From Samurai to Skyscrapers: How Transaction Costs Shape Tokyo*

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Abstract: Whether transaction costs to assemble or split land can persistently hinder urban land use remains unknown. Constructing a 100 m*100 m-cell-level dataset of central Tokyo from the 19th-century pre-modern era to the 21st-century skyscraper era, we study how initial lot fragmentation has affected urban development. We exploit a plausibly exogenous supply shock of large lots in 1868, the release of local lords' estates (*daimyo yashiki*) scattered throughout central Tokyo. Using ordinary least squares and a regression discontinuity design, we find that cells previously used as local lords' estates have larger lots today, implying that lot size persists through transaction costs. Such cells today see more tall buildings, higher land prices, and higher labor productivity of firms. We also find these effects only in the core area, and the effect on land price is 129%. Our conceptual framework suggests this effect as the lower bound of transaction costs to assemble land in the control group. Finally, the effect of lot size on land prices became positive only after the rise of skyscrapers that made optimal lot size larger. Overall, initial lot allocation affects the urban economy, land assembly costs are disproportionately increasing in the local economic potential, and assembly friction became more salient in the skyscraper age.

Keywords: Transaction costs, historical persistence, skyscrapers, lot fragmentation, agglomeration economy, Coase theorem
JEL Codes: R14, R30, O18, N95

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1 Introduction

The Coase theorem is a benchmark in analyzing whether rights allocation would affect outcomes. The central message of the theorem is that without transaction costs, the initial allocation of rights would not affect efficiency, and agents could reach an optimal outcome by negotiation. This message is critical for policymakers, because the Pigovian tax or market design can be replaced by decentralized negotiation to achieve efficiency. Accordingly, economists have empirically investigated how the allocation of rights affects economic outcomes using a variety of settings, such as emission-caps trading (Zaklan, 2020), divorce law (Wolfers, 2006; Stevenson and Wolfers, 2006; Voena, 2015), agricultural land (Hornbeck, 2010; Bleakley and Ferrie, 2016), and oil fields (Leonard and Parker, 2021).

By contrast, we know little about whether the Coase theorem is relevant in the land market of a city's central business district (CBD). The CBD hosts core economic activities of modern economy within a small area and thus inefficiency caused by transaction costs will be crucial (cf. Glaeser (2011)). The inefficiency will be particularly large when the economic environment changes. For example, the development of construction technology induces a change in demand for a particular size of land. In this case, it is key to change the lot size by either split or assembly. However, transaction costs, such as negotiation with multiple landowners to assemble land, may prevent such transactions. This makes lot size persistent and generates a huge economic loss. Such transaction costs are reported in the media and recognized by policymakers in many cities worldwide (Nelson and Lang, 2007; Kirk, 2017; Chen, 2021).

The presence of such transaction costs and lot size persistence may affect city development in the long run. We might expect that cities enjoy high benefit from optimal land use owing to agglomeration economies and thus lot size will not persist, as the Coase theorem would predict. However, transaction costs can be high in cities, possibly because they tend to have heterogeneous land owners or the potential benefits of land assembly itself intensifies landowners' strategic behavior in their negotiation of land assembly. In this case, lot size persists with a huge economic loss. Understanding the relative importance of these two forces has implications for future cities, particularly those in developing countries, which have slums with fragmented lots (Bryan et al., 2020; Glaeser, 2021).

In addition, when transaction costs are high enough to generate lot size persistence, the consequence of such persistence can be different over space and time. For example, the value of large lots may be greater with the rise in tall buildings generating agglomeration economies, because tall buildings require large footprints.[1] Previous studies show mixed results on whether large lots are at a premium or are discounted, but by tracking how the large lot size is evaluated over time, we can shed light on the mechanism of the lot size effect.[2]

In this study, we analyze land use and values in Tokyo over a 150-year period. Several features of Tokyo make its setting an ideal laboratory for studying the long-run effects of the initial lot size. First, there is a natural experiment that, in our view, offers the closest analog to exogenous releases of land with larger lot sizes on a large scale throughout the central areas of a big city at the beginning of modern development. During the feudal era before 1868, 19% of the land in Tokyo was occupied by *daimyo*. Daimyo were among the top of the samurai (warrior) class in Japan and governed their local domain outside Tokyo as feudal local lords, but had to own estates in Tokyo (*daimyo yashiki*) for political reasons, which we explain later in the background section. These estates were much larger than the lots in the other areas in Tokyo. However, after a political regime change in 1868 (the Meiji Restoration), these local lords were forced to release their estates into the private market. This was a plausibly exogenous shock providing large lots to the Tokyo land market.

Furthermore, a particular central Tokyo area allows us to exploit a discontinuity in historical land use due to the central government's zoning before 1868. Specifically, around the beginning of the 17th century, the Tokugawa shogunate, Japan's feudal military government that preceded the Meiji period, designated the western half of newly developed areas to local lords' estates and the eastern half to commoners. When the Shogunate further reclaimed land to the east, the newly reclaimed land became the local lords' estate zone. These newly developed areas were in lowlands close to the seashore at the time, and therefore, are likely to share similar characteristics.

[1] We confirm this relationship using data for Tokyo (Figure A.1(a)). In addition, we observe a similar pattern between building height and footprint for New York: using height and footprint data, we plot them in a similar manner to Figure A.1(a). The result shows a positive relationship between footprint and height. Moreover, assuming 4 m per story, the 120 m-or-higher group in New York corresponds to the 30-story-or-higher group in Tokyo, both of which have a very similar percentile of footprint (see Figure A.1(b)). These results imply that the relationship in Tokyo (Figure A.1(a)) is not solely due to earthquake risk in Japan.

[2] White (1988), Brownstone and Vany (1991), Tabuchi (1996), and Brooks and Lutz (2016), for example.

Second, Tokyo provides the historical and modern datasets necessary for our study. We can keep track of land prices or lot fragmentation over time since the Meiji Restoration, when the modern property system was introduced to determine initial lot size. These data cover the entire process of Tokyo's transformation from a historical castle city with low-rise brick buildings to a modern megalopolis with skyscrapers. We can also measure the location and height of all buildings in today's Tokyo. This enables us to study the nature of lot persistence and transaction costs in an important city under different economic environments.

We analyze the full sample using ordinary least squares (OLS) with geographical control variables and, for a cleaner identification, we employ a regression discontinuity (RD) design using the clear zoning boundary for a particular area of the sample. The results of both approaches consistently show lot size persistence: the presence of local lords before 1868 results in larger lots in 2011. We also find that larger lots facilitate urban development today: these areas have taller and fewer buildings, and higher land prices. We observe a stark contrast between the local lords' estates zone and the control zone: most of the skyscrapers are located in the local lords' estates zone, for example. This persistence and its economic effects contrast with the prediction of the Coase theorem without transaction costs (Coase, 1960), whereby the initial allocation of property rights does not affect long-run outcomes.

To investigate a potential benefit of large lots through agglomeration economies, we also examine the effect of local lords' estates on firm productivity using firm-level microdata in 2017 with OLS and RD analyses. We find a positive effect on revenue per worker, a proxy of total factor productivity (TFP). Furthermore, we find that this effect is higher in the upper quantiles, implying that the effect on firm productivity is through the agglomeration benefits channel, rather than the exit of less productive firms (the selection channel).

Next, we analyze the mechanism by which lot size affects land prices. We find a positive effect on land prices in the 2010s, but the sign of this effect may change depending on the technological environment, such as the possibility of constructing skyscrapers. To investigate this point, we examine the effect on lots and land prices before WWII, when Tokyo had no skyscrapers and industries were less knowledge based.[3] We find that local lords' estates

[3]The high-rise buildings before WWII typically had only 7 to 8 stories. A notable exception was the *Ryounkaku* Tower, which stood at 52 meters and had 12 stories. However, it collapsed during the Kanto earthquake in 1923. The first building in Tokyo to exceed a height of 100 meters is the *Kasumigaseki* Building, as further explained in the background section.

decreased the number of lots, but had *negative* effects on land prices. We also find that the effect on land prices became zero in 1972 and turned positive in 1983, suggesting that before WWII, there were split frictions: lots in local lords' estates were too large for optimal land use, but were not split owing to split costs. However, after WWII, these large lots obtained advantages from technological change (i.e., increased high-rise buildings and the emergence of skyscrapers and the transition to the knowledge economy) and assembly costs. Firm productivity analysis shows a consistent pattern with this finding: quantile regression results show weaker effects on firm productivity in 1993 than in 2017. This difference between 1993 and 2017 is attenuated when we control for the height of buildings. These results suggest that the value of a large lot can change according to the technological environment (i.e., positive effects arise only after the 1970s with increased high-rise buildings).[4]

To further investigate the nature of lot size persistence, we compare the heterogeneous effects between the core area and the non-core area.[5] Lot size persistence and its related effects may not exist in the core area because the benefit of assembly by constructing high-rise buildings exceeds the transaction costs, as pointed out in Coase (1960).[6] However, the result is inconsistent with this view: we find lot size persistence and its effect on land use today only in the core area. The estimated impact on the land price in the RD analysis is 129% in the core area, which is a lower bound of the transaction costs to assemble land in the control group. This result implies that transaction costs are disproportionately increasing in the local economic potential. Also, the absence of 150-year lot size persistence in the non-core area is consistent with other studies in the rural/suburban land market examining similar periods (Bleakley and Ferrie, 2014; Smith, 2020; Finley et al., 2021).

The higher transaction costs in the core area can be explained by two types of channels. One is that higher potential gain of assembling land may endogenously increase transaction costs by intensifying landowners' strategic behavior in their negotiation of assembly costs,

[4]This also suggests that the positive effect on land prices in the main results is not driven by time-invariant location-specific effects.

[5]For the OLS, we define the area inside the *Yamanote* loop line, which connects the major hub stations of regional and urban railway/subway services such as *Shinjuku*, *Shibuya*, and (central) Tokyo station, as the core area. Its area, $60\,km^2$, roughly corresponds to the area of Manhattan. For the RD analysis, we separate the border line into two parts: close to and far from the core area.

[6]Coase (1960) states that "it is clear that such a rearrangement of rights will only be undertaken when the increase in the value of production consequent upon the rearrangement is greater than the costs which would be involved in bringing it about."

which is called the hold-out problem in the literature (Miceli and Sirmans, 2007; Brooks and Lutz, 2016; Grossman et al., 2019). Expected higher land price growth in the core area will also incentize them to postpone the negotiation. Other characteristics than the potential benefit of assembly may play a role. For example, population or land use may be more heterogeneous in the core area and thus landowners may face difficulties in collective action (Olson, 2003). Although we cannot quantify these channels, the results suggest a large role of transaction costs in the urban core land market, which is against the natural conjecture that the large economic potential can overcome the cost of assembly.

As robustness checks, we first examine the coefficient stability analysis (Oster, 2019), finding largely robust results against unobserved confounders. Next, we consider other potential channels to explain the main results. For example, lower transaction costs might have facilitated public infrastructure construction and increased amenities. In addition, the presence of local lords' estates might affect construction costs of buildings by road width, the size of the blocks (area surrounded by roads) or floor–area ratio (FAR) regulation. Also, the shocks in WWII such as land use change, or owner change caused after WWII might explain the reverse of fortune. Although we do not exclude these channels, we find that controlling for these factors does not change the main results qualitatively. We also further the robustness for alternative specification choice in regression equation or data construction using 200 m-level data, but none of these alter the results.

Our study contributes to the literature on the role of transaction costs in urban development. Past studies consider coordination problems in redevelopment (Hornbeck and Keniston, 2017; Owens et al., 2020) and delays owing to litigation (Gandhi et al., 2021), for example.[7] We find that the transaction costs incurred in changing lot sizes can generate lot size persistence and affect economic activities over 150 years, particularly in the core area, which is a novel finding in the literature.[8] These results are linked to recent studies on the formalization costs of slums (Gechter and Tsivanidis, 2018; Harari and Wong, 2019; Michaels et al., 2021). These studies discuss the role of weak property rights in slums limiting their land mobility and find

[7] As a related study, Libecap and Lueck (2011) compare two land demarcation regimes, (1) metes and bounds and (2) the rectangular system, in Ohio and find a positive impact of the rectangular system on farmland value. Meanwhile, we examine an urban setting in which larger lots may have large benefits through the construction of tall buildings.

[8] As discussed earlier, we are not aware of studies on lot size persistence and its economic impact in the context of cities.

its negative impact on urban development. On the other hand, our results in Tokyo suggest even if people in slums are entitled to strong property rights, it may not lead to urban development because slums, often dense and fragmented, face assembly costs at redevelopment, as Glaeser (2021) discusses.

We also contribute to the literature on historical persistence. The literature has investigated deep roots of economic growth or cultural traits (Alesina and Giuliano, 2015; Nunn, 2020; Voth, 2021). Spatial economic distribution is no exception, showing persistence due to natural endowments or man-made advantange such as infrastructure or larger population (Davis and Weinstein, 2002; Redding et al., 2010; Bleakley and Lin, 2012; Michaels and Rauch, 2018; Brooks and Lutz, 2019; Lin and Rauch, 2020). We examine the lot size in an urban area as an underinvestigated man-made factor and quantify transaction costs to change lot size using the impact on land price. Another unique feature of our finding is that we find a "reversal of fortune" (cf. Acemoglu et al. (2002); Nunn and Puga (2012)); the effect of lot size on land price alters after the skyscraper age, implying that technological shock changes which transaction costs (split or assembly) matter.

Our study also offers a perspective on the conflicting results found in studies of lot size and land prices. Some studies find a negative premium of large lots (White, 1988; Brownstone and Vany, 1991), while others find a positive premium (Tabuchi, 1996) with a difference-in-differences strategy (Brooks and Lutz, 2016).[9] Our study examines the relationship between lot size and land prices based on a natural experiment and compares the relationship in different periods of the same location to shed light on how lot size premia arise.

We also contribute to the recently growing literature on building heights (Liu et al., 2017; Ahlfeldt and McMillen, 2018; Ahlfeldt and Barr, 2022). We investigate the obstacles to constructing high-rise buildings (Barr et al., 2011; Jedwab et al., 2020), which is key to enhancing the benefits arising from the density of economic activities (Ahlfeldt et al., 2015). We offer a unique contribution to the literature by showing a very close link between lot fragmentation and tall buildings. This link is discussed in the previous literature (Barr, 2016), but systematic evidence is scarce. We also find that because lot fragmentation prevents the construction of tall buildings, the cost of lot fragmentation becomes more salient with the availability of

[9] As a related study, Leonard and Parker (2021) find that land fragmentation decreases oil production in North Dakota because shale extraction is profitable only when a sufficient amount of contiguous land is used.

construction technology for tall buildings.

Our study belongs to the expanding literature that analyzes cities with historical granular datasets (Hanlon and Heblich, 2021), such as O'Grady (2014), Baruah et al. (2017), Hornbeck and Keniston (2017), Brooks and Lutz (2019), Ambrus et al. (2020), Heblich et al. (2020), Harari (2020), Dericks and Koster (2021), Heblich et al. (2021), and Yamagishi and Sato (2022).[10] Our study offers a new phenomenon, persistent effect experiencing a reversal of fortune: historically determined lot size differences persist, but the negative effect of lot size became positive about 100 years after the original shock due to the rise of the knowledge economy and the development of construction technology.

The rest of this paper is organized as follows. Section 2 explains our conceptual framework. Section 3 provides background information on land use in Tokyo. Section 4 describes the data and the empirical strategy. In Section 5, we present the results. In Section 6, we briefly discuss policy implications. Section 7 concludes.

2 Conceptual Framework

To guide our empirical analysis, we set up a simple framework of lot size, transaction costs of changing lot sizes, and land values by extending the framework in Brooks and Lutz (2016) as follows.

Suppose there are two commercial locations, i and j, in a city. Location i has a large lot with a size of $2a$, while j has two small lots with a size of a. The value of land is given by $V(a) = Aa^{\beta}$ where $\beta \geq 0$. In reality, $V(a)$ can take a more complicated function, and there will be an optimal a^* to maximize the value per area. However, we focus on the value of a and $2a$, and β is only to capture which of a or $2a$ makes the value per area higher rather than how the function V is shaped in the whole range. $\beta \lessgtr 1$ captures whether large lots are suitable for development: when tall and large buildings are not available, β will be less than one, because we need additional roads to obtain access to small buildings in a large lot, for example (lot size discount). When high construction technologies become available and important, however, β will be larger than one (lot size premia). A represents local economic potential.

[10] See Davis and Weinstein (2002), Bleakley and Lin (2012), and Hanlon (2017) for studies using historical cross-city datasets, for example.

The lots are owned by landowners, and developers can negotiate with the landowner to assemble the small lots in j into one big lot. This entails transaction costs, $C_a = c_a A^{\gamma_a}$, where $\gamma_a \geq 0$ and $c_a \geq 0$. Therefore, when $V(2a) - 2V(a) > C_a$, small lots will be assembled. γ_a determines the nature of transaction costs. When $\gamma_a = 0$, transaction costs are constant ($C_a = c_a$) and, therefore, when the value of assembly is higher, assembly will happen. This corresponds to the classic argument of Coase (1960). However, to assemble the lots, they will have to spend a large amount of time to demolish the existing buildings and construct a new building. These opportunity costs can increase γ_a to the value of one. Moreover, when A is high, this will increase the value of assembly and the potential rent for landowners when negotiating assembly, resulting in intensifying the hold-out problem as examined in theory and lab experiments. Also, landowners might expect land price increase in productive area, which also gives them incentive to postpone the negotiations. In these cases, we may have $\gamma_a > 1$.

Similarly, the large lot in i can be split into two small lots with a fixed cost, $C_s = c_s A^{\gamma_s}$. Therefore, when $2V(a) - V(2a) > C_s$, the large lot will be split. Note that, unlike in the case of assembly, we do not have the hold-out problem in split and γ_s might be smaller than γ_a.

Using this model, we can relate the parameters, β, γ_a, γ_s, and A to the empirical patterns we may find in the lot size or land prices.

(1) Suppose $\beta > 1$. When C_a is large enough, transaction costs are too high and there is no assembly. Therefore, historical lot size determines the lot size (lot size persistence), and larger lots have higher land prices (lot size premia).

(2) In case (1), when c_a is not so large, γ_a predicts where we will observe the lot size persistence depending on the value of A. If $\gamma_a < 1$, we will see lot size persistence and its effect on land price only in the area with low A. This corresponds to a natural conjecture from Coase (1960). However, if $\gamma_a > 1$, we will see lot size persistence and its effect on land price only in the area with high A.

(3) Suppose instead $\beta < 1$. When C_s is large enough, we will see lot size persistence as well as in case (1), but historically larger lots have lower land prices (lot size discount). Therefore, with large C_a and C_s, when β increases from smaller than one to larger than one, the effect of historical large lots will become positive from negative. $\gamma_s > 1$ ($\gamma_s < 1$)

will similarly determine whether we observe the effects of historical lots in the area with high A (low A) area as in case (2).

In the empirical analysis, we estimate the effect of local lords' estates on the lot size and land prices using data in the 2010s, corresponding to the comparison between locations i and j. The result would be one of the following three cases: (i) transaction costs are small and lot size difference disappears, (ii) transaction costs are large, lot size difference persists, and large lots have premia ($\beta > 1$) or (iii) transaction costs are large, lot size difference persists, and large lots are discounted ($\beta < 1$) in the case of today's Tokyo.

This framework also guides us to interpret the price difference ($V(2a) - 2V(a)$ in the case of premia, for example) as the lower bound of the transaction costs to change lot size. If transaction costs are smaller than this, lot size persistence will disappear and we will not observe the price difference as discussed in Brooks and Lutz (2016).[11]

We can further examine whether the increase of β alters the relationship between lot size and land prices by using the results before the skyscraper age, as predicted in the conceptual framework. Similarly, by comparing the results in each era between the core areas and non-core areas, corresponding to high A and low A, respectively, we infer $\gamma_a \lesseqgtr 1$ or $\gamma_s \lesseqgtr 1$, or whether transaction costs are more or less proportionate in local economic potential.

3 Background

We first describe the historical background in each period (1600–1868, 1868–1945, 1945–) and then explain the population growth in Tokyo, related regulations, and anecdotes.

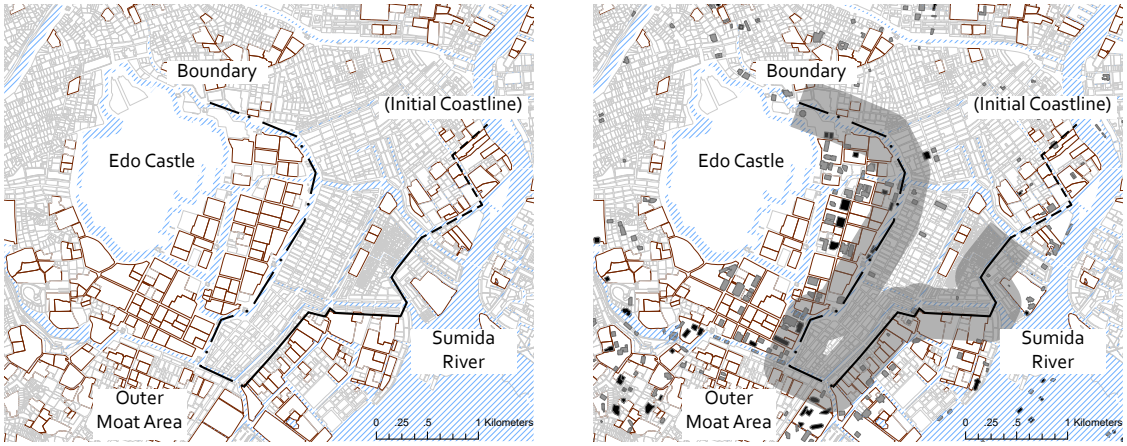
3.1 During the Edo Period: 1600–1868

Tokyo, which was called Edo during the Edo period (1600–1868), is one of the most prosperous cities in the world, but it was not a big city prior to the Edo period.[12] A local lord constructed Edo Castle in 1457, but Edo remained a small town, surrounded by a marsh.

