



## Article

# Political Circles and Land Supply for the Service and Industrial Sectors: Evidence from 284 Cities in China

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**Abstract:** This study examines how political career incentives drive city leaders to strategically lease land to the service and industrial sectors within their terms of office and trigger political circles in land supply. Drawing on a comprehensive panel dataset covering 284 cities in China from 2006 to 2020, the results of panel regressions reveal a U-shaped correlation between mayors' tenure in office and the quantity and proportion of land leased to the service sector for the 2006–2013 period, when economic growth was the overwhelming indicator of political performance. Newly appointed mayors are more motivated to stimulate long-term economic growth and supply more land to the industrial sector. As their tenure in office increases, mayors become less concerned with maximizing long-term economic growth and opt to lease more land to the service sector for immediate one-off proceeds. However, the U-shaped relationship has disappeared since 2013, when the cadre evaluation system was amended to prohibit using GDP growth as the primary criterion for evaluating local officials' performance.

**Keywords:** land supply; local officials; political promotion; political circles



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## 1. Introduction

To promote market-oriented reform and stimulate economic growth, the central government in China has transferred a substantial amount of administrative power over local jurisdictions to local governments, especially in terms of allowing local autonomy in setting fiscal and economic regulations and policies, since the early 1980s [1–3]. The management of urban land resources in China has also been delegated to local governments. The Land Administration Law enacted in 1986 authorizes local governments to perform functions related to land administration [4]. Since 1994, the central government has distributed all land-leasing revenue to subnational governments to compensate them for the loss in tax revenue incurred by the tax-sharing reform initiated in 1994 [5]. Consequently, subnational governments, especially city-level and county-level governments, hold discretionary power to outline land-supply plans, lease out urban land and claim land-leasing proceeds as off-budgetary revenues, which they are not obliged to share with the central government [6–9].

Despite embracing regional decentralization in the economic sphere since the early 1980s, China remains a politically centralized regime [10]. The central government and four tiers of local governments, including province, prefecture, county and township levels, make up China's five tiers of government. The appointment, assessment, promotion and removal of local leaders, including the head of the executive branch and the party secretary at each level of government, are ultimately controlled by governments one level above [11,12]. Since the early 1980s, the most crucial factor in evaluating local officials' performance during their terms in office has been their economic achievements [13,14]. By rewarding and punishing local officials according to their performance related to economic growth, top-down personnel management motivates local officials to stimulate economic growth and induces tournament-like competition between local leaders for higher positions [15–17]. Scholars generally accept that the "regionally decentralized authoritarian"

system, which featured a combination of regional economic decentralization and political centralization, has served as the foundation for the rapid economic development in China since 1978 [18,19].

However, the performance evaluation system dominated by indicators of economic growth has incentivized local governments to exploit market instruments for political purposes and incurred some problems that should not be overlooked. Studies have documented the strategic behaviors of local governments induced by political career incentives. Local governments are found to compete for foreign and domestic capital, which serves as a critical factor driving local economic growth, by providing preferential treatment such as low taxes and fees, especially discounted land use fees, and building massive infrastructure projects such as airports and highways to improve accessibility as well as other business-friendly services [20,21]. In addition, an overemphasis on economic growth has resulted in distorted public policies and inadequate social welfare provision. Local governments opt to compromise long-term social welfare to attain higher rates of short-term economic growth, resulting in a “race to the bottom” regarding pollution control and the supply of public services [22–25].

Urban land, as a primary factor of production entirely controlled by local governments, is a vital instrument exploited by local governments to intervene in and stimulate local economies. Since the late 1990s, urban land has been not only the major source of local fiscal revenues but also the fundamental driver of economic prosperity and urban development in China [26–29]. Local governments are found to devise land-supply strategies that allow them to stimulate economic growth and maximize their promotion prospects. On the one hand, local authorities supply low-cost industrial land to attract mobile capital, especially manufacturing firms, to stimulate long-term industrial growth [30–33]. On the other hand, local governments opt to transfer residential and commercial land at the market rate to maximize short-term lump-sum land-leasing income [34–37]. Such land supply strategies have induced adverse impacts such as distorting industrial land prices, causing manufacturing firms to overinvest, reducing the production efficiency of the industrial sector, intensifying pollution emissions and hindering the advancement of the industrial structure [38–40].

Although local officials’ strategic land policies triggered by political career incentives and the consequent adverse impacts have been discussed by previous studies, none empirically examine the relationship between local politicians’ career incentives and local governments’ land supply strategies. To fill this research gap, this article investigates how local leaders trade off short-term lump-sum land-leasing proceeds against long-term industrial growth and strategically allocate land between the service and industrial sectors to maximize the odds of promotion within their term of office.

The political economy literature has documented politicians’ opportunistic behaviors and the consequent “political business cycles”, manifested by public policies that incumbent governors systematically manipulate in accordance with political turnover cycles [41]. Empirical evidence of political business cycles has been observed in different countries, such as the United States, India, Germany, Brazil and Russia [42–46]. In democratic countries, reelection pressure faced by incumbents induces opportunistic public policies, such as budget distortions before an election and tax reductions during election years [42–46]. In the context of China, the political business circle is incurred by local political leaders’ incentives to satisfy the criteria for career advancement designated by high-level governments. Some empirical studies have documented local leaders’ strategic public spending during their term of office [9,47]. However, there is little empirical evidence on political circles regarding land supply. This research extends the literature on political business circles to an authoritarian regime and investigates how the performance evaluation system dominated by economic growth triggers political circles of city leaders’ land supply for the service and industrial sectors.

