

Firm Foundations: Legal Systems and Economic Performance in Colonial Shanghai, 1903–1934

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Abstract. How important are legal systems to economic performance? To address this question, I focus on a historical period from colonial Shanghai, where quite different legal systems operated in the International Settlement and French Concession. In particular, employing novel historical data, I examine 1903–1934 land value discontinuities at the border between them. Substantial discontinuities were found in the 1900s, with higher land values associated with the International Settlement. However, by the 1930s, this land value advantage of the International Settlement had disappeared. A closer look at the institutions reveals that the French Concession adapted its operation to be more business friendly, under competition from the neighboring International Settlement. This suggests that the French legal system *per se* was not a barrier to economic growth, but rather it could function well if interpreted and implemented properly. This paper thus adds to evidence that formal legal system is not a key determinant of economic performance.

Keywords: Legal System · Land Value · Economic Development · Shanghai Settlements

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1 Introduction

What is the role played by legal system in economy? In a summarization of economic consequences of legal origins, it is defined as “a style of social control of economic life,” where “common law stands for the strategy of social control that seeks to support private market outcomes, whereas civil law seeks to replace such outcomes with state-desired allocations” (La Porta et al., 2008). Utilizing the experience of European colonialism as a natural experiment and viewing the adoption of the legal systems as exogenous, La Porta, Lopez-de-Silanes, Shleifer, and Vishny pioneer a strand of literature that favors the common law system for its better investor protection and lighter government regulation, arguing that it is more conducive to economic growth (La Porta et al., 1997, 1998, 1999a,b). Subsequent research extends the influence of legal origins to many other spheres, including government ownership of banks (La Porta et al., 2002) and media (Djankov et al., 2003a), corruption (Treisman, 2000), labor markets (Botero et al., 2004), judicial system (Djankov et al., 2003b; La Porta et al., 2004), entry regulation (Djankov et al., 2002), military conscription (Mulligan and Shleifer, 2005a,b), public goods provision (Iyer, 2010), and spatial structure (Baruah et al., 2021). All of the above literature points to a significant relationship between the legal system (or legal origin in cases where the original legal system survived and continued exerting influence after a long time) and institutions, (at least one of) the fundamental explanation(s) for economic growth (North and Thomas, 1973; North, 1990).

Although the importance of institutions to economic performance has been widely acknowledged, whether legal system is a determinant of institutions remains debatable. Utilizing former colonies as well, Acemoglu, Johnson, and Robinson argue that the settler mortality (Acemoglu et al., 2001) and population density before colonization (Acemoglu et al., 2002) have largely shaped the colonization strategy of Europeans: regardless of their identity, Europeans were less likely to settle and were more likely to set up extractive institutions in areas where they faced high mortality or prosperous areas with dense populations. They, therefore, conclude that it is not the identity of the colonizer or legal origin, but the way in which countries were colonized that matters for the institutions and thus economic development. In terms of the role of legal system, Acemoglu and Johnson unbundle the broad cluster of institutions and show that legal origins mainly influence the contracting institutions, but unlike “property rights institutions,” which protect citizens against expropriation by the government and powerful elites, “contracting institutions,” which enable private contracts between citizens, do not have a first-order effect on long-run economic growth, but only matter for the form of financial intermediation (Acemoglu and Johnson, 2005).

This paper attempts to provide more direct evidence for the unsettled debate regarding how legal systems shape institutions and thus influence economic growth. Unlike the cross-country studies (the most commonly used in the legal origins literature) that view the adoption of legal systems as exogenous and assume that the fundamen-

tal strategies of legal systems survived even after centuries of evolution, this paper investigates two adjacent settlements that were built from scratch with contemporary data. Specifically, it studies the land value in colonial Shanghai, where the original British Settlement and the French Concession coexisted for nearly 100 years. By applying regression discontinuity (RD) design to the land value at the border between the Settlements, this paper effectively overcomes the problems of reverse causality and omitted variable bias common in the cross-country studies.