[11] Brooks and Lutz (2016) distinguish "good-institution" transaction costs such as demolish costs and "bad-institution" transaction costs such as hold out costs to define the surplus. We treat the sum of them as the transaction costs to predict the impact on the lot size and land price.

[12] See Kawasaki (1965), Suzuki (2000), and Matsuyama (2014) for a more detailed historical context.

Figure 1: Zoning in the Initially Developed Area



(a) (b)

Notes: Polygons with red borders are local lords' estates. The U-shaped line in both figures is the boundary between the local lords' estate zone (the outer side) and the commoners' zone (the inner side). The dash-dot part is the initial boundary between the zones. The solid and dash parts are the initial coastline. The solid part became part of the boundary after the second reclamation. The gray area in the right figure shows a 250-m buffer, which we use for the local randomization regression analysis. Another line in the right figure from south to north shows the overground railroad loop line (*Yamanote* line). In the right figure, we overlay high-rise buildings in 2011, indicated by black (more than or equal to 30 stories) and gray (15–29 stories) rectangles.

This situation changed in 1590, when *Tokugawa Ieyasu*, one of the most powerful feudal lords of that time, was transferred to Tokyo. He reconstructed the castle to strengthen his military capacity and reclaimed the inlet in front of the castle to expand the land. He also seems to have adopted class-based zoning inside the outer moat (the "inner area").[13] The area closest to the main gate on the east side of the castle was used for the estates of local lords, who govern their local domains outside Tokyo. The east side of this area was allocated to Tokugawa's bureaucrats and to commoners as business districts. Importantly, local lords were among the highest rank of the samurai class, and therefore, local lords' estates were on average larger than other buildings used by bureaucrats (lower-ranked samurai) or commoners. We exploit the clear zoning on the east side of the castle for the RD design (the dash-dot line in Figure 1(a)). Tokyo became the political capital after Tokugawa won significant wars in 1600 and 1615, and his government (Shogunate) ordered all local lords to have estates in Tokyo for political interactions.[14] As a result, the Shogunate further reclaimed land and allocated a

[13]Other local lords often adopted planning systems in their castle cities.

[14]In particular, demand for land grew because Tokugawa required that all local lords (approximately 250)

new area for local lords. Therefore, the initial coastline (the solid line in Figure 1(a)) became a boundary between the local lords' estates zone and the commoners' zone, except in the northwestern part, where some local lords' estates were located by chance on both sides (the dash-line in Figure 1(a)). This is another discontinuity in our identification strategy. The Shogunate also developed an area outside the outer moat (the "outer area"). In the outer area, the local lords chose the location for their estates and had to ask permission from the Shogunate to use the land. In that sense, the Tokugawa shogunate controlled urban land use. However, unlike the inner area, there is no indication of a clear zoning policy.

Although local lords could swap their estates with other lords, the social class of land users for each land area seems to have been stable until the end of the Edo period in 1868. At that time, local lords' estates occupied about 20% of the land in Tokyo, as shown in a map from the 1850s (Figure 2). Tokyo experienced significant economic and cultural growth during the Edo period, and its estimated population at the end of the 1860s was about 1 million.[15]

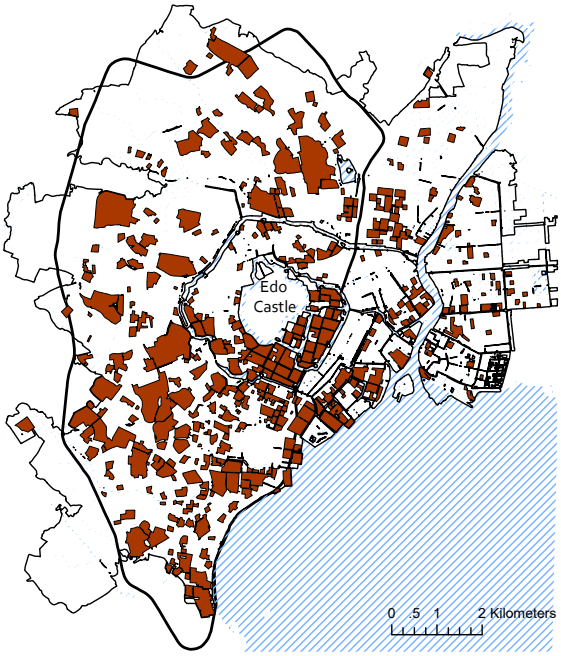
3.2 Meiji Restoration and Pre-WWII: 1868–1945

A commonly held view among historians is that the Meiji Restoration caused a significantly negative shock on Tokyo's economy. After the collapse of the Tokugawa shogunate, local lords were no longer required to stay in Tokyo and their estates became vacant. Around half of Tokugawa's bureaucrats moved to Shizuoka, where Tokugawa was transferred to, about 150 km from Tokyo. As a result, the samurai class, which occupied a large proportion of the Tokyo population, migrated out of Tokyo and its economy, which had previously been sustained by the samurai class, collapsed. Moreover, part of Tokyo became a battlefield (during the Battle of Ueno) in the civil war during the Meiji Restoration. Due to this economic turmoil in Tokyo, it was uncertain which of Tokyo, Osaka, or Kyoto, three important economic and political cities, would become the new capital of the Meiji Restoration. Finally, the new government chose Tokyo as its capital, and Tokyo began to grow economically as the nation's modern economy took off. In that sense, the Meiji Restoration is regarded as the initial point of modern Tokyo's economic growth.

alternate between living in Tokyo and living in their local domains and that their families stay in Tokyo as hostages. These policies significantly increased demand for local lords' estates.

[15]There are many estimates of the population of Edo, but most estimates range from 1 million to 1.5 million. See, for example, Kito (1989).

Figure 2: Distribution of Local Lords' Estates



Notes: This map covers the whole of Edo's city area (*Sumibiki sen-nai*). Red areas represent local lords' estates. The thick solid line shows the *Yamanote* loop rail line.

Local lords typically held three estates during the Edo period, but the Meiji government allowed local lords to own just one estate in Tokyo and confiscated the others. In the core area, Kasumigaseki, the Meiji government transformed these estates into government offices or training fields for the army. The Meiji government sold or gave the remaining estates to the private sector.

There was continuity in the lot boundary between the periods before and after the Meiji Restoration. Along with these land transformation processes, the Meiji government introduced a modern property rights and tax system (*chiso kaisei*) and determined the boundaries of lots based on the land usage before the Meiji Restoration. Therefore, the local lords' estates retained their large lots in the early Meiji period.

3.3 After WWII: 1945–

After 1945, the descendants of local lords experienced a significant policy shock. Despite the regime change in 1868, local lords retained their political elite status as noblemen (*kazoku*)

and possessed privileges such as seats in the house of peers. However, in 1946, the General Headquarters introduced a very high asset tax to remove the political and economic elites supported by Imperial Japan. In addition, the General Headquarters deprived the elite of their political and economic privileges. There are many anecdotes of local lords being required to sell their properties to pay the asset tax (Sakai, 2016). Consequently, most of the former local lords' estates became owned by the private sector in this period, with the exception of those in the Kasumigaseki area.

3.4 Population Growth and Related Regulations

After Tokyo became the capital of Japan in 1871, its population recovered and began to grow. In the eight wards of central Tokyo, the residential population, which had been 0.89 million in 1883, rose to 2.17 million by 1920 (Tokyo Hu, 1887, 1923). Since WWII, the population became stable (in 2015, it was 1.95 million), but the daytime population (number of people present during normal business hours) has been increasing (2.95 million in 1955 vs. 4.72 million in 2015), implying that business activities have continued to expand (Tokyo To, 2015). Old Tokyo is now the center of Greater Tokyo, which has about 38 million inhabitants and is the biggest megalopolis in the world.

Post-WWII economic growth increased demand for high-rise buildings. In 1952, the government deregulated the height restriction that had prohibited buildings over 31 m since 1919. In 1968, the first skyscraper, the *Kasumigaseki* Building, was constructed. The number of buildings over 30 stories has been increasing in Tokyo's 23 wards, rising from 32 in 1990 to 86 in 2000 and 260 in 2010 (Tokyo Shobo Cho Kikaku Chouseibu Kikakuka, 1990–2010).

3.5 Anecdotes of Assembly and Split Costs

Several anecdotes suggest the presence of high assembly costs, consistent with our argument. A large conglomerate, *Mitsui*, was originally an exchange trader and *kimono* trader in the Edo period, and held a small lot as its head office in a former commoners' area in the CBD (*Muromachi*). After *Mitsui* became a large conglomerate, it planned to assemble lots nearby to expand its headquarters, but it did not succeed and faced opposition by landlords. It finally completed the planned assembly in 1969, but lots in *Muromachi* remain fragmented.

Meanwhile, a former local lords' estate area in the CBD (just about 1 km from *Muromachi*) has been owned by another large conglomerate, *Mitsubishi*, since the 1890s, when it bought the land from the government. Lots are larger than in *Muromachi*, and there have been large-scale developments such as Western-style brick buildings before WWII and skyscrapers today. Comparing these two close but different areas, Washizaki (2015) suggests that lot fragmentation is a potential reason for the low number of skyscrapers in Tokyo.

As another example, the Mori Building Company planned a large-scale (5.6-ha) redevelopment in *Akasaka* in 1967 and obtained a small lot. Although the government approved the plan, it was not until 1983 that it could obtain permission from landlords and start the construction of the building (Akasaka ARK Hills). In 1986, the building finally opened. The company also planned a similar redevelopment project in another area, and it took 17 years to open the building (Roppongi Hills, opened in 2003). The former CEO looks back on these developments as a project that would have been impossible if the company had not been family owned or long-sighted (Mori, 2009).

There are also anecdotes suggesting the split costs. When landowner divide a large lot into small lots to construct small buildings, they had to provide private roads to each small lots for accessibility (Mitsubishi Estate Co., Ltd., 1993). Also, the urban land market had a large friction in matching sellers and buyers. In an interview to a broker about Tokyo land market in the 1920's, he recalls that he relied on community network or posting newspaper advertisements to find his transaction parter (Housing Research and Advancement Foundation of Japan, 1994). Also, a survey to brokers in 1947 reveal that the majority of brokers had only about 5–20 percent as sucessful land transaction rate (Institute of Social Science, the University of Tokyo, 1952). Though this fact does not directly mean that finding multiple buyers is harder than finding single but rich buyer that can afford a large lot, it indicates a large friction in land market.

4 Data

We constructed a 100 m*100 m-cell-level dataset spanning 150 years based on scanned printed maps and other electronic data.[16] We constructed the dataset within the old Tokyo's (Edo's)

[16]This cell size roughly corresponds to the median of area of local lords' estates (13845 m^2).

city area, which covers and remains the center of economic activities in Tokyo during the Edo period. Among Japanese listed firms with their headquarters in Tokyo, the headquarters of 72% of firms are located in our sample area.[17] In this section, we present a table with definitions of the main variables and their sources (Table 1) and briefly explain the sources of the main variables. Panel A in Table 2 shows the descriptive statistics. For the firm-level microdata, we do not aggregate the data at the cell level to analyze firm-level locational or entry/exit choices and/or use firm-level information (i.e., industry) as control variables. Panel B in Table 2 shows the descriptive statistics in 1993 and 2017.

Land Usage before 1868 We digitized a map showing landownership in the 1850s. This map documented the types of ownership for each lot (local lords, bureaucrats, commoners, and other owners such as temples).[18] Figure 2 plots local lords' estates, showing they are well distributed across Edo city. Based on this map, we calculated the share of land owned by local lords for each cell.[19]

Lots Cadastral maps are available for 1876, 1912, 1931, and 2011 (Ichihara, ed, 1876; Tokyo Shiku Chosakai, 1912; Seizusha, ed, 1931-1935; TDi and Inc, 2017). We digitized or used these maps to calculate the number of lots within a cell. Panel A in Table 2 shows that the number of lots has increased over time, particularly after 1931. This increase is largely due to a change in the civil code: before 1945, the oldest son inherited all the household assets as the household head. After 1945, all siblings had equal rights to inherit the assets, resulting in a trend of fragmentation.

Land Prices Before 1945, land prices were available for 1912, and 1931. The cadastral maps in 1912 and 1931 list the land prices for each lot. These lists have land prices (and land rental prices for 1931) so that we can calculate the area-weighted average land price for each cell.

[17] *Source:* `http://disclosure.edinet-fsa.go.jp`. These firms with headquarters in our sample area account for 35% of the total number of firms in Japan.

[18] We used georeferenced digital images of this map for creating shapefile (APP Company, ed, 2009). The primary sources are several maps published at that time, such as (Kageyama et al., eds, 1849-1862).

[19] An alternative and perhaps more natural treatment variable is the number of lots in the 1850s, but the map describes only blocks (area surrounded by roads) in the commoners' area without lot boundaries, and thus, we cannot count the number of lots from the map. Instead, in the robustness check, we employ the maximum lot size of local lords' estates as an alternative treatment variable.

These land prices are based on the evaluations used as the basis for land tax. The evaluation of each lot in the 1860s–1870s referred to the market land price used in the Edo period. However, for land owned by local lords and bureaucrats, there were no market transactions during the Edo period. For this land, the price when the land was sold to the private sector by auction was used. When such land was transferred for free, the neighbor's land prices sold by auction to the private sector were used.[20]

In 1910, the government updated the land prices in cities using market land rental prices, and the data in 1912 contained this land price. The rental price was multiplied by 10 to calculate the land price. If it exceeded the previous land price by more than 18 times, the land price was reduced to avoid a drastic increase in the tax burden for landowners. In 1929, they again updated the land prices by simply using rental prices, which are published in Seizusha, ed (1931-1935).[21]

After 1945, the government started to use a different tax system. It first evaluated the place value at the road level and then multiplied it by lot-specific factors such as shape. Because lot-specific factors are automatically related to lot size, the road-level price is suitable to capture the effects of lot size on economic activities. The data in 2012 (Research Center for Property Assessment System, 2012) contain this road-level price, and we calculated the length-weighted average land price data within a cell.

These variables before the 1980s are not easily available, and thus, we complemented the land price data in 1972 and 1983 by using Tokyo-to Takuchi Tatemono Tohirikigyo Kyokai (1972) and Tokyo-to Takuchi Tatemono Tohirikigyo Kyokai (1983). These maps produced by the real estate agents' association record the estimated market value of land per area at each place.

Buildings The Tokyo Metropolitan Government has been producing an electronic map covering all the buildings and land usage in Tokyo every 5 years since 1986 for urban planning

[20]There might be a concern that local lords' estates were priced differently for political reasons. However, this way of selling their land suggests that the land price fairly reflects the market value (Fukushima, 1962). We also analyze whether such political consideration might change our results using whether landowners are former local lords' descendants in the landowner characteristics data of 1931.

[21]Seizusha, ed (1931-1935) lists both the land rental price and land price. When we regress the log of rental price on the log of land price at the lot level, we obtain 1.02 as the coefficient and 0.89 as R^2, implying that the land price well reflects market value. We use the land rental price as the land price data for 1931 throughout our analysis since the data coverage is better than land price data.

(Tokyo Metropolitan Government, 1986, 1991, 1996, 2001, 2006, 2011). From these maps, we calculated the number of buildings, total floor area provided, and average number of stories. We also confirm the positive relationship between the number of stories and footprints of buildings using data in 2011 (Figure A.1(a)). In addition, the government has been making electronic maps for land usage, from which we calculated the share of land used for business or residence.

Geographies We used geographical variables as control variables, because geography may affect the supply of buildings (Saiz, 2010) and determine the location of local lords' estates. Altitude data are available from the Ministry of Land, Infrastructure, Transport and Tourism (2014). We calculated the average and standard deviation of altitude in a cell: higher places may attract richer people and flatter places may be suitable for large-scale development. We also controlled for earthquake risk. Tokyo Metropolitan Government (2018) assesses several types of risk (e.g., building materials) at the community level, and we used the risk resulting from the type of ground to focus on purely geographical risks. We took the area-weighted average of these community-level risks at the cell level.

Firm-level Microdata To analyze firm-level productivity and firms' locational or entry/exit choices, we used a firm-level dataset in our sample area. We obtained the data from the Teikoku Databank Center for Advanced Empirical Research on Enterprise and Economy (TDB-CAREE) at Hitotsubashi University. Teikoku Databank is a major Japanese credit research company, and this dataset covers most Japanese firms. These data contain basic information such as industry, locations of headquarters, and the number of workers and revenue, so that we could construct revenue per worker, a proxy of TFP.

Illustration of Raw Data Before discussing the regression analysis results, we illustrated our analysis using raw data for an area around a station in the CBD. Figure 3(a) shows one of the primary sources. Figure 3(b) shows the distribution of local lords' estates using red-hatched polygons. We overlaid the cadastral map of today with the Figure 3(c) and found that former local lords' estates are associated with larger lots today. When we overlaid today's tall buildings with Figure 3(d), most of the tall buildings were found to be located on land that

was formerly local lords' estates. In the regression analysis, we confirmed these relationships using the whole sample while considering potential endogeneity bias. When we examined the aerial images of the area using Figure 3(e), we observed a great deal of variation in the height of buildings in this small area, suggesting high land assembly costs.

Table 1: Definition of Variables and Their Data Sources

Variable	Definition	Data Source
Main variables		
Local Lords' Estates Share	The share of areas owned by local lords in the 1850s.	APP Company, ed (2009)
Number of Lots	The number of lots located (at least a part of the lot) in a cell.	Ichihara, ed (1876), Tokyo Shiku Chosakai (1912), Seizusha, ed (1931-1935), TDi and Inc (2017)
Number of Buildings	The number of buildings located (at least a part of the building) in a cell.	Tokyo Metropolitan Government (2011)
Stories	The average number of buildings' stories in a cell. *(aboveground)* counts only the stories aboveground, whereas *(including underground)* includes the stories underground.	Tokyo Metropolitan Government (2011)
Log Land Price in 2012	The average of the road-level price factor by weighting the length of each road.	Research Center for Property Assessment System (2012)
Log Land Price in 1912, and 1931	The area-weighted average of the lot land price.	Nakai, ed (1880), Tokyo Shiku Chosakai (1912), Seizusha, ed (1931-1935)
Log Land Price in 1972 and 1983	The average of land prices.	Tokyo-to Takuchi Tatemono Tohirikigyo Kyokai (1972) and Tokyo-to Takuchi Tatemono Tohirikigyo Kyokai (1983)
Other variables		
Average Road Width	The length-weighted average width of roads in a cell.	Shobumsha (2018)
Hospital, University, and Park Share	The share of areas used for these purposes in each cell.	Tokyo Metropolitan Government (2011).
Distance to Station in (Year)	The distance in meters to the nearest station in each year.	Ministry of Land, Infrastructure, Transport and Tourism (2014)
FAR Regulations	The average of maximum floor-area ratio.	Tokyo Metropolitan Government (2011) and Shobumsha (2018)
Block Area	The average of blocks' (areas surrounded by roads)s area.	Tokyo Metropolitan Government (2011)
WWII Destruction Share	The share of area destroyed during WWII air raids on Tokyo in each cell.	Ueno (1945)
Remaining Estates Share in 1931	The share of area owned by the descendants of local lords and used as their estate. in each cell	Kazoku Kaikan (1931)
Other Lords' Land / Military Use Share in 1931	The share of area owned by the descendants of local lords not as their estate/used as military infrastructure in each cell.	Seizusha, ed (1931-1935)
Lon and Lat controls	This includes latitude, longitude, their squared terms, and their interaction term.	Centroid of each cell

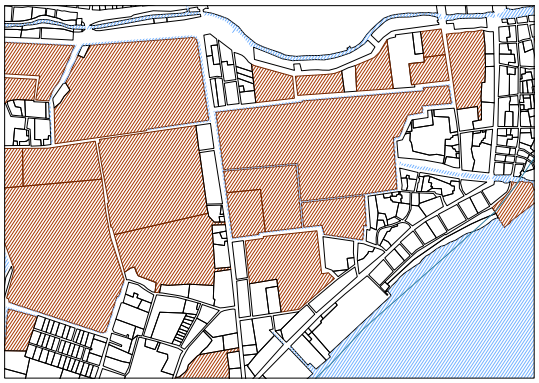
5 Results

We first show the main results analyzing the effect of local lords' estates on the outcomes of lots, buildings, and land prices in our modern data. We also present the effects on firm productivity using firm-level microdata as suggestive evidence for the agglomeration benefits generated by large lots. Then, we analyze how the effects vary with time and space to shed light on the mechanism of lot size persistence and lot size effect. Finally, we conduct robustness checks such as examining other possible mechanisms that might explain the main results.