The remainder of the paper proceeds as follows. Section 2 reviews the literature related to this research. Section 3 discusses the institutional background and develops hypotheses.

Section 4 presents the research methods and describes the data. Section 5 elaborates on the empirical results. Section 6 concludes the study.

## 2. Literature Review

### 2.1. Political Business Circles

The first formal model of the “political business cycle” is proposed by Nordhaus [48], premised on the Phillips curve with dynamic voter expectations. It indicates that naive voters are often duped by an inflationary boom before elections in spite of a subsequent slump, and predicts the political cycles in economic growth, unemployment and inflation. According to Rogoff’s [49] signaling model with information asymmetry, incumbent politicians often execute policies that are more apparent to voters during preelection and election periods to signify their capacity for reelection, thereby causing “election year budget distortions”. Besley and Case [42] develop a reputation-building model to illuminate how mandatory term limits influence policy decisions in a setting where voters have asymmetrical information about politicians’ competence. If incumbents are permitted to stay in office for up to two terms, those who provide more benefits for voters are more likely to win reelection and serve for the second term. Nonetheless, due to the lack of reelection pressure, incumbents tend to provide voters with smaller perks during their final term of office than they did during their first term. Martinez [50] examines the political business circle based on a model that assumes politicians are motivated to enhance their reputations to boost their prospects of winning reelection. In order to improve their reputation, officials optimally allocate their efforts throughout a political cycle and tend to intensify their efforts just before an election.

Empirical evidence of preelection distortions and manipulations, exhibited in diverse manners, has been observed in different countries, such as the United States, India, Germany, Brazil and Russia. Employing a dataset of 48 American states between 1950 and 1986, Besley and Case [42] conclude that sitting governors who are ineligible for reelection tend to yield higher public spending and taxes, but lower per capita income. The overwhelming outcome is a fiscal cycle, manifested by public expenditures below the state mean during governors’ first term and above the state mean during their last term. Based on a sample of 7738 German municipalities from 2000 to 2008, Foremny and Riedel [46] provide empirical evidence of the political business cycle in terms of taxation by demonstrating that the growth in local business tax rates drops remarkably in the election year as well as the year prior to the election, whereas it rises significantly in the year after the election.

Employing monthly regional panel data of Russia between 1996 and 2003, Akhmedov and Zhuravskaya [51] document political business cycles in budget expenditure and composition. Overall regional public spending rises and tends to be channeled to straightforward monetary payoffs to voters during the period prior to elections. Such systematic manipulations before elections have significantly enhanced incumbents’ likelihood of winning reelection. Additionally, preelection manipulations are found to decline with the improvement of democracy, government openness, media freedom and voter consciousness. With a dataset of municipalities in Brazil between 1989 and 2005, Sakurai and Menezes-Filho [45] report a rise in fiscal spending as well as declines in local tax income, budget surplus and municipal investment in election years.

A study on 14 main Indian states from 1960 to 1992 presents that fiscal policies are maneuvered during election years to cater to the demands of specific interest groups that are crucial for an election win, rather than escalate populist spending to curry favor with the majority of voters [43]. Another study on Colombian municipalities documents an increase in public spending on specific programs, which are exceptionally alluring to voters, and a decrease in other types of expenditures before elections [44]. Further empirical findings also suggest that voters are inclined to vote for incumbents who increase spending on their preferred projects before elections.

Cross-country studies also support the hypothesis of the political business cycle. Employing data on 106 countries between 1960 and 2001, Brender and Drazen [52] report

a political budget cycle, with an increase in the deficit in election years. The deficit cycle is driven by newly established democracies, where fiscal manipulation is feasible since voters are not familiar with elections or lack the information necessary for evaluating fiscal manipulations. Based on a dataset of government expenditure in 71 democratic countries during 1972–2009, Brender and Drazen [53] find more remarkable changes in expenditure composition during election years. Using a panel dataset of 85 countries between 1975 and 1995, Shi and Svensson [54] find that the “political budget cycle” is more significant in developing countries, while becoming moderate or even completely absent in developed countries. The expected rents of staying in office, measured by government rent-seeking activities and corruption, and the proportion of informed voters who are capable of differentiating preelection manipulations from sitting governors’ competence, measured by access to free media, are the two major triggers for the distinction in the degree of the political budget cycle between developing and developed economies.

In the context of China, the political business cycle is incurred by local political leaders’ motives to satisfy the criteria for promotion set by high-level governments. Top-down personnel management has induced opportunistic behaviors of local political leaders, since they have extensive control over local policies to enhance their chances of political promotion.

By analyzing a comprehensive dataset of all Chinese counties from 1997 to 2002, Guo [47] finds that county leaders tend to strategically spend more public funds on measurable and visible massive development projects at the critical time of their term of office to impress their superiors with accomplishments in office and improve their chances of promotion. Public expenditure per capita of county government exhibits the highest growth rate in a county leader’s third and fourth year in office. Chen and Kung [9] conclude that an escalation in land-leasing income tends to enhance local governments’ spending on urban construction by analyzing panel data on 4390 county leaders in China between 1999 and 2008. The positive correlation demonstrates a non-linear pattern and peaks at the fourth year of a term, which seems to be the optimal time for a county leader to signal competence as the first term is going to expire.

