

Hungry Childhood and Land Market Operations:Evidence from China

Abstract

This paper examines how leaders' preferences affect their policy choices. Using data of plot-level transaction records and the regression discontinuity design approach, we investigate the impact of the preference of municipal party secretaries(MPS) shaped by their early-life experience, the unpredictable widespread famine occurred in exact 1959-1961, on their land market decisions in China. Our findings indicate that MPSs with early-life famine experiences significantly raise the prices of industrial and residential land. Additionally, we find that MPSs with early-life famine experiences pay greater attention to agricultural production, thereby expropriating less agricultural land. This results in a lower supply and consequently higher prices of residential land. Moreover, they are more inclined to supply industrial land through market rather than non-market, resulting in more market transactions and thus higher prices of industrial land. We suggest that variations in land market decisions among local governments can be attributed to local leaders' differing resource allocation preferences, influenced by their early-life experiences. This paper contributes to understanding the land market, leaders' policy preferences, and the interaction between the two in certain developing country contexts.

Keywords: Preferences of Leaders, Famine Experience, Land Market, Policy Choice

JEL Classification: E64, H11, H41, H82, J18

1 Introduction

Do the preferences of political leaders influence their policy choices? It has been widely accepted that governments play an important role in economic development (Ram, 1986; Manuel, 2010). From a micro perspective, political leaders play a pivotal role in the selection and implementation of policies (Besley and Persson, 2010; Jones and Olken, 2005; Yao and Zhang, 2015). This has been highlighted in political economy, where several studies reveal that different groups of leaders make different policies and imply that this is due to differences in the preferences of the groups (Edlund and Pande, 2001; Chattopadhyay and Duflo, 2004)¹. Hence, it is possible that similar governments have chosen and implemented different policies that can be attributed to differences in preferences among leaders. However, little is known about how the preferences of government leaders are formed, or about the empirical evidence of the causal relationship between their policy preferences and policy choices.

This topic is well suited to be studied in the Chinese context, where local government officials face both very similar constraints and more autonomy in their jurisdictions. Several noteworthy features of the appointment and management of local leaders should be mentioned. First, local leaders at a given level of government, especially the top leaders, have ultimate authority and relative administrative discretion in choosing and formulating economic policies, which provides them with some room to choose policies that are consistent with their preferences (Yao and Zhang, 2015). In the Chinese administrative system, the top leader of the government is usually the party secretary. In a prefecture-level city, the top leader is the secretary of the municipal party committee, appointed by the higher-level Communist Party committee as the representative of the CCP. Similarly, the top leaders of a county and a town are the county party secretary and the town party secretary, respectively. Second, local leaders are generally appointed by higher levels of government and the Communist Party Committee, so they are limited by similar institutional constraints and sources of authority (Pi et al., 2014; Yu et al., 2016). Third, the competition mechanisms faced by local leaders are also highly similar. In other words, local leaders in different regions have homogeneous objective functions and are subject to some similar conditions (Li and Zhou, 2005). All these characteristics collectively offer an ideal context for identifying the impact of local leaders' preferences on their policy decisions.

We aim to estimate the impact of MPS' preferences induced by the specific unexpected shock of the 1959-61 famine on land prices, which are the most important decision of local governments in the land market. We contend that divergent land policies, driven by varying preferences shaped by the famine, may significantly affect land market supply and demand.² Three reasons motivate our focus on the land market. First, local governments in China are deeply involved in economic activities through the land market (Lan, 2021; Lichtenberg and Ding, 2008, 2009; Wang et al., 2014). These literatures are referred to as the "land finance"³ perspective, in which the role played by local leaders is also highly emphasized (Zhang et al., 2011, 2013; Yu et al., 2015; Tian et al.,

¹ Edlund and Pande (2002) and Chattopadhyay and Duflo (2004) indicate that different policies enacted by different officials can be ascribed to their differentiated preferences stemming from gender.

² Existing literature has discussed the influences of human capital characteristics, incentives for competition among governments and external constraints on their policy making (Zhang and Gao, 2007; Zhou, 2007; Wang and Xu, 2008).

³ "Land finance" refers to the fact that local governments rely mainly on revenues from land sales to sustain their fiscal expenditures. In China, local governments' revenue from land sales is the largest part of the fiscal revenue they can independently dispose of (Han and Kung, 2015).

2019). Second, land⁴ in urban China is categorized based on its use⁵, leading to segregated markets for different land categories.⁶ This allows us to further reveal the mechanisms by which local leaders' preferences exert influence on the land market (Zhou et al., 2005; Tao et al., 2009; Zhou, 2006; Cao et al., 2007; Sun and Zhou, 2013; Zhou, 2007; Zhang et al., 2011; Fan and Mo, 2014). Third, the detailed geographic information contained in the plot-level transaction data. It allows us to use the RD approach with the city boundaries as the cut-offs to overcome endogenous problems.

The 1959-61 famine is used in this paper to be a proxy for a specific early-life experience of local leaders for several reasons. Most importantly, the famine's impact on Chinese society as a whole was enormous and widespread, and few people living in this period could be immune from any direct or indirect impairment (Lin and Yang, 2000; Chen and Zhou, 2007). Furthermore, since the time of start and end of the famine is definite, it can be easily distinguished from other major historical events. Moreover, It has been mentioned in some researches that people exposed to the famine do present some prominent preferences in their subsequent lives⁷. The affected local leaders may have a greater preference for agricultural development in policy making and for the use of market mechanisms to allocate resources (Guo et al., 2018; Luo and Hong, 2021).

In this paper, we use two major databases on local leaders and the land market, including 853 MPS and about 800,000 plots of land in a total of 261 prefecture-level cities from 2010 to 2018, respectively. This allows us to identify whether a MPS experienced a famine by birth year, as well as to determine the specific location of the plot and its corresponding distance from the city boundary. Then the RD approach is used to estimate the effect of the early-life experience of MPS on the land market decision. Our results show that for residential land, prices are 42% higher and transactions are 15% lower in cities with MPS who exposed to the famine; for industrial land, prices are 14% higher and transactions are 22% higher in cities with MPS who exposed to the famine. The mechanism behind this may be that MPS who have exposed the famine tend to blame the famine on the central planning system and the agricultural failure during that tough period. Thus, they may place more emphasis on market mechanisms and agricultural production during their tenure. These preferences may be eventually imposed on the land market. The market preference may be mainly exhibited in the industrial land market, resulting in more land supplied through market mechanisms and higher prices due to the decreased non-market supply. In terms of the residential land market, preferences for agricultural production can be revealed. Land supply may be compressed due to the strong sense of agricultural land protection by MPS, bringing higher prices.

This paper contributes to the study of how individuals' experiences influence their preferences and behaviors. Existing Research has provided evidence on the effect of the

⁴ Land in China can be divided into agricultural land in rural areas and construction land in urban areas.

Agricultural land is owned by village collectives, while the ownership of urban construction land belongs to the state. Therefore, agricultural land should be expropriated and converted into urban construction land before the land is sold out by local governments.

⁵ Urban land can be subdivided into industrial land, residential land, commercial land, infrastructure land, etc, according to land uses. This paper focuses on industrial land and residential land, which account for more than half of the urban land sold by local governments.

⁶ There are significant differences between the markets for industrial and residential land, especially in terms of price. Industrial land prices have been very low, while residential land prices have been widely high. Please refer to Section 2 for detailed information.

⁷ For example, it has been studied that those who have experienced the 1959-61 famine in China showed a common preference for risk aversion, hence contributing to more conservative decisions (Cheng and Zhang, 2011; Feng and Johansson, 2018; Long et al., 2020; Hu et al., 2020; Wang, 2022).

macroeconomic environment, natural disaster, life experience, and previous work experience on individual decision making. It suggests that executives of companies who had experienced the Great Depression are inclined to make more conservative management decisions (Malmendier et al., 2011; Malmendier and Nagel, 2011; Cronqvist et al., 2015; Schoar and Zuo, 2017). Moreover, studies in corporate governance have also figured out the substantial influence of the experiences of military service (almendier et al., 2011; Koch and Wernicke, 2013; Benmelech and Frydman, 2015), raising daughters (Cronqvist and Yu, 2017), pilot (Cain and McKeon, 2016) and famine (Feng and Johansson, 2018) of executives on their management decisions and performances. In addition, Cameron and Shah (2015) and Cassar et al. (2017) claim that those who had suffered from the natural disaster may make some risk-averse decisions in their subsequent lives. However, whether these results can be generalized to the field of political economy to explore the political leaders' preferences and behavioral decisions from the perspective of their early life experiences is less discussed in literature. This study demonstrates that the famine-influenced preferences of local leaders can account for their varied land market decisions.

Additionally, the paper contributes to the literature on the subsequent effects of famine. Some studies find that the famine directly leads to increased mortality, which in turn causes serious damage to human capital. It is illustrated that famines in Neiterlands and Bangladesh both caused increased infant mortality (Stein et al., 1975; Razzaque et al., 1990). Bleker et al. (2005) found that survivors of the 1944-45 famine in Neiterlands were more likely to encounter the cardiovascular disease. In terms of the 1959-61 famine in China, extensive research has concluded that famine survivors tend to be lower in height (Chen and Zhou, 2007; Meng and Qian, 2009), have a lower level of education (Meng and Qian, 2009; Shi, 2011) and have less labor supply (Chen and Zhou, 2007; Shi, 2011). In addition, the Chinese famine is substantiated to have impact on individual behaviors. Cheng and Zhang (2011) suggests that a higher saving rate in China may be attributed to individuals' famine experiences. People exposed to the famine are presumably not to be self-employed, taking the corresponding risk into account (Wang et al., 2015). Deng et al. (2019) show that farmers with famine experience tend to increase farmland transferring in and decrease farmland transferring out. Executives of companies who had experienced the famine in their early lives are more conservative in making management decisions (Feng and Johansson, 2018; Long et al., 2020; Hu et al., 2020). The results from Guo et al. (2023) and Luo and Hong (2021) provide some insights for this paper. Leaders with famine experiences are highlighted in the former in attaching more importance to agricultural development, and they are found in the latter to be more inclined to apply the market-oriented household responsibility system in rural area. This paper systematically examines the land market decisions made by local leaders exposed to the early famine.

This paper is also in line with the growing literature on "land finance" in China. Some literature have focused on the motivation of selling land from the perspective of both the incentives for local governments to gain fiscal revenue and for local leaders to promote (Tao et al., 2007; Han and Kung, 2015; Wang and Yang, 2016; Zhang et al., 2011; Zhou, 2004; Tian et al., 2019). On the one hand, the industrial land in the urban area is sold out by the local government exactly for the motivation of attracting industrial enterprises (investments) (Zhou et al., 2005; Tao et al., 2009). In this case, more industrial land being sold out means an increase in the introduction of industrial enterprises, which is conducive to local economic growth and increases tax revenue (Zhou, 2006; Cao et al., 2007; Sun and Zhou, 2013; Zhou, 2007; Zhang et al., 2011). This is often

driven by local leaders' motivation for promotion (Zhang et al., 2011). However, competitions among cities to attract industrial enterprises eventually bring about deeply distressed land price of the industrial land (Fan and Mo, 2014). On the other hand, the residential land is mainly sold out by local governments to increase extra-budgetary revenue (Tao et al., 2007, 2009; Han and Kung, 2015), as this kind of income is not necessary to be proportionally turned over to the upper government (Han and Kung, 2015). Therefore, the local government's behavior of sold out residential land generally at high price is often pertinent to its motive of grabbing the lump-sum payment, so that it can partially alleviate the financial pressure caused by the tax reform⁸(Zhou, 2006; Cao et al., 2007). In addition, the government-enterprise relationship (Zhang et al., 2013; Zhao and Yang, 2015; Yang, 2019), appointment and removal of local leaders (Yu et al., 2015), stimulus plans (Yang and Yang, 2016) and controls over land use are discussed in literature as critical factors influencing local governments' land market decisions. Instead of these institutional factors, this paper focuses on local leaders' intrinsic personality and contributes connecting their personal preferences with their policy making.

Finally, this paper adds to the literature on how leaders influence economic activity by exploring in depth the impact of leaders' preferences on land market decisions. (Jones and Olken, 2005; Yao and Zhang, 2015). Some personal characteristics of local political leaders in China have received more attention (Zhang and Gao, 2007; Zhou, 2007; Wang and Xu, 2008). Based on a promotion incentive perspective, some studies have focused on the impact of local leaders' turnover and tenure on land market decisions (Zhang et al., 2013; Yu et al., 2015; Tian et al., 2019). However, these characteristics are related to the career mobility of leaders and tend to reflect the governance mechanisms of the central government to lower levels of government. Therefore, it is difficult to specify their impact on land market decisions. In addition, leaders' personal characteristics, including gender, age, and educational background, are also critical to their decision making. However, they are easier to identify and are almost homogeneous among leaders. Leaders' personal preferences, especially those shaped by their early experiences and more reflective of their intrinsic characteristics, are often overlooked and their influence is even more difficult to identify (Becker, 1996; Loewenstein and Angner, 2003; Malmendier and Nagel, 2011; Cronqvist et al. 2015; Cassar et al. 2017). This paper attempts to reveal how the preferences of leaders induced by famine experiences influence their land market decisions.