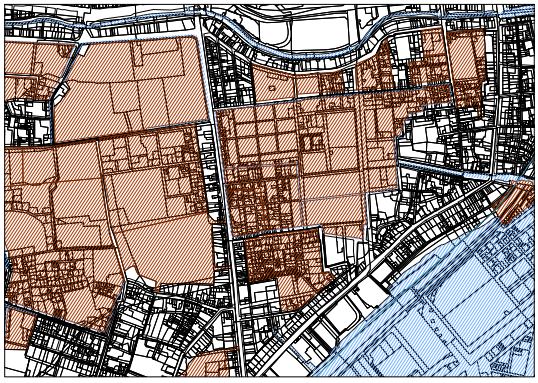
Figure 3: Illustration from a Corner of the Tokyo CBD



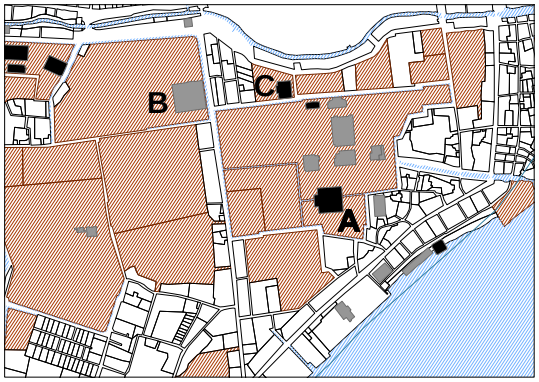
(a) Original Data Source



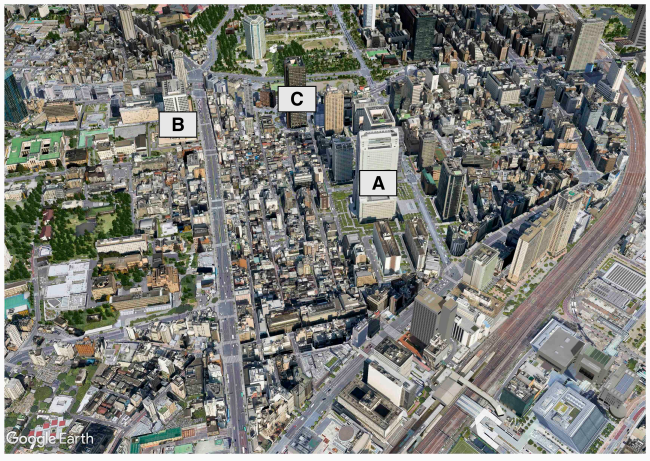
(b) Local Lords' Estates (Red-hatched Area)



(c) (b) + Lot in 2008–2011



(d) (b) + Tall Buildings: Black (Gray) Buildings Have More Than 30 (15) Stories



(e) Google Earth's Aerial Image Suggesting High Land Assembly Costs: Labels (A, B, and C) correspond to buildings in (d).

Notes: These figures show the raw data and aerial images around *Tamachi* station, a station in the CBD. Panel (a) is a reprinted map of one of the original data sources (Yomiuri Shimbun Hanbaikyoku, ed, 1990-1991). Panel (e) is the aerial image as of November 2021 taken from Google Earth.

Table 2: Descriptive Statistics

	Observation	Mean	SD	Min	Max
Panel A: Cell-level Variables					
Local Lords' Estates Share	9761	0.190	0.330	0	1
Number of Lots in 1872	5530	12.15	10.02	1	80
Number of Lots in 1912	8133	14.38	10.11	1	86
Number of Lots in 1931	7830	17.21	11.65	1	129
Number of Lots in 2008–2011	9101	55.99	36.57	1	202
Land Price in 1912 (Thousand Yen)	7122	0.0485	0.0622	5.69e-08	0.612
Land Price in 1931 (Thousand Yen)	7024	0.0391	0.0369	0.000000711	0.360
Log Land Price in 1972 (Thousand Yen)	6071	573.2	530.6	91.30	6640.0
Log Land Price in 1983 (Thousand Yen)	3276	1512.3	1492.1	249.7	22650.2
Land Price in 2012 (Thousand Yen)	8971	908.1	1516.5	98	16658.2
Stories (aboveground) in 2011	9542	5.764	4.687	0	56.00
Number of Buildings in 2011	9542	35.17	25.22	1	136
Number of Buildings >= 30 Stories in 2011	9542	0.0380	0.214	0	3
Panel B: Firm-level Variables					
Log Revenue per Worker in 2017	80473	3.363	1.167	-3.466	12.48
Log Revenue per Worker in 1993	85313	3.579	1.085	-3.020	12.04

5.1 Main Results

OLS using the full sample Table 3 shows the baseline results from the OLS regressing the outcome variables on the local lords' estates share variable. As a baseline specification, column (1) controls for the distance from the center (Edo Castle or today's Imperial Palace), a polynominal function of latitude and longitude, and the inside of the *Yamanote* loop line. This loop-line railway connects terminal stations in Tokyo, and the area inside the circular line is generally recognized as the center of Tokyo.

Panels A and B show that the greater the proportion of local lords' estates, the less lots are fragmented, both for 1872 and for 2008–2011. The point estimate shows that if a cell is occupied by local lords' estates, it decreases the number of lots in the 2010s by 21.6, about half of the mean, implying substantial lot size persistence.

In Panels C to E of Table 3, we find negative impacts on the number of buildings and positive impacts on the number of stories and tall buildings. The decreased number of buildings implies that large-scale developments with greater footprints are more common in areas that used to be local lords' estates. The point estimate for the number of buildings more than or equal to 30 stories is 0.038, which is about the same size as its mean. In Panel F, we find

that land prices increase as predicted. The point estimate shows a large impact: if local lords' estates occupy a cell (corresponding to a reduction in the number of lots by 21.6 in 2011), it increases the land price by 17.4%. As discussed in the conceptual framework, this is the lower bound of the transaction costs to assemble land, indicating a non-negligible role of transaction costs.

In Column (2) of Table 3, we additionally control for the mean and standard deviation of altitude, as higher places may attract richer people, whereas flatter places may be suitable for large-scale development. In Column (3), we also control for earthquake risk, which would affect the construction cost and the decision to build high-rise buildings. The results remain largely unchanged by adding these controls.

Overall, these results indicate lot size persistence and lot size premia. This corresponds to the following parameters of the conceptual framework described in Section 2: $\beta > 1$, the land value per area is increasing in lot size, and high C_a, high transaction costs to assemble land.

Table 3: Main Results

	(1)	(2)	(3)
Panel A: Number of Lots in 1872 (N: 5530)			
Local Lords' Estates Share	-12.00***	-11.89***	-11.95***
	(0.762)	(0.749)	(0.755)
Panel B: Number of Lots in 2008–2011 (N: 9101)			
Local Lords' Estates Share	-21.62***	-19.44***	-19.47***
	(3.150)	(3.033)	(3.040)
Panel C: Number of Buildings in 2011 (N: 9542)			
Local Lords' Estates Share	-10.88***	-10.09***	-9.974***
	(1.915)	(1.880)	(1.891)
Panel D: Stories (aboveground) in 2011 (N: 9542)			
Local Lords' Estates Share	0.677*	0.865**	0.799**
	(0.352)	(0.357)	(0.341)
Panel E: Number of Buildings >= 30 Stories in 2011 (N: 9542)			
Local Lords' Estates Share	0.0380**	0.0402**	0.0380**
	(0.0160)	(0.0166)	(0.0158)
Panel F: Log Land Price in 2012 (N: 8971)			
Local Lords' Estates Share	0.174***	0.182***	0.163***
	(0.0610)	(0.0617)	(0.0570)
Locational Controls	Yes	Yes	Yes
Topological Controls	No	Yes	Yes
Ground Type	No	No	Yes

Notes: Standard errors are shown in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Locational Controls contains the distance from the Edo castle, a dummy variable indicating whether the cell is inside the *Yamanote* loop line, latitude, longitude, their interaction term and square terms. *Topological Controls* contains the mean and standard deviation of altitude. *Ground Type* controls for earthquake risks based on their ground type. See Table 1 for the definitions of variables.

Exploiting a Historical Zoning Policy As another identification strategy, we exploit a historical zoning policy to conduct a local randomization analysis, as briefly explained in the background section. Figure 1(a) shows a part of central Tokyo area, some of which the Tokugawa shogunate developed via reclamation. At the initial declamation, the shogunate developed the land to the eastern part of the U-shaped line, the dash and solid part, which became the initial coastline. At the same time, the shogunate clearly set the dash-dot part of the U-shaped line as a boundary between the local lords' estates zone and the commoners' zone, although we are not aware of formal documents specifying this zoning. The estates shown with a red border are obviously larger than the lots to the east of the dashed line, the commoners' zone. After the increase in demand for land by local lords, the shogunate further reclaimed the area to the east of the initial coastline, reaching today's Sumida River. These areas were occupied largely by local lords. Therefore, the initial coastline became another boundary between the local lords' estate zone and the commoners' zone, and as a whole, the U-shaped line works as a boundary between the two zones except the northeastern dash part without the gray-colored buffer in Figure 1(b), where local lords' estates happened to be located in both zones. In Figure 1(b), we also overlay high-rise buildings in 2011, indicated by the black (more than or equal to 30 stories) and gray (15–29 stories) rectangles, and we observe that they are mainly located in the local lords' estate zone.

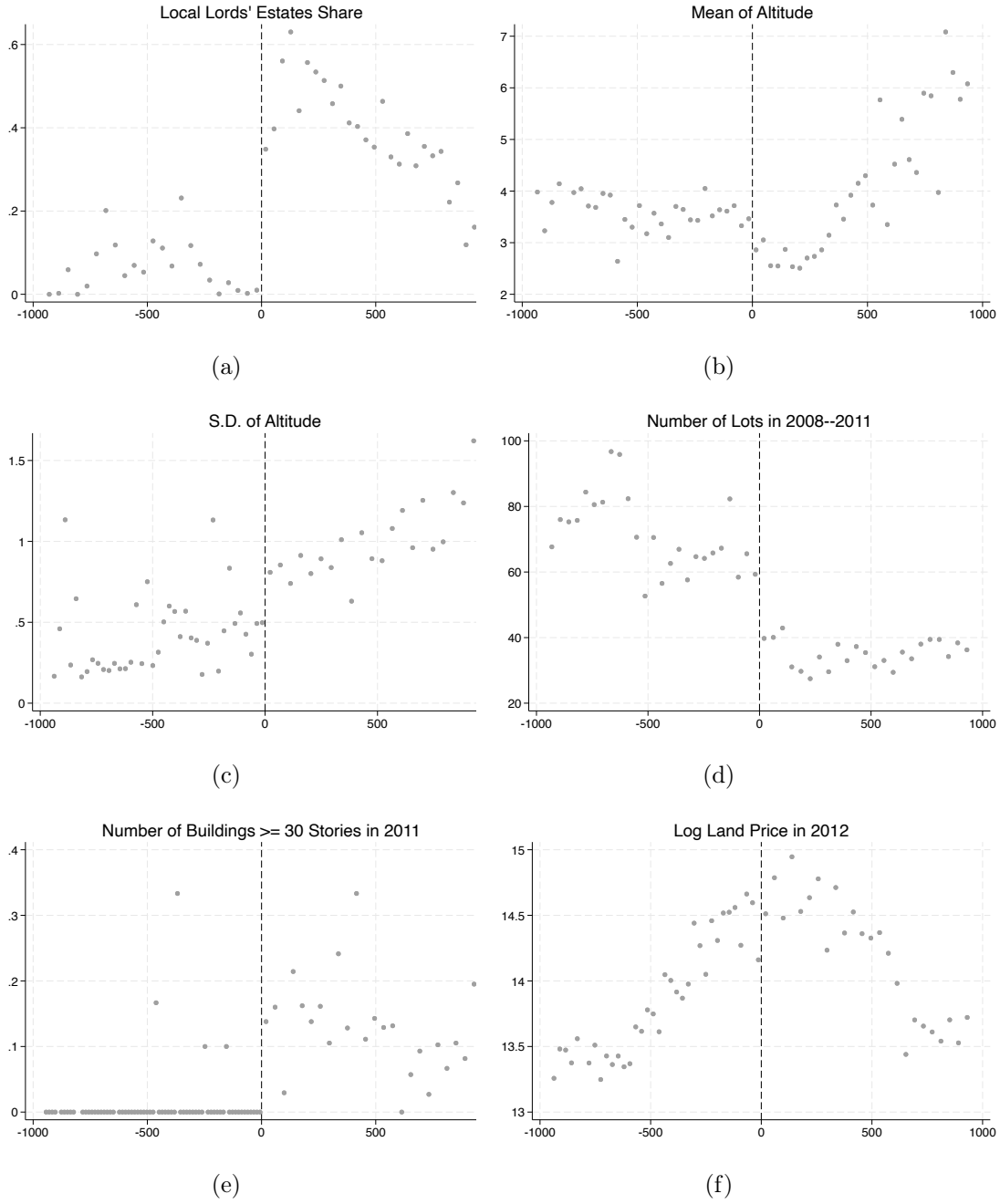
We first rely on geographical representation using the sample average and a polynomial regression, as shown in Figure 4, to examine the distribution of the variables. We use cells whose centroids are within 1 km of the boundary, but exclude cells whose centroids are within 50 m of the boundary, because such cells are separated on both sides and attenuate the jump (if any) at the discontinuity. The x-axis is the distance from the boundary, taking a positive and negative value in the local lords' estate zone and the commoners' zone. Figure 4(a) shows a clear discontinuous jump in the presence of local lords' estates. Figure 4(b) and 4(c) show the mean and standard deviation of altitude, respectively. Figure 4(b) shows no clear discontinuity at the boundary in the mean of altitude. Figure 4(c) shows some discontinuity at the boundary in the standard deviation of altitude, but higher ruggedness is disadvantageous to development, and thus, the simple RD design does not overstate the positive effects on development. We check the robustness to controlling for these variables in the regression analysis. Figure 4(d)–4(f) show that the western area has fewer lots, more high-rise buildings,

and higher land prices.

For the regression analysis, we employ a local randomization approach, because we do not have a large sample along the boundary (Cattaneo et al., 2018). We use the cells whose centroid is within 250 m of the boundary, corresponding to about one block from the boundary, which is shown as the gray-shaded area in Figure 1(b). We do not use the boundary in the northeastern part for this analysis (dashed-line without the gray-shaded buffer), because some local lords had estates along the intimal coastline. We define a *Local Lords' Estates Zone* dummy by the location of the centroid of cells and regress the outcome variable on this dummy and the other controls. Table 4 shows the results. In Column (1) of Panel I, we regress the share of local lords' estates on the *Local Lords' Estates Zone* dummy with controlling for the same set of control variables in column (1) of Table 3, which confirms the expected large impact.[22] Column (2) adds the controls for the other geographical variables, the mean or standard deviation of altitudes, and column (3) adds earthquake risk. The results are similar across the specifications. In Panels A–F, we find a very similar pattern to that shown for Panels A–F in Table 3. Again, there is a negative effect on the number of lots, implying lot size persistence, and a positive effect on high-rise buildings. The effect on land prices is not robustly statistically significant, unlike in Table 3 because of higher standard errors. We analyze the effect on firm-level productivity in the next section, which gives us more precise and direct evidence of the effect on firm productivity. Another finding is that the point estimates for high-rise buildings and land prices are larger in magnitude than those in Table 3. This is because this area is the most central part of Tokyo and the agglomeration benefits from constructing high-rise buildings are larger.

[22] In the tables showing the RD results, we add Panel I into the top of the panels so that the panel structure is the same with that in the OLS tables.

Figure 4: RD Plots around the Zoning Boundary



Notes: We use all cells within 1 km of the boundary in Figure 1(b) excluding cells within 50 m of the boundary to avoid mechanical attenuation effects. The x-axis is the distance from the boundary, which is shown as the solid line and dash-dot line in Figure 1(b), taking a positive and negative value in the local lords' estate zone and the commoners' zone, respectively. The points show the average of each outcome variable within each bin. The number of bins is chosen using the mimicking variance evenly spaced method using spacing estimators. The lines show the fourth-order polynomial fit for each zone.

Table 4: Local Randomization Design

	(1)	(2)	(3)
Panel I: Local Lords' Estates Share (N: 351)			
Local Lords' Estates Zone	0.402***	0.351***	0.351***
	(0.0547)	(0.0590)	(0.0592)
Panel A: Number of Lots in 1872 (N: 350)			
Local Lords' Estates Zone	-11.97***	-10.79***	-10.79***
	(1.777)	(2.055)	(2.059)
Panel B: Number of Lots in 2008–2011 (N: 352)			
Local Lords' Estates Zone	-24.29***	-22.32***	-22.22***
	(5.781)	(6.472)	(6.297)
Panel C: Number of Buildings in 2011 (N: 351)			
Local Lords' Estates Zone	-11.16***	-10.64***	-10.60***
	(3.866)	(3.723)	(3.656)
Panel D: Stories (aboveground) in 2011 (N: 351)			
Local Lords' Estates Zone	2.317***	2.045**	2.020**
	(0.715)	(0.882)	(0.873)
Panel E: Number of Buildings >= 30 Stories in 2011 (N: 351)			
Local Lords' Estates Zone	0.126**	0.126**	0.124***
	(0.0512)	(0.0513)	(0.0469)
Panel F: Log Land Price in 2012 (N: 341)			
Local Lords' Estates Zone	0.443*	0.348	0.343*
	(0.244)	(0.219)	(0.202)
Locational Controls	Yes	Yes	Yes
Topological Controls	No	Yes	Yes
Ground Type	No	No	Yes

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Locational Controls contains the distance from the Edo castle and a dummy variable indicating whether the cell is inside the *Yamanote* loop line. *Topological Controls* contains the mean and standard deviation of altitude. *Ground Type* controls for earthquake risks based on their ground type. See Table 1 for the definitions of the variables.

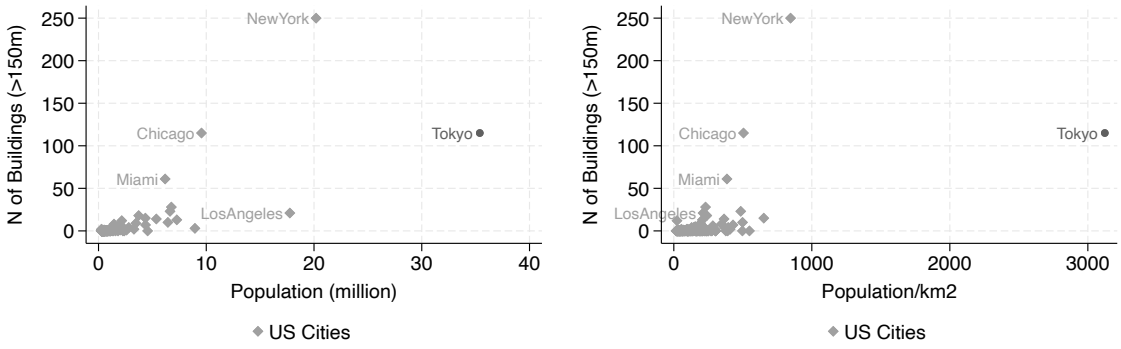
Local Lords' Estates Zone takes a value of one if the central point of the cell is in the local lords' estate zone, the outer side of the U-shaped boundary in Figure 1.

Size of the effects To understand the magnitude of the effects in the OLS analysis, we compare them with the distance-decay function in land prices and the number of skyscrapers. By regressing the log of land prices on the distance from Tokyo station (today's center), we find, on the one hand, that the land price decreases by about 17% when 1 km from Tokyo station. On the other hand, our local lords' estate effect is also 17% (column (1) in Panel F, Table 3), meaning that the effect is comparable to being about 1 km from the center. Similarly, we find that the effect on the number of tall buildings is comparable to being about 4.6 km from Tokyo station.

A within-city analysis is limited for assessing a city's overall impact. For example, the number of skyscrapers when we replace the commoners' zone with local lords' estates is hard to predict because our data do not tell us the aggregated demand function of skyscrapers in Tokyo. As an extreme case, demand for space in Tokyo is fixed (i.e., the demand curve is vertical), and thus, removing the transaction costs may not increase the total number of skyscrapers. However, this is very unlikely because Tokyo metropolitan had lower number of skyscrapers than metropolitan areas in the United States. Figure 5(a) and Figure 5(b) shows the number of building over 150 m and population and population density in 2015, respectively, of Tokyo and the metropolitan areas in the United States. Compared with New York or Chicago, Tokyo should have had more tall buildings given its population. Los Angeles had also the small number of skyscrapers, but when we adjust it by population density, Tokyo is an exceptionally dense but low-rise city. In fact, Tokyo is increasing the number of skyscrapers after 2015. Therefore, removing transaction costs would have increased land prices and tall buildings at the city level.

Effect on Firm Productivity To further examine the positive effect of local lords' estates on land prices through agglomeration benefits ($\beta_{postWWII} > 1$), we analyze the impact on firm productivity using microdata. There are two channels of how local lords' estates affect local-level TFP through high-rise buildings: the selection channel in which competition becomes tougher and less productive firms exit and the agglomeration benefits channel in which firms increase their TFP by knowledge spillovers, a thick labor market, sharing common sources, and so on. If the selection channel is the main driver of the effect on land prices, it does not represent a productivity gain for firms.

Figure 5: Skyscraper in Metropolitan Areas of the United States and Tokyo



(a) Skyscraper and Population

(b) Skyscraper and Population Density

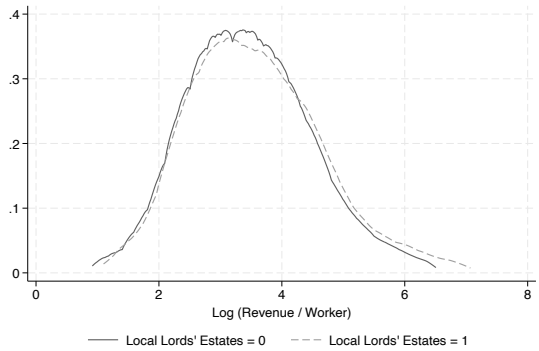
Notes: Figure 5(a) (Figure 5(b)) shows the number of buildings over 150 m and population (population density) in 2015 in the metropolitan areas of the United States and Tokyo. Data sources are Council on Tall Buildings and Urban Habitat Tallest Buildings dataset for skyscrapers and OECD City statistics for population and population density, respectively.

To disentangle these channels, we examine the distribution of firm productivity in each cell (Combes et al., 2012). The selection channel generates a cutoff in the lower tail, because the least productive firm exits. Meanwhile, the agglomeration benefits channel shifts the whole distribution to the right and/or the upper tail becomes thicker when productive firms can enjoy the agglomeration benefits more.