## 2.2. Top-Down Personnel Control and Land Supply Strategy

The existing literature suggests that top-down personnel control motivates local governments to lean upon land-leasing revenue to stimulate economic growth. Local governments’ strategies for land supply have been significantly shaped by the intense competition between them in terms of economic performance [26,31,32]. Local governments’ ability to compete with other jurisdictions by reducing tax rates and providing tax refunds has been curtailed by the tax-sharing reform started in 1994, which has recentralized the authority of setting tax rates [38]. As monopolistic suppliers of urban land, local governments are motivated to resort to land in order to mobilize larger capital investment [30,33]. By examining land use maps of Shunde City located in the Pearl River Delta, and Jiangyin City, located in the Yangtze River Delta, between 2001 and 2010, Tian [29] finds that the strict land quota system prompts local officials in the peri-urban districts to allocate the majority of quotas to the industrial sector in an effort to promote economic growth. Based on a micro-level dataset of manufacturing enterprises in 2009, Zheng and Shi [55] report that industrial land supply is positively correlated with enterprise location decisions by demonstrating that the execution of industrial land expansion policies contributes to attracting more enterprises.

Local governments endeavor to offer industrial land at negotiated and exceptionally low prices to attract mobile manufacturing firms and stimulate long-term economic growth. Some even sell land at prices lower than land development costs, leading to a “race to the bottom” regarding industrial land prices [26,31,32]. Drawing on a panel dataset of prefecture-level cities from 2003 to 2012, Huang and Du [56] find that the industrial land-leasing prices of prefectural cities are considerably influenced by those of adjacent cities. In order to attract external investment, neighboring cities choose to mimic each other’s industrial land-leasing prices. Local governments, which heavily rely on investment or

industrial production, are inclined to respond more to their neighbors' industrial land-leasing prices.

On the other hand, local governments opt to transfer residential and commercial land at the market rate to maximize one-off land sale revenue, finance growth-oriented infrastructure and support urban construction and development [26,30,34–37]. The recentralization of fiscal power in 1994 has led to asymmetric or partial fiscal decentralization and increased local governments' fiscal pressure [57,58]. Asymmetric fiscal decentralization and top-down personnel control motivate local governments to rely on land-leasing revenue as a crucial source of off-budgetary revenue, which is under local authorities' discretionary control and tends to be spent disproportionately on construction projects that can further local officials' political career goals [8,9,27,35,59,60].

Drawing on a panel dataset of prefecture-level cities between 1999 and 2006, Ding et al. [27] report that local officials frequently direct land-leasing income toward growth-oriented infrastructure, including urban roadways and image projects (e.g., open spaces and public squares). By looking into a dataset collected from 31 provinces from 1999 to 2014, Tang et al. [60] show that the growth in land-leasing revenue has distorted local public expenditure by increasing local governments' spending on infrastructure development projects while reducing their expenditure on public services. Some studies have revealed an emerging trend that local governments exploit land sale proceeds to finance grand construction projects to signal achievements in office directly. By constructing a dataset on the turnovers of 4390 county leaders from 24 Chinese provinces between 1999 and 2008, Chen and Kung [9] demonstrate that county officials have channeled the land-leasing income disproportionately toward conspicuous construction projects, such as large-scale squares or plazas and magnificent government buildings, in order to signal their in-office political achievement and increase the prospects of promotion.

### 3. Institutional Background and Hypotheses

#### 3.1. Institutional Background

##### 3.1.1. Political Hierarchy and Top-down Political Personnel Control

The central government and four tiers of sub-national governments, including province, prefecture (or municipality), county and township levels, make up China's five tiers of government [61]. The head of the executive branch, for example the mayor at the city level, and the secretary of the Communist Party Committee, are the two prominent leaders in control of the local government at each level [62]. A term of office for local leaders is typically five years, while most officials stay in office for a shorter period [17]. Although certain officials may be selected for a second term, it is exceedingly uncommon for them to hold office for longer than ten years in a position [61].

Local officials are directly appointed and assessed by authorities at administrative levels immediately above them [10–12]. Since the early 1980s, the most crucial indicator of local officials' performance has been their economic achievements during their term of office [4,13,14]. Local leaders are motivated to pursue short-term economic growth instead of long-term development for promotion because, commonly, they will not be held accountable for any issues in their former jurisdictions after their terms are over [4].

##### 3.1.2. Reforming the Cadre Performance Evaluation System

Since 2013, the central government has significantly increased the emphasis on policies that support sustainable development while decreasing the priority of economic growth in assessing local officials' performance. *The Notice on Improving the Performance Evaluation of Leading Local Officials* was published in December 2013 by the Organization Department of the Central Committee, which forbade the use of GDP growth ranking as the primary criterion for performance assessment and required that national and subnational governments create a more comprehensive evaluation system and raise the weight of environmental protection (<http://renshi.people.com.cn/n/2013/1210/c139617-23793408.html>, accessed on 10 August 2022).

The Central Committee and the State Council initiated an environmental campaign in 2016 by sending high-ranking central officials, who formed an environmental protection inspection team, to check and monitor how local governments implement national environmental policies. This campaign aims to enforce the implementation of environmental regulations and policies launched by the central government [63]. The National Development and Reform Commission unveiled the Green Development Evaluation Indicators in December 2016, giving environmental preservation the most significant weight while only allocating 9.2% of the overall weight to economic growth ([https://www.ndrc.gov.cn/fggz/hjzy/stwmjs/201612/t20161222\\_1161174.html](https://www.ndrc.gov.cn/fggz/hjzy/stwmjs/201612/t20161222_1161174.html), accessed on 10 August 2022).