The remainder of the paper is organized as follows. Section 2 provides a concise background on the 1959-61 famine and the land market in China. Section 3 briefly describes the conceptual framework and provides some hypothesis guiding the subsequent empirical estimation. Section 4 introduces our databases and key variables used in the empirical analysis. Section 5 specifies the empirical model and reports the estimation results. Section 6 concludes.

2 Background

2.1 1959-61 Famine in China

The severe famine of 1959-61 was the worst in China's history, spreading across almost the entire country. The total collapse of grain production is thought to have been the direct cause of the famine (Lin and Yang, 2000). Before the famine, total grain production reached 200 million tons in 1958. However, production dropped sharply by 15 percent in 1959 and continued to

⁸ Since the tax reform in 1994, it is estimated that, approximately 75% of local transaction taxes or value-added taxes have been handed over to the central government (Jin et al., 2006).

decline in 1960 and 1961, falling to only 70 percent of the 1958 level. After the famine, starting in 1962, it took about 4-5 years for China's total grain production to gradually recover to the 1958 level (Lin and Yang, 2000).

Apart from some external factors, the collapse of grain production was largely attributed to the centrally planned economic system, which was very rigid (Li and Yang, 2005; Lin and Yang, 2000; Lin, 1990). This system was first established in 1952, the third year after the founding of the People's Republic of China, as an institutional choice by the central government to emulate the Soviet model. It attempted to rapidly increase the country's industrialisation by adopting a development strategy that prioritised heavy industry. A high proportion of grain was extracted from the rural areas to meet urban food consumption and the demand for industrial raw materials. This development strategy therefore had to be underpinned by high grain production, with 'agriculture feeding industry' as the main way of doing so. In 1953, the central government implemented a unified purchasing policy, thereby allowing direct control over the purchase and distribution of all grain. Specifically, in order to maintain the grain supply in the cities, the government purchased grain from rural areas at low prices and then sold it to the cities. Under such a system of food distribution, free trade in the market was largely prohibited. In addition, the Great Leap Forward broke out in 1958 with the aim of rapidly increasing agricultural production and promoting industrialisation. At almost the same time, the establishment of people's communes was accelerated in rural areas. However, a series of problems erupted during the Great Leap Forward, such as the mismanagement of people's communes, a decline in the incentive to produce, the mass exodus of labour from rural areas to the cities, and the lack of withdrawal rights for commune members (Li and Yang, 2005; Kong and Lin, 2003; Zhang and Wen, 1997; Lin, 1990). This eventually led to widespread food shortages and famine.

During the famine years, the average mortality rate rose and the birth rate fell sharply. Figure 1 shows that the birth rate declined sharply between 1959 and 1961, reaching its lowest value in 1961, but rebounding to pre-famine levels in 1962. Correspondingly, the mortality rate began to rise in 1959, peaking in 1960, but fell back to almost the same level as in 1959 in 1961 and did not reach pre-famine levels until 1962.

(Figure 1 is here)

Although the famine was widespread almost throughout the country, there are regional variations in severity. Referring to the method used in Cheng and Zhang (2011) to measure the regional famine intensity and using the 2005 1% census data, we calculate the shrink rate⁹ of each prefecture city. Figure 2 shows the regional distribution of famine intensity across the country (data are missing for a few cities). The features are consistent with the findings in some previous studies (e.g. Chen and Zhou, 2007). The areas most affected by the famine were concentrated in the northwestern, southwestern and central parts of the country, while cities in eastern and northeastern areas were less affected. The worst affected cities were located in Anhui, Sichuan, Guizhou and Henan provinces.

⁹ Shrink rate = $(N_{normal} - N_{famine}) / N_{normal}$. N_{normal} indicates the average population of three years before the famine (1956-1958) and three years after the famine (1962-1964). N_{famine} indicates the average population of the famine years.

(Figure 2 is here)

2.2 Land market in Urban China

China's urban land market has been a solo monopoly of the government. During more than 40 years of rapid economic growth, a large amount of agricultural land was converted into non-agricultural land for urban construction, mainly industrial and residential land. This land use conversion was accomplished through land expropriation, which transferred land ownership from village collectives to the state. Under the *Land Management Law* implemented in 1998, only local governments have the authority to expropriate and exploit agricultural land. Local governments, especially local leaders, play an important role as intermediaries between land expropriation and transferring the use right of the urban land to land users by means of bilateral negotiation, bidding, auction and listing¹⁰ (Sun and Zhou, 2013). Consequently, local governments possess complete control over the management of urban land and monopolize the primary market of urban land supply.

“Land Finance” has emerged as the primary source of fiscal revenue for local governments. Following the tax sharing reform in 1994 and the subsequent income tax reform in 2002, a significant portion of fiscal authority was transferred from local governments to the central government, resulting in a substantial decline in their total fiscal revenues (Zhou, 2006). However, the responsibilities assigned to local governments have increased, leading to considerable financial pressure. Consequently, local governments have resorted to selling vast amounts of land to generate additional revenue and alleviate their financial distress. It is important to note that local governments adopt diverse pricing strategies for different types of land and purposes, and they are not obligated to sell out all land at higher prices (Lei and Gong, 2014). For instance, residential and commercial land is primarily sold out at higher prices to obtain lump-sum land sales revenue, while industrial land tends to be sold out at significantly lower prices to attract more industrial enterprises (Han and Kung, 2015). Local governments impose corresponding fees and taxes when selling land for construction, which constitutes part of the extra-budgetary revenue under the complete control of local governments. Consequently, land finance has gradually become the primary revenue source for local governments (Zhou, 2007). This is a significant factor driving their eagerness to sell more and more land.

Local governments apply two strategies in land selling for two purposes. Before the late 1990s, local governments primarily sold out land by bilateral negotiation, the non-market mechanism, by which they could easily control the prices and choose desirable land users (Wang and Yang, 2016). Some serious corruption problems in the non-market oriented land selling process have been revealed (Yang et al., 2019). Subsequently, the market-oriented reform targeting land selling has been carried out gradually. The *Notice on Strengthening the Management of State-owned Land* issued in 2002 stipulated that all profit-oriented land, including land for commerce, tourism, entertainment, and residence, must be sold out publicly and transparently by bidding, auction and listing. Nevertheless, this reform did not target the market for industrial land, which was still given priority to non-market means to sell out the land. In 2006,

¹⁰ Bilateral negotiation is a non-market mechanism, through which land users acquire urban land by negotiating with local governments opaquely. However, bidding, auction and listing are market mechanisms. Before the market-oriented reform of the land market, the land was sold out mainly by bilateral negotiation. While after the reform, bidding, auction and listing take over. Though the reform has been carried out, non-market mechanism still exists, but only accounts for a relatively small part.

the *Notice on Issues Related to Strengthening Land Regulation* was issued and proclaimed that industrial land should be sold mainly through bidding, auction and listing. That is, the market for residential land practiced the market-oriented reform previous to that for the industrial land. Though the marketization of land selling has been deepening, local governments apply two distinct selling strategies for industrial land and residential land. Prior to the tax reform mentioned above, local governments took more endeavors to attract enterprises and even sold out industrial land at extremely low prices by non-market mechanisms, because the corporate income taxes made up most of their fiscal revenues. Since the income tax reform in 2002, the central government has centralized a great proportion of the local revenue, resulting in most of the corporate income taxes used to be charged by local governments being taken away. Subsequently, two different land selling strategies have been adopted by local governments. On the one hand, the industrial land are continued to be supplied at low prices to attract enterprises, which is directly related to local economic growth and performances of local leaders on their tenure. On the other hand, the supply of residential land is far more restricted, enabling local governments to gain more income by selling out at higher prices (see Figure 3).

(Figure 3 is here)

According to this logic, the prices of industrial and residential land will move in completely different directions (Figure 4). The price of industrial land remains extremely low, typically below 200 yuan/m², and experiences minimal fluctuations. On the other hand, residential land prices are significantly higher and exhibit greater volatility. At its lowest value in 2014, the price of residential land was approximately 8 times higher than that of industrial land, at around 1600 yuan/m². In 2017, it even reached a peak of approximately 15 times higher than the price of industrial land.

(Figure 4 is here)

3 Theoretical Framework

To better explain how the preferences of local leaders, influenced by experiences of famine, impact their decisions regarding land market, and to provide guidance for subsequent empirical analysis, we propose a theoretical framework in this section. This theoretical framework revolves around three key aspects:

1. Local leaders as agents of local governments: Local leaders act as representatives of local governments and play a crucial role in decision-making processes.
2. Influence of early famine experience on preferences: The experiences of famine in the past have shaped the preferences of local leaders. These experiences may have influenced their attitudes towards risk, resource allocation, and revenue generation strategies.
3. Impact of preferences on policy selections: The preferences of local leaders significantly influence their policy selections. These preferences, shaped by early famine experience, may affect their decision to sell land, the pricing strategies employed, and the overall approach to land management.

Local leaders, especially the top leader (the party secretary), act as agents of local governments in formulating and implementing policies. They possess significant discretionary power within their jurisdictions while also being involved in intense competition for promotion. Under China's dual-track economic system, the boundaries between the government and the market are not clearly defined (Lau et al., 2000). The government, along with its various affiliated institutions (including state-owned enterprises, public sectors, state-owned banks, etc.), deeply participates in most production and distribution processes (Lan, 2021). The economic development performance is a key assessment indicator for local leaders. To promote economic development, these leaders strive to attract external business investments, increase employment, expand the economic scale, and broaden the tax base. Additionally, they make efforts to increase fiscal revenue in order to participate more effectively in economic activities and provide better public infrastructure and services. The most significant means for local leaders to achieve these economic goals is through land selling!

How can the 1959-61 famine experience affect local leaders' preferences? Local leaders exposed to the famine must have experienced the era of China's planned economy and realized the tragic consequences of food deficiency during the famine. The centrally planned economic system stated in the last section was in essence an indirect collection of taxes from agriculture by the state in a planned way (Kochin, 1996; Young, 2000). In one way, the government restricted the purchase and sale prices of agricultural products through the Unified Purchase Program and limited trades by markets. Even more, in order to obtain enough agricultural products to re-feed industrial development, the government forcefully set a production quota for each farming unit, which may be more than the unit could produce on its own. Both reflect that the government planned almost all the production and distribution processes. The occurrence of the famine seemed to be an inexorable outcome, confirming the impracticality of realizing industrialization by some planned economic schemes which is separate from the market (Rawski, 1994). Once the famine broke out, food shortages spread rapidly throughout the country, especially in rural areas, where the famine were extremely severe due to the deprivation of farmers' control over their grain (Sen, 1981; Lin and Yang, 2000). Accordingly, the profound feelings about the famine of local leaders who had experienced such a tough period may be associated with the planned economic system and the phenomenon of people living on the edge of starvation during the famine. On this basis, we suppose that famine experiences of local leaders shape their preferences for market mechanisms and agricultural production (Luo and Hong, 2021; Guo et al., 2023).

Finally, we attempt to demonstrate the influence of local leaders' preferences on their land market decisions. In the land market, land demand is determined by external factors, while supply is determined by the government, and together they determine land prices and transaction volume. For residential land, MPS with early famine experiences tend to prioritize agricultural production and requisition less agricultural land, resulting in a lower supply of residential land. Additionally, all land supply must go through market means. This implies that, holding other factors constant, these cities have higher prices and lower transaction for residential land. As for industrial land, all cities strive to meet the demand for industrial land as much as possible to attract commercial investment, generate future tax revenue, and achieve better economic development performance. The difference lies in the fact that MPS with early famine experiences tend to supply land through market means, resulting in a higher supply of industrial land in the market. This means that,

holding other factors constant, these cities have slightly higher prices and higher transaction for industrial land.

From the analysis above, the following hypothesis emerges:

Hypothesis: Compared with other cities, cities with MPS exposed to the 1959-61 famine have higher prices for both residential and industrial land. Furthermore, these cities have fewer market transactions for residential land and more market transactions for industrial land. The former is because the MPS is less willing to requisition agricultural land, while the latter is because they prefer to allocate land through market means rather than non-market means.

4 Data

We resemble a panel data set including 267 prefecture-level cities from 2010 to 2018. This time interval is selected under several considerations. Firstly, we aim to eliminate the confounding effect of the financial crisis that broke out in 2008 on land prices. Secondly, in the database of local leaders, almost all the MPS who was on their tenure before 2010 was born during or before the famine years. In this paper, we focus on pairs of contiguous cities with common boundaries. In each pair of cities, there is one party secretary who experienced the famine, while the other did not. In other words, most of them have famine experiences, so we cannot obtain the targeted city pairs. Therefore, taking years after 2010, we can certainly obtain a large number of city pairs, within which MPSs were born either before (during) or after the famine. Due to data limitations, the information of MPS ends in 2018, we finally choose the time interval from 2010 to 2018.