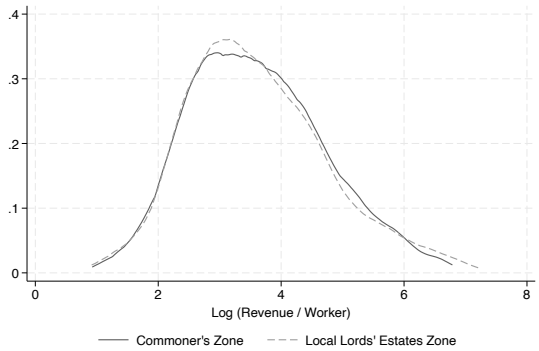
Figure 6(a) shows the distribution of firm productivity in 2017 proxied by revenue per worker in cells whose local lords' estates share is zero and one (the solid line and dash line, respectively). We find that the lower tail does not show a significant difference, suggesting a very weak cutoff channel, but the upper tail becomes thicker in the local lords' estates zone. We find a very similar pattern when we compare firms in the local lords' estates zone and the other zone using firms close to the boundary, as in the local randomization design (Figure 6(b)). Quantile regression analysis including the other cells in the sample and controlling for other variables (geographical controls and industry fixed effects) confirm this pattern, with a larger effect in the upper tail (Figure 6(c) for OLS and Figure 6(d) for local randomization). We further investigate the selection channel by examining firms' moving, exit, and entry using the datasets in 1993 and 2017. We find no evidence that less productive firms disappear from the local lords' estates zone through these channels.[23] These results imply that local lords' estates

[23]Focusing on firms that change their location from 1993 to 2017, we find that more productive firms do not

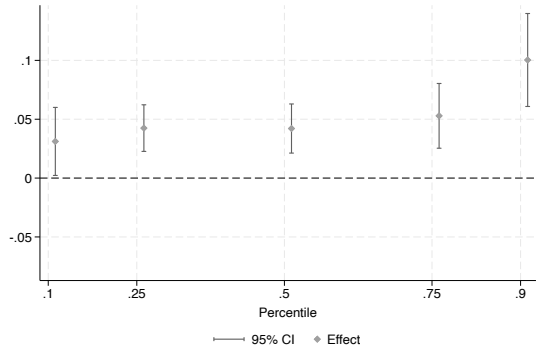
Figure 6: The Difference in Firm Productivity between the Local Lords' Estate Areas and Other Areas



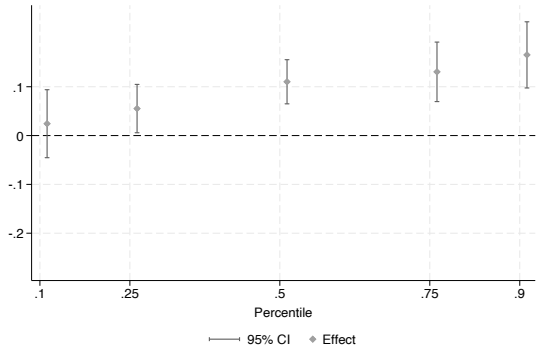
(a) Firm Productivity (OLS Sample)



(b) Firm Productivity (RD Sample)



(c) Quantile Regression (OLS Sample)



(d) Quantile Regression (RD Sample)

Notes: Figure 6(a) shows the distribution of firm productivity in 2017 proxied by revenue per worker in cells whose local lords' estates share is zero and one (solid line and dash line, respectively). Similarly, Figure 6(b) shows the distribution of firm productivity in 2017 proxied by revenue per worker in the local lords' estates zone and the other zone within the sample, respectively, for the local randomization design. Figure 6(c) shows the coefficients when regressing the log of revenue per worker on local lords' estates share, conditional on *Distance from the Center (Castle)*, *Mean of altitude*, *S.D. of Altitude*, *Inside Yamanote Line*, and industry fixed effects. Diamonds (triangles) show the results using the sample in 2017 (1993). Figure 6(d) shows the coefficients when regressing the log of revenue per worker on the local lords' estates zone variable, conditional on *Distance from the Center (Castle)*, *Mean of altitude*, *S.D. of Altitude*, *Inside Yamanote Line*, and industry fixed effects.

contribute to productivity gains for firms mainly through agglomeration benefits.

significantly move into areas with a high local lords' estates share (Panel A in Table A.1). Focusing on firms that exist in 2017, we find that the more productive firm is not more likely to be a new entrant after 1993 particularly in the high local lords' estates share area (Panel B in Table A.1). Similarly, focusing on firms that exist in 1993, we find that the less productive firm is not more likely to exit by 2017 particularly in the high local lords' estates share area (Panel C in Table A.1). These results suggest that the selection channel does not operate in these margins. As a counterpart of our local randomization design, Table A.2 analyzes the move from or to the local lords' estates zone and entry and exit from our sample area for local randomization. We find qualitatively similar results.

5.2 Mechanisms

5.2.1 Role of Skyscrapers

Before the prevalence of skyscrapers or transition to an office economy, there would have been fewer agglomeration benefits and the value of land per area would be decreasing in lot size ($\beta < 1$). In that case, smaller lots would be preferred, and if split costs (C_s) were small, large lots would be split.

To analyze this point, we use cadastral map and land price data before the 2010s when there were fewer skyscrapers. We examine how local lords' estates affected lot fragmentation and land prices in, 1912, 1931, 1972, and 1983 using the same set of specifications as in Table 3.

The results in Table 5 show that lot size persistence through out the sample period as expected. We also find that local lords' estates had *negative* effects on the number of lots before WWII, affecting land prices *negatively* before WWII. We also find the reverse of fortune in the value of local lords estates area: the effect became around zero in the core area in 1972 and 1983, when high-rise buildings started to be constructed, and in the 2010s, when there were many skyscrapers, there was a clear positive effect.

These findings suggest two insights about lot size and land price relationships: (1) before WWII, smaller lots were preferred, but there were substantial split costs ($\beta_{preWWII} < 1$ and $C_s > 0$), generating lot size persistence and lot size discount; and (2) technological progress after WWII (the development of construction technology for high-rise buildings and the transition in production from factories to offices) changed the relationship between lot size and the land value per area ($\beta_{preWWII} < 1 < \beta_{postWWII}$).[24]

[24]There is anecdotal evidence that larger lots were less preferred in 17th-century Manhattan as well (Barr, 2016).

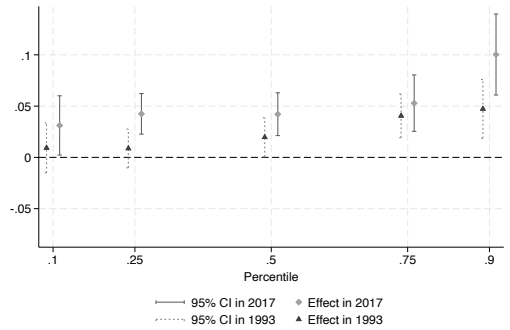
Table 5: Role of Skyscrapers: Time Series Comparison of the Effect of Local Lords' Estates

	Inside vs Outside the Circle (*Yamanote*) Line					
	N of Lot			Log Land Price		
	(1)	(2)	(3)	(4)	(5)	(6)
Historical Outcomes						
Panel A: 1873						
Local Lords' Estates Share	-12.00***	-11.89***	-11.95***			
	(0.762)	(0.749)	(0.755)			
Panel B: 1912						
Local Lords' Estates Share	-12.83***	-12.65***	-12.67***	-0.522***	-0.507***	-0.511***
	(0.614)	(0.610)	(0.613)	(0.116)	(0.113)	(0.113)
Panel C: 1931						
Local Lords' Estates Share	-9.821***	-9.618***	-9.625***	-0.400***	-0.383***	-0.394***
	(1.006)	(0.987)	(0.993)	(0.0913)	(0.0879)	(0.0877)
Panel D: 1972						
Local Lords' Estates Share				-0.0628	-0.0509	-0.0587
				(0.0458)	(0.0437)	(0.0417)
Panel E: 1983						
Local Lords' Estates Share				-0.00910	0.00343	-0.00809
				(0.0522)	(0.0502)	(0.0468)
	N of Lot			Log Land Price		
	(1)	(2)	(3)	(4)	(5)	(6)
Modern Outcomes						
Panel F: 2012						
Local Lords' Estates Share	-21.62***	-19.44***	-19.47***	0.174***	0.182***	0.163***
	(3.150)	(3.033)	(3.040)	(0.0610)	(0.0617)	(0.0570)
Panel G: Skyscraper in 2011				N of $\geq$ 30 Stories Buildings		
				(4)	(5)	(6)
Local Lords' Estates Share				0.0380**	0.0402**	0.0380**
				(0.0160)	(0.0166)	(0.0158)
Locational Controls	Yes	Yes	Yes	Yes	Yes	Yes
Topological Controls	No	Yes	Yes	No	Yes	Yes
Ground Type	No	No	Yes	No	No	Yes
N in Panel A	5530	5530	5530			
N in Panel B	8133	8133	8133	7122	7122	7122
N in Panel C	7830	7830	7830	7024	7024	7024
N in Panel D				6071	6071	6071
N in Panel E				3276	3276	3276
N in Panel F	9101	9101	9101	8971	8971	8971
N in Panel G				9542	9542	9542

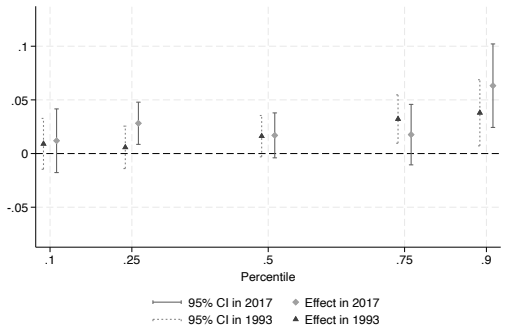
Notes: Standard errors are shown in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Locational Controls contains the distance from the Edo castle, a dummy variable indicating whether the cell is inside the *Yamanote* loop line, latitude, longitude, their interaction term and square terms. *Topological Controls* contains the mean and standard deviation of altitude. *Ground Type* controls for earthquake risks based on their ground type. See Table 1 for the definitions of variables.

Although the results in Table 5 show a stark difference in the effect of lot size on land prices between the periods, there may be changes in those 150 years other than the emergence of skyscrapers or the knowledge-based economy to explain the difference. To investigate the role of tall buildings more explicitly, we focus on more recent changes in the height of buildings from 1993 using firm productivity data. Using the same specification as in the analysis using the 2017 data, we find that the effects are smaller in 1993 (shown as black triangles in Figure 7(a)) than in 2017. In addition, once we control for the average number of stories, the effect of local lords' estates attenuates and the difference between 2017 and 1993 becomes smaller (Figure 7(b)). We find a similar pattern when we employ the local randomization design (Figure 7(c) and Figure 7(d)). Although the point estimates are not precisely estimated and the analyses are not free from the bad control problem, they provide suggestive evidence that local lords' estates contribute to a productivity gain for firms through agglomeration benefits in high-rise buildings.

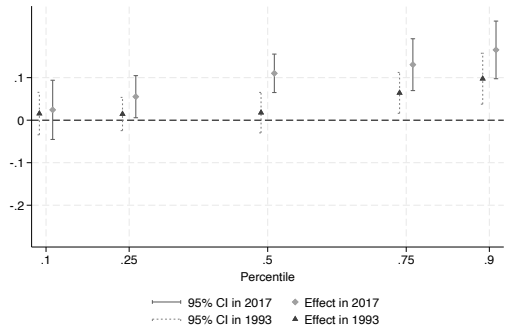
Figure 7: The Effect on Firm Productivity: Comparison between 1993 and 2017



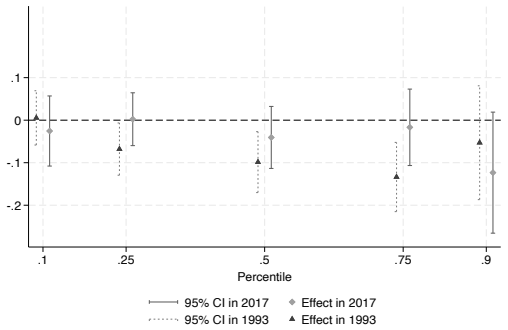
(a) OLS Sample with Controls



(b) (a) + Controlling for Stories



(c) RD Sample with Controls



(d) (c) + Controlling for Stories

Notes: (a) shows the coefficients when regressing the log of revenue per worker on local lords' estates share, conditional on *Distance from the Center (Castle)*, *Mean of altitude*, *S.D. of Altitude*, and industry fixed effects. Diamonds (triangles) show the results using the sample in 2017 (1993). (c) shows the coefficients when regressing the log of revenue per worker on the local lords' estates zone variable, conditional on *Distance from the Center (Castle)*, *Mean of altitude*, *S.D. of Altitude*, *Inside Yamanote Line*, *Earthquake Risk*, and industry fixed effects. (c) and (d) show the results when we add the mean of stories (aboveground) as an additional control variable to the analysis in (a) and (b), respectively.

5.2.2 Heterogeneity in Local Economic Potential

To examine the nature of the transaction costs (γ_a or γ_s), we consider how the local potential productivity (A) will predict heterogeneous effects by splitting the sample into core and non-core areas. Higher productivity result in two scenarios. If transaction costs are constant or less than proportional to the value of redevelopment ($0 \leq \gamma_a < 1$, for example), we would find weaker persistence in productive areas, because there would be enough benefits to cover the transaction costs. However, if transaction costs are more than proportional to the value of redevelopment, owing to the hold-out problem, for example, we might find stronger persistence in productive areas.

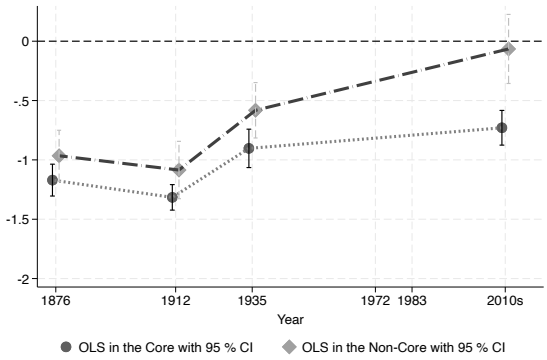
We investigate the heterogeneous impacts between the core and non-core areas in our OLS and RD analyses. For the OLS analysis, we split the sample into the core area and the non-core area using the *Yamanote* loop line and execute the regression analysis as in Table 3. Because stations often have business and shopping streets both in the outside and inside railroads, we define the cell within 250 m-buffer of the area surrounded by the railroad line as the core area and other cells as the non-core area. For the RD analysis, we use the dash-dot boundary close to the Edo castle in Figure 1 as the core boundary and the solid boundary close to the river as the non-core boundary.

Figure 8 shows the results graphically.[25] Black circle shows the point estimates in the core area, implying that we can observe previous results of lot size persistence and reverse of fortune using the full sample in the core area both when we conduct the OLS (Figure 8(a) and Figure 8(c)) and RD analyses (Figure 8(b) and Figure 8(d)). The point estimate in the RD analysis indicates that the effect on land price in the 2010s is 129%, which our conceptual framework interprets as the lower bound of transaction costs to assemble land in the control zone. On the contrary, as indicated by diamonds, non-core area shows lot size persistence and lot size discount before WWII, but shows no lot size persistence and no effect of local lords estates in 2010s.

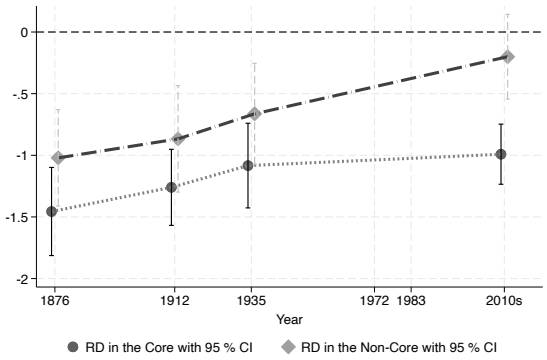
These results imply that land assembly costs are not constant and are disproportionately higher in the core area ($\gamma_a > 1$) while land split cost seems fairly constant across areas

[25] Corresponding regression tables are in Table A.3 (OLS) and Table A.4 (RD). Corresponding RD plots are in Figure A.3 (Core) and Figure A.4 (Non-Core).

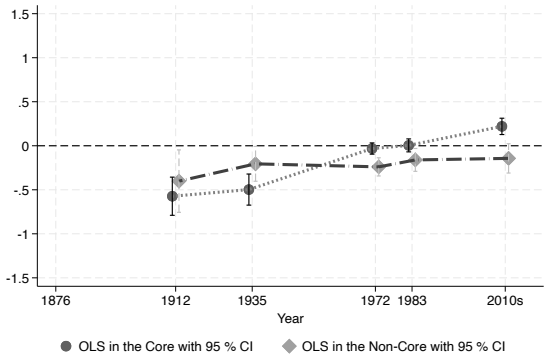
Figure 8: Time-varying Effects of Local Lords' Estates



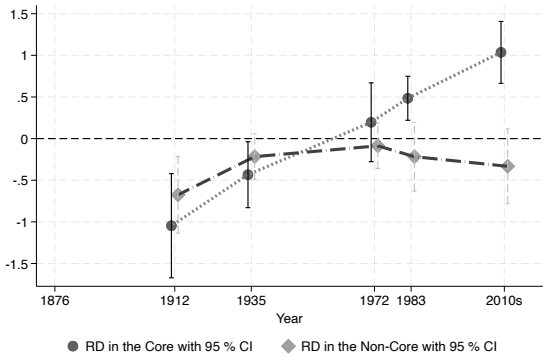
(a) OLS, the Effect on the Number of Lots



(b) RD, the Effect on the Number of Lots



(c) OLS, the Effect on Log of Land Prices



(d) RD, the Effect on Log of Land Prices

Notes: The circles (diamonds) in Figure 8(a) and Figure 8(c) show the point estimates of the effect of local lords' estates on the number of lots and log of land price using the core (non-core) sample with the OLS analysis controlling for the distance from the Edo castle, a dummy variable indicating whether the cell is inside the *Yamanote* loop line, latitude, longitude, their interaction term and square terms, respectively. The circles (diamonds) in Figure 8(b) and Figure 8(d) show the point estimates of the core local lords' estates zone and non-core local lords' estates zone on the number of lots and log of land price with RD analysis controlling for the distance from the Edo castle, and a dummy variable indicating whether the cell is inside the *Yamanote* loop line, respectively.

($\gamma_s \approx 1$).[26] Together with the result indicating time-variant β, this result indicate that city planner should consider these nature of transaction costs at regulating urban land market.

[26] An alternative explanation is that splitting lots has been always preferable in non-core areas (β did not become greater than one in the non-core area even after WWII). If split costs are smaller than assembly costs, splits were successfully accomplished, and the non-core area should show no persistence, as we find in the data. However, there are suggestive evidences that assembly is also preferable in the today's non-core area. The number of buildings over 30 stories in 2011 is substantial (0.28 in non-core areas and 0.44 in core areas in the sample of OLS analysis of Figure 8, respectrively), and the average number of lots in 2008–2011 is similarly fragmented as in the core area (60.4 and 53.7, respectrively). Therefore, it is likely that β became greater than one and assembly costs became relevant in the non-core area as well.

5.2.3 Discussion: Comparison with Other Studies

The results so far suggest that substantial transaction costs are incurred in changing lot size in Tokyo's CBD, generating lot size persistence over 150 years and lot size premia. This is in contrast to the results of other studies using rural/suburban areas (Bleakley and Ferrie, 2014; Finley et al., 2021; Smith, 2020), which also find the gain of assembly but weaker lot size persistence (persistence disappears after 150 years). Through the lens of our conceptual framework, this difference is attributed to local economic potential (A) and the nature of transaction costs (γ_a): A is higher in cities than in rural/suburban areas, and because assembly costs are increasing in economic potential ($\gamma_a > 1$), lot size persistence is stronger in cities. Although we cannot pin down why γ_a is greater than one, it can be explained by prior theoretical and experimental studies on hold-out (Eckart, 1985; O'Flaherty, 1994; Strange, 1995; Miceli and Sirmans, 2007; Winn and McCarter, 2018).

Our results suggest that the rise of skyscrapers generates the value of large lots, resulting in the change of the case from $\beta_{preWWII} < 1$ to $\beta_{postWWII} > 1$. On the contrary, some previous studies find lot size discount, not premia, by hedonic regression (White, 1988; Brownstone and Vany, 1991). However, their setting is suburban residential areas in the U.S., and the mean lot size is 0.71 acres or 0.64 acres, respectively, which is 10 times more than the typical lot size for four-member families in the U.S. Therefore, split would be preferred over assembly in their case, corresponding to the case of $\beta < 1$.

5.3 Robustness Checks

Unobserved Confounders To account for the potential influence of unobserved confounders in the reduced form effect in Figure 8, we employ Oster (2019)'s method. We compare the "short" regression with locational controls and "long" regression with adding topological controls and ground type to obtain bias-adjusted coefficient. The pattern we found in the main analysis, the lot size persistence and increased value of large lots after WWII only in the core area, do not change in these bias-adjusted coefficients in OLS (Table A.5) and RD (Table A.6) though the RD result indicate the lot size discount in the core area might be overestimated in 1917.

Alternative Channels for Heterogeneous Effects The results in Figure 8 support the view that local lords' estates keep lot size large persistently in the core area, turning its effect on land price from negative to positive after the rise of skyscraper in the core area. In the non-core area, there will be less demand for skyscrapers even after 1960, finding no such a reversion in the effect on land price and no lot size persistence. We consider alternative channels to explain these pattern.[27]

First, public use may affect the outcomes. For example, large lots may facilitate the construction of transportation infrastructure (proximity to railroad stations) or buildings for the public sector (hospitals, universities, and parks), which would increase the land price. We consider these channels by controlling for the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks for both the OLS and the RD analyses.[28] We compare the result in the main specification and the result controlling for these factors in columns (1) and (2) or columns (3) and (4) in Table A.7, finding qualitatively similar results.

