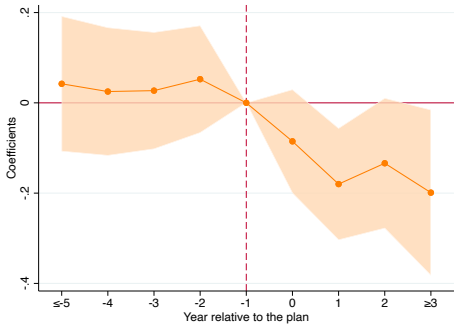
(c) Land revenue



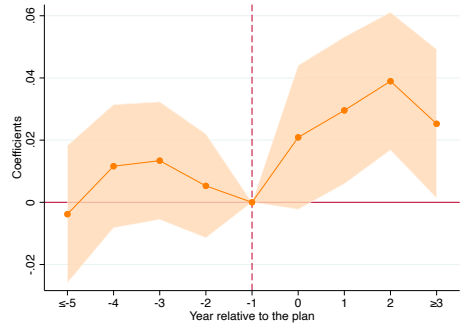
(d) Land area



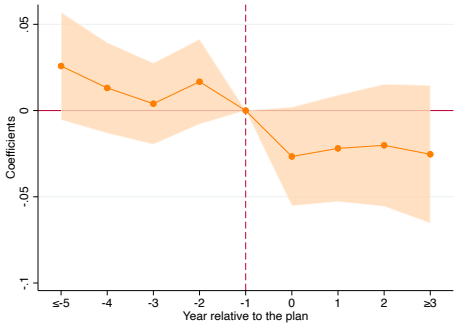
(e) LGFVs



(f) FRA limit



(g) Commercial land



(h) Residential land

Notes: The figure shows event study estimates of the impact of the pilot program on land finance and use, using two-way fixed effects estimators. The dependent variables are listed in Panel B of Table 2 Event period -1 is normalized to 0. The figures show the 95% confidence interval with standard errors clustered at the county level.
Sources: Land transaction records 2010-2019.

B. Anecdotal Evidence

One showy project example comes from Ocean Flower Island in Danzhou city, Hainan province. Ocean Flower Island is an artificial archipelago located off the north coast of Danzhou city. It covers almost 381 hectares (940 acres), placing it among the world's largest artificial islands (Figure B1). The Evergrande Group (real estate company) invested 160 billion RMB (US $24 billion) on the project, which consists of a mix of tourist attractions, residential complexes, and other infrastructure spread across three distinct islets.[24]

The project was initiated in late 2010, after the former CCP Secretary of Danzhou, Qi Zhang, took office in February 2010. The Evergrande Group obtained the sea-use right in 2013 and then the land-use right in 2015 for the construction of Ocean Flower Island. Danzhou city was selected for the first wave of the NUP pilot program at the end of 2014, and it was the only pilot from Hainan province in that wave. The original documents from the central governments did not include Ocean Flower Island as a pilot goal of Danzhou city. However, in the follow-up documents issued by Danzhou city, Ocean Flower Island became one of the projects incorporated into the New Urbanization Plan.[25]

Later, Qi Zhang lost his office during China's anti-corruption campaign in 2019. Zhang's case was later made as a typical inquiry that highlights cronyism in the Central Commission for Discipline Inspection (CCDI) news.[26] News reports highlighted two issues related to the development of Ocean Flower Island. First, while using land reclamation, Zhang divided the whole project into 36 sub-projects, each with an area of less than 27 hectares.[27] Doing so circumvented requirements that higher-level authorities review and approve its construction. Second, the Environmental Assessment Report, by local environmental officers, in 2012 indicated that the nearest coral reefs were 4.1km from the

[24]See a video introduction provided by the South China Morning Post at: https://www.scmp.com/video/china/3094196/china-prepares-open-hainan-ocean-flower-island-worlds-largest-man-made-tourist.

[25]See news: http://hainan.sina.com.cn/news/hnyw/2015-11-27/detail-ifxmazmz8903678.shtml.

[26]See news: https://jjjcb.ccdi.gov.cn/epaper/index.html?guid=1408265715324026881.

[27]If the reclamation reaches 50 hectares, it must be approved by the State Council and the State Ocean Bureau, according to the legislation.

project. However, several coral reefs were discovered in its within-1km southern sea regions. The partial development of Ocean Flower Island harmed the coral reefs and breached the law.

Unlike Danzhou city, some of the counties in the pilot program are "impoverished counties" in China. The "impoverished county" designation allow county to receive higher budgetary transfers from the central government while indicating a lack of resources and chances to attract investment from significant property developers such as the Evergrand Group. However, some flashy projects were also being built, along with debt issues uncovered later among the local governments of these impoverished counties.

One famous example is the Shuisi Building in Dushan county, Guizhou province (Figure B2). Dushan is a county with a GDP of 1 billion RMB (and a population of 356 thousand) in 2018, yet holds a debt of more than 40 billion RMB in the same year. With a nearly 200 million RMB debt, Dushan county started constructing the Shuisi Building. The building has a construction area of 60,000 square meters, a height of 99.9 meters, and a total of 24 floors. The project started in September 2016, three months before Dushan County was selected for the third wave of the NUP pilot program. After being selected for the pilot program, Dushan County started some other costly projects, including a museum, a college town, a big data center, etc. Sandu county, which is adjunct to Dushan county and was also selected for the third wave of the NUP pilot program. It, too, undertook costly projects and faced the same debt problems as Dushan county. The County CCP Secretaries of both counties were arrested in a joint investigation by the CCDI in 2019. As of June 2020, the balance of government debt in Dushan County is 13.568 billion RMB, and the balance of government debt in Sandu County is 9.747 billion RMB.[28]

[28]See news at: https://www.ccdi.gov.cn/yaowen/202007/t20200716_222132.html.

Figure B1: Ocean Flower Island



Notes: The figure shows a natural-color image of the Ocean Flower Island located in Yangpu Bay, Hainan province. The image is taken on 6 May 2020, by Lauren Dauphin from NASA Earth Observatory images, using Landsat data from the U.S. Geological Survey.
Sources: https://earthobservatory.nasa.gov/images/147129/a-sandy-flower-in-the-pacific.

Figure B2: Shuisi Building



Notes: The figure shows the Shuisi Building located in Jingxingu Scenic Area, Dushan county, Guizhou province.
Sources: https://news.cgtn.com/news/2020-07-15/What-will-happen-to-Dushan-County-s-Shuisi-Building--S8ZbeYzMWc/index.html.