Four databases are used in the paper. Our analysis concentrates on the top leaders of prefecture-level cities. As is mentioned in the existing literature (e.g. Tian et al., 2019), the municipal party secretary (MPS) is authorized by the Communist Party of China and has the supreme decision-making authority to manage the major social and economic affairs. We collect the information of MPSs and mayors who are in tenure during 2010-2018 in the targeted prefecture-level cities from websites and government disclosure reports. This data contains detailed characteristics and occupational information regarding MPSs, including the date of birth, gender, birthplace, educational background, the date of appointment and the date of departure. Local leaders' tenure duration is important for their decision making (Li and Zhou, 2005), so we also control the tenure duration of MPSs. Whether a MPS has experienced the 1959-61 famine is determined by his/her year of birth. If the MPS was born before 1961 (inclusive), then he/she is considered to be exposed to the famine, otherwise the MPS has not experienced the famine. Figure 5 shows the distribution of birth years of MPSs who are on tenure from 2010 to 2018. In general, 47.4% of MPSs in our samples have famine experiences, and 52.6% are not exposed to the famine. the disparity of regional famine intensity is also considered. MPSs exposed to the famine may live in regions with different levels of famine severity during that period, and may have different feelings about the famine. The more severe the famine MPSs experienced, the more deeply they felt about it. However, if MPSs lived in regions that had been slightly affected by the famine, they may not have impressive feelings. we calculate the population shrink rate of the municipal cities where MPSs were born to be the index of famine intensity. This index is presented in Figure 2. We also obtain some political characteristics of city mayors who are also authorized to make decisions. Table 1 shows all the characteristic variables of MPSs and mayors used in the paper.

(Figure 5 is here)

(Table 1 is here)

Land transaction data collected from a website¹¹ releasing plot-level transaction records. From the website we can obtain detailed information including the plot's location, area, selling price, source of land use right, the ultimate use of the plot, the way to sell out the plot by the government, land user, floor area ratio, and the date of the selling contract in force. We determine the specific year when the plot is sold out by the date the selling contract entering into force, and then select all the plots located in targeted cities and sold out during 2010-2018. Additionally, we also attain the latitude and longitude of each plot by converting its detailed address, and calculate the geographical distance between each plot and the center of the city where the plot is located. Table 2 shows the characteristic variables of plots used in the empirical analysis. Provincial plot distribution and City level average selling price are also presented in Figure A1 and Figure A2 in the Appendix.

(Table 2 is here)

We determine city boundaries from the city level vector data from the Aliyun Map¹². These city boundaries are all sinuous and relatively complex rather than rectilinear. Therefore, we need to use the vector data of city boundaries to identify city pairs with common boundaries through domain analysis. In this way, all these boundaries can be encoded uniquely. In addition, combined the geographical coordinates of city boundaries with those of plots, the shortest geographical distance from each plot to the boundary of the city where the plot is located can be derived through a specific algorithm. Since the RD approach is used in the empirical analysis, we merely focus on plots adjacent to the common boundaries of city pairs. Figure 6 illustrates the distribution of plots within 10 km of the city boundaries. Since we focus on city pairs within which one MPS was exposed to the famine and the other was not, we obtain a total of 599 valid city boundaries.

(Figure 6 is here)

City-level socioeconomic data is extracted from *China's Statistical Yearbook of Prefecture City* from 2010-2018. Following Tian et al. (2019), Yang (2019), Zhao and Yang (2015), Yu et al. (2015) and Zhang et al. (2013), several city socioeconomic indicators are used in the empirical analysis, see Table 3. All the socioeconomic indicators are one year lagged, as the local leaders may make decisions based on the economic outcomes of the previous year. We also adjust all these indicators by using the provincial price deflators with 2009 as the base year to cope with the long-term inflation.

(Table 3 is about here)

¹¹ <http://www.chinalands.com>.

¹² <http://datav.aliyun.com/tools/atlas>.

5 The Effect of the Famine Experience of MPSs on Land Price

5.1 Model Specification

Referring to Turner et al. (2014), we use following RD specification to identify the impact of MPS' early famine experience on urban land selling price:

$$\ln Price_{i,c,b,t} = \beta_0 + \beta_1 Famine_{c,b,t} + \beta_2 Leader_{c,b,t} + \beta_3 Land_{i,c,b,t} + \beta_4 City_{c,b,t-1} + f(Geographical\ Distance_{i,c,b}) + \mu_b + \mu_t + \mu_p \times t + \epsilon_{i,c,b,t} \quad (1)$$

where the subscript t, c, b and p indicate year, city, common boundary of city pair and province, respectively. Since we focus on both the industrial and residential land, dependent variable $\ln Price_{i,c,b,t}$ represents the logarithm of the price per unit area of industrial land and residential land sold out by market mechanisms which include bidding, auction and listing. Both the two price variables are deflated to 2010. $Famine_{c,b,t}$ is the famine experience indicator, which is equal to 1 if the MPS serving in city c in year t has experienced the famine, and 0 otherwise. Moreover, three aspects of heterogeneity are controlled. First, characteristics of local leaders ($Leader_{c,b,t}$), including personal characteristics and political characteristics, are controlled to eliminate their influences on land decisions hence the land selling prices. We also control the political characteristics of mayors. Second, characteristics of plots ($Land_{i,c,b,t}$) are added to the function to control the impact of the heterogeneity of plots on their selling prices. Third, social and economic characteristics of cities where the plots are located may affect the plots' selling prices. Accounting for policies in a specific year generally being made according to social and economic circumstances of the previous year, we take all the socioeconomic indicators one year lagged ($City_{c,b,t-1}$). $f(Geographical\ Distance_{i,c,b})$ is the RD polynomial function and determined by the geographical distance from the plot to the common city boundary. Both the linear and quadratic polynomial function will be used in our estimation. Since we compare the difference in land selling price within the city pair, the common boundary fixed effect (μ_b) is necessary to be control to obtain the within-group estimator. The standard error is also clustered to the common boundaries of city pairs. Moreover, the year fixed effect (μ_t) and interaction term between the province fixed effect and the linear time trend ($\mu_p \times t$) are also added to the function to control the effect of unobservable time-varying macroeconomic factors and unobservable provincial time-varying factors on land selling price, respectively. $\epsilon_{i,c,b,t}$ is the error term. We primarily pay attention to plots located within 10 km of the city boundaries, with estimation based on those located within 5 km as a benchmark. Finally, both the prices of industrial and residential land are winsored by 1% to eliminate the interference of outliers to our estimated results.

5.2 Results

5.2.1 Discontinuities of the selling Price at the City Boundary

We first compare intuitively both the land selling prices of industrial and residential land on both sides of common boundaries of city pairs. The common boundaries of city pairs are cut-offs which distinguish between cities with MPSs exposed to the famine and cities with MPSs without the famine experience. We focus on plots with the shortest geographical distances within 5km from the common city boundaries to control for the heterogeneity. Figure 7 presents two prominent cut-offs for selling prices of industrial and residential land, respectively, which

illustrates the differences in selling prices of plots located on both sides of city boundaries distinguishing whether MPSs are exposed to the famine. It shows that both the selling prices of industrial land and residential land located in cities where MPSs have been exposed to the famine are higher than those in other cities. Furthermore, there is a larger jump in residential land prices, indicating that the impact of MPSs' famine experience on residential land prices is greater compared to industrial land. Since the cities' own characteristics on either side of the boundaries and characteristics of MPSs may also play essential roles, the rigorous empirical analysis will be presented below.

(Figure 7 is here)

5.2.2 Baseline Results

Restricting plots located within 5km from the common city boundaries, we first present the baseline results by local linear regression of specification (1). Columns (1) and (2) in Table 4 show that, compared with cities where MPS on tenure are without famine experiences, prices of both the industrial land and residential land in cities with MPS exposed to the famine are much higher. In the point estimates, MPSs' famine experiences explain approximately 14 and 40 percentage points of the increases in selling prices of industrial land and residential land, respectively. Considering the possibility of nonlinearity of the treatment effect, the polynomial of the RD specification is set to be quadratic form, with results in Column (3) and (4) still similar to the linear regression results. It implies that the increases in selling prices of industrial and residential land may partially attribute to local leaders' specific experiences, especially those pertinent to the 1959-61 famine.

(Table 4 is here)

5.2.3 Robustness Checks

5.2.3.1 Famine Intensity

Maybe not all MPSs born before the famine have impressive memories of it. Although the famine almost swept across the whole country, the regional severity of the famine varied extensively (see Figure 2). Some MPSs living in regions during the famine may not be actually affected by the famine. However, in our specification, MPSs' experience of the famine is determined only by their birth years. It means that these unaffected MPSs may be identified artificially to be having experienced the famine. To mitigate the impact of this issue, in the following robustness checks, MPSs born before (or during) the famine in places with shrink rate below the 10%, 20% and 30% quantiles will be considered to be without famine experience. We estimate by the fuzzy RD specification. Results in Figure 8 are still consistent, with coefficients in the first row almost similar to that of the baseline and coefficients even greater in magnitude in the second and third row. This indicates that the effects of the MPSs' famine experience on both the selling prices of industrial land and residential land may be underestimated in the baseline results where the indicator of MPSs' famine experience is measured by their birth years. In other words, the baseline results may be lower bounds. In the following estimation, fuzzy RD specification with

the indicator of MPSs' exposure to the famine adjusted by the 20% quantile of the shrink rate will be applied.

(Figure 8 is here)

5.2.3.2 Sensitivity Tests for Alternative Bandwidths

Robustness check is done with different bandwidths. Plots are restricted to 3km, 4km, 6km, 7km and 10km from city boundaries¹³, respectively. As is presented in Figure 9, the results are similar to those obtained from the baseline regression, with the effect of the MPSs's famine experience on both the prices of industrial and residential land being positive and the magnitudes of the latter larger. The downside is that the result derived from the quadratic RD regression with plots limited to 3km from city boundaries is not statistically significant, which mainly accounts for the fact that less land is sold out for industry when closer to city boundaries. The results with different bandwidths are robust.

(Figure 9 is here)

5.2.3.3 Endogenous Birth Year

As mentioned above, the famine indicator is specified by birth years of MPSs and adjusted according their birthplaces' famine severity. The precondition must rely on the exogeneity of MPSs' birth years. It means that when MPSs were born should not be affected by the famine if birth years are used to identify MPSs' famine exposures. However, some researchers have indicated that the deterioration of the external environment caused by the famine is not conducive to the development of embryos (Cai and Feng, 2005; Almond et al., 2010). So the birth year may be endogenous if the health of its mother is negatively affected by the famine. Excluding MPSs born during 1959-61 may be a plausible solution, since the birth years of these samples are most likely to have been affected by the famine. In Figure 10, it shows that the effect on the price of the residential land is still larger than that of the industrial land, with magnitudes of the latter approximately two times larger than those of baseline results and magnitudes of the former slightly decreased. Results further confirm that the impact of MPSs' famine experience on selling prices of industrial and residential land obtained from the baseline regression is likely to be lower bounds.

(Figure 10 is here)

5.2.3.4 Placebo Test

We try to make some placebo tests by shifting the city boundaries. In our RD specification, common boundaries of city pairs are cut-offs that differentiate the famine experiences of MPSs. Next, we place some virtual "boundaries" on either side of the actual city boundaries. These artificially set "boundaries" do not actually exist, serving effectively as a placebo. "City pairs",

¹³ We don't restrict plots within 3km from city boundaries because there are much less plots as the proximity to city boundaries decreases. Figure A3 in Appendix presents some detailed information about the numbers of plots located at different location with different proximity to city boundaries.

within which MPSs are either both exposed to the famine or both not exposed to the famine, are also artificially specified. We then examine the differences of selling prices of plots located on either side of the artificially set city “boundaries”.

We take out plots on either side of city boundaries and place the artificially set “boundaries” on locations 3km, 5km and 7km from the actual boundaries, respectively. Then we observe whether there are discontinuities in land selling prices at these virtual “boundaries”. As expected, neither Figure 11 nor 12 show any cut-offs at these artificially set “boundaries”. It is confirmed by the empirical results presented in Figure 7¹⁴. Placebo tests further imply that land selling price differences within city pairs only exist at the actual common city boundaries which differentiate whether MPSs have experienced the famine.

(Figure 11 is about here)

(Figure 12 is about here)

(Figure 13 is about here)

5.2.3.5 Eliminating Province Boundaries

There are city pairs with province boundaries as common boundaries in our data. Cities within these city pairs are located in different provinces. Natural barriers, like rivers and mountain ranges, were previously chosen as dividing lines between neighboring provinces. There may be enormous social, economic and cultural differences among different provinces. This kind of heterogeneity may result in the heterogeneity of cities and plots, and therefore biases the results. We re-estimate by excluding city pairs within which cities are located in different provinces. Results in Figure 14 still show the consistence.

(Figure 14 is about here)

5.2.3.5 Other Life Experiences of MPSs

Even if we control for the characteristics of MPSs in the specification, MPS land selling decisions are inevitably influenced by other experiences in their early lives. To solve this problem, we focus on two cohorts: MPSs born during 1959-61 and 1962-64. The former is exposed to the famine, while the latter without famine experience. The two cohorts may share more similarity in early-life experiences, since their birth years fall within a very short interval. Results presented in Figure 15 are still robust.

(Figure 15 is about here)

5.2.4 Mechanisms

In this section, we will shed light on the mechanisms through which the famine experience of MPSs influences land market prices. For residential land, MPSs with famine experience place a

¹⁴ Only results estimated by the local linear RD regression are reported here.

greater emphasis on agricultural production and expropriate less agricultural land, resulting in a lower supply of residential land. Holding other conditions constant, these cities experience higher prices and less transaction for residential land. As for industrial land, all cities strive to meet the demand for this type of land, but MPSs with famine experience are more inclined to supply land through market. Holding other conditions constant, these cities experience higher prices and more transaction for industrial land. The detailed empirical analysis below will test these two mechanisms.