### 3.2. Hypotheses

The political market framework has been widely used to analyze governmental officials' incentives and the consequent public policies [64]. In this framework, public policies are the results of continuous exchanges between government officials, i.e., policy suppliers, and the voters or interest groups, i.e., policy demanders. Institutional arrangements affect the incentives of policymakers, thereby shaping the outcomes of such exchanges. This study applies this concept to analyze how centralized personnel control, a political institution, influences city leaders' motivations and shapes their land supply strategies. It examines the land supply strategies of cities at or above prefecture levels. The first two hypotheses focus on the impact of political career incentives on city governments' land supply strategy before 2013, when economic growth is the primary criterion for performance assessment. Promotions of local officials are determined by their immediate superiors according to their economic achievements during their tenure. To spur economic development, city leaders are incentivized to supply industrial land at low prices to attract mobile manufacturing firms and stimulate long-term industrial growth. However, they also have motivations to supply commercial and residential land at market prices to maximize one-off land sale revenue to finance growth-oriented infrastructure and urban development to signal their political achievements. These two divergent motivations induce term-limited city leaders to supply land strategically to the service and industrial sectors to maximize their promotion prospects at the end of a term. Specifically, newly appointed city leaders have longer time horizons and are more motivated to promote long-term economic growth and supply larger portions of land to the industrial sector. As their tenure in office grows and time horizons shorten, city leaders become less concerned with maximizing long-term revenue, which rewards their successors, and tend to allocate more land to the service sector for immediate lump-sum revenue. Thus, the relationship between the quantity of land supplied to the service sector and city leaders' tenure in office exhibits a U-shaped pattern. This U-shaped relationship also applies to the proportion of land allocated to the service sector.

**Hypothesis 1a:** *When economic growth is the major indicator of political performance, ceteris paribus, the total area of land allocated to the service sector first decreases and then increases with city leaders' tenure in office.*

**Hypothesis 1b:** *When economic growth is the major indicator of political performance, ceteris paribus, the proportion of land allocated to the service sector first decreases and then increases with city leaders' tenure in office.*

The following two hypotheses concern the institutional change of the cadre performance evaluation system. When the performance evaluation system is dominated by other factors, such as environmental protection after 2013, city leaders lose the incentive to stimulate economic growth, which will no longer facilitate them to climb up the career ladder, but in some cases, will even increase their chances to be investigated by the central government due to suspicions of corruption or the poor enforcement of environmental regulations [63,65–67]. Thus, the hypotheses, premised on the assumption that city leaders

are maximizing their promotion prospects by maximizing economic revenue stemming from the land supply, do not hold.

**Hypothesis 2a:** *When the performance evaluation system is not dominated by economic growth, the U-shaped relationship between the total area of land allocated to the service sector and city leaders' tenure in office does not hold.*

**Hypothesis 2b:** *When the performance evaluation system is not dominated by economic growth, the U-shaped relationship between the proportion of land allocated to the service sector and city leaders' tenure in office does not hold.*

## 4. Data and Methods

### 4.1. Data

Three categories of data are gathered from different sources. City-level land supply is obtained by aggregating parcel-level land transaction data retrieved from the China Land Market Website. The China Land Market website is an official land market information platform. It provides detailed and comprehensive information on land transactions in cities at or above the prefectural level. Since 2006, the central land authority has mandated local land and resources departments to report all land transaction information to this public website. Control variables, including the budgetary fiscal revenue, budgetary fiscal expenditure, population density, GDP and the ratio of the output value of the tertiary industry to GDP, are all extracted from the *China City Statistical Yearbooks* (2006–2020). Information on city leaders (mayors and party secretaries) is extracted from Baidu Baike, which is a useful information website that discloses the resumes of Chinese government officials. For each official, the information contains the start and end times of a term of office in each position. City leaders' information during the sample period is matched with annual macroeconomic data and land supply data.

Due to missing values of key variables in several cities, a panel dataset covering 284 cities at or above the prefecture level from 2006 to 2020 is obtained. It includes over 95% of cities at or above the prefecture level in China. Table 1 lists the definitions of variables. The descriptive statistics of variables are summarized in Table 2. For city leaders, a typical term of office is five years. However, most city leaders stay in a position for less than five years. The data show that from 2006 to 2020, city party secretaries' and mayors' average number of years in office in a specific city was 2.76 years and 2.57 years, respectively. Figure 1 displays the spatial distribution of the average *Ratio\_service* over the examined timeframe. Overall, the landscape of *Ratio\_service* in Chinese cities is featured by slight unevenness. In contrast to the landscapes of some economic and social indicators in post-reform China, the coast–inland disparity is not readily discernible throughout the research period. The share of land supplied to the service sector is relatively lower in coastal cities in Guangdong, Fujian, Zhejiang, Jiangsu and Shandong, whereas cities exhibiting high proportions of land leased to the service sector are mostly located in the inland regions.

**Table 1.** Definitions of variables.

Variables	Definition
Panel A dependent variables and key variables	
Area_service	The total area of land leased for residential and commercial uses (hectare)
Ratio_service	The ratio of the total area of land leased for residential and commercial uses to the total area of land lots leased for industrial, residential and commercial uses (%)
T_secretary	Incumbent city party secretary's number of years in office
T_mayor	Incumbent mayor's number of years in office

Table 1. Cont.