Second, local lords' estates may facilitate skyscraper construction, but not through lot size. We consider the size of blocks (not each lot, but the area surrounded by roads), width of roads (wider roads are advantageous for delivery to construction sites) the FAR regulation as an alternative construction costs.[29] We add these variables into the main specification, finding that the main results remain largely unchanged in Table A.7.[30]

Finally, we consider alternative historical shocks that might explain why we observe persistence only in the core area or the sign of the effect on land price changes. For example, destruction during the WWII bombing might explain the results.[31] Destruction might be

[27] See "Other variables" Table 1 for the data sources of the variables used to account for alternative channels.

[28] Demolished stations can have persistent effects, as shown in Brooks and Lutz (2019).

[29] Before 1919, there were no height restrictions or FAR regulations. However, in response to rapid city growth, in 1919, the government established height regulations, and in 1961, the government switched from height regulations to FAR regulations.

[30] FAR regulations depend on the land use zones established under urban planning laws and the width of the roads that the buildings face under construction laws. Specifically, when road width x is equal to or more than 12 m, the maximum FAR is equal to that set by land use zones (FAR_{zone}). When x is less than 12 m, the formula $\min\{FAR_{zone}, x * k * 100\}$ determines the maximum FAR, where $k = 0.6$ ($k = 0.4$) when the land is commercial (residential). For example, suppose that the land use zone regulation specifies 500% as the maximum ratio. If the road in front of the land is 6 m and the land is commercial, the maximum FAR is reduced to 360%. Although there are some special cases in which $k > 0.6$ due to policies by local municipalities, in the regression analysis, we calculate the road-level maximum FAR using the formula above and use its weighted mean using the length of each road segment as the control variable.

[31] Harada et al. (2022) investigate the long-term effect of this bombing on local communities and their livelihood in residential areas.

concentrated in the non-core area and affect lot size persistence. In addition, it might affect the change in the land price after WWII. Also, we consider the change in land use caused by the end of WWII. Before WWII, the descendants of local lords still used a part of the estates to live on or for military infrastructure. There should be a significant change in land use in those areas after WWII, which may explain the difference between the core and non-core areas or in the sign of the effect on local lords' estates. Similarly, land owned by local lords' descendants in 1931 might have been priced lower than its market value for political reasons, as discussed in the data section. After WWII, lords were deprived of their political privilege; they might have sold their land and their land might have been highly valued. To address these concerns, we control for the destructed area, the descendants' estates or their other land for high-ranked family and other family separately, and military infrastructure in the regression analysis. However, the results are robust to controlling for these factors in columns (5) and (11) and all of the three channels discussed so far in columns (6) and (12) in Table A.7 (OLS) and Table A.8 (RD).

Other Concerns We also investigate the robustness of the main results against more specification issues such as the functional forms or choice of parameters in data construction in the main analysis. As for the OLS analysis, we first restrict the sample to the cells where we can observe the outcome variables both in 1912 or 1931 and 2012 because the data in 1912 and 1931 does not cover a particular zone (See Figure A.2). Second, we increase the threshold for spatial correlation in standard errors from 300 m to 500 m or 1000 m. Third, we employ alternative treatment variable, the size of local loads' estates in the regression analysis. These modification does not change the results qualitatively (Table A.9, Table A.10, Table A.11, and Table A.12 respectively). We also constructed 200 m-level, not 100 m-level, data set and conducted the same analysis in Table A.7 to observe how our choice of the unit affects the results. We find that the effect on land price are amplified suggesting spillover effects, but the pattern of heterogeneous effects in time and location do not change. (Table A.13). As for local randomization, we implement donuts hole approach by using the cells slightly far from the boundary Table A.14 and parametric approach using polynomials of the distance to the boundary (Table A.15).

To deal with particular concerns for the core-and-non-core comparison, we implement two

additional analyses for the robustness of the OLS results. First, we employ different methods in defining the core area and non-core areas. First, we simply use the Yamanote line without 250 m buffer to define the core area. This will exclude some vibrant areas close to the station but in the outer area of the railroad lines from the core area. Though the effect in the core area attenuated as expected, the qualitative results do not change (Table A.16). Second, instead of relying on the Yamanote-line to divide the sample into the core and non-core area, we use the land price data to estimate local economic potential in each era to define these areas, finding similar results with the result in Table A.7 (Table A.17).[32] Second, the size of local lord estates may be different between the core area and non-core area, and this may drive the heterogeneity in the effect between them. We control for the number of local load estates because it will capture how much local lords estates are fragmented conditional on the share of local lords estates area. However, the results unchanged qualitatively in Table A.18.

6 Policy Implications

Policymakers recognize that lot fragmentation is an important obstacle in urban development (Nelson and Lang, 2007), but the long-run effects of lot fragmentation are not well understood. This is particularly relevant to today's growing cities in developing countries (Bryan et al., 2020), which often have poor urban slums in core areas. The provision of property rights in urban slums to enhance economic development has been discussed and implemented in practice. Various studies analyze whether such entitlements increase investments in housing (Field, 2005; Field and Torero, 2006; Henderson et al., 2016). Our results imply that entitling property rights may have unintended consequences for productivity through lot fragmentation in rapidly growing cities when such areas need to be transformed into business zones with high-rise buildings, echoing the view in Glaeser (2021).[33]

To obtain a more policy-relevant parameter, we estimate the impact of additional lots in 1872 on the land prices of today using local lords' estates as an instrument. We find that

[32] A concern of this approach is that land price is affected by local lord estates and thus will have a bad control problem. Therefore, we first regress land price in cells without local loads estates on the set of locational controls used in the main analysis (polynomials of latitude and longitudes) and obtain predicted land price for the full sample by extrapolation.

[33] Similarly, Harari and Wong (2019) and Michaels et al. (2021) show that upgrading amenities in slums may result in lower land prices and shorter buildings by increasing formalization costs.

additional lots in 1872 decrease the land price in 2012 by 1.1–1.3%. Because the standard deviation of the number of lots is about 10, this suggests a substantial negative impact of initial lot fragmentation on the land price. Although this parameter is heterogeneous across cities, it is a benchmark for policymakers in rapidly growing cities in developing countries.

7 Conclusion

In this study, we investigate whether transaction costs in the urban land market generate lot size persistence and hinder efficient land use. We construct a 100 m*100 m-cell-level dataset spanning 150 years and use a plausibly exogenous release of large lots (local lords' estates) to the private market in 1868. Using OLS and local randomization designs, we find that cells used as local lords' estates formerly have larger lots even after 150 years. This lot size persistence is stronger in the core area, implying higher transaction costs there. We also find that previous local lords' estates generate agglomeration benefits in the 2010s: there are more skyscrapers, higher land prices, and productive firms. We further confirm that the effect on firm productivity does not come from the moving, exit, or entry of firms. Meanwhile, before WWII, former local lords' estates had larger lots than other areas but lower land prices. This opposite result on the land price from the 2010s means that previous local lords' estates were too large for optimal land use and discounted due to land split costs. These findings imply that the prediction of the Coase theorem without transaction costs is not relevant in the urban land market, particularly in the CBD, and initial lot sizes have substantial impacts on economic activities even after 150 years. City planners in developing countries should take account of these results when entitling property rights to fragmented areas such as slums.

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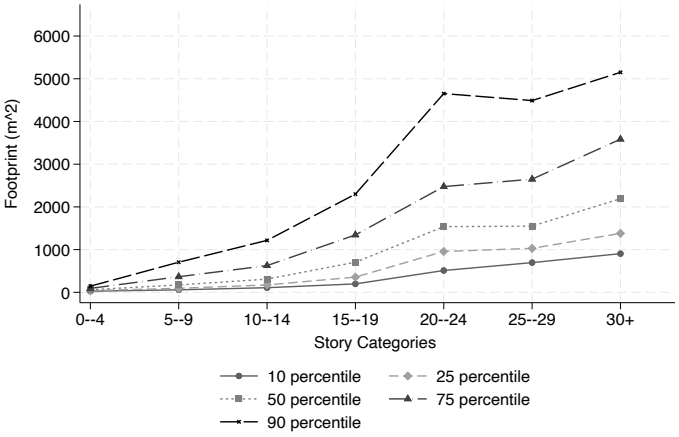
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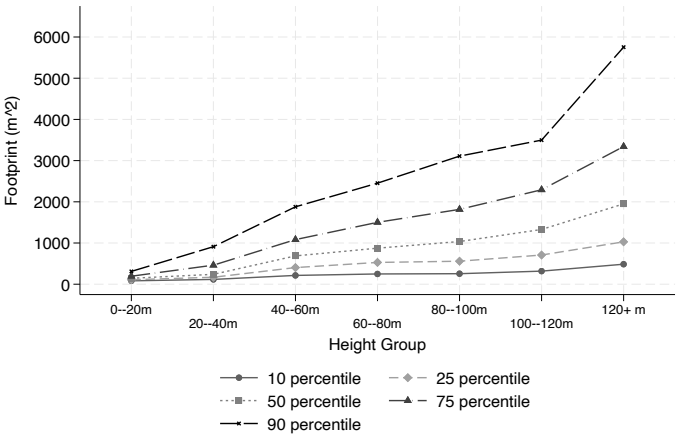
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Appendix Not for Publication

Figure A.1: Building Heights and Footprint



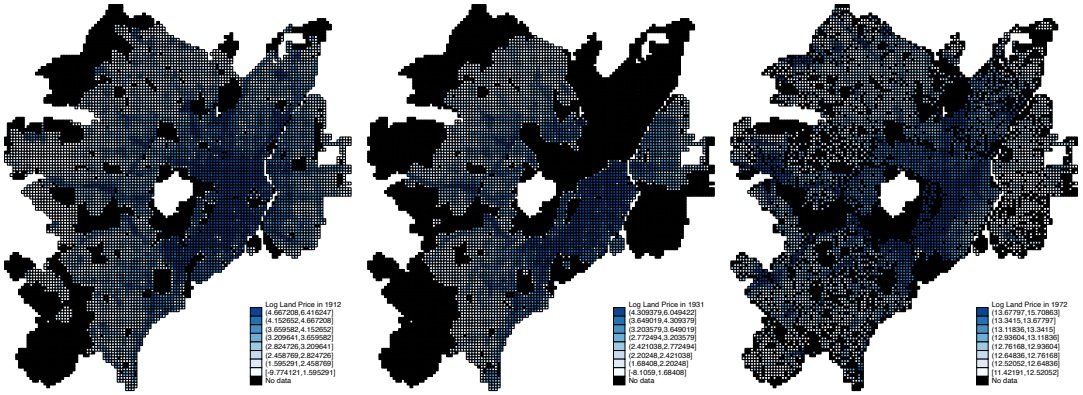
(a) Tokyo



(b) New York City

Notes: Figure A.1(a) shows the distribution of footprint of buildings located in Tokyo's 23 wards in 2011 (Tokyo Metropolitan Government, 2011). See the main text for the details of the dataset. We show the percentiles of footprint conditional on the building-story group. Figure A.1(b) shows the distribution of footprint of buildings located in New York City (Syracuse and Manhattan) in 2017 (Microsoft, 2017). We show the percentiles of footprint conditional on the building-height groups

Figure A.2: Coverage and Pattern of Land Price Data

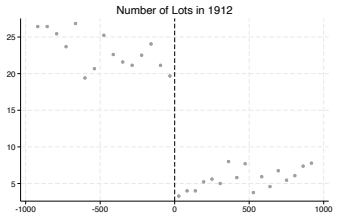


(a) 1912 (b) 1931 (c) 1972

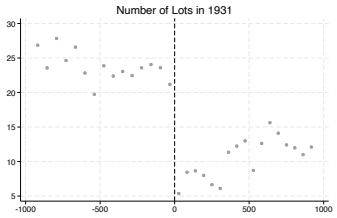
(d) 1983 (e) 2012

Notes: These maps show the pattern of land price data within our sample defined by the border of old Tokyo city. Black cells indicate missing values.

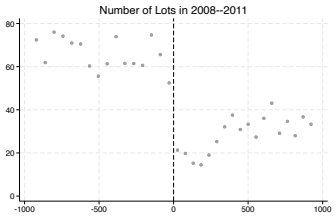
Figure A.3: Number of Lots and Land Prices along Zoning Boundary in the Core Area from 1912 to the 2010s



(a) Number of Lots in 1912



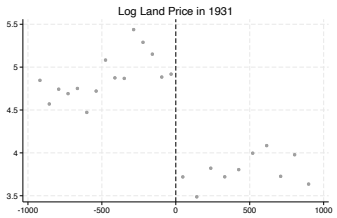
(b) Number of Lots in 1931



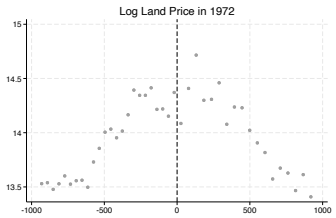
(c) Number of Lots in the 2010s



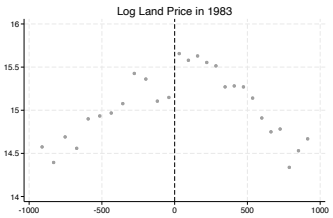
(d) Log Land Price in 1912



(e) Log Land Price in 1931



(f) Log Land Price in 1972



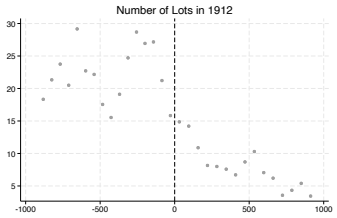
(g) Log Land Price in 1983



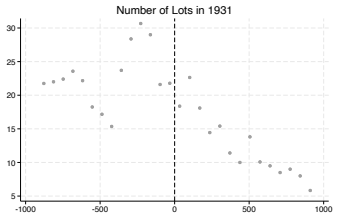
(h) Log Land Price in the 2010s

Notes: We use all cells within 1 km of the core boundary (dash-dot line in Figure 1) excluding cells within 50 m of the boundary to avoid mechanical attenuation effects. The x-axis is the distance from the boundary taking a positive and negative value in the local lords' estate zone and the commoners' zone, respectively. The points show the average of each outcome variable within each bin. The number of bins is chosen using the mimicking variance evenly spaced method using spacing estimators.

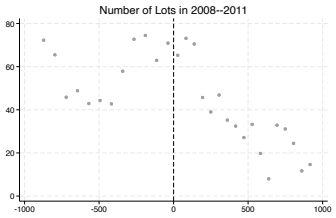
Figure A.4: Number of Lots and Land Prices along Zoning Boundary in the Non-Core Area from 1912 to the 2010s



(a) Number of Lots in 1912



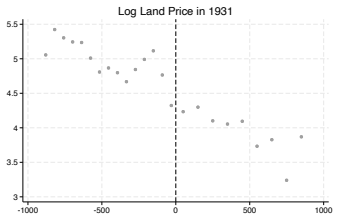
(b) Number of Lots in 1931



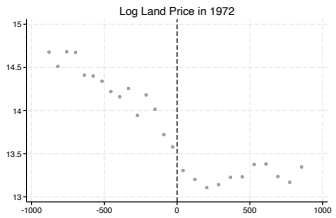
(c) Number of Lots in the 2010s



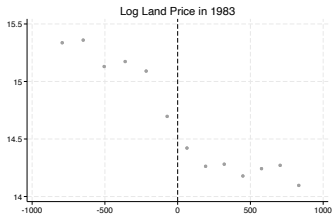
(d) Log Land Price in 1912



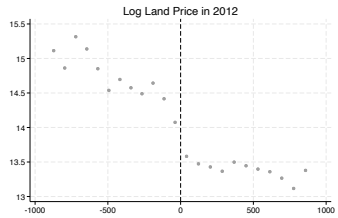
(e) Log Land Price in 1931



(f) Log Land Price in 1972



(g) Log Land Price in 1983



(h) Log Land Price in the 2010s

Notes: We use all cells within 1 km of the non-core boundary (solid line in Figure 1) excluding cells within 50 m of the boundary to avoid mechanical attenuation effects. The x-axis is the distance from the boundary taking a positive and negative value in the local lords' estate zone and the commoners' zone, respectively. The points show the average of each outcome variable within each bin. The number of bins is chosen using the mimicking variance evenly spaced method using spacing estimators.

Table A.1: Selection Channel (OLS Sample)

	(1)	(2)	(3)
Panel A: Sorting of Movers			
	Δ Local Lords' Estates		
Log Revenue per Worker in 1993	0.00134	0.00317	
	(0.00335)	(0.00395)	
Industry FEs	No	Yes	
Observation (Firm)	12309	12309	
Panel B: Entrant (Outcome: Entrant Dummy)			
	Sample: Full in 2017		
Local Lords' Estates Share	0.00268	0.00239	
	(0.0160)	(0.0156)	
Local Lords' Estates Share * Log Revenue per Worker in 2017	0.00459	0.00293	-0.000294
	(0.00462)	(0.00449)	(0.00495)
Baseline Controls (* Log Revenue per Worker in 2017)	Yes	Yes	Yes
Industry FEs	No	Yes	Yes
Local Lords' Estates Share * Industry FEs	No	No	Yes
Observation (Firm)	76510	76510	76510
Panel C: Exiter (Outcome: Exiter Dummy)			
	Sample: Full in 1993		
Local Lords' Estates Share	-0.0164	-0.0170	
	(0.0185)	(0.0184)	
Local Lords' Estates Share * Log Revenue per Worker in 1993	0.00649	0.00708	0.00432
	(0.00494)	(0.00491)	(0.00550)
Baseline Controls (* Log Revenue per Worker in 1993)	Yes	Yes	Yes
Industry FEs	No	Yes	Yes
Local Lords' Estates Share * Industry FEs	No	No	Yes
Observation (Firm)	85307	85307	85307

Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Δ indicates the variable in 2017 minus 1993. Panel A uses firms that change their cells within our sample area. In Panel B (C), the outcome variable is a dummy variable that takes the value one if a firm exists only in 2017 (1993). *Baseline Controls* contains the distance from the Edo cas- tle, a dummy variable indicating whether the cell is inside the Yamanote loop line, latitude, longitude, their interaction term and square terms, and the mean and standard deviation of altitude (and constant term).

Table A.2: Selection Channel (RD Sample)

	(1)	(2)	(3)
Panel A: Sorting of Movers			
	Δ Local Lords' Estates Zone		
Log Revenue per Worker in 1993	0.0140	0.0179	
	(0.0136)	(0.0175)	
Industry FEs	No	Yes	
Observation (Firm)	1341	1341	
Panel B: Entrant (Outcome: Entrant Dummy)			
	Sample: Full in 2017		
Local Lords' Estates Zone	-0.0348	-0.0381	
	(0.0280)	(0.0277)	
Local Lords' Estates Zone * Log Revenue per Worker in 2017	0.0100	0.0114	0.0106
	(0.00790)	(0.00783)	(0.00843)
Baseline Controls (* Log Revenue per Worker in 2017)	Yes	Yes	Yes
Industry FEs	No	Yes	Yes
Local Lords' Estates * Industry FEs	No	No	Yes
Observation (Firm)	7491	7491	7491
Panel C: Exiter (Outcome: Exiter Dummy)			
	Sample: Full in 1993		
Local Lords' Estates Zone	0.0277	0.0280	
	(0.0352)	(0.0354)	
Local Lords' Estates Zone * Log Revenue per Worker in 1993	-0.00171	-0.00276	-0.00245
	(0.00906)	(0.00916)	(0.0102)
Baseline Controls (* Log Revenue per Worker in 1993)	Yes	Yes	Yes
Industry FEs	No	Yes	Yes
Local Lords' Estates * Industry FEs	No	No	Yes
Observation (Firm)	8206	8206	8206

Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Δ indicates the variable in 2017 minus 1993. For stories, we use the number of stories aboveground in 2011 and 1991, respectively. Panel A uses firms that change their located cells within our sample area for the local randomization analysis. In Panel B (C), the outcome variable is a dummy variable that takes the value one if a firm exists only in 2017 (1993). *Baseline Controls* contains the distance from the Edo cas- tle, a dummy variable indicating whether the cell is inside the Yamanote loop line, and the mean and standard deviation of altitude (and constant term).