5.2.4.1 The Increased Price of Residential Land attributed to reduced Supply

To test whether MPSs' preference for agricultural production trigger the effect of their famine experience on residential land price, we regress MPSs' famine experience on the non-market and market supply of residential land, respectively. Column (1) in Table 5 shows that MPSs' famine experiences have no significant impact on the supply of residential land sold out by bilateral negotiation, indicating that there is no difference in MPSs' preference for using the market or non-market mechanisms. The result may be driven by the fact that residential land is overwhelmingly supplied through the market. However, result in column (2) shows that the residential land supplied by market mechanisms in cities with MPSs exposed to the famine declines significantly by approximately 16 percentage points. Apparently, the decreased supply of residential land is not resulted from a shift in the way through which residential land sold out from non-market to market mechanisms. Therefore, combining these two points, we can conclude that in cities where MPS with famine experience, there is a lower overall supply of residential land, primarily due to a decrease in supply through the land market. Naturally, with a decrease in supply in the market, prices increase, holding other conditions constant.

(Table 5 is here)

5.2.4.2 The Increased Price of Industrial Land Induced by the Market Demand

Similarly, to examine whether MPSs' preference for market mechanisms contributes to the mechanism of increased industrial land prices, we regress the MPSs' famine experience on industrial land supply, distinguishing between non-market supply and market supply. Column (1) in Table 6 shows that MPSs with famine experience may reduce the scale of industrial land sold through bilateral negotiation by 29 percentage points. After the market-oriented reform of the industrial land market, the proportion of industrial land sold through non-market mechanisms decreases overall but is not completely eliminated. These results indicate that MPSs with famine experience may attach greater importance to market-oriented reforms, significantly reducing the supply of industrial land through non-market mechanisms. Column (2) in Table 6 further confirms that MPSs with famine experience tend to increase the supply of industrial land sold through market mechanisms by 22 percentage points. Overall, the total supply of industrial land remains unchanged as local governments aim to attract more business investments and strive to meet all investment demands. Therefore, combining these two points, we can conclude that in cities where MPSs have experienced famine, the total supply of industrial land remains constant, but the predominant supply is through the land market. In other words, there is a greater proportion

demand for industrial land fulfilled through the land market. Naturally, with a higher demand in the market, prices increase, holding other conditions constant.

(Table 6 is here)

6 Conclusion

In recent years, development economists have paid more attention to the role of government in the process of economic development, particularly the role played by political leaders. However, there is still limited knowledge about whether political leaders have an influence and how that influence is generated. This paper provides empirical evidence of a causal relationship between political leaders' preferences and their economic decision-making. Based on the context of China, we employ a Regression Discontinuity (RD) identification strategy and find that the early experiences of local leaders shape their policy preferences, which systematically influence economic policies. This evidence helps us better understand the role of political leaders in economic development and provides valuable insights for policy formulation in developing countries.

Over the past four decades, China's rapid economic growth has been significantly influenced by government action, particularly through land finance. Understanding the land sale strategies of local governments in this context is crucial, as they have long monopolized the supply of urban land. What causes differences in land market decisions among different local governments? Existing literature focuses more on the political characteristics of local leaders. However, due to the fact that local leaders are usually appointed by higher-level governments and subject to similar institutional constraints, the differences in these political characteristics are not substantial and are clearly endogenous variables. As a result, it is challenging to draw conclusions from related studies that reveal the reasons behind regional variations in land sale strategies. In contrast, certain inherent characteristics of leaders may be of significant importance and vary greatly among local leaders but have been overlooked due to difficulties in clear identification. This paper explored the relationship between leaders' personal preferences and decision-making in the land market, starting from their early life experiences. It provides a new perspective and insights for understanding the Chinese land market.

This paper focused on a specific nationwide catastrophe, the severe famine that occurred from 1959 to 1961, and its impact on land sale decisions made by the top leader considered as municipal Party secretaries in prefecture level cities. We have demonstrated that the famine experience of MPSs significantly increases the prices of industrial and residential land by 14% and 42%, respectively. However, the mechanisms behind these two effects are entirely different. The price increase in residential land is mainly driven by a reduction in land supply. As the famine is directly attributed to agricultural failure, MPSs with famine experience may place greater emphasis on agricultural production. Consequently, the expropriation of agricultural land decreases, leading to a reduction in the supply of residential land. According to our research estimates, the supply of residential land in cities where MPSs with famine experience is 15% less than in other cities. On the other hand, the price increase in industrial land caused by MPSs' famine experience is driven by a greater proportion of industrial land being sold through market rather than non-market. In these cities, the scale of industrial land sold through market is 22%

higher than in other cities, revealing the market preference of MPSs with famine experience in supplying industrial land.

This paper demonstrated the relationship between individual early life experiences and subsequent behavior. Research in psychology, corporate governance, and behavioral economics emphasizes that individuals' early experiences, especially traumatic ones, can subconsciously influence their preferences and subsequently impact their behavior. By providing empirical evidence in the field of political economy, this paper contributed to these literature. The land sale decisions of local leaders may be influenced by their preferences triggered by their famine experience. Furthermore, this paper further substantiates the importance of leaders in economic development from a micro perspective, which aligns with the views of Jones and Olken (2005).

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Figures and Tables

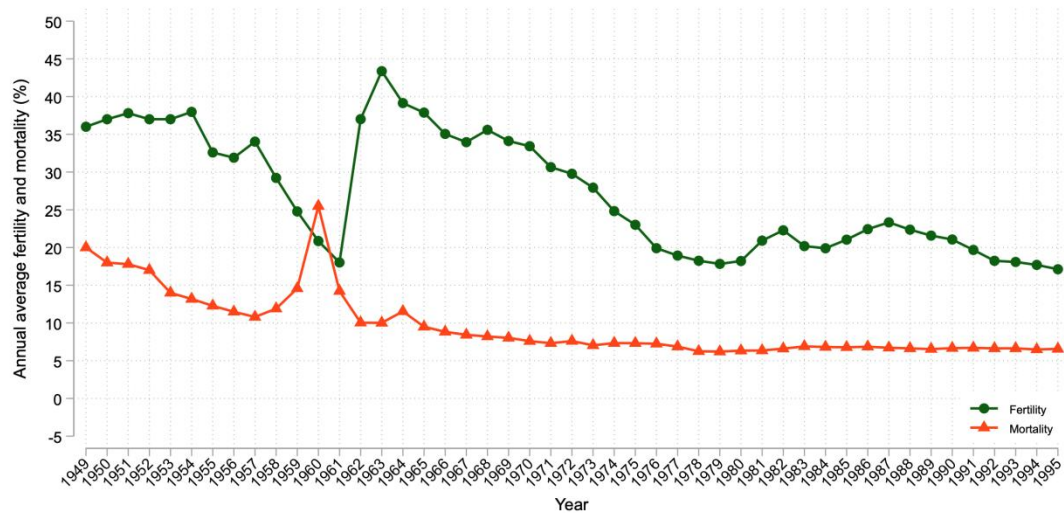


Figure 1. Annual Fertility and Mortality Rates

Sources: *China's Demographic Yearbook* of 2001 and the *China's Statistical Yearbook* of 2003.

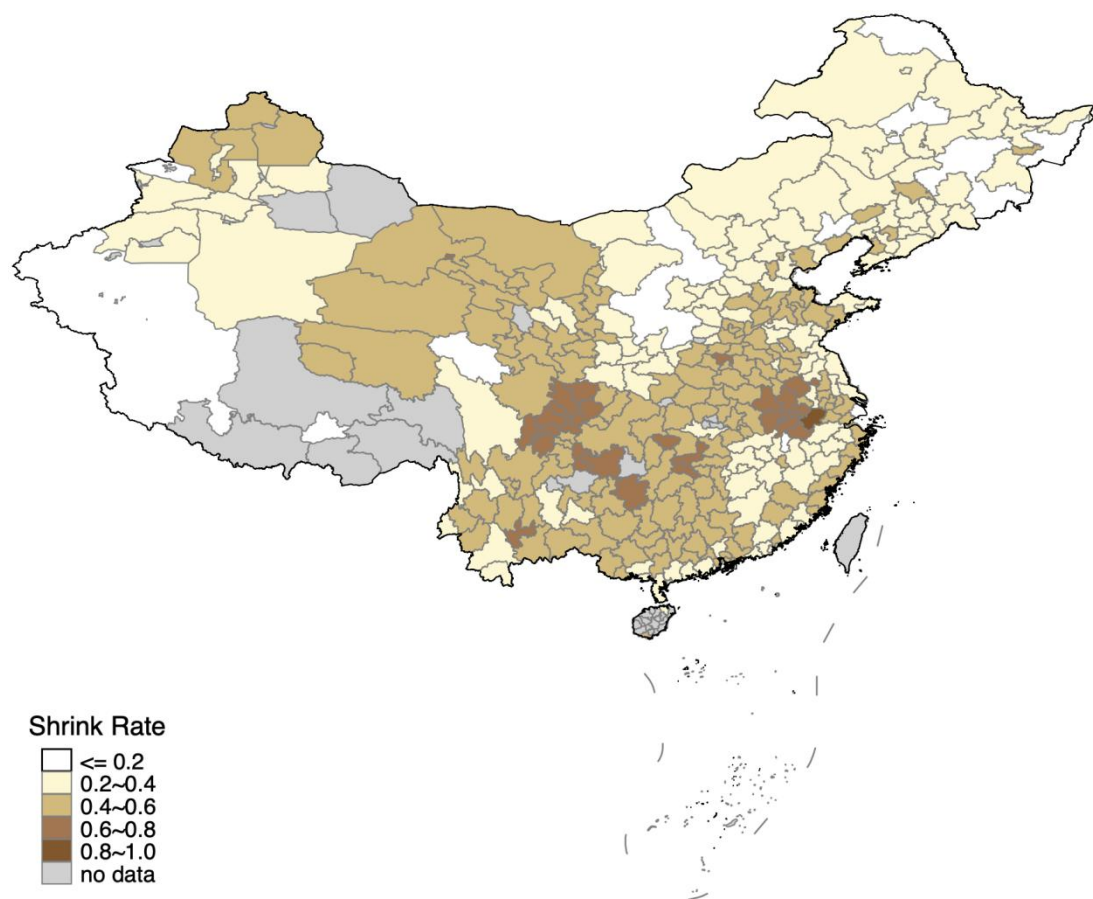


Figure 2. Regional Intensity of the 1959-61 Famine

Source: The census data derived from 1% of the population in 2005.

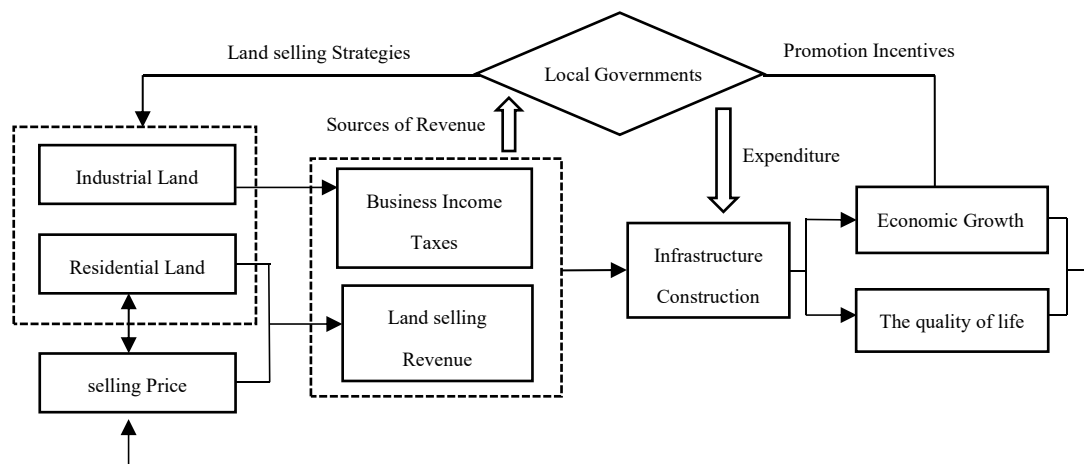


Figure 3. The Strategies of Local Governments in Land Market
Source: Lan (2021)

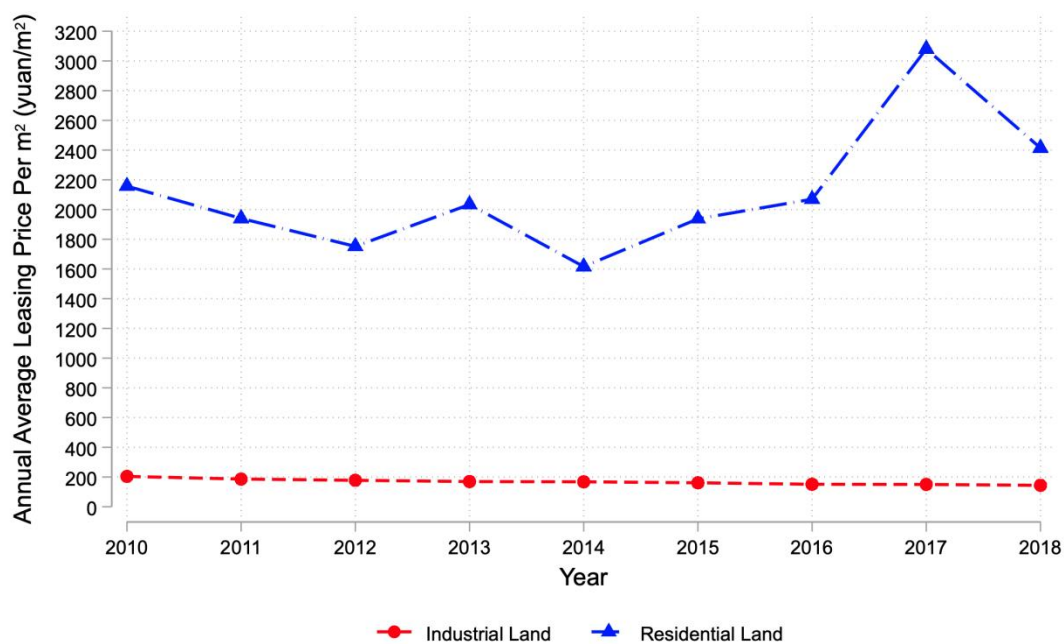


Figure 4. Prices of Industrial and Residential Land
Source: Plot-level transaction records on <http://www.chinalands.com>.
Note: Prices are deflated to 2010.