Variables	Definition
Panel B control variables	
Tertiary	Share of tertiary industry (service sector) output in GDP (%)
Fiscal pressure	The ratio of budgetary fiscal expenditure to budgetary fiscal revenue
Land finance	The ratio of land-leasing revenue to budgetary fiscal revenue
Per capita GDP	Log of per capita GDP (CNY)
Land price	Log of average land price (CNY/m <sup>2</sup> )
Population	Log of the density of population (persons/km <sup>2</sup> )

Table 2. Descriptive statistics of city-level data.

Variable	N	Mean	Std.Dev.	Min	Max
Area_service	3772	356.199	407.151	0.015	4918.007
Ratio_service	3772	46.340	17.593	0.123	99.796
T_secretary	3772	2.761	1.668	1	10
T_mayor	3772	2.573	1.496	1	12
Tertiary	3772	39.589	9.995	8.575	88.304
Fiscal pressure	3772	2.792	1.893	0.649	18.399
Land finance	3772	0.614	0.435	0.001	4.834
Per capita GDP	3772	10.368	0.718	7.924	12.324
Land price	3772	6.418	0.940	1.816	10.239
Population	3772	5.713	0.955	1.761	8.814

#### 4.2. Empirical Models

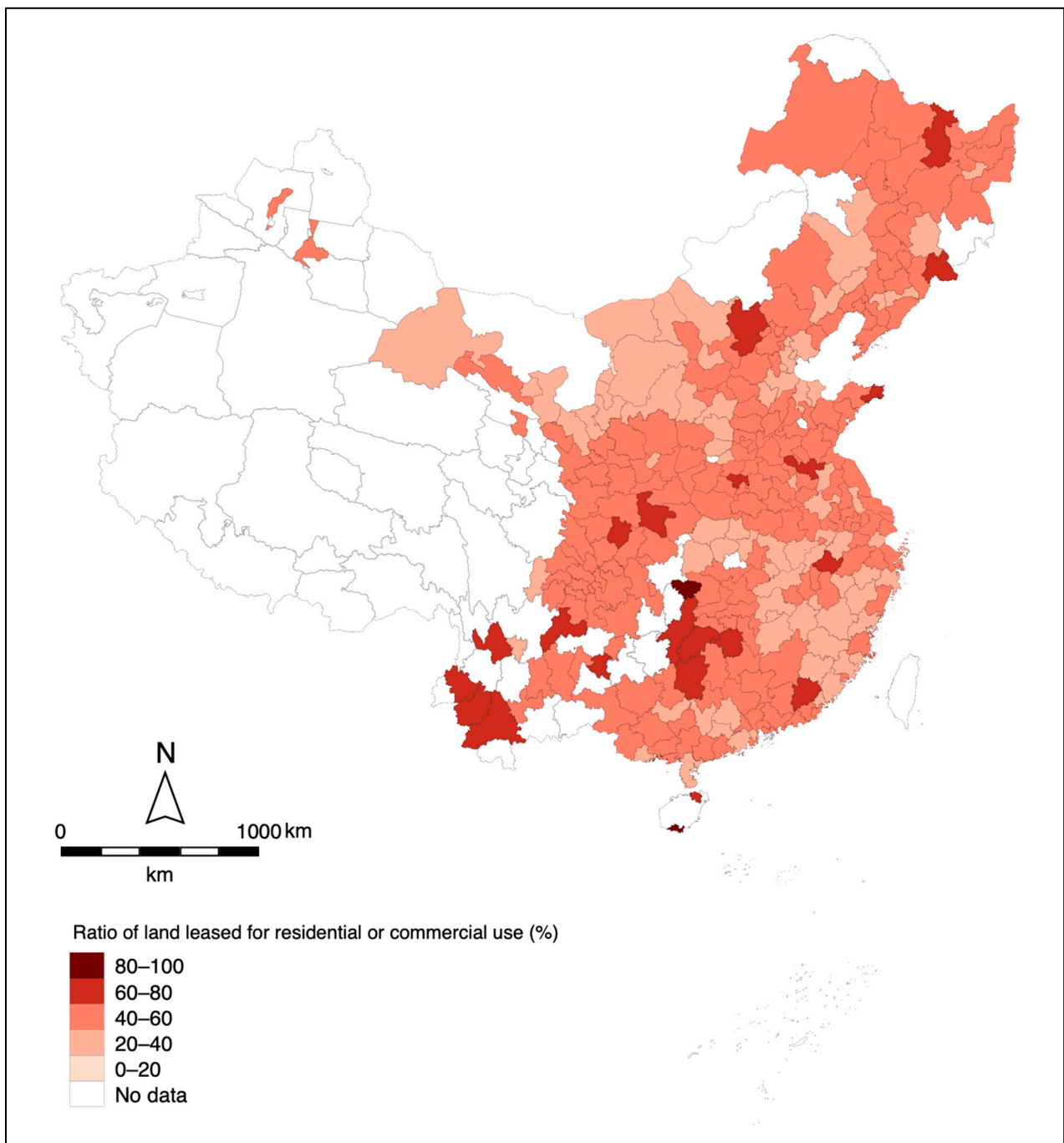
This research examines how the quantity and the proportion of land allocated to the service sector change with city leaders' tenure in office to identify the political business circles in land supply. Panel data regression is used with econometric models specified as follows:

$$\ln(\text{Area\_service}_{it}) = \alpha_0 + \alpha_1 T\_leader_{it} + \alpha_2 T\_leader_{it}^2 + \mathbf{X}_{i,t-1}\boldsymbol{\beta} + \theta_i + \gamma_t + \varepsilon_{it} \quad (1)$$

$$\ln(\text{Ratio\_service}_{it}) = \alpha_0 + \alpha_1 T\_leader_{it} + \alpha_2 T\_leader_{it}^2 + \mathbf{X}_{i,t-1}\boldsymbol{\beta} + \theta_i + \gamma_t + \varepsilon_{it} \quad (2)$$

where  $i$  and  $t$  stand for city and year, respectively.  $\ln(\text{Area\_service}_{it})$  is the natural logarithm of the total area of land parcels leased to the service sector of city  $i$  in year  $t$ .  $\ln(\text{Ratio\_service}_{it})$  is the natural logarithm of the proportion of land parcels leased to the service sector of city  $i$  in year  $t$ .  $T\_leader_{it}$  is the variable of interest, which refers to the number of years in office of the corresponding city leader of city  $i$  in year  $t$ . The quadratic form of  $T\_leader_{it}$  is used to capture the non-linear correlation between tenure in office and the quantity or ratio of land leased to the service sector.  $\mathbf{X}_{i,t-1}$  is a set of control variables, including the development of the tertiary industry (measured by the share of tertiary industry output in GDP, fiscal pressure (proxied by the ratio of budgetary fiscal expenditure to budgetary fiscal revenue), land finance dependence (proxied by the ratio of land-leasing revenue to budgetary fiscal revenue), per capita GDP, land price and population density. To minimize potential endogeneity issues, all control variables are lagged by one year. Year fixed effect  $\gamma_t$  captures common macroeconomic shocks and policy effects on all Chinese cities in year  $t$ .  $\theta_i$  is city fixed effect, which captures time-invariant city-level features such as resource endowment, cultural characteristics and geographic location.  $\varepsilon_{it}$  is the error term.





**Figure 1.** Spatial pattern of the average ratios of land leased to the service sector, 2006–2020.

## 5. Empirical Results

Tables 3 and 4 report the estimation results of fixed effects panel models for mayors and party secretaries, respectively. Standard errors are clustered by province. All the models control for city fixed effects and year fixed effects. Table 3 reports the effects of mayors' tenure in office on the quantity and the ratio of land parcels leased to the service sector. Columns (1) and (2) present regression results for the 2006–2013 period. Columns (3) and (4) show estimated results for the 2014–2020 period. Specifically, Columns (1) and (3) show the estimated results of Model (1), which investigates how the total quantity of land leased to the service sector changes with city leaders' tenure in office,

while Columns (2) and (4) demonstrate results of Model (2), which examines how the ratio of land leased to the service sector changes with city leaders' tenure in office.

**Table 3.** Mayors' tenure in office and land supply.

Variables	Panel A: Before the Change of Assessment Criteria		Panel B: After the Change of Assessment Criteria	
	(1)	(2)	(3)	(4)
	Area_Service	Ratio_Service	Area_Service	Ratio_Service
T_mayor	−0.101 *** (0.032)	−0.056 ** (0.025)	0.027 (0.020)	−0.005 (0.015)
T_mayor <sup>2</sup>	0.015 *** (0.005)	0.008 ** (0.004)	−0.001 (0.003)	0.001 (0.002)
Tertiary	0.003 (.012)	−0.009 (.007)	0.000 (.004)	0.005 * (0.003)
Fiscal pressure	−0.030 (0.022)	−0.014 (0.010)	−0.024 (0.027)	0.019 (0.024)
Land finance	0.277 *** (0.092)	0.123 ** (0.059)	0.272 *** (0.076)	0.069 * (0.037)
Per capita GDP	0.272 (0.376)	−0.059 (0.293)	0.531 *** (0.189)	0.340 ** (0.133)
Land price	−0.175 ** (0.065)	−0.050 (0.046)	−0.039 (0.075)	−0.009 (0.037)
Population	−0.562 (0.538)	0.171 (0.429)	0.524 (0.365)	0.242 (0.151)
Observations	2032	2032	1740	1740
Within R <sup>2</sup>	0.706	0.129	0.298	0.024
City FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: Standard errors are clustered by province. Robust standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

The results in Columns (1) and (2) affirm Hypotheses 1a and 1b and reveal a U-shaped relationship between mayors' tenure in office and *Area\_service* as well as *Ratio\_service* for the 2006–2013 period, when economic growth was the overwhelming criterion for cadre performance evaluation. The coefficients of mayors' tenure in office and its squared term are all significant. In Column (1), the coefficient of mayors' tenure in office is negative and significant at the 1% level ( $-0.101, p < 0.01$ ), whereas the coefficient of square terms of mayors' tenure in office is positive and significant at the 1% level ( $0.015, p < 0.01$ ). The extreme point is 3.37 ( $-0.101 / (-0.015 * 2)$ ), suggesting that the quantity of land leased to the service sector is lowest between the third and fourth year of mayors' tenure, all else being equal. As mayors' tenure in office increases, *Area\_service* first declines and then increases. The marginal effect of mayors' tenure in office on the quantity of land leased to the service sector is negative from the first to third year of office but turns positive in the fourth year of tenure. In Column (2), the coefficient of mayors' tenure in office is negative ( $-0.056, p < 0.05$ ), while the coefficient of square terms of mayors' tenure in office is positive ( $0.008, p < 0.05$ ). Both are significant at the 5% level. The extreme point is 3.50 ( $-0.056 / (-0.008 * 2)$ ), indicating that city governments lease the smallest ratio of land to the service sector between the third and fourth year of mayors' tenure, all else being equal. As mayors' tenure in office increases, the proportion of land leased to the service sector first drops and then rises.