Table A.3: Lot Size Persistence, Core vs. Non-core

	Inside vs Outside the Circle (*Yamanote*) Line					
	N of Lot			Log Land Price		
	(1)	(2)	(3)	(4)	(5)	(6)
Historical Outcomes						
Panel A: 1873						
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-11.79***	-11.74***	-11.78***			
	(0.853)	(0.859)	(0.858)			
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.76***	-11.97***	-11.88***			
	(1.527)	(1.425)	(1.389)			
Panel B: 1912						
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-13.31***	-13.14***	-13.15***	-0.573***	-0.573***	-0.572***
	(0.660)	(0.666)	(0.668)	(0.132)	(0.128)	(0.128)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-10.98***	-11.36***	-11.37***	-0.402*	-0.391*	-0.375*
	(1.485)	(1.447)	(1.449)	(0.215)	(0.203)	(0.197)
Panel C: 1931						
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-10.52***	-10.14***	-10.14***	-0.498***	-0.478***	-0.478***
	(1.146)	(1.131)	(1.132)	(0.107)	(0.105)	(0.105)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-6.780***	-7.507***	-7.469***	-0.205*	-0.208*	-0.207*
	(1.652)	(1.620)	(1.632)	(0.120)	(0.117)	(0.118)
Panel D: 1972						
Local Lords' Estates Share * Inside Yamanote Zone + 250 m				-0.0316	-0.0230	-0.0284
				(0.0389)	(0.0389)	(0.0362)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m				-0.240***	-0.247***	-0.233***
				(0.0628)	(0.0629)	(0.0626)
Panel E: 1983						
Local Lords' Estates Share * Inside Yamanote Zone + 250 m				0.00423	0.0144	0.00782
				(0.0448)	(0.0445)	(0.0415)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m				-0.161**	-0.162**	-0.137*
				(0.0788)	(0.0789)	(0.0778)
	N of Lot			Log Land Price		
	(1)	(2)	(3)	(4)	(5)	(6)
Modern Outcomes						
Panel F: 2012						
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-26.68***	-23.93***	-24.03***	0.220***	0.229***	0.216***
	(3.250)	(3.195)	(3.197)	(0.0563)	(0.0572)	(0.0523)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-2.388	-4.657	-4.591	-0.143	-0.143	-0.143
	(6.467)	(6.424)	(6.407)	(0.101)	(0.0996)	(0.0993)
Panel G: Skyscraper in 2011				N of ≥ 30 Stories Buildings		
				(4)	(5)	(6)
Local Lords' Estates Share * Inside Yamanote Zone + 250 m				0.0363**	0.0383**	0.0368**
				(0.0147)	(0.0152)	(0.0150)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m				0.0236	0.0245	0.0240
				(0.0325)	(0.0323)	(0.0315)
Locational Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes
Topological Controls (* Inside)	No	Yes	Yes	No	Yes	Yes
Ground Type (* Inside)	No	No	Yes	No	No	Yes
N in Panel A	5530	5530	5530			
N in Panel B	8133	8133	8133	7122	7122	7122
N in Panel C	7830	7830	7830	7024	7024	7024
N in Panel D				6071	6071	6071
N in Panel E				3276	3276	3276
N in Panel F	9101	9101	9101	8971	8971	8971
N in Panel G				9542	9542	9542

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Locational Controls contains the distance from the Edo castle, a dummy variable indicating whether the cell is inside the *Yamanote* loop line, latitude, longitude, their interaction term and square terms. *Topological Controls* contains the mean and standard deviation of altitude. *Ground Type* controls for earthquake risks based on their ground type. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.4: Lot Size Persistence, Core vs. Non-core (RD)

	Boundaries Close to vs Far from the Core Area					
	N of Lot			Log Land Price		
	(1)	(2)	(3)	(4)	(5)	(6)
Historical Outcomes						
Panel A: 1873						
Local Lords' Estates Zone (Core)	-13.11***	-11.87***	-12.86***			
	(2.088)	(2.183)	(2.039)			
Local Lords' Estates Zone (Non-core)	-10.40***	-9.432***	-8.210***			
	(2.541)	(2.785)	(2.706)			
Panel B: 1912						
Local Lords' Estates Zone (Core)	-12.74***	-11.73***	-12.77***	-1.046***	-0.836**	-0.832**
	(1.892)	(1.925)	(1.877)	(0.379)	(0.384)	(0.376)
Local Lords' Estates Zone (Non-core)	-8.765***	-8.020***	-6.816**	-0.675**	-0.574**	-0.580**
	(2.647)	(2.873)	(2.819)	(0.279)	(0.233)	(0.235)
Panel C: 1931						
Local Lords' Estates Zone (Core)	-12.62***	-11.87***	-12.51***	-0.434*	-0.479*	-0.528**
	(2.426)	(2.878)	(2.793)	(0.240)	(0.257)	(0.254)
Local Lords' Estates Zone (Non-core)	-7.730***	-6.908**	-6.169**	-0.217	-0.228	-0.154
	(2.893)	(2.696)	(2.663)	(0.166)	(0.173)	(0.176)
Panel D: 1972						
Local Lords' Estates Zone (Core)				0.196	0.0263	-0.0453
				(0.287)	(0.280)	(0.279)
Local Lords' Estates Zone (Non-core)				-0.0870	-0.146	-0.0427
				(0.165)	(0.177)	(0.156)
Panel E: 1983						
Local Lords' Estates Zone (Core)				0.484***	0.447***	0.410***
				(0.160)	(0.148)	(0.144)
Local Lords' Estates Zone (Non-core)				-0.217	-0.230	-0.180
				(0.250)	(0.268)	(0.254)
	N of Lot			Log Land Price		
	(1)	(2)	(3)	(4)	(5)	(6)
Modern Outcomes						
Panel F: 2012						
Local Lords' Estates Zone (Core)	-36.26***	-35.09***	-34.63***	1.035***	0.954***	0.827***
	(5.407)	(6.552)	(6.817)	(0.225)	(0.215)	(0.228)
Local Lords' Estates Zone (Non-core)	-7.405	-5.819	-6.375	-0.333	-0.385	-0.237
	(7.601)	(7.316)	(7.711)	(0.272)	(0.300)	(0.275)
Panel G: Skyscraper				N of $\geq$ 30 Stories Buildings		
				(4)	(5)	(6)
Local Lords' Estates Zone (Core)				0.239***	0.242***	0.213***
				(0.0748)	(0.0724)	(0.0728)
Local Lords' Estates Zone (Non-core)				-0.0331	-0.0242	0.0113
				(0.0382)	(0.0350)	(0.0327)
Locational Controls	Yes	Yes	Yes	Yes	Yes	Yes
Topological Controls	No	Yes	Yes	No	Yes	Yes
Ground Type	No	No	Yes	No	No	Yes
N in Panel A	350	350	350			
N in Panel B	343	343	343	294	294	294
N in Panel C	347	347	347	299	299	299
N in Panel D				279	279	279
N in Panel E				157	157	157
N in Panel F	352	352	352	341	341	341
N in Panel G				351	351	351

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Locational Controls contains the distance from the Edo castle, a dummy variable indicating whether the cell is inside the *Yamanote* loop line, latitude, longitude, their interaction term and square terms. *Topological Controls* contains the mean and standard deviation of altitude. *Ground Type* controls for earthquake risks based on their ground type. See Table 1 for the definitions of the variables.

Local Lords' Estates Zone (Core) (*Local Lords' Estates Zone (Non-Core)*) takes a value of one if the central point of the cell is in the local lords' estate zone, and the closest boundary is the solid (dash-dot) line in Figure 1.

Table A.5: Coefficient Stability Analysis (OLS)

	N of Lot				Log Land Price				
	1873	1912	1931	2011	1912	1931	1972	1983	2011
Local Lords Estates Share * Inside	-11.78***	-13.15***	-10.14***	-24.03***	-0.572***	-0.478***	-0.0284	0.00782	0.216***
	(-30.65)	(-39.76)	(-23.84)	(-19.55)	(-10.35)	(-10.70)	(-1.24)	(0.24)	(10.51)
Bias-Adjusted Beta	-11.62	-13.18	-9.880	-21.02	-0.781	-0.524	0.00185	-0.00785	0.139
Local Lords Estates Share * Outside	-11.88***	-11.37***	-7.469***	-4.591*	-0.375***	-0.207***	-0.233***	-0.137***	-0.143***
	(-15.55)	(-16.11)	(-9.64)	(-1.84)	(-4.63)	(-3.33)	(-7.23)	(-2.92)	(-4.43)
Bias-Adjusted Beta	-11.45	-11.41	-7.869	-5.764	-0.298	-0.160	-0.206	-0.0420	-0.131

Notes: The first rows in each panel show the coefficients using specifications in column (3) of Table A.3 using the land price or land price in each era as indicated in the top row. The second rows show the bias-adjusted coefficients proposed by Oster (2019) using the column (1) as the short regression. As suggested in this study, we set $\delta = 1$ and $R^2_{max} = 1.3\tilde{R}^2$, where $\tilde{R}^2$ is R^2 in the regression models in each column as plausible parameters. In case there are multiple solutions for the bias-adjusted beta, we show the one closest to the original beta.

Table A.6: Coefficient Stability Analysis (RD)

	N of Lot				Log Land Price				
	1873	1912	1931	2011	1912	1931	1972	1983	2011
Local Lords' Estates Zone (Core)	-12.86***	-12.77***	-12.51***	-34.63***	-0.832***	-0.528***	-0.0453	0.410***	0.827***
Bias-Adjusted Beta (Core)	-16.65	-12.50	-13.74	-44.58	0.0456	-0.00138	-1.064	0.740	2.018
Local Lords' Estates Zone (Non-core)	-8.210***	-6.816***	-6.169***	-6.375	-0.580***	-0.154	-0.0427	-0.180	-0.237*
Bias-Adjusted Beta (Non-Core)	3.264	4.031	7.027	-19.58	0.0787	0.278	0.339	-0.615	0.979

Notes: The first rows in each panel show the coefficients using specifications in column (3) of Table A.4 using the land price or land price in each era as indicated in the top row.The second rows show the bias-adjusted coefficients proposed by Oster (2019) using the column (1) as the short regression. As suggested in this study, we set $\delta = 1$ and $R^2_{max} = 1.3\tilde{R}^2$, where $\tilde{R}^2$ is R^2 in the regression models in each column as plausible parameters. In case there are multiple solutions for the bias-adjusted beta, we show the one closest to the original beta.

Table A.7: Controlling Channels (OLS)

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-11.78***	-11.67***	-11.38***	-10.19***	-12.16***	-10.73***						
	(0.858)	(0.815)	(0.869)	(0.656)	(0.878)	(0.690)						
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.88***	-11.46***	-12.55***	-10.39***	-10.81***	-8.872***						
	(1.389)	(1.371)	(1.413)	(1.410)	(1.428)	(1.457)						
Panel B: 1912												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-13.15***	-12.04***	-12.70***	-11.17***	-12.72***	-10.77***	-0.572***	-0.521***	-0.529***	-0.443***	-0.577***	-0.397***
	(0.668)	(0.652)	(0.641)	(0.609)	(0.706)	(0.616)	(0.128)	(0.130)	(0.126)	(0.125)	(0.139)	(0.137)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.37***	-10.63***	-11.64***	-9.445***	-10.46***	-8.844***	-0.375*	-0.299	-0.333*	-0.114	-0.446***	-0.191
	(1.449)	(1.353)	(1.399)	(1.429)	(1.420)	(1.417)	(0.197)	(0.202)	(0.198)	(0.189)	(0.164)	(0.164)
Panel C: 1931												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-10.14***	-8.277***	-7.611***	-7.742***	-9.521***	-6.610***	-0.478***	-0.410***	-0.373***	-0.349***	-0.552***	-0.376***
	(1.132)	(1.051)	(1.192)	(1.137)	(1.231)	(1.146)	(0.105)	(0.0952)	(0.0952)	(0.0967)	(0.108)	(0.0993)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-7.469***	-6.545***	-7.546***	-6.036***	-6.756***	-5.490***	-0.207*	-0.145	-0.141	-0.0451	-0.257**	-0.0886
	(1.632)	(1.550)	(1.482)	(1.653)	(1.676)	(1.620)	(0.118)	(0.115)	(0.111)	(0.117)	(0.119)	(0.110)
Panel D: 1972												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							-0.0284	-0.0230	-0.0256	-0.0290	-0.0164	-0.0145
							(0.0362)	(0.0333)	(0.0296)	(0.0394)	(0.0388)	(0.0366)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.233***	-0.191***	-0.133**	-0.145***	-0.179***	-0.115**
							(0.0626)	(0.0577)	(0.0541)	(0.0526)	(0.0599)	(0.0496)
Panel E: 1983												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.00782	0.0230	0.0276	0.00601	0.0296	0.0230
							(0.0415)	(0.0372)	(0.0334)	(0.0414)	(0.0432)	(0.0387)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.137*	-0.0949	-0.0726	-0.0564	-0.106	-0.0476
							(0.0778)	(0.0721)	(0.0617)	(0.0689)	(0.0808)	(0.0622)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-24.03***	-17.41***	-15.17***	-16.79***	-24.25***	-14.55***	0.216***	0.231***	0.162***	0.222***	0.228***	0.230***
	(3.197)	(2.606)	(2.911)	(2.836)	(3.240)	(2.501)	(0.0523)	(0.0507)	(0.0428)	(0.0543)	(0.0550)	(0.0540)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-4.591	-2.187	-6.428	0.326	-3.064	-0.534	-0.143	-0.119	-0.0601	-0.0913	-0.105	-0.0567
	(6.407)	(5.983)	(4.653)	(5.828)	(5.221)	(5.110)	(0.0993)	(0.0929)	(0.0786)	(0.0875)	(0.0897)	(0.0771)
Panel G: Skyscraper in 2011							N of $\geq$ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.0368**	0.0395**	0.0386**	0.0424***	0.0498***	0.0491***
							(0.0150)	(0.0158)	(0.0158)	(0.0148)	(0.0174)	(0.0179)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							0.0240	0.0225	0.0505*	0.0161	0.0420	0.0326
							(0.0315)	(0.0314)	(0.0289)	(0.0348)	(0.0343)	(0.0374)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	5530	5530	5133	5530	5292	5292						
N in Panel B	8133	8133	7726	8133	7319	7319	7122	7122	6927	7122	6552	6552
N in Panel C	7830	7830	7399	7830	7830	7830	7024	7024	6884	7024	7024	7024
N in Panel D							6071	6071	6046	6071	5080	5080
N in Panel E							3276	3276	3256	3276	2770	2770
N in Panel F	9101	9101	8518	9101	7783	7783	8971	8971	8906	8971	7332	7332
N in Panel G							9542	9542	9000	9542	7726	7726

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.8: Controlling Channels (RD)

	Boundaries Close to vs Far from the Core Area											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Zone (Core)	-12.86***	-13.96***	-11.85***	-10.79***	-12.89***	-11.99***						
	(2.039)	(1.853)	(1.821)	(1.923)	(2.073)	(1.799)						
Local Lords' Estates Zone (Non-core)	-8.210***	-6.479**	-8.035***	-3.096	-7.488***	-1.981						
	(2.706)	(2.751)	(2.935)	(2.828)	(2.759)	(2.728)						
Panel B: 1912												
Local Lords' Estates Zone (Core)	-12.77***	-13.81***	-11.27***	-10.48***	-12.70***	-11.73***	-0.832**	-0.922***	-0.470***	-0.820***	-0.773**	-0.868***
	(1.877)	(1.898)	(1.776)	(1.657)	(1.874)	(1.736)	(0.376)	(0.344)	(0.155)	(0.305)	(0.390)	(0.303)
Local Lords' Estates Zone (Non-core)	-6.816**	-5.181*	-6.361**	-1.838	-5.844**	-0.681	-0.580**	-0.467**	-0.430**	-0.0999	-0.438*	-0.0789
	(2.819)	(2.833)	(3.033)	(2.726)	(2.881)	(2.566)	(0.235)	(0.225)	(0.182)	(0.183)	(0.229)	(0.189)
Panel C: 1931												
Local Lords' Estates Zone (Core)	-12.51***	-12.85***	-9.495***	-11.17***	-12.50***	-11.49***	-0.528**	-0.585**	-0.477**	-0.467*	-0.521**	-0.535**
	(2.793)	(2.602)	(2.821)	(2.636)	(2.810)	(2.531)	(0.254)	(0.244)	(0.201)	(0.257)	(0.253)	(0.250)
Local Lords' Estates Zone (Non-core)	-6.169**	-5.032**	-6.120**	-2.503	-6.114**	-2.234	-0.154	-0.0225	-0.129	0.00709	-0.172	0.0685
	(2.663)	(2.472)	(2.722)	(2.300)	(2.915)	(2.237)	(0.176)	(0.153)	(0.164)	(0.157)	(0.185)	(0.142)
Panel D: 1972												
Local Lords' Estates Zone (Core)							-0.0453	-0.125	-0.188	-0.0156	-0.0466	-0.0995
							(0.279)	(0.263)	(0.296)	(0.320)	(0.276)	(0.303)
Local Lords' Estates Zone (Non-core)							-0.0427	0.0529	-0.0576	0.116	0.00466	0.220*
							(0.156)	(0.146)	(0.119)	(0.135)	(0.159)	(0.119)
Panel E: 1983												
Local Lords' Estates Zone (Core)							0.410***	0.346***	0.362**	0.445***	0.414***	0.356***
							(0.144)	(0.115)	(0.148)	(0.112)	(0.141)	(0.104)
Local Lords' Estates Zone (Non-core)							-0.180	0.00192	-0.0798	0.0659	-0.192	0.179
							(0.254)	(0.227)	(0.216)	(0.196)	(0.274)	(0.169)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Zone (Core)	-34.63***	-33.57***	-23.57***	-33.84***	-33.23***	-30.38***	0.827***	0.704***	0.362*	0.875***	0.828***	0.752***
	(6.817)	(6.603)	(6.547)	(7.401)	(6.565)	(6.975)	(0.228)	(0.222)	(0.191)	(0.226)	(0.229)	(0.233)
Local Lords' Estates Zone (Non-core)	-6.375	-7.635	-6.753	-7.208	-11.37	-10.74*	-0.237	-0.0312	-0.149	0.0637	-0.201	0.186
	(7.711)	(7.621)	(7.065)	(6.880)	(8.060)	(6.486)	(0.275)	(0.266)	(0.180)	(0.202)	(0.277)	(0.179)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Zone (Core)							0.213***	0.224***	0.209***	0.230***	0.215***	0.237***
							(0.0728)	(0.0704)	(0.0770)	(0.0693)	(0.0772)	(0.0684)
Local Lords' Estates Zone (Non-core)							0.0113	-0.0178	0.0128	-0.0249	0.0181	-0.0237
							(0.0327)	(0.0390)	(0.0326)	(0.0530)	(0.0365)	(0.0510)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	350	350	336	348	344	344						
N in Panel B	343	343	330	343	339	339	294	294	289	294	293	293
N in Panel C	347	347	336	347	347	347	299	299	296	299	299	299
N in Panel D							279	279	277	279	279	279
N in Panel E							157	157	155	157	157	157
N in Panel F	352	352	338	351	347	347	341	341	336	341	339	339
N in Panel G							351	351	338	350	346	346

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 4. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.9: Using Consistent Observations in 1912 or 1931 and 2012 data

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-12.83***	-13.05***	-12.61***	-11.54***	-12.81***	-11.68***						
	(0.892)	(0.858)	(0.868)	(0.782)	(0.895)	(0.805)						
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-12.91***	-11.70***	-12.44***	-11.01***	-11.29***	-9.252***						
	(1.453)	(1.472)	(1.439)	(1.537)	(1.441)	(1.508)						
Panel B: 1912												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-13.21***	-12.98***	-12.89***	-12.04***	-12.67***	-11.43***	-0.573***	-0.529***	-0.541***	-0.446***	-0.580***	-0.413***
	(0.659)	(0.662)	(0.653)	(0.635)	(0.670)	(0.640)	(0.126)	(0.124)	(0.126)	(0.122)	(0.135)	(0.131)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-12.05***	-11.07***	-11.70***	-10.35***	-10.55***	-9.118***	-0.409**	-0.309	-0.332*	-0.133	-0.473***	-0.214
	(1.440)	(1.403)	(1.420)	(1.488)	(1.413)	(1.459)	(0.203)	(0.212)	(0.198)	(0.196)	(0.167)	(0.165)
Panel C: 1931												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-7.005***	-6.798***	-6.218***	-5.968***	-6.256***	-5.121***	-0.469***	-0.420***	-0.376***	-0.354***	-0.543***	-0.397***
	(1.312)	(1.244)	(1.319)	(1.334)	(1.396)	(1.329)	(0.103)	(0.0909)	(0.0932)	(0.0960)	(0.106)	(0.0950)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-7.172***	-6.180***	-7.356***	-5.738***	-6.294***	-4.936***	-0.181	-0.114	-0.137	-0.0340	-0.227*	-0.0640
	(1.576)	(1.521)	(1.503)	(1.587)	(1.588)	(1.548)	(0.116)	(0.114)	(0.112)	(0.113)	(0.117)	(0.108)
Panel D: 1972												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							-0.0245	-0.0243	-0.0181	-0.0296	-0.0224	-0.0248
							(0.0369)	(0.0347)	(0.0302)	(0.0398)	(0.0397)	(0.0372)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.203***	-0.168***	-0.101**	-0.149***	-0.176***	-0.112**
							(0.0592)	(0.0536)	(0.0500)	(0.0535)	(0.0599)	(0.0494)
Panel E: 1983												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.0340	0.0329	0.0513	0.0232	0.0425	0.0275
							(0.0434)	(0.0396)	(0.0336)	(0.0437)	(0.0463)	(0.0413)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.131*	-0.0808	-0.0529	-0.0880	-0.111	-0.0522
							(0.0758)	(0.0703)	(0.0581)	(0.0653)	(0.0804)	(0.0617)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-14.00***	-12.13***	-10.57***	-11.06***	-14.98***	-10.58***	0.169***	0.173***	0.154***	0.165***	0.185***	0.178***
	(3.025)	(2.411)	(2.609)	(2.989)	(3.083)	(2.495)	(0.0560)	(0.0548)	(0.0448)	(0.0578)	(0.0592)	(0.0572)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-2.485	1.532	-3.803	1.604	0.129	3.225	-0.175**	-0.144**	-0.0743	-0.145**	-0.162**	-0.111*
	(5.449)	(4.950)	(4.367)	(5.189)	(4.635)	(4.391)	(0.0693)	(0.0644)	(0.0608)	(0.0611)	(0.0668)	(0.0572)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.0465***	0.0459***	0.0420***	0.0425***	0.0530***	0.0461***
							(0.0162)	(0.0166)	(0.0156)	(0.0158)	(0.0175)	(0.0172)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							0.0102	0.0100	0.0284*	-0.00202	0.0228*	0.0140
							(0.0135)	(0.0126)	(0.0155)	(0.0152)	(0.0118)	(0.0119)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	4757	4757	4734	4757	4743	4743						
N in Panel B	7148	7148	7117	7148	6632	6632	6904	6904	6874	6904	6388	6388
N in Panel C	6959	6959	6931	6959	6959	6959	6878	6878	6852	6878	6878	6878
N in Panel D							5356	5356	5350	5356	5014	5014
N in Panel E							2880	2880	2874	2880	2707	2707
N in Panel F	7402	7402	7370	7402	6955	6955	7475	7475	7443	7475	6959	6959
N in Panel G							7457	7457	7428	7457	6944	6944

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.10: Using 500 m threshold for Conley Standard Errors