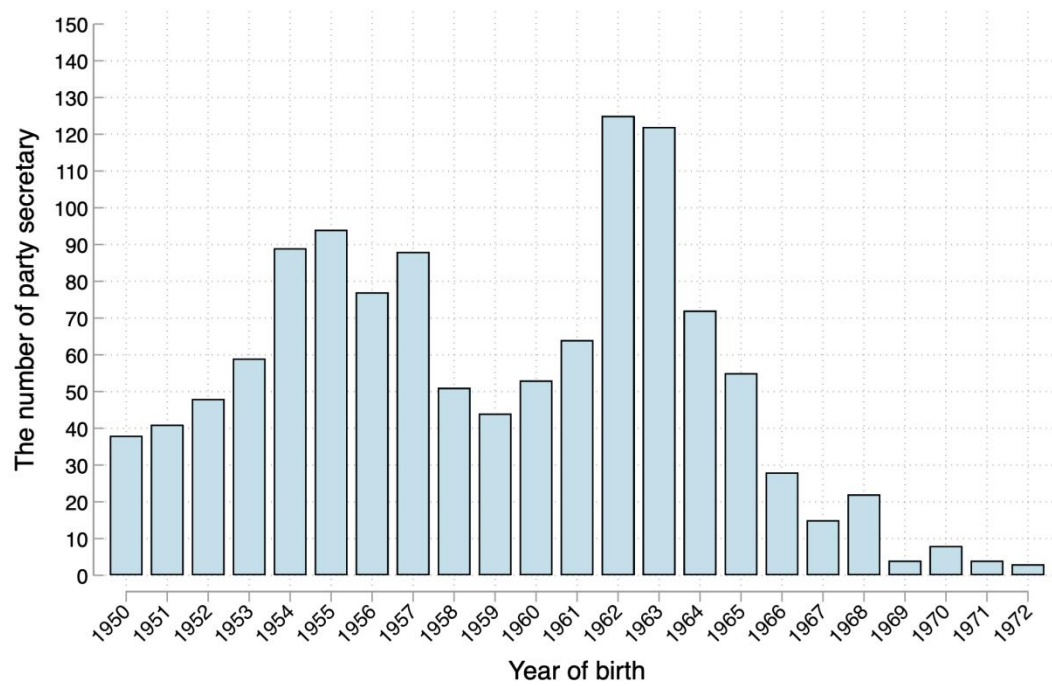


Figure 5. Distribution of Birth Years of MPSs in Tenure during 2010-2018

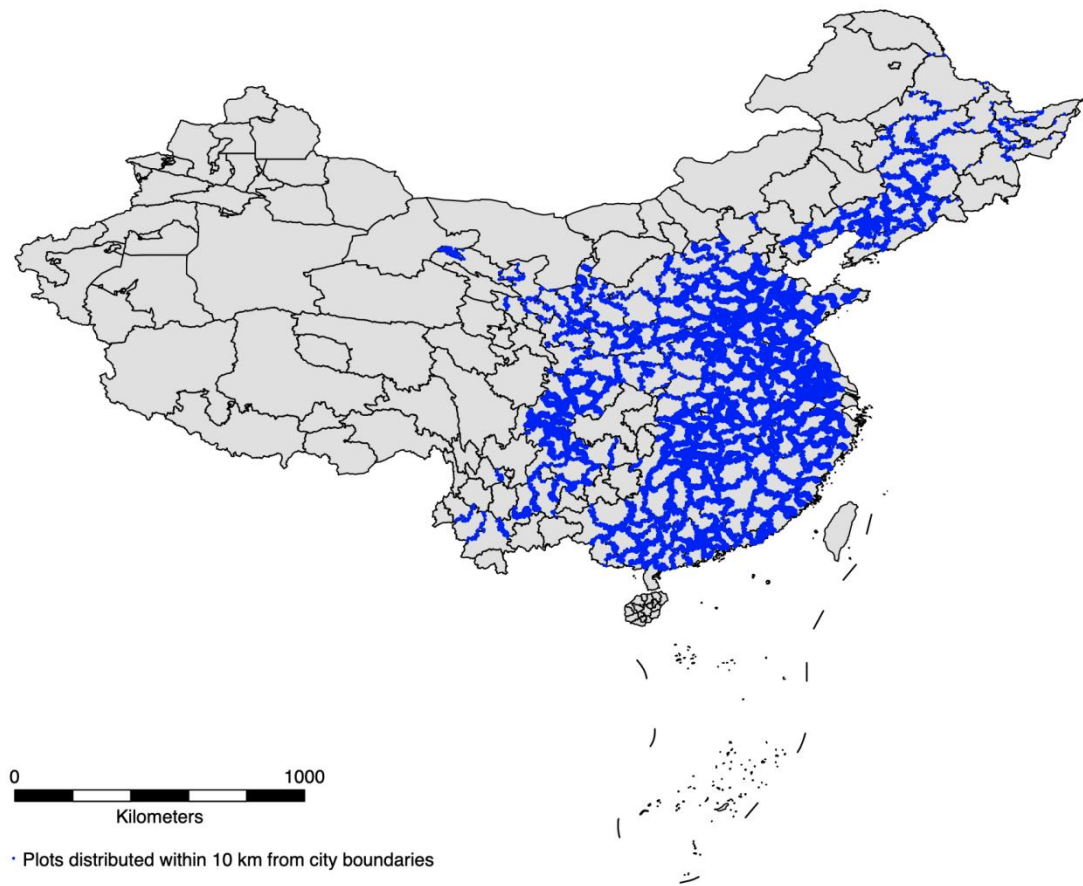


Figure 6. Plots Located within 10 km of City Boundaries

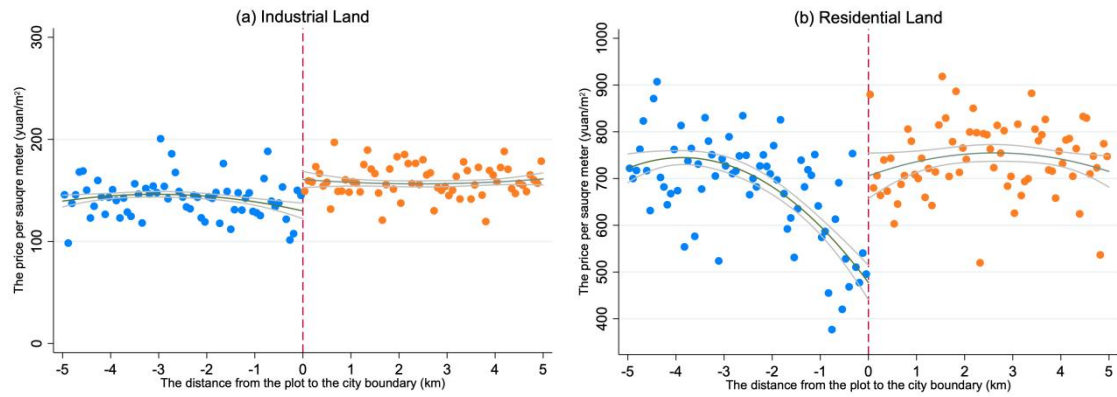


Figure 7. Discontinuities of Prices of Industrial and Residential Land at the City Boundary

Differentiating Whether MPS Was Exposed to the Famine

Note: 0 on the x axis indicates the common boundaries of city pairs. Points on the left side of 0 are plots located in cities with MPSs without famine experience. Points on the right side of 0 are plots located in cities with MPSs exposed to the famine. The negative signs of the values in the x-coordinates indicate the left side of the city boundaries. MPSs in cities in the left side of the city boundaries are not exposed to the famine. The positive signs of the values in the x-coordinates indicate the right of the actual city boundaries. MPSs in cities in the right side of the city boundaries are exposed to the famine. The absolute values of the x-coordinate are the shortest distance from the plots to the common city boundaries. The 95% confidence intervals also added.

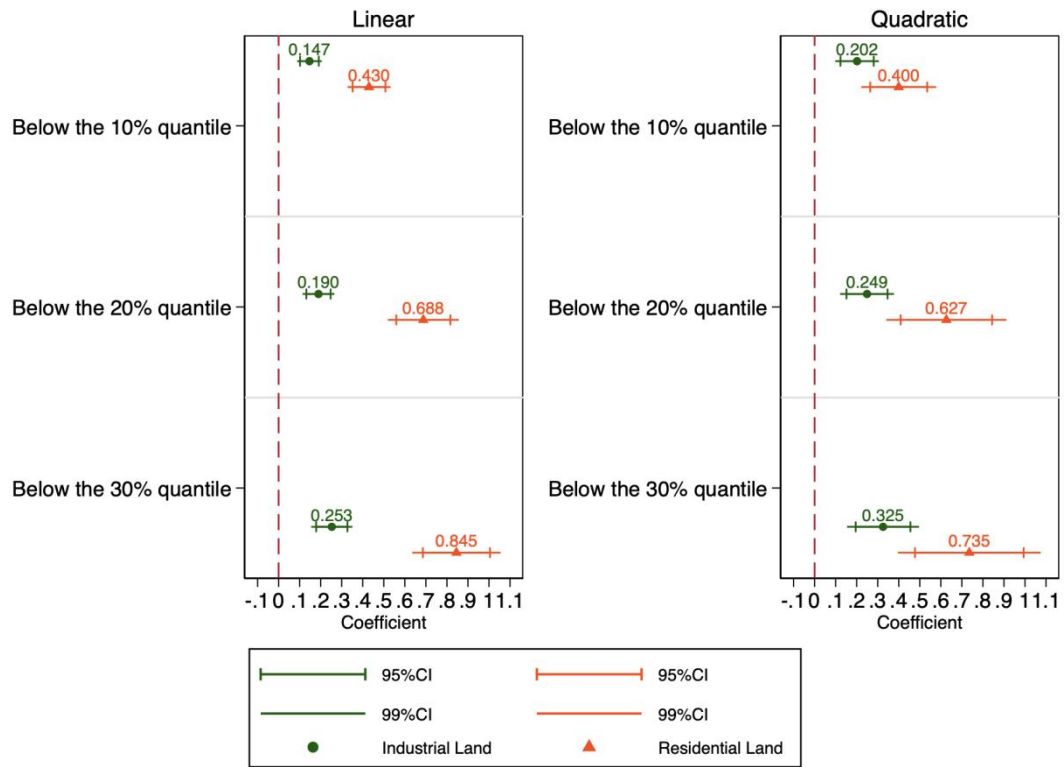


Figure 8. Results Estimated by Fuzzy RD

Note: Plots located within 5 km of the common city boundaries are used. Robust standard errors are clustered at the common city boundary level. All the results are derived from the local fuzzy RD regression. Results derived from the RD specification with linear and quadratic polynomial are presented. In the fuzzy RD specification, MPSs born before (or during) the famine in places with shrink rate below the 10%, 20% and 30% quantiles are specified to be without famine experience, respectively. Other controls are all the same with the shark RD specification, see Table 4. The abscissas represent the magnitudes of the estimated coefficients. The dots in the figure represent the industrial land, and the triangles represent the residential land. Both the 95% and 99% confidence intervals are shown in the figure.