**Table 4.** Party secretaries' tenure in office and land supply.

Variables	Panel A: Before the Change of Assessment Criteria		Panel B: After the Change of Assessment Criteria	
	(1)	(2)	(3)	(4)
	Area_Service	Ratio_Service	Area_Service	Ratio_Service
T_secretary	−0.058 ** (0.028)	−0.035 (0.023)	0.060 ** (0.026)	0.022 (0.022)
T_secretary <sup>2</sup>	0.007 (0.004)	0.006 (0.003)	−0.007 (0.005)	−0.005 (0.003)
Tertiary	0.003 (0.012)	−0.009 (0.008)	0.000 (0.003)	0.005 ** (0.003)
Fiscal pressure	−0.032 (0.022)	−0.013 (0.010)	−0.022 (0.027)	0.021 (0.025)
Land finance	0.278 *** (0.093)	0.128 ** (0.060)	0.272 *** (0.074)	0.076 ** (0.037)
Per capita GDP	0.284 (0.375)	−0.061 (0.294)	0.542 *** (0.181)	0.361 ** (0.133)
Land price	−0.174 ** (0.065)	−0.050 (0.046)	−0.042 (0.074)	−0.012 (0.037)
Population	−0.470 (0.587)	0.222 (0.441)	0.546 (0.365)	0.254 * (0.148)
Observations	2032	2032	1740	1740
Within R <sup>2</sup>	0.705	0.128	0.298	0.027
City FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: Standard errors are clustered by province. Robust standard errors are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

The results displayed in Columns (3) and (4) confirm Hypotheses 2a and 2b. For the 2014–2020 period, the coefficient of mayors' tenure in office and its quadratic forms are all not significantly different from 0. The U-shaped relationship disappeared both for the quantity and the ratio of land parcels leased to the service sector after 2013, at the end of which the performance evaluation system was revised to prohibit the use of GDP growth as the primary factor for assessing local leaders' political performance and to incorporate environmental protection as a crucial performance evaluation criterion for local leaders. Consistent with the hypotheses, when economic growth has no longer performed as the primary indicator to assess local leaders' performance, the U-shaped correlation between city leaders' tenure in office and *Area\_service*, and the U-shaped relationship between city leaders' tenure in office and *Ratio\_service* are no longer observed.

The effects of party secretaries' tenure in office on land supply are presented in Table 4. Columns (1) and (2) show the results for the 2006–2013 period. Columns (3) and (4) show the results for the 2014–2020 period. In Columns (1) and (3), the dependent variable is the total area of land transferred to the service sector, while the dependent variable in Column (2) and (4) is the proportion of land leased to the service sector. As displayed in Columns (1) and (2), for the 2006–2013 period, the signs of coefficients of tenure in office ( $-0.058$ ,  $p < 0.05$ ) and their quadratic form ( $0.007$ ,  $p > 0.1$ ) for party secretary are the same as those for mayors. However, the coefficient of the quadratic term of party secretaries' tenure in office is not significant in Column (1). The coefficients of party secretaries' tenure in office and its squared term are both not significantly different from 0 in Column (2). This finding implies that the strategic land supply predicted by Hypotheses 1a and 1b is more pronounced for mayors. A possible explanation is that mayors are one level lower than party secretaries and face higher prospects of promotion. For the 2014–2020 period, the coefficients of party secretaries' tenure in office and its quadratic forms all have opposite signs, as exhibited in Columns (3) and (4). It suggests that, in line with Hypotheses 2a and 2b, the U-shaped correlation, albeit not significant, disappeared after 2013.

Regarding control variables, in all the models, the coefficients of *Land finance* are positive and significant at the 5% level, suggesting that cities with higher ratios of land-leasing revenue to budgetary fiscal revenue tend to lease both larger quantities and higher proportions of land to the service sector. It implies that, throughout the study period, higher reliance on land finance leads city governments to supply more residential and commercial land, which generally yields higher prices than industrial land. In addition, the coefficients of *Per capita GDP* in Columns (3) and (4) of Tables 3 and 4 are positive and significant at the 5% level, indicating that cities having higher per capita GDP leased both a larger quantity and a higher ratio of land to the service sector during 2014–2020.

## 6. Discussions

The political economy literature has documented politicians' opportunistic behaviors and the resulting political business cycles [41]. In democratic countries, incumbent politicians often execute policies more apparent to voters during preelection and election periods to boost their prospects of winning reelection [49]. Political business cycles in terms of public expenditure and taxation have been empirically observed in various countries, such as the United States, India, Germany, Brazil and Russia [42–46].

In China, centralized political personnel control provides political career incentives for local officials. It induces them to manipulate local policies to satisfy the criteria for career advancement designated by high-level governments, thereby creating political business circles. Some empirical studies have documented local leaders' strategic public spending during their term of office. Guo [47] finds that the public expenditure per capita of county government shows the highest growth rate during county leaders' third and fourth years in office. Chen and Kung [9] report that the positive correlation between land-leasing revenue and county governments' expenditure on urban construction exhibits a curvilinear pattern and peaks in the fourth year of a term, which is the critical time for a county leader to signal competence.