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-11.78***	-11.67***	-11.38***	-10.19***	-12.16***	-10.73***						
	(1.078)	(1.012)	(1.061)	(0.778)	(1.067)	(0.791)						
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.88***	-11.46***	-12.55***	-10.39***	-10.81***	-8.872***						
	(1.660)	(1.562)	(1.619)	(1.655)	(1.733)	(1.740)						
Panel B: 1912												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-13.15***	-12.04***	-12.70***	-11.17***	-12.72***	-10.77***	-0.572***	-0.521***	-0.529***	-0.443***	-0.577***	-0.397**
	(0.813)	(0.783)	(0.764)	(0.728)	(0.837)	(0.731)	(0.142)	(0.142)	(0.135)	(0.137)	(0.160)	(0.156)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.37***	-10.63***	-11.64***	-9.445***	-10.46***	-8.844***	-0.375*	-0.299	-0.333	-0.114	-0.446***	-0.191
	(1.694)	(1.525)	(1.584)	(1.603)	(1.595)	(1.524)	(0.214)	(0.221)	(0.210)	(0.206)	(0.168)	(0.164)
Panel C: 1931												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-10.14***	-8.277***	-7.611***	-7.742***	-9.521***	-6.610***	-0.478***	-0.410***	-0.373***	-0.349***	-0.552***	-0.376***
	(1.283)	(1.172)	(1.340)	(1.234)	(1.378)	(1.274)	(0.113)	(0.0965)	(0.103)	(0.0976)	(0.114)	(0.100)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-7.469***	-6.545***	-7.546***	-6.036***	-6.756***	-5.490***	-0.207*	-0.145	-0.141	-0.0451	-0.257**	-0.0886
	(1.695)	(1.640)	(1.472)	(1.798)	(1.771)	(1.786)	(0.124)	(0.128)	(0.117)	(0.117)	(0.123)	(0.116)
Panel D: 1972												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							-0.0284	-0.0230	-0.0256	-0.0290	-0.0164	-0.0145
							(0.0393)	(0.0357)	(0.0320)	(0.0439)	(0.0420)	(0.0400)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.233***	-0.191***	-0.133**	-0.145***	-0.179***	-0.115**
							(0.0699)	(0.0625)	(0.0577)	(0.0535)	(0.0653)	(0.0499)
Panel E: 1983												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.00782	0.0230	0.0276	0.00601	0.0296	0.0230
							(0.0390)	(0.0340)	(0.0341)	(0.0407)	(0.0421)	(0.0380)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.137*	-0.0949	-0.0726	-0.0564	-0.106	-0.0476
							(0.0761)	(0.0693)	(0.0563)	(0.0650)	(0.0807)	(0.0576)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-24.03***	-17.41***	-15.17***	-16.79***	-24.25***	-14.55***	0.216***	0.231***	0.162***	0.222***	0.228***	0.230***
	(3.648)	(2.948)	(3.373)	(2.955)	(3.567)	(2.587)	(0.0623)	(0.0596)	(0.0510)	(0.0652)	(0.0648)	(0.0634)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-4.591	-2.187	-6.428	0.326	-3.064	-0.534	-0.143	-0.119	-0.0601	-0.0913	-0.105	-0.0567
	(7.670)	(7.448)	(5.602)	(7.067)	(5.976)	(6.075)	(0.115)	(0.106)	(0.0856)	(0.0977)	(0.0975)	(0.0780)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.0368**	0.0395***	0.0386***	0.0424***	0.0498***	0.0491***
							(0.0147)	(0.0150)	(0.0148)	(0.0143)	(0.0172)	(0.0177)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							0.0240	0.0225	0.0505*	0.0161	0.0420	0.0326
							(0.0311)	(0.0305)	(0.0269)	(0.0341)	(0.0331)	(0.0356)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	5530	5530	5133	5530	5292	5292						
N in Panel B	8133	8133	7726	8133	7319	7319	7122	7122	6927	7122	6552	6552
N in Panel C	7830	7830	7399	7830	7830	7830	7024	7024	6884	7024	7024	7024
N in Panel D							6071	6071	6046	6071	5080	5080
N in Panel E							3276	3276	3256	3276	2770	2770
N in Panel F	9101	9101	8518	9101	7783	7783	8971	8971	8906	8971	7332	7332
N in Panel G							9542	9542	9000	9542	7726	7726

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.11: Using 1000 m threshold for Conley Standard Errors

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-11.78***	-11.67***	-11.38***	-10.19***	-12.16***	-10.73***						
	(1.144)	(1.145)	(1.099)	(0.854)	(1.019)	(0.800)						
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.88***	-11.46***	-12.55***	-10.39***	-10.81***	-8.872***						
	(2.216)	(2.154)	(2.165)	(2.144)	(2.341)	(2.283)						
Panel B: 1912												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-13.15***	-12.04***	-12.70***	-11.17***	-12.72***	-10.77***	-0.572***	-0.521***	-0.529***	-0.443***	-0.577***	-0.397**
	(0.836)	(0.768)	(0.776)	(0.685)	(0.775)	(0.694)	(0.166)	(0.166)	(0.153)	(0.155)	(0.182)	(0.171)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.37***	-10.63***	-11.64***	-9.445***	-10.46***	-8.844***	-0.375	-0.299	-0.333	-0.114	-0.446**	-0.191
	(2.057)	(1.913)	(1.947)	(1.747)	(1.971)	(1.685)	(0.230)	(0.238)	(0.219)	(0.225)	(0.174)	(0.173)
Panel C: 1931												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-10.14***	-8.277***	-7.611***	-7.742***	-9.521***	-6.610***	-0.478***	-0.410***	-0.373***	-0.349***	-0.552***	-0.376***
	(1.122)	(1.059)	(1.362)	(0.935)	(1.152)	(1.036)	(0.131)	(0.124)	(0.126)	(0.114)	(0.137)	(0.126)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-7.469***	-6.545***	-7.546***	-6.036***	-6.756***	-5.490**	-0.207*	-0.145	-0.141	-0.0451	-0.257**	-0.0886
	(2.075)	(2.020)	(1.774)	(2.167)	(2.174)	(2.206)	(0.108)	(0.119)	(0.101)	(0.100)	(0.107)	(0.105)
Panel D: 1972												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							-0.0284	-0.0230	-0.0256	-0.0290	-0.0164	-0.0145
							(0.0383)	(0.0350)	(0.0328)	(0.0401)	(0.0421)	(0.0405)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.233***	-0.191***	-0.133**	-0.145**	-0.179**	-0.115**
							(0.0731)	(0.0640)	(0.0627)	(0.0577)	(0.0716)	(0.0547)
Panel E: 1983												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.00782	0.0230	0.0276	0.00601	0.0296	0.0230
							(0.0425)	(0.0397)	(0.0339)	(0.0468)	(0.0482)	(0.0494)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.137*	-0.0949	-0.0726	-0.0564	-0.106	-0.0476
							(0.0725)	(0.0680)	(0.0497)	(0.0581)	(0.0744)	(0.0474)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-24.03***	-17.41***	-15.17***	-16.79***	-24.25***	-14.55***	0.216***	0.231***	0.162***	0.222***	0.228***	0.230***
	(3.352)	(2.961)	(3.373)	(2.243)	(3.003)	(2.032)	(0.0723)	(0.0698)	(0.0565)	(0.0771)	(0.0764)	(0.0757)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-4.591	-2.187	-6.428	0.326	-3.064	-0.534	-0.143	-0.119	-0.0601	-0.0913	-0.105	-0.0567
	(7.956)	(8.460)	(6.662)	(7.344)	(7.024)	(7.361)	(0.105)	(0.0981)	(0.0833)	(0.0895)	(0.0845)	(0.0683)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.0368**	0.0395***	0.0386**	0.0424***	0.0498***	0.0491***
							(0.0144)	(0.0141)	(0.0154)	(0.0144)	(0.0168)	(0.0170)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							0.0240	0.0225	0.0505**	0.0161	0.0420	0.0326
							(0.0286)	(0.0283)	(0.0225)	(0.0340)	(0.0303)	(0.0350)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	5530	5530	5133	5530	5292	5292						
N in Panel B	8133	8133	7726	8133	7319	7319	7122	7122	6927	7122	6552	6552
N in Panel C	7830	7830	7399	7830	7830	7830	7024	7024	6884	7024	7024	7024
N in Panel D							6071	6071	6046	6071	5080	5080
N in Panel E							3276	3276	3256	3276	2770	2770
N in Panel F	9101	9101	8518	9101	7783	7783	8971	8971	8906	8971	7332	7332
N in Panel G							9542	9542	9000	9542	7726	7726

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.12: Using Max Local Lords' Estate Size as a Treatment Variable

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Max Local Lords' Estate Size * Inside Yamanote Zone + 250 m	-12.53***	-12.41***	-12.16***	-10.83***	-12.95***	-11.42***						
	(0.872)	(0.829)	(0.893)	(0.671)	(0.898)	(0.703)						
Max Local Lords' Estate Size * Outside Yamanote Zone + 250 m	-12.62***	-12.33***	-13.39***	-11.10***	-11.51***	-9.566***						
	(1.515)	(1.484)	(1.555)	(1.519)	(1.532)	(1.538)						
Panel B: 1912												
Max Local Lords' Estate Size * Inside Yamanote Zone + 250 m	-13.99***	-12.72***	-13.55***	-11.85***	-13.54***	-11.34***	-0.630***	-0.572***	-0.595***	-0.496***	-0.638***	-0.444***
	(0.678)	(0.676)	(0.656)	(0.629)	(0.717)	(0.636)	(0.138)	(0.138)	(0.136)	(0.133)	(0.147)	(0.143)
Max Local Lords' Estate Size * Outside Yamanote Zone + 250 m	-12.09***	-11.39***	-12.44***	-10.07***	-11.21***	-9.610***	-0.387*	-0.319	-0.349	-0.111	-0.472**	-0.218
	(1.561)	(1.454)	(1.523)	(1.531)	(1.518)	(1.495)	(0.229)	(0.235)	(0.231)	(0.221)	(0.192)	(0.192)
Panel C: 1931												
Max Local Lords' Estate Size * Inside Yamanote Zone + 250 m	-10.86***	-8.752***	-8.193***	-8.272***	-10.20***	-6.965***	-0.534***	-0.457***	-0.427***	-0.398***	-0.629***	-0.434***
	(1.189)	(1.110)	(1.278)	(1.205)	(1.298)	(1.217)	(0.116)	(0.105)	(0.104)	(0.107)	(0.119)	(0.108)
Max Local Lords' Estate Size * Outside Yamanote Zone + 250 m	-7.927***	-7.058***	-7.970***	-6.488***	-7.178***	-5.967***	-0.224*	-0.171	-0.149	-0.0600	-0.274**	-0.111
	(1.857)	(1.757)	(1.698)	(1.861)	(1.908)	(1.823)	(0.133)	(0.130)	(0.126)	(0.131)	(0.134)	(0.123)
Panel D: 1972												
Max Local Lords' Estate Size * Inside Yamanote Zone + 250 m							-0.0384	-0.0288	-0.0290	-0.0393	-0.0260	-0.0212
							(0.0379)	(0.0348)	(0.0309)	(0.0414)	(0.0406)	(0.0382)
Max Local Lords' Estate Size * Outside Yamanote Zone + 250 m							-0.250***	-0.207***	-0.135**	-0.157***	-0.192***	-0.123**
							(0.0662)	(0.0607)	(0.0584)	(0.0562)	(0.0634)	(0.0526)
Panel E: 1983												
Max Local Lords' Estate Size * Inside Yamanote Zone + 250 m							0.0127	0.0352	0.0382	0.0137	0.0374	0.0363
							(0.0431)	(0.0376)	(0.0352)	(0.0425)	(0.0449)	(0.0389)
Max Local Lords' Estate Size * Outside Yamanote Zone + 250 m							-0.166**	-0.122	-0.0805	-0.0822	-0.136*	-0.0713
							(0.0804)	(0.0748)	(0.0649)	(0.0735)	(0.0815)	(0.0646)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Max Local Lords' Estate Size * Inside Yamanote Zone + 250 m	-25.94***	-18.70***	-16.66***	-18.16***	-26.24***	-15.51***	0.215***	0.236***	0.165***	0.221***	0.226***	0.232***
	(3.367)	(2.765)	(3.116)	(3.006)	(3.398)	(2.627)	(0.0532)	(0.0513)	(0.0438)	(0.0547)	(0.0562)	(0.0546)
Max Local Lords' Estate Size * Outside Yamanote Zone + 250 m	-5.083	-3.107	-7.015	-0.101	-3.397	-1.291	-0.151	-0.124	-0.0558	-0.0967	-0.111	-0.0583
	(6.927)	(6.522)	(5.020)	(6.204)	(5.710)	(5.541)	(0.107)	(0.100)	(0.0841)	(0.0952)	(0.0967)	(0.0833)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Max Local Lords' Estate Size * Inside Yamanote Zone + 250 m							0.0391**	0.0424***	0.0411**	0.0456***	0.0534***	0.0530***
							(0.0155)	(0.0163)	(0.0165)	(0.0152)	(0.0183)	(0.0186)
Max Local Lords' Estate Size * Outside Yamanote Zone + 250 m							0.0229	0.0211	0.0522*	0.0139	0.0420	0.0319
							(0.0340)	(0.0338)	(0.0312)	(0.0373)	(0.0366)	(0.0398)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	5530	5530	5133	5530	5292	5292						
N in Panel B	8133	8133	7726	8133	7319	7319	7122	7122	6927	7122	6552	6552
N in Panel C	7830	7830	7399	7830	7830	7830	7024	7024	6884	7024	7024	7024
N in Panel D							6071	6071	6046	6071	5080	5080
N in Panel E							3276	3276	3256	3276	2770	2770
N in Panel F	9101	9101	8518	9101	7783	7783	8971	8971	8906	8971	7332	7332
N in Panel G							9542	9542	9000	9542	7726	7726

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.13: Using 200 m-level Data

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-37.58***	-37.28***	-34.25***	-33.01***	-39.04***	-35.16***						
	(3.682)	(3.424)	(3.539)	(2.920)	(3.731)	(3.034)						
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-43.36***	-41.36***	-45.37***	-40.53***	-36.50***	-32.32***						
	(6.451)	(6.137)	(6.251)	(6.802)	(6.736)	(6.773)						
Panel B: 1912												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-43.46***	-38.45***	-39.92***	-36.11***	-42.00***	-34.79***	-0.933***	-0.827***	-0.929***	-0.687***	-0.947***	-0.653***
	(2.857)	(2.797)	(2.673)	(2.686)	(3.050)	(2.680)	(0.204)	(0.198)	(0.203)	(0.184)	(0.220)	(0.202)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-42.24***	-38.68***	-43.10***	-35.50***	-38.37***	-33.99***	-0.376	-0.256	-0.346	-0.0103	-0.338	-0.0481
	(6.708)	(6.245)	(6.364)	(6.863)	(6.513)	(6.205)	(0.279)	(0.292)	(0.290)	(0.250)	(0.251)	(0.240)
Panel C: 1931												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-34.00***	-26.33***	-25.85***	-25.13***	-31.77***	-21.13***	-1.090***	-0.859***	-0.757***	-0.836***	-1.167***	-0.797***
	(4.543)	(4.314)	(4.489)	(4.601)	(5.041)	(4.795)	(0.218)	(0.175)	(0.178)	(0.180)	(0.225)	(0.173)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-25.15***	-20.89***	-28.63***	-22.09***	-21.63***	-19.80**	-0.365**	-0.271	-0.337**	-0.205	-0.457**	-0.290
	(7.821)	(7.206)	(6.806)	(8.003)	(8.354)	(7.810)	(0.180)	(0.182)	(0.171)	(0.209)	(0.190)	(0.206)
Panel D: 1972												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							-0.0389	-0.00866	-0.0794*	-0.0355	-0.0166	-0.0103
							(0.0493)	(0.0425)	(0.0430)	(0.0506)	(0.0511)	(0.0486)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.310***	-0.260***	-0.177**	-0.159**	-0.216***	-0.126*
							(0.0838)	(0.0773)	(0.0717)	(0.0657)	(0.0831)	(0.0655)
Panel E: 1983												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.0449	0.0698	0.0146	0.0673	0.0847	0.0833
							(0.0601)	(0.0488)	(0.0478)	(0.0574)	(0.0606)	(0.0524)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.206**	-0.162**	-0.0900	-0.0730	-0.165*	-0.104
							(0.0807)	(0.0751)	(0.0677)	(0.0742)	(0.0885)	(0.0724)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-87.58***	-59.14***	-55.19***	-59.08***	-90.52***	-53.39***	0.281***	0.314***	0.182***	0.314***	0.319***	0.330***
	(14.66)	(12.60)	(13.58)	(13.16)	(14.69)	(12.33)	(0.0723)	(0.0672)	(0.0628)	(0.0735)	(0.0752)	(0.0748)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	0.834	13.54	-24.90	18.13	7.177	9.323	-0.260**	-0.250**	-0.129	-0.166	-0.210*	-0.151
	(32.15)	(29.45)	(24.65)	(28.55)	(28.65)	(27.04)	(0.128)	(0.122)	(0.105)	(0.111)	(0.110)	(0.0953)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.109**	0.122**	0.124**	0.138***	0.147***	0.153***
							(0.0500)	(0.0540)	(0.0518)	(0.0488)	(0.0551)	(0.0574)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							0.0181	0.0202	0.106	-0.000846	0.0749	0.0437
							(0.0883)	(0.0878)	(0.0763)	(0.104)	(0.0856)	(0.0956)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	1486	1486	1447	1486	1445	1445						
N in Panel B	2222	2222	2193	2222	1993	1993	2022	2022	2012	2022	1864	1864
N in Panel C	2099	2099	2066	2099	2099	2099	1968	1968	1962	1968	1968	1968
N in Panel D							2163	2163	2163	2163	1804	1804
N in Panel E							2030	2030	2028	2030	1670	1670
N in Panel F	2414	2414	2367	2414	2091	2091	2513	2513	2508	2513	2054	2054
N in Panel G							2584	2584	2534	2584	2097	2097

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.14: Donuts Hole Approach

	Boundaries Close to vs Far from the Core Area											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Zone (Core)	-15.40***	-15.58***	-14.30***	-12.99***	-15.50***	-13.38***						
	(3.027)	(2.570)	(3.146)	(2.986)	(3.106)	(2.676)						
Local Lords' Estates Zone (Non-core)	-15.46***	-13.80***	-15.27***	-10.50***	-15.33***	-9.417***						
	(2.136)	(2.563)	(2.143)	(2.864)	(2.227)	(3.131)						
Panel B: 1912												
Local Lords' Estates Zone (Core)	-15.38***	-15.34***	-12.57***	-12.27***	-14.90***	-12.43***	-0.957**	-0.995**	-0.355	-0.775**	-0.847*	-0.765**
	(2.768)	(2.477)	(2.830)	(2.463)	(2.811)	(2.335)	(0.435)	(0.401)	(0.220)	(0.311)	(0.436)	(0.316)
Local Lords' Estates Zone (Non-core)	-15.52***	-14.37***	-15.78***	-11.89***	-15.54***	-11.34***	-1.298***	-0.995***	-0.966***	-0.562**	-1.198***	-0.427*
	(2.737)	(2.857)	(2.897)	(3.350)	(2.747)	(3.506)	(0.395)	(0.355)	(0.290)	(0.244)	(0.422)	(0.253)
Panel C: 1931												
Local Lords' Estates Zone (Core)	-17.09***	-16.11***	-11.08***	-14.22***	-17.12***	-13.66***	-0.342	-0.402	-0.303	-0.359*	-0.344	-0.410*
	(3.634)	(3.100)	(3.697)	(3.357)	(3.642)	(3.037)	(0.268)	(0.264)	(0.253)	(0.212)	(0.265)	(0.214)
Local Lords' Estates Zone (Non-core)	-11.24***	-9.233***	-11.78***	-6.892**	-11.32***	-6.656**	-0.511*	-0.218	-0.448*	-0.337	-0.538*	-0.197
	(2.952)	(2.840)	(2.637)	(3.412)	(3.212)	(3.277)	(0.280)	(0.225)	(0.266)	(0.205)	(0.283)	(0.190)
Panel D: 1972												
Local Lords' Estates Zone (Core)							0.178	0.0809	-0.0676	0.0940	0.180	0.0347
							(0.367)	(0.360)	(0.405)	(0.373)	(0.363)	(0.372)
Local Lords' Estates Zone (Non-core)							-0.244	-0.105	-0.259	0.0383	-0.262	0.104
							(0.323)	(0.299)	(0.282)	(0.244)	(0.330)	(0.225)
Panel E: 1983												
Local Lords' Estates Zone (Core)							0.581**	0.486*	0.396	0.455***	0.586**	0.353**
							(0.291)	(0.249)	(0.309)	(0.172)	(0.292)	(0.157)
Local Lords' Estates Zone (Non-core)							-0.120	0.107	-0.0920	0.111	-0.110	0.201
							(0.317)	(0.291)	(0.278)	(0.239)	(0.315)	(0.188)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Zone (Core)	-46.84***	-45.00***	-26.51***	-41.34***	-45.74***	-37.52***	1.122***	1.029***	0.443*	1.080***	1.154***	0.990***
	(7.486)	(7.348)	(8.580)	(8.623)	(7.162)	(7.552)	(0.240)	(0.258)	(0.259)	(0.274)	(0.247)	(0.284)
Local Lords' Estates Zone (Non-core)	-17.58*	-16.64*	-19.28**	-13.37	-22.50**	-18.26**	-0.394	-0.141	-0.384	-0.128	-0.337	-0.0163
	(10.09)	(9.296)	(8.817)	(11.10)	(8.986)	(9.181)	(0.388)	(0.392)	(0.258)	(0.290)	(0.386)	(0.261)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Zone (Core)							0.349***	0.333***	0.342***	0.322***	0.374***	0.322***
							(0.127)	(0.108)	(0.124)	(0.0940)	(0.126)	(0.0788)
Local Lords' Estates Zone (Non-core)							-0.00857	-0.0429	-0.00475	-0.128	0.0133	-0.155
							(0.101)	(0.113)	(0.106)	(0.144)	(0.0994)	(0.137)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	336	336	319	329	325	325						
N in Panel B	318	318	305	316	313	312	272	272	266	272	270	270
N in Panel C	326	326	315	325	326	325	271	271	268	271	271	271
N in Panel D							252	252	250	252	252	252
N in Panel E							147	147	144	147	147	147
N in Panel F	334	334	318	329	326	325	319	319	316	318	316	316
N in Panel G							332	332	316	327	324	323