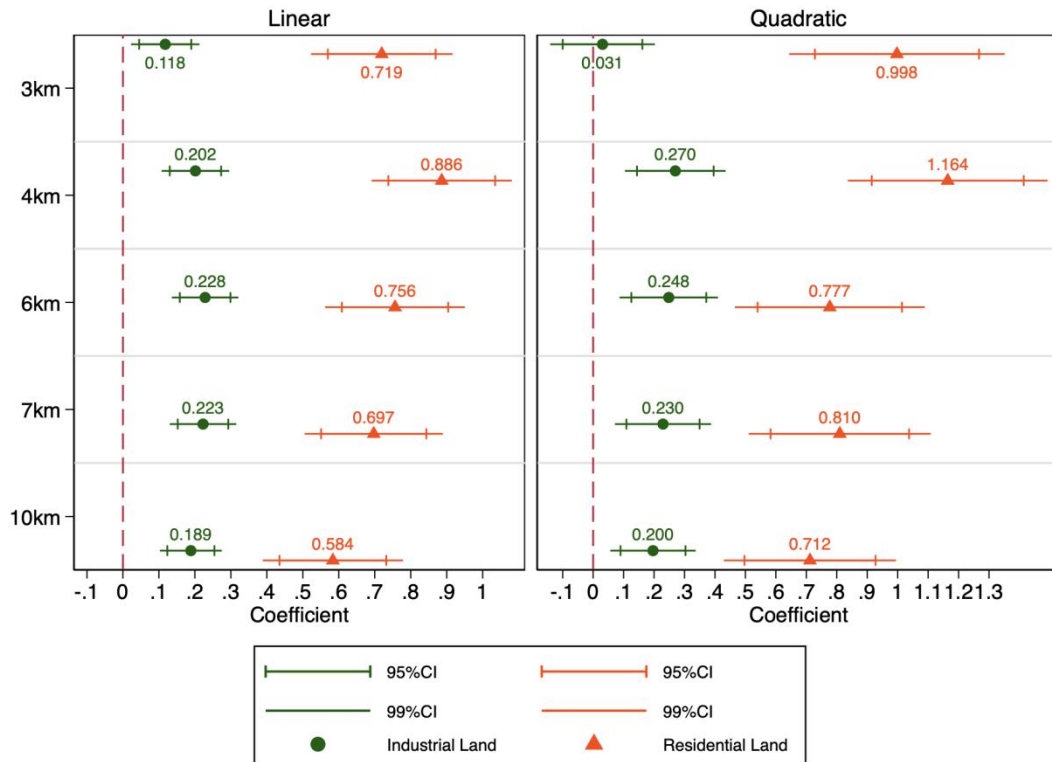


Figure 9. Robustness Checks by Specifying Different Bandwidths

Notes: Plots located within 3km, 4km, 6km, 7km and 10 km of the common city boundaries are used, respectively. Robust standard errors are clustered at the common city boundary level. All the results are derived from the local fuzzy RD regression. Results derived from the RD specification with linear and quadratic polynomial are all presented. In the fuzzy RD specification, MPSs born before (or during) the famine in places with shrink rate below the 20% quantile are specified to be without famine experience. Bandwidths are specified to be 3km, 4km, 6km, 7km and 10 km, respectively. Other controls are all the same with the shark RD specification, see Table 4. The abscissas represent the magnitudes of the estimated coefficients. The dots in the figure represent the industrial land, and the triangles represent the residential land. Both the 95% and 99% confidence intervals are shown in the figure.

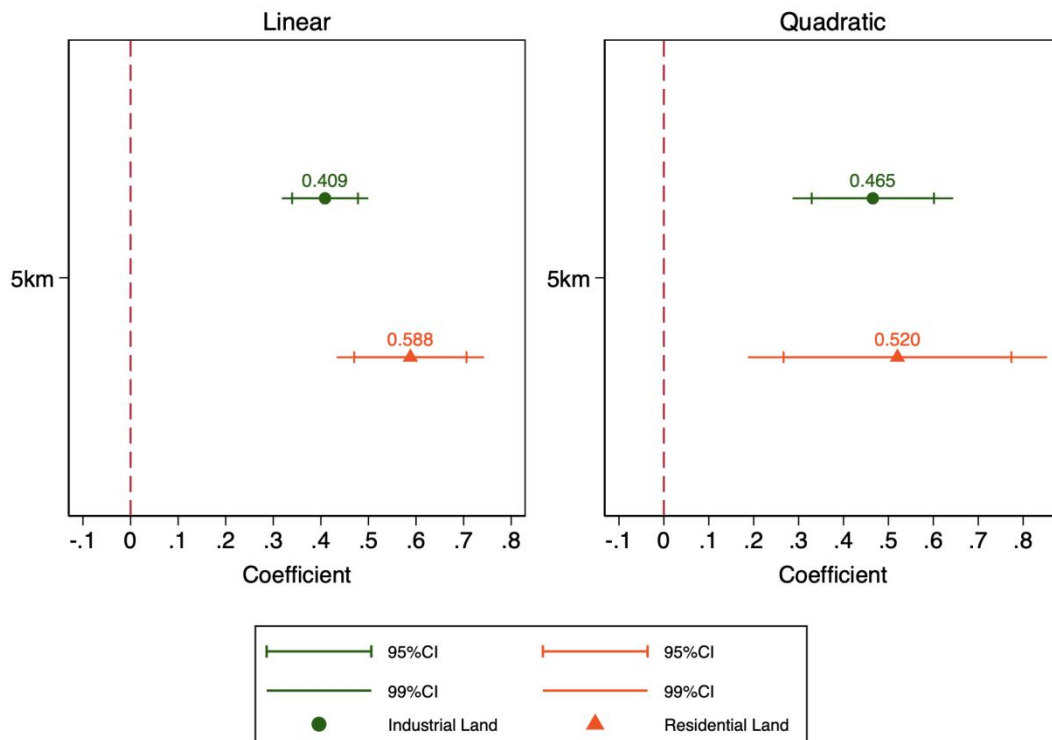


Figure 10. Robustness Checks by Eliminating the Endogenous Influence of the Famine on MPSs' Birth Years

Notes: Considering the endogeneity of MPSs' birth years, MPSs born during 1959-61 are excluded in the sample. Plots located within 5 km of the common city boundaries are used. Robust standard errors are clustered at the common city boundary level. All the results are derived from the local fuzzy RD regression. Results derived from the RD specification with linear and quadratic polynomial are all presented. In the fuzzy RD specification, MPSs born before (or during) the famine in places with shrink rate below the 20% quantile are specified to be without famine experience. Other controls are all the same with the sharp RD specification, see Table 4. The abscissas represent the magnitudes of the estimated coefficients. The dots in the figure represent the industrial land, and the triangles represent the residential land. Both the 95% and 99% confidence intervals are shown in the figure.

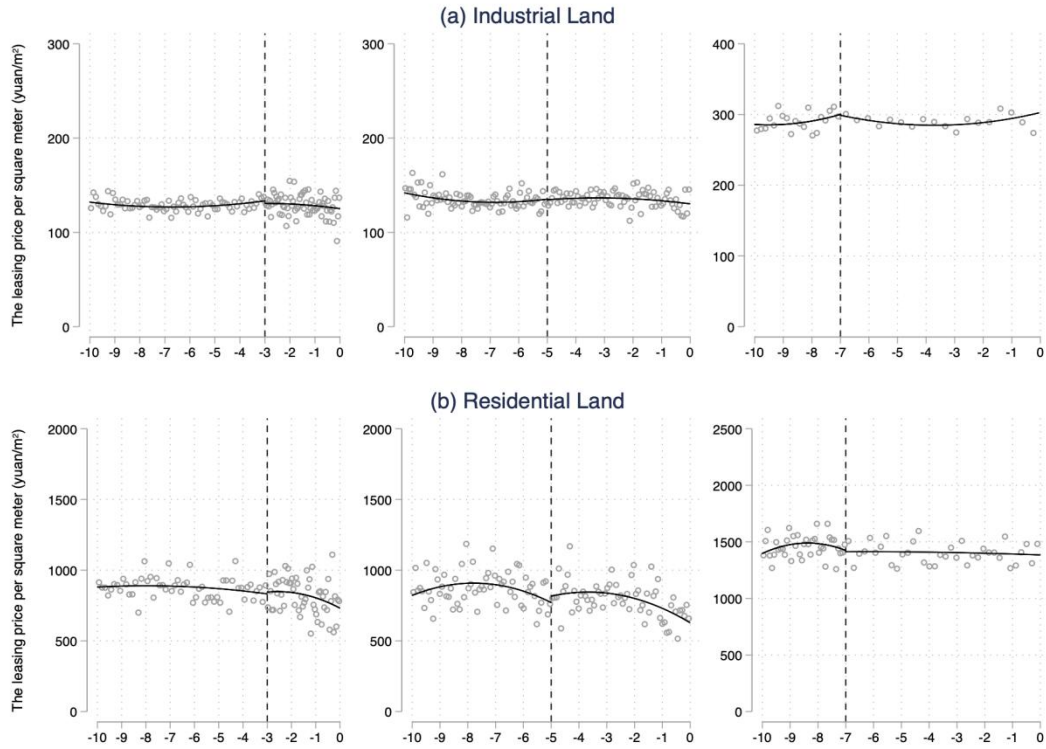


Figure 11. Placebo tests with plots located in the left side of city boundaries (MPSs without famine experience)

Notes: Plots located in the left side and within 10 km of the common city boundaries are used. 0 on the x axis indicates the actual city boundaries. The negative signs of the values in the x-coordinates indicate the left of the actual city boundaries. MPSs in cities in the left side of the city boundaries are not exposed to the famine. The absolute values of the x-coordinate are the shortest distance from the plots to the actual city boundaries. The dashed lines are virtual “boundaries” that are artificially set. The values of the y-axis are the selling prices per square meter.

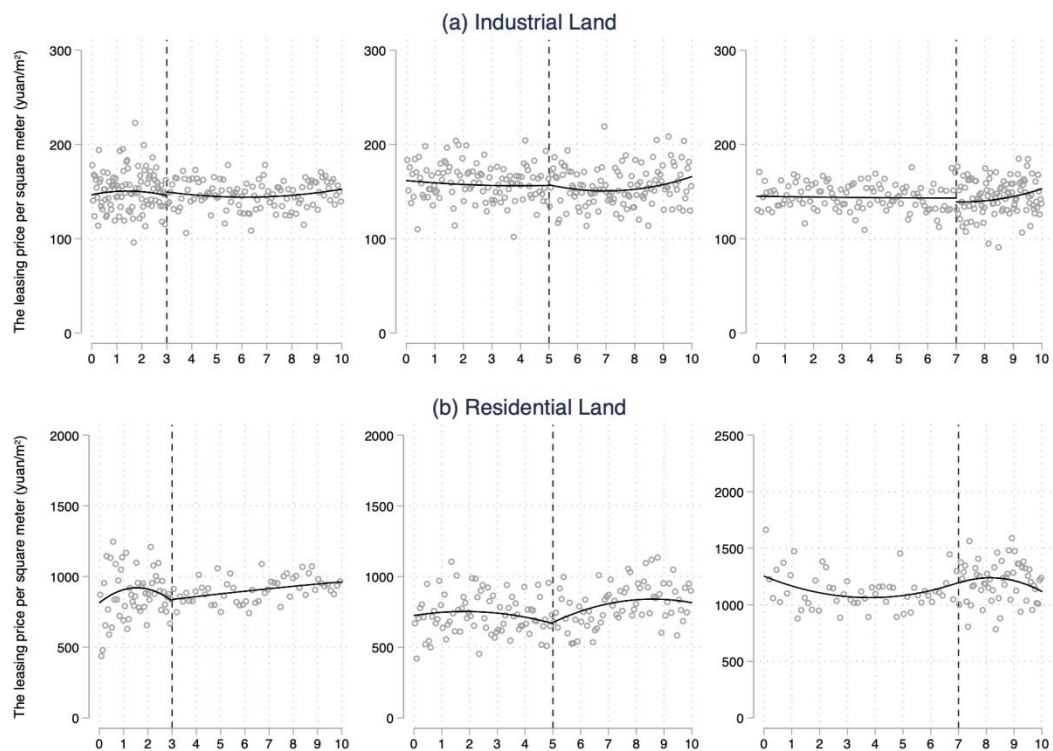


Figure 12. Placebo tests with plots located in the right side of city boundaries (MPSs with famine experience)

Notes: Plots located in the right side and within 10 km of the common city boundaries are used. 0 on the x-axis indicates the actual city boundaries. The positive signs of the values in the x-coordinates indicate the right of the actual city boundaries. MPSs in cities in the right side of the city boundaries are exposed to the famine. The absolute values of the x-coordinate are the shortest distance from the plots to the actual city boundaries. The dashed lines are virtual “boundaries” that are artificially set. The values of the y-axis are the selling prices per square meter.