However, there is little empirical evidence of political business circles regarding land supply. Cai [68] proposes a conjecture that local leaders with lengthier time horizons are inclined to assign a larger portion of land parcels to the industrial sector, as opposed to the tertiary sector, in an attempt to increase long-term revenue. However, the empirical analysis uses the share of land parcels leased via negotiation of 120 cities in 2005 to proxy land supplied to the industrial sector. Thus, it fails to provide sufficient and reasonable evidence to confirm this hypothesis. This study empirically reveals political circles regarding land allocation between the service sector and industrial sector for the 2006–2013 period, when economic development is the primary indicator of local officials' political performance. As mayors' tenure in office grows, the total area and the ratio of land allocated to the service sector first decrease and then increase after the third year in office. It implies that city leaders exploit their control over urban land for political purposes.

Although China's cadre performance evaluation system has been revised since 2013, few studies have directly investigated the effects of this structural change. Xi et al. [67] find that the promotive effect of city leaders' capacity to facilitate GDP growth on political promotion disappears after 2013, indicating a structural shift in the pattern of prefecture-level city leaders' promotions. Tang et al. [69] observe that the changes in the evaluations of political performance, which emphasize environmental protection, can restrain illegal land usage. Other studies mainly concentrate on the intensified efforts put into environmental protection by local governments [63,66,70,71]. However, no study has directly examined the influences of this structural change on land supply. This article reveals that the cadre assessment system's amendment has altered local leaders' objective function and mitigated the political circles regarding land supply.

## 7. Conclusions

This article extends the literature on political business circles to an authoritarian regime and examines political circles triggered by incentives to satisfy the criteria for

career advancement designated by high-level governments. It proposes four hypotheses to investigate how the performance evaluation system dominated by economic growth drives city leaders to strategically allocate land between the service and industrial sectors within their term of office and results in political circles in land supply. Hypotheses 1a and 1b focus on local governments' land supply before 2013, when economic growth is the primary indicator of local officials' political performance. Hypotheses 2a and 2b concern local governments' land supply after the amendment of the cadre performance evaluation system, which has undermined local leaders' incentive to stimulate economic growth. Using a panel dataset covering 284 cities at or above the prefecture level in China from 2006 to 2020, this study confirms the first two hypotheses and reveals a U-shaped correlation between city leaders' tenure in office and the quantity of as well as the proportion of land allocated to the service sector for the 2006–2013 period, when economic growth was the overwhelming indicator of political performance. The U-shaped relationship is more pronounced for mayors, who are one level lower than party secretaries and face higher prospects of political promotion. During the 2006–2013 period, the total area and the ratio of land allocated to the service sector first decreased and then increased with mayors' tenure in office. It indicates that newly appointed mayors have longer time horizons and are more motivated to promote long-term economic growth and allocate larger portions of land to the industrial sector. As their tenure in office grows and time horizons shorten, mayors become less concerned with maximizing long-term economic growth, which rewards their successors, and tend to allocate more land to the service sector for immediate lump-sum revenue. However, as Hypotheses 2a and 2b predict, the U-shaped relationship has no longer existed since the revision of the performance evaluation system at the end of 2013, which prohibits using GDP growth as the primary indicator for evaluating the political performance of local leaders and incorporates environment protection as a crucial evaluation criterion. These findings imply that the political career incentive drives city leaders to trade off one-off land-leasing revenue and long-term industrial growth and strategically allocate land among sectors to maximize their promotion odds.

China's regional economic decentralization and cadre performance evaluation system, which prioritizes measurable economic development, have promoted competition between local governments and supported economic booms in recent decades. Nevertheless, regional economic decentralization has enhanced the ability of local officials, who compete for political promotion, to manipulate policies to achieve local economic growth. Such politically driven policies are likely to trigger resource misallocation and thus hinder long-term development.

The highly centralized personnel system has generated unintended incentive effects that induce myopic land-leasing strategies by local officials. The empirical findings of this research suggest that the amendment of the cadre assessment system has altered the objective function of local leaders and curtailed local opportunistic behaviors in land supply. It highlights the importance of appropriate interventions from the central authority in correcting local leaders' opportunistic land supply behaviors. Nevertheless, central control should be executed with caution to sustain the pro-growth incentive of local governments [72].

In addition, the revised cadre performance evaluation system has accentuated the importance of environmental performance in political performance assessments, while altering the decisive role of economic growth. Thus, local officials remain accountable to upper-level governments. Facing such upward accountability, they have little incentive to respond to local residents' concerns regarding health care, education, living standards and social welfare. It is still of great importance to design a political incentive structure that motivates local officials to be accountable to citizens. Instead of an overwhelming reliance on specific criteria, multifaceted indicators such as local peoples' satisfaction with public services and social welfare should be incorporated into the local cadre evaluation system to increase the influence of public opinion. Furthermore, more opportunities for local people to directly voice opinions on government policies should be provided. Social

media is a promising platform for enhancing information exchange between the public and local governments and hence for promoting government accountability to the public.

This article finds that the highly centralized personnel system has incentivized local officials, who compete for political promotion, to manipulate land supply to stimulate local economic growth. It also highlights the importance of appropriate interventions from the central government in correcting local leaders' opportunistic behaviors. Nonetheless, there is little research on the economic and social effects of politically driven land supply strategies, which is an important avenue for future research. Moreover, whether the revision of the official performance evaluation system is beneficial to all of society and conducive to long-term development remain critical research questions worth exploration.

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