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 4. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.15: Using Polynomial Controls

	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Zone (Core)	-9.589***	-9.754***	-8.936***	-7.110***	-9.541***	-6.809***						
	(2.517)	(2.378)	(2.399)	(2.249)	(2.373)	(2.282)						
Local Lords' Estates Zone (Non-core)	-8.640***	-7.686***	-8.141***	-5.470**	-7.017***	-4.564*						
	(2.657)	(2.459)	(2.556)	(2.553)	(2.516)	(2.462)						
Panel B: 1912												
Local Lords' Estates Zone (Core)	-7.923***	-8.355***	-7.015***	-5.727**	-8.310***	-5.855***	-0.879***	-0.913***	-0.783***	-0.797***	-0.845**	-0.673**
	(2.639)	(2.493)	(2.413)	(2.265)	(2.473)	(2.272)	(0.335)	(0.321)	(0.278)	(0.275)	(0.336)	(0.270)
Local Lords' Estates Zone (Non-core)	-7.359**	-6.724**	-6.682**	-4.165	-6.175**	-3.738	-0.624**	-0.571**	-0.507*	-0.388	-0.577**	-0.276
	(2.906)	(2.700)	(2.697)	(2.693)	(2.780)	(2.635)	(0.292)	(0.273)	(0.259)	(0.256)	(0.290)	(0.244)
Panel C: 1931												
Local Lords' Estates Zone (Core)	-9.512***	-8.988***	-6.864***	-5.993**	-9.459***	-5.953***	-0.264	-0.307	-0.196	-0.164	-0.263	-0.194
	(2.682)	(2.450)	(2.649)	(2.345)	(2.680)	(2.271)	(0.214)	(0.192)	(0.202)	(0.217)	(0.209)	(0.202)
Local Lords' Estates Zone (Non-core)	-6.436**	-5.993**	-6.200**	-3.890	-6.344**	-3.891	-0.159	-0.167	-0.177	-0.0664	-0.192	-0.0937
	(3.087)	(2.812)	(2.771)	(2.873)	(3.109)	(2.780)	(0.171)	(0.156)	(0.173)	(0.170)	(0.166)	(0.159)
Panel D: 1972												
Local Lords' Estates Zone (Core)							-0.0570	-0.127	-0.124	-0.0403	-0.0589	-0.0971
							(0.241)	(0.227)	(0.233)	(0.243)	(0.241)	(0.233)
Local Lords' Estates Zone (Non-core)							-0.121	-0.151	-0.183	-0.0934	-0.128	-0.127
							(0.173)	(0.170)	(0.152)	(0.152)	(0.172)	(0.148)
Panel E: 1983												
Local Lords' Estates Zone (Core)							0.170	0.117	0.155	0.188	0.164	0.124
							(0.185)	(0.156)	(0.166)	(0.145)	(0.186)	(0.132)
Local Lords' Estates Zone (Non-core)							0.0694	0.0489	0.0358	0.110	0.0579	0.0443
							(0.178)	(0.172)	(0.153)	(0.137)	(0.177)	(0.144)

	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Zone (Core)	-18.77**	-21.00***	-12.19	-11.69*	-21.01***	-13.95**	0.479*	0.366	0.281	0.431*	0.479*	0.333
	(8.492)	(7.349)	(7.757)	(6.932)	(7.773)	(6.320)	(0.276)	(0.259)	(0.226)	(0.235)	(0.278)	(0.227)
Local Lords' Estates Zone (Non-core)	-11.08	-8.033	-11.51	-4.340	-13.20	-6.631	-0.142	-0.188	-0.259	-0.0949	-0.150	-0.153
	(9.682)	(8.403)	(8.296)	(8.757)	(9.263)	(7.995)	(0.264)	(0.254)	(0.215)	(0.228)	(0.262)	(0.222)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Zone (Core)							0.229***	0.210***	0.207***	0.187**	0.232***	0.156*
							(0.0803)	(0.0796)	(0.0804)	(0.0802)	(0.0864)	(0.0822)
Local Lords' Estates Zone (Non-core)							-0.0268	-0.0419	-0.0124	-0.0951	-0.0163	-0.104
							(0.0679)	(0.0711)	(0.0611)	(0.0798)	(0.0701)	(0.0768)
Running Variable (1st–4th)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	1348	1348	1171	1257	1171	1160						
N in Panel B	1195	1195	1104	1169	1148	1123	1003	1003	956	1001	963	961
N in Panel C	1196	1196	1123	1166	1196	1166	1020	1020	991	998	1020	998
N in Panel D							883	883	879	881	883	881
N in Panel E							508	508	503	498	505	495
N in Panel F	1290	1290	1155	1240	1196	1166	1135	1135	1123	1115	1118	1100
N in Panel G							1296	1296	1162	1207	1183	1156

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 4. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

Table A.16: Using 0 m Buffer to Define the Core Area

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Share * Inside Yamanote Zone	-11.58***	-11.55***	-11.25***	-10.09***	-11.97***	-10.64***						
	(0.884)	(0.840)	(0.898)	(0.688)	(0.910)	(0.730)						
Local Lords' Estates Share * Outside Yamanote Zone	-12.06***	-11.48***	-12.35***	-11.06***	-11.28***	-9.545***						
	(1.330)	(1.244)	(1.272)	(1.310)	(1.298)	(1.344)						
Panel B: 1912												
Local Lords' Estates Share * Inside Yamanote Zone	-13.28***	-12.14***	-12.79***	-11.14***	-12.75***	-10.69***	-0.552***	-0.500***	-0.507***	-0.402***	-0.557***	-0.369***
	(0.699)	(0.681)	(0.675)	(0.619)	(0.724)	(0.628)	(0.135)	(0.136)	(0.134)	(0.130)	(0.142)	(0.140)
Local Lords' Estates Share * Outside Yamanote Zone	-11.50***	-10.78***	-11.75***	-10.71***	-10.74***	-9.852***	-0.420**	-0.347*	-0.375**	-0.276	-0.512***	-0.387**
	(1.319)	(1.246)	(1.284)	(1.300)	(1.361)	(1.297)	(0.194)	(0.199)	(0.188)	(0.185)	(0.159)	(0.153)
Panel C: 1931												
Local Lords' Estates Share * Inside Yamanote Zone	-10.04***	-8.168***	-7.562***	-7.340***	-9.362***	-6.271***	-0.479***	-0.409***	-0.361***	-0.331***	-0.552***	-0.366***
	(1.171)	(1.088)	(1.232)	(1.168)	(1.281)	(1.190)	(0.106)	(0.0964)	(0.0969)	(0.0990)	(0.110)	(0.102)
Local Lords' Estates Share * Outside Yamanote Zone	-7.613***	-6.768***	-7.349***	-7.276***	-7.168***	-6.506***	-0.203*	-0.153	-0.166	-0.137	-0.253**	-0.170
	(1.533)	(1.466)	(1.359)	(1.483)	(1.589)	(1.464)	(0.119)	(0.117)	(0.114)	(0.112)	(0.121)	(0.110)
Panel D: 1972												
Local Lords' Estates Share * Inside Yamanote Zone							-0.0341	-0.0262	-0.0285	-0.0266	-0.0211	-0.0137
							(0.0370)	(0.0338)	(0.0301)	(0.0386)	(0.0377)	(0.0353)
Local Lords' Estates Share * Outside Yamanote Zone							-0.246***	-0.190***	-0.140***	-0.204***	-0.168***	-0.125**
							(0.0592)	(0.0534)	(0.0514)	(0.0586)	(0.0597)	(0.0540)
Panel E: 1983												
Local Lords' Estates Share * Inside Yamanote Zone							0.00410	0.0224	0.0221	-0.00306	0.0241	0.0158
							(0.0424)	(0.0374)	(0.0338)	(0.0411)	(0.0431)	(0.0379)
Local Lords' Estates Share * Outside Yamanote Zone							-0.180**	-0.117*	-0.0995*	-0.0906	-0.124	-0.0478
							(0.0717)	(0.0642)	(0.0584)	(0.0654)	(0.0783)	(0.0637)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Share * Inside Yamanote Zone	-23.52***	-17.02***	-14.54***	-15.91***	-23.88***	-13.91***	0.202***	0.219***	0.153***	0.202***	0.209***	0.206***
	(3.336)	(2.671)	(3.004)	(2.905)	(3.357)	(2.558)	(0.0523)	(0.0507)	(0.0429)	(0.0539)	(0.0547)	(0.0536)
Local Lords' Estates Share * Outside Yamanote Zone	-9.062	-6.361	-9.412*	-7.584	-6.100	-4.212	-0.0825	-0.0499	-0.0229	-0.0546	-0.0268	0.00918
	(6.151)	(5.698)	(4.839)	(5.478)	(5.140)	(4.906)	(0.115)	(0.106)	(0.0802)	(0.102)	(0.114)	(0.0963)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Share * Inside Yamanote Zone							0.0287**	0.0318**	0.0305**	0.0327**	0.0378**	0.0366**
							(0.0135)	(0.0146)	(0.0137)	(0.0133)	(0.0149)	(0.0156)
Local Lords' Estates Share * Outside Yamanote Zone							0.0600	0.0574	0.0771	0.0620	0.0874	0.0845
							(0.0565)	(0.0558)	(0.0536)	(0.0570)	(0.0651)	(0.0652)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	5530	5530	5133	5530	5292	5292						
N in Panel B	8133	8133	7726	8133	7319	7319	7122	7122	6927	7122	6552	6552
N in Panel C	7830	7830	7399	7830	7830	7830	7024	7024	6884	7024	7024	7024
N in Panel D							6071	6071	6046	6071	5080	5080
N in Panel E							3276	3276	3256	3276	2770	2770
N in Panel F	9101	9101	8518	9101	7783	7783	8971	8971	8906	8971	7332	7332
N in Panel G							9542	9542	9000	9542	7726	7726

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).
We use the *Yamanote* loop line zone, not its 250 m buffer, to divide into the core and non-core area.

Table A.17: Using Predicted Land Price to Define the Core Area

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Share * Core	-13.01***	-12.62***	-12.90***	-11.28***	-12.90***	-11.18***						
	(0.967)	(0.905)	(0.955)	(0.861)	(0.954)	(0.854)						
Local Lords' Estates Share * Non-Core	-12.51***	-12.76***	-12.76***	-11.81***	-12.62***	-11.70***						
	(1.111)	(1.125)	(1.099)	(1.015)	(1.062)	(1.053)						
Panel B: 1912												
Local Lords' Estates Share * Core	-12.87***	-12.48***	-12.75***	-11.61***	-12.47***	-11.62***	-0.688***	-0.624***	-0.591***	-0.523***	-0.697***	-0.479***
	(0.995)	(0.937)	(0.962)	(0.902)	(0.960)	(0.844)	(0.145)	(0.148)	(0.148)	(0.142)	(0.147)	(0.138)
Local Lords' Estates Share * Non-Core	-11.69***	-11.15***	-11.61***	-10.40***	-11.16***	-9.735***	-0.417**	-0.361**	-0.423***	-0.300*	-0.465***	-0.271
	(0.766)	(0.807)	(0.792)	(0.789)	(0.777)	(0.762)	(0.164)	(0.164)	(0.159)	(0.157)	(0.177)	(0.173)
Panel C: 1931												
Local Lords' Estates Share * Core	-6.221***	-5.564***	-5.637***	-5.417***	-6.254***	-5.459***	-0.484***	-0.405***	-0.349***	-0.347***	-0.597***	-0.436***
	(1.342)	(1.255)	(1.282)	(1.329)	(1.367)	(1.280)	(0.118)	(0.104)	(0.106)	(0.109)	(0.122)	(0.108)
Local Lords' Estates Share * Non-Core	-6.832***	-6.471***	-6.498***	-5.890***	-5.706***	-4.553***	-0.359***	-0.304***	-0.294***	-0.256**	-0.391***	-0.179
	(1.501)	(1.501)	(1.578)	(1.519)	(1.630)	(1.629)	(0.121)	(0.114)	(0.113)	(0.111)	(0.124)	(0.115)
Panel D: 1972												
Local Lords' Estates Share * Core							-0.0423	-0.0292	-0.0288	-0.0288	-0.0772	0.00892
							(0.0537)	(0.0478)	(0.0446)	(0.0498)	(0.0556)	(0.0506)
Local Lords' Estates Share * Non-Core							-0.0697	-0.0845**	-0.0701*	-0.118***	-0.0172	-0.0569
							(0.0437)	(0.0384)	(0.0369)	(0.0446)	(0.0400)	(0.0442)
Panel E: 1983												
Local Lords' Estates Share * Core							0.0131	0.0286	0.00824	0.0159	0.00160	0.0661
							(0.0574)	(0.0497)	(0.0472)	(0.0520)	(0.0588)	(0.0538)
Local Lords' Estates Share * Non-Core							-0.0758	-0.0608	-0.0187	-0.0806*	-0.0451	-0.0453
							(0.0570)	(0.0448)	(0.0487)	(0.0434)	(0.0597)	(0.0424)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Share * Core	-15.85***	-14.33***	-11.89***	-12.35***	-16.09***	-13.77***	0.145**	0.173***	0.0718	0.177**	0.159**	0.291***
	(3.145)	(2.670)	(2.670)	(3.012)	(3.185)	(2.845)	(0.0692)	(0.0644)	(0.0505)	(0.0687)	(0.0688)	(0.0740)
Local Lords' Estates Share * Non-Core	-8.119	-2.717	-7.236*	-4.069	-4.136	1.477	0.0472	0.0434	0.0723**	0.0219	0.0263	-0.0902*
	(5.151)	(3.734)	(4.148)	(4.506)	(4.764)	(3.651)	(0.0423)	(0.0360)	(0.0363)	(0.0388)	(0.0457)	(0.0542)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Share * Core							0.0747***	0.0767***	0.0669***	0.0717***	0.0854***	0.0838***
							(0.0271)	(0.0271)	(0.0254)	(0.0278)	(0.0291)	(0.0296)
Local Lords' Estates Share * Non-Core							0.000326	-0.000235	0.00344	0.000154	0.00195	-0.00575
							(0.00745)	(0.00769)	(0.00803)	(0.00727)	(0.00808)	(0.00829)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	4738	4738	4605	4738	4687	4687						
N in Panel B	7122	7122	6927	7122	6552	6552	7122	7122	6927	7122	6552	6552
N in Panel C	7024	7024	6884	7024	7024	7024	7024	7024	6884	7024	7024	7024
N in Panel D							6071	6071	6046	6071	5080	5080
N in Panel E							3276	3276	3256	3276	2770	2770
N in Panel F	8427	8427	8366	8427	7313	7313	8971	8971	8906	8971	7332	7332
N in Panel G							8919	8919	8860	8919	7294	7294

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).

We use the the median of Log Land Price in each era to divide into the core and non-core area. We obtain Log $\widehat{\text{Land}}$ Price by (1) regressing Log Land Price on the distance from the Edo castle, a dummy variable indicating whether the cell is inside the *Yamanote* loop line, latitude, longitude, their interaction term and square terms without using cells with local lords estates, (2) predict Log Land Price by these explanatory variables including the cells we did not use in (1) by interpolation. For Panel A examining the effect on lot size 1873, we use 1912 land price data to define the core and non-core areas.

Table A.18: Controlling for The Number of Local Lords' Estates

	Inside vs Outside the Circle (*Yamanote*) Line											
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Historical Outcomes												
Panel A: 1873												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-11.15***	-10.82***	-10.51***	-9.415***	-11.46***	-9.933***						
	(0.760)	(0.755)	(0.787)	(0.638)	(0.773)	(0.673)						
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.00***	-10.29***	-11.43***	-9.350***	-9.916***	-7.883***						
	(1.441)	(1.423)	(1.455)	(1.443)	(1.474)	(1.495)						
Panel B: 1912												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-12.89***	-11.32***	-12.32***	-10.81***	-12.58***	-10.20***	-0.539***	-0.483***	-0.496***	-0.444***	-0.561***	-0.407***
	(0.610)	(0.624)	(0.611)	(0.590)	(0.630)	(0.603)	(0.133)	(0.134)	(0.130)	(0.130)	(0.139)	(0.138)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.01***	-9.658***	-11.13***	-8.964***	-10.27***	-8.111***	-0.333	-0.252	-0.292	-0.116	-0.427**	-0.202
	(1.482)	(1.391)	(1.439)	(1.472)	(1.486)	(1.474)	(0.222)	(0.226)	(0.222)	(0.214)	(0.185)	(0.183)
Panel C: 1931												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-11.07***	-8.632***	-8.540***	-8.638***	-10.48***	-7.010***	-0.571***	-0.486***	-0.467***	-0.477***	-0.678***	-0.502***
	(1.123)	(1.053)	(1.210)	(1.145)	(1.213)	(1.167)	(0.118)	(0.107)	(0.104)	(0.110)	(0.119)	(0.109)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-8.766***	-7.028***	-8.798***	-7.237***	-8.041***	-6.003***	-0.326**	-0.244*	-0.263**	-0.207	-0.413***	-0.243**
	(1.850)	(1.730)	(1.700)	(1.835)	(1.879)	(1.784)	(0.135)	(0.130)	(0.126)	(0.131)	(0.134)	(0.123)
Panel D: 1972												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							-0.0848***	-0.0627**	-0.0209	-0.0988***	-0.0841**	-0.0743**
							(0.0328)	(0.0306)	(0.0272)	(0.0355)	(0.0339)	(0.0321)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.304***	-0.240***	-0.127**	-0.231***	-0.259***	-0.186***
							(0.0588)	(0.0539)	(0.0513)	(0.0524)	(0.0570)	(0.0489)
Panel E: 1983												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							-0.0273	0.00804	0.0559	-0.0362	-0.0145	-0.00982
							(0.0408)	(0.0367)	(0.0345)	(0.0412)	(0.0418)	(0.0372)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							-0.183**	-0.114	-0.0355	-0.111	-0.160*	-0.0877
							(0.0806)	(0.0763)	(0.0655)	(0.0733)	(0.0825)	(0.0668)
	N of Lot						Log Land Price					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Modern Outcomes												
Panel F: 2012												
Local Lords' Estates Share * Inside Yamanote Zone + 250 m	-29.32***	-20.87***	-20.93***	-21.50***	-28.88***	-17.08***	0.111**	0.144***	0.129***	0.101**	0.115**	0.127***
	(3.220)	(2.733)	(3.020)	(2.900)	(3.177)	(2.545)	(0.0449)	(0.0437)	(0.0367)	(0.0456)	(0.0477)	(0.0470)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m	-11.97*	-6.955	-14.07***	-5.965	-9.245*	-3.765	-0.278***	-0.229**	-0.102	-0.244***	-0.245***	-0.182**
	(6.526)	(6.194)	(4.869)	(5.951)	(5.506)	(5.360)	(0.103)	(0.0970)	(0.0779)	(0.0934)	(0.0946)	(0.0834)
Panel G: Skyscraper in 2011							N of ≥ 30 Stories Buildings					
							(7)	(8)	(9)	(10)	(11)	(12)
Local Lords' Estates Share * Inside Yamanote Zone + 250 m							0.0278	0.0323*	0.0332*	0.0324*	0.0390*	0.0365*
							(0.0183)	(0.0191)	(0.0200)	(0.0177)	(0.0208)	(0.0208)
Local Lords' Estates Share * Outside Yamanote Zone + 250 m							0.0117	0.0129	0.0434	0.00289	0.0276	0.0165
							(0.0373)	(0.0371)	(0.0367)	(0.0390)	(0.0400)	(0.0420)
Baseline Controls (* Inside)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Uses (* Inside)	No	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes
Construction Costs (* Inside)	No	No	Yes	No	No	No	No	No	Yes	No	No	No
Historical Proxies for Costs (* Inside)	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
WWII Shocks (* Inside)	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N in Panel A	5530	5530	5133	5530	5292	5292						
N in Panel B	8133	8133	7726	8133	7319	7319	7122	7122	6927	7122	6552	6552
N in Panel C	7830	7830	7399	7830	7830	7830	7024	7024	6884	7024	7024	7024
N in Panel D							6071	6071	6046	6071	5080	5080
N in Panel E							3276	3276	3256	3276	2770	2770
N in Panel F	9101	9101	8518	9101	7783	7783	8971	8971	8906	8971	7332	7332
N in Panel G							9542	9542	9000	9542	7726	7726

Notes: Standard errors are in parentheses. We allow a within-300 m correlation in the error terms. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Baseline Controls contains *Locational Controls*, *Yamanote*, and *Topological Controls* used in Table 3. *Public Use* contains the distance to the nearest station in 2017 and 1950, the share of land used as hospitals, universities, and parks. *Construction Costs* contains the average floor-area ratio (FAR), the average road width, and average block area. *Historical Proxies for Costs* contains the share of area specified as commercial area by regulation, the distance from the historical main roads (*gokaido*), and average block area in the 1850s. *WWII Shocks* contains the share of the destructed area during WWII, the descendants' estates or other land of high-ranked ex-local-lord family (*Hakushaku*) in 1931, these land of other ex-local-lord family in 1931, and military infrastructure in 1931. See Table 1 for the definitions of variables. We add interaction terms between the inside dummy and control variable (and constant term).