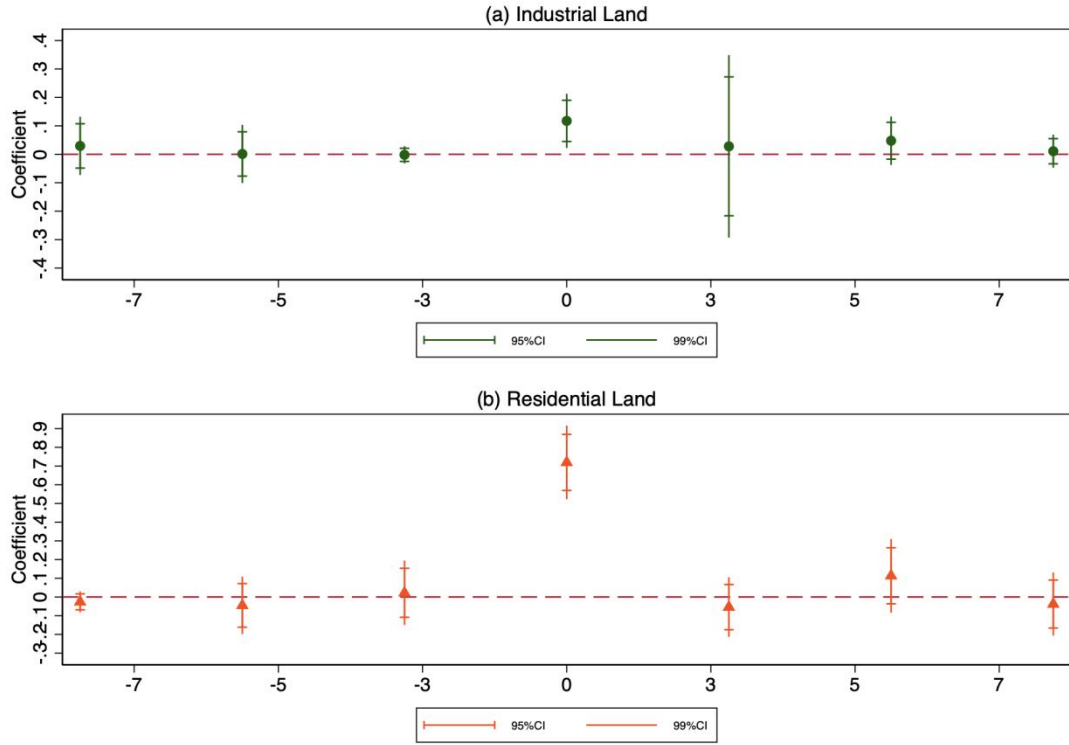


Figure 13. Results of Placebo Tests

Notes: Plots located within 5 km of the common city boundaries are used. Robust standard errors are clustered at the common city boundary level. All the results derived from the local fuzzy RD specification with linear RD polynomial are given. In the fuzzy RD specification, MPSs born before (or during) the famine in places with shrink rate below the 20% quantile are specified to be without famine experience. Other controls are all the same with the sharp RD specification, see Table 4. The absolute values of the x-axis are the distances to the actual city boundaries. 0 on the x-axis indicates the actual city boundaries, while other values represent the locations of the virtual “boundary”. The values of the y-axis are the magnitudes of the estimated coefficients. The dots in the figure represent the industrial land, and the triangles represent the residential land. Both the 95% and 99% confidence intervals are shown in the figure.

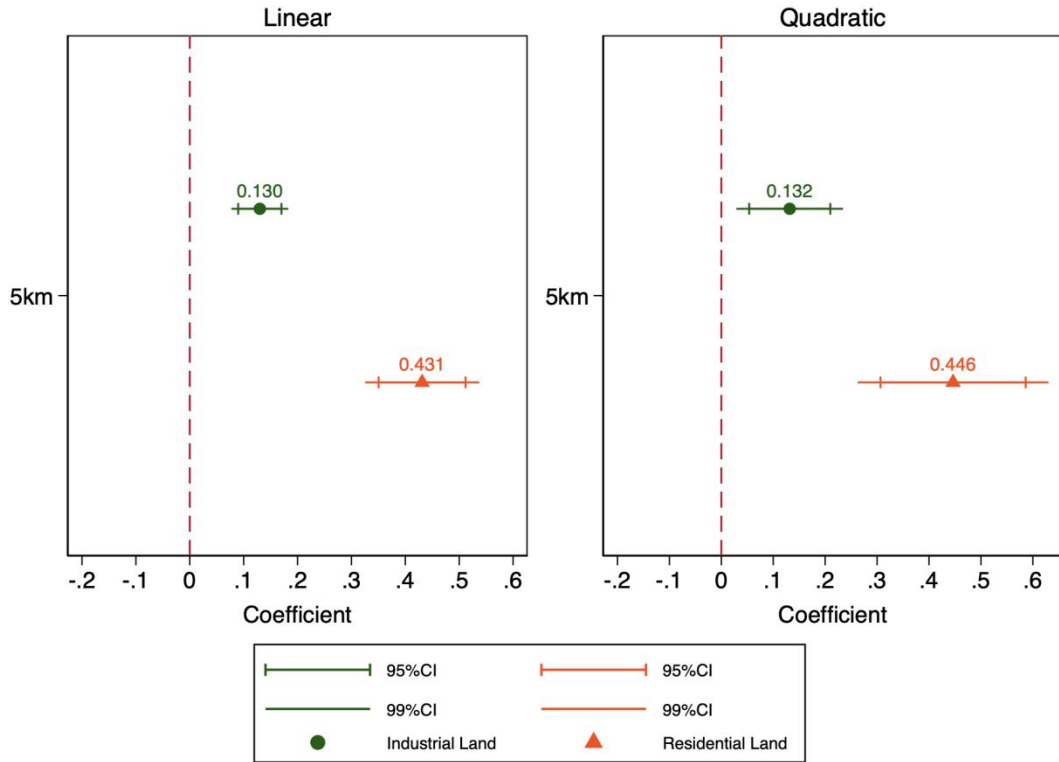


Figure 14. Robustness Check by Eliminating Province Boundaries

Notes: City pairs with province boundaries as common boundaries are excluded. Plots located within 5 km of the common city boundaries are used. Robust standard errors are clustered at the common city boundary level. All the results are derived from the local fuzzy RD regression. Results derived from the RD specification with linear and quadratic polynomial are all presented. In the fuzzy RD specification, MPSs born before (or during) the famine in places with shrink rate below the 20% quantile are specified to be without famine experience. Other controls are all the same with the shark RD specification, see Table 4. The abscissas represent the magnitudes of the estimated coefficients. The dots in the figure represent the industrial land, and the triangles represent the residential land. Both the 95% and 99% confidence intervals are shown in the figure.

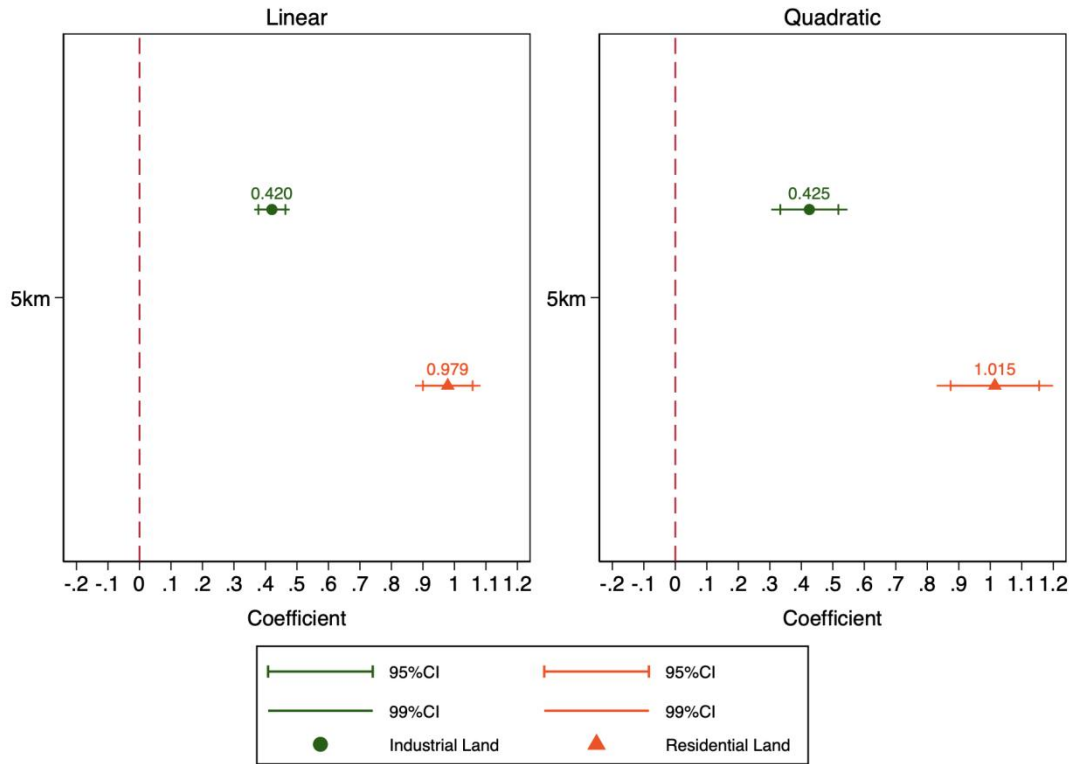


Figure 15. Robustness Check by Eliminating Other Life Experiences of MPSs

Notes: Only MPSs born during 1959--64 are remained. Plots located within 5 km of the common city boundaries are used. Robust standard errors are clustered at the common city boundary level. All the results are derived from the local fuzzy RD regression. Results derived from the RD specification with linear and quadratic polynomial are all presented. In the fuzzy RD specification, MPSs born before (or during) the famine in places with shrink rate below the 20% quantile are specified to be without famine experience. Other controls are all the same with the shark RD specification, see Table 4. The abscissas represent the magnitudes of the estimated coefficients. The dots in the figure represent the industrial land, and the triangles represent the residential land. Both the 95% and 99% confidence intervals are shown in the figure.

Table 1. Characteristics of Local Leaders

Variables	Descriptions	Mean	Std. Dev.	Min	Max
Municipal Party Secretary					
Tenure	The time duration of a municipal party secretary has been in office in a specific year (month).	18.536	16.503	1	102
Education	The highest qualification.				
College degree or below	The highest qualification is a college degree or below.	0.006	0.080	0	1
Bachelor degree	The highest qualification is a bachelor degree.	0.151	0.358	0	1
Master degree	The highest qualification is a master degree.	0.585	0.493	0	1
Doctoral degree	The highest qualification is a doctoral degree.	0.258	0.437	0	1
Gender	It is equal to 1 if a municipal party secretary is a male, and 0 otherwise.	0.945	0.227	0	1
Age	The age of a municipal party secretary in a specific year.	52.989	3.257	42	62
Shrink Rate of Birthplace	The severity of the 1959-61 famine in the birthplace of a municipal party secretary.	0.416	0.139	-0.021	0.808
Municipal Mayor					
Tenure	The time duration of a municipal mayor has been in office in a specific year (month).	18.446	14.790	1	125

Source: Public Information on Authoritative Websites.

Table 2. Characteristics of Plots

Variables	Descriptions	Mean	Std. Dev.	Min	Max
selling Price (log)	The logarithm of the selling price per square meter of the plot.	5.022	2.095	0.000	20.267
Area (log)	The logarithm of the area of the plot sold out by the local government.	7.861	2.798	0.086	17.687
Upper Floor-Area Ratio	The upper limit on the ratio of overall floorage to net usable area.	1.146	45.293	0	21000
Lower Floor-Area Ratio	The lower limit on the ratio of overall floorage to net usable area.	2.419	150	0	100000
Distance from the plot to the central city (log)	The logarithm of the geographical distance from the plot to the central city where the plot is located. (m)	10.17	1.219	2.617	14.675
Shortest distance from the plot to city boundary (log)	The logarithm of the shortest geographical distance from the plot to the boundaries of the city where the plot is located. (m)	9.561	0.962	0.608	12.805
The way to lease out land (listing as baseline)					
Auction	It is equal to 1 if the plot is sold out by means of auction, and 0 otherwise.	0.081	0.274	0	1
Bidding	It is equal to 1 if the plot is sold out by means of bidding, and 0 otherwise.	0.0023	0.046	0	1

Source: <http://www.chinalands.com>.

Table 3. Socioeconomic Characteristics of Municipal Cities

Variables	Descriptions	Mean	Std. Dev.	Min	Max
Proportion of Built-up Area	Proportion of built-up area to total urban area in a city.	0.014	0.020	0	0.214
Population Density (log)	The logarithm of the population per square kilometer of a city.	5.777	0.838	1.787	7.882
Number of Large Scale Industrial Enterprises (log)	The logarithm of the number of industrial enterprises whose prime operating revenues exceed 20 million CNY in a city.	6.599	1.065	3.045	10.631
GDP per capita (log)	The logarithm of the GDP per capita in a city.	5.459	0.565	0.688	7.185
Share of Secondary Industry	The proportion of the output value of the secondary industry to the GDP in a city.	49.748	9.902	14.950	82.240
Share of Tertiary Industry	The proportion of the output value of the tertiary industry to the GDP in a city.	36.858	7.983	14.360	69.350
Proportion of Science and Education Expenditure	The proportion of the total of the science and education expenditure to the GDP in a city.	0.015	0.010	0.001	0.099
Average Wage of Urban Employee (log)	The logarithm of the average wage of urban employee in a city.	5.633	0.205	3.326	7.817
Paved Road Area Per Capita (log)	The logarithm of the paved road area per capita in a city.	2.380	0.499	0.270	4.286
Share of Fixed Asset Investment	The proportion of the total value of fixed asset investment to the GDP in a city.	0.774	0.271	0.087	2.197
Income-Expenditure Ratio	The proportion of the general budget revenue to the general budget expenditure in a city.	0.563	0.246	0.028	2.665
Share of Budget Revenue	The proportion of the general budget revenue to the GDP in a city.	0.044	0.030	0.003	0.376
Share of Credit Outstanding of Financial Institutions	The proportion of the total credit outstanding of financial institutions to the GDP in a city.	1.552	1.307	0.407	24.800
Actual Amount of Foreign Investment (log)	The logarithm of actual amount of foreign investment.	10.011	1.725	1.386	14.526

Source: Statistical Yearbook of Chinese cities from 2009-2017

Table 4. The Effect of MPSs' Famine Experience on the selling Prices of Industrial and Residential Land (Sharp RD)

	RD polynomial: linear		RD polynomial: quadratic	
	Industrial Land	Residential Land	Industrial Land	Residential Land
	(1)	(2)	(3)	(4)
Famine experience of MPS	0.139*** (0.023)	0.391*** (0.040)	0.176*** (0.041)	0.377*** (0.067)
Other controls				
Characteristics of plots	Y	Y	Y	Y
Characteristics of local leaders	Y	Y	Y	Y
Socioeconomic Characteristics of cities	Y	Y	Y	Y
Year F.E.	Y	Y	Y	Y
Common Boundary F.E.	Y	Y	Y	Y
Province F.E. × Linear Time Trend	Y	Y	Y	Y
Observations	20330	28351	20330	28351

Notes: Plots located within 5 km of the common city boundaries are used. Robust standard errors in parentheses are clustered at the common city boundary level. Dependent variables of column (1) and (3) are the logarithm of the selling price of the industrial land. Dependent variables of column (2) and (4) are the logarithm of the selling price of the residential land. Characteristics of plots include the area (log), upper floor-area ratio, lower floor-area ratio, distance from the plot to the central city (log), shortest distance from the plot to city boundary (log), and the way to be sold out. Characteristics of local leaders include the tenure duration of MPSs, the squared form of the tenure duration of MPSs, the highest qualification of MPSs, the gender of MPSs, the age of MPSs, the shrink rate of MPSs' birthplaces, the tenure duration of mayors and the squared form of the tenure duration of mayors. Socioeconomic Characteristics of cities include all the variables listed in Table 3. Results in all the columns are derived from the local sharp RD regression. Results in column (1) and (2) are derived from the RD specification with linear polynomial. Results in column (3) and (4) are derived the RD specification with quadratic polynomial. * indicates statistical significance at the 10% level. ** indicates statistical significance at the 5% level. *** indicates statistical significance at the 1% level.

Table 5. The Effect of MPSs' Famine Experience on the Supply of Residential Land through Market and No-Market

	No-Market	Market
	(1)	(2)
Famine experience of MPS	-0.598 (0.565)	-0.155* (0.085)
Other controls		
Characteristics of plots	Y	Y
Characteristics of local leaders	Y	Y
Socioeconomic Characteristics of cities	Y	Y
Year F.E.	Y	Y
Common Boundary F.E.	Y	Y
Province and Year F.E.	Y	Y
Observations	10383	29634

Notes: a. All the results are derived from the local RD estimation with linear polynomial. b. Robust standard error in parentheses are adjusted for clustering by common boundaries. c. * indicates statistical significance at the 10% level. ** indicates statistical significance at the 5% level. *** indicates statistical significance at the 1% level.

Table 6. The Effect of MPSs' Famine Experience on the Supply of Industrial Land through Market and No-Market

	No-Market (1)	Market (2)
Famine experience of MPS	-0.294*** (0.081)	0.223*** (0.061)
Other controls		
Characteristics of plots	Y	Y
Characteristics of local leaders	Y	Y
Socioeconomic Characteristics of cities	Y	Y
Year F.E.	Y	Y
Common Boundary F.E.	Y	Y
Province F.E. × Linear Time Trend	Y	Y
Observations	1029	2116

Notes: Plots located within 5 km of the common city boundaries are used. Robust standard errors in parentheses are clustered at the common city boundary level. Dependent variables are the scale of industrial land supplied through bilateral negotiation in column (1) and the scale of industrial land supplied through market mechanisms (bidding, auction and listing) in column (2). Characteristics of plots include the area (log), upper floor-area ratio, lower floor-area ratio, distance from the plot to the central city (log), shortest distance from the plot to city boundary (log), and the way to be sold out. Characteristics of local leaders include the tenure duration of MPSs, the squared form of the tenure duration of MPSs, the highest qualification of MPSs, the gender of MPSs, the age of MPSs, the shrink rate of MPSs' birthplaces, the tenure duration of mayors and the squared form of the tenure duration of mayors. Socioeconomic Characteristics of cities include all the variables listed in Table 3. Results are derived from the local fuzzy RD specification with linear polynomial. In the fuzzy RD specification, MPSs born before (or during) the famine in places with shrink rate below the 20% quantile are specified to be without famine experience. * indicates statistical significance at the 10% level. ** indicates statistical significance at the 5% level. *** indicates statistical significance at the 1% level.

Appendix

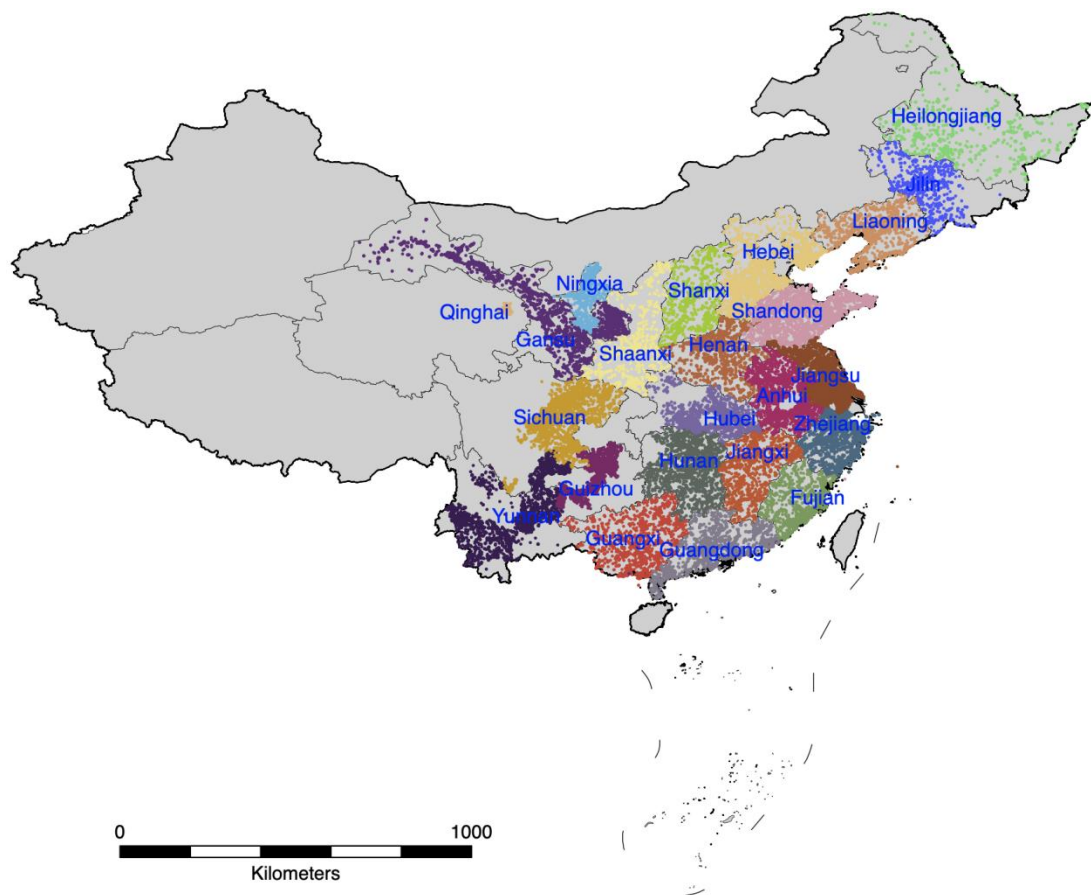


Figure A1. Plot Distribution

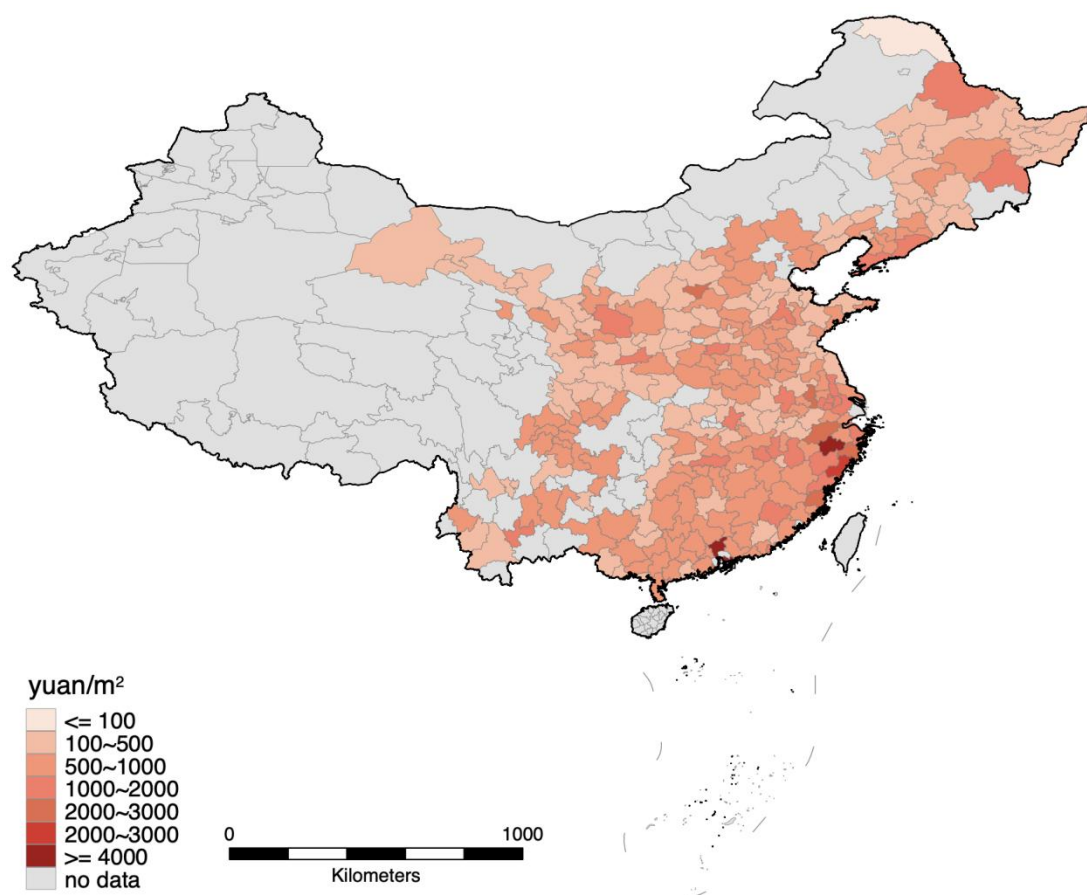


Figure A2. City-level Average Price of Land (deflating to 2010)

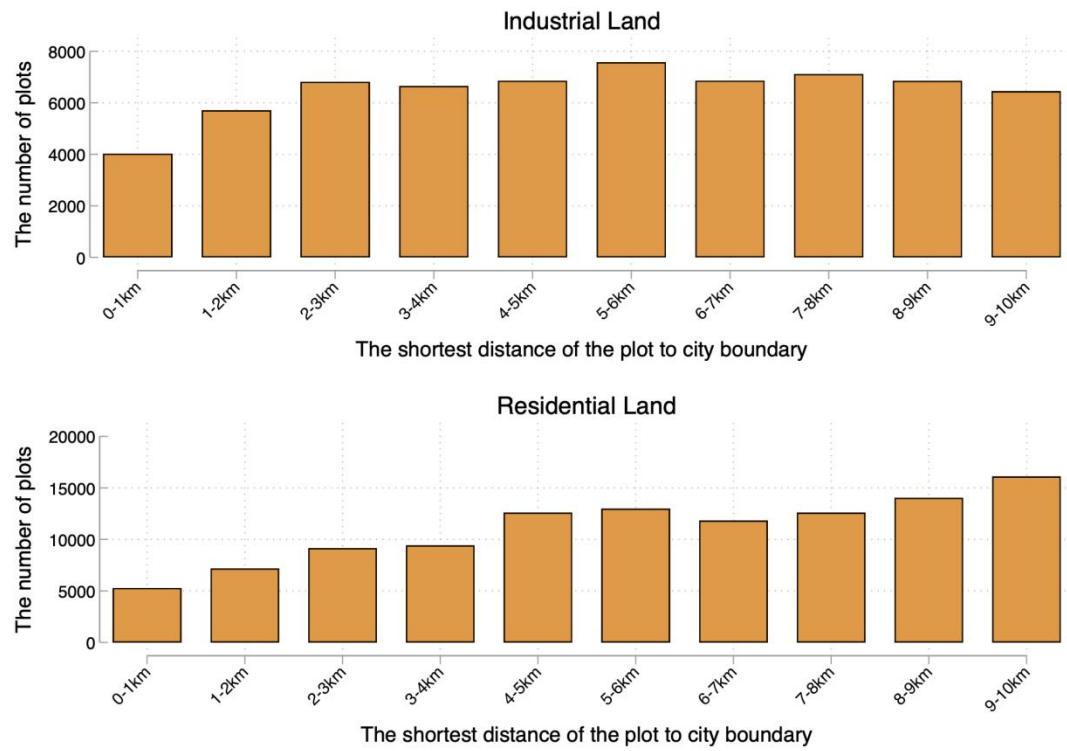


Figure A3. Numbers of Plots at Locations with Different Proximity to City Boundaries