The last decade has witnessed a popular trend to use RD design in colonial institutions literature. This approach is particularly attractive when there is an arbitrary border drawn between different colonial powers. Examples include Berger (2009), Lee and Schultz (2012), Cogneau and Moradi (2014), Cogneau et al. (2015), Dupraz (2019), and Ali et al. (2019).¹ However, even if the borders were indeed arbitrarily drawn, other challenges may arise such as the non-closedness of the treatment groups (i.e., the experimental data may be “contaminated” by the post-treatment policies or the free migration of the objects of the study) and the ambiguity of the treatment (McCauley and Posner, 2015). Compared to other studies with an RD design, this paper is largely immune to the contamination issue, as it employs the contemporary data and as the object of study, land lots, could not move freely. Identifying the exact treatment is not a problem either, because any *discontinuous* treatment is considered as incorporated in the connotation of legal origin, while *continuous* treatments—such as the distance to the most prosperous commercial street, Nanking Road—could be safely eliminated by the RD design. It is legitimate to do so because the connotation is broad and because the settlements remained unimproved before the entrance of the foreigners. As stated in La Porta et al. (2008), “Legal Origin Theory traces the different strategies of common and civil law to different ideas about law and its purpose,” and the ideas and strategies were incorporated not only into specific legal rules “but also into the organization of the legal system, as well as the human capital and beliefs of its participants.” In Shanghai, the western settlers arrived where there used to be nothing but wilderness. They then operated various legal institutions in two separate yet adjacent plots of land. The historical context is therefore well-suited to applying RD design where the treatment effects could be clearly attributed to their later practices.

The uniqueness of colonial Shanghai has attracted scholarly attention (for example, Ma, 2008; Keller et al. 2013; and Levine et al. 2021), but comparative studies on coexistent settlements are rare, in which the tumultuous history of the city and the imbalances among its settlements are non-negligible obstacles to econometric methods. This paper, taking advantage of the RD design, avoids these caveats by focusing on land lots in a small neighborhood around the border. The catch-up of the French Concession found in this paper challenges the stereotype of colonial Shanghai, where the International

¹ They leverage the arbitrary nature of Africa’s country borders and find different outcomes for each side of the boundaries, ranging from quality of governance, household wealth, public goods provision, literacy and religious affiliation, socio-economic welfare, and education, to the salience of ethnicity.

Settlement (developed from the original British and American Settlements) traditionally has been regarded as “more advanced.” In fact, its better performances in the early years were likely rooted in the “first-mover advantage.” Though the two plots of land were identical as a “wilderness of marshes” (MacPherson, 1987) in pre-concession characteristics, the differences in the location and early development did exist—it was the British that first picked the original British Settlement near the Huangpu River and the Soochow Creek in 1843, right after the Opium War, and then the French that chose the original French Concession near the Huangpu River and the old Shanghai town much later in 1849.² The old Shanghai town narrowed the “hinterland” of the French Concession, limiting its exploitation of the Huangpu River and the Bund (see Fig. 2). Notably, the French would have claimed the same plot of land as the British, had they had the opportunity to select first.³ Moreover, the initial establishment of the French Concession was more like a result of French national pride rather than necessity, as there were very few French settlers in Shanghai in the 1840s and 1850s.⁴ This underpopulation perhaps contributed to the French Concession missing the first wave of financial and commercial development, when large banks and trading companies came to Shanghai en masse.⁵ Due to the first-mover advantage, the British Settlement (and later the International Settlement) kept a leading position for a long time with higher population⁶ and commercial density, more advanced public facilities, and greater fiscal revenue⁷. Consequently, any naive comparison would undoubtedly favor the British Settlement as the preferred system, and the quite possible violation of the “parallel trends” in pretreatment outcomes could invalidate a difference-in-difference method.

² Before the Opium War, Canton was the only port in China opened to foreign trade, where the British dominated the business and claimed 4/5 of the total trade volume. The French, on the other hand, knew much less about China at that time. In 1843, the French government was motivated by the Treaty of Nanking to send a diplomatic corps to China. The corps signed a treaty with the Chinese government in 1844 in Canton and then spent two years investigating other ports in the north. In 1847, when Montigny was designated as the first French consul-general in Shanghai, the French were still unfamiliar with the city (Fredet and Maybon, 1929).

³ As stated in *Histoire de la Concession Française de Changhai* (1929), a book about the French Concession in Shanghai, the British were the first to arrive and claimed the “best plot of land for themselves” in this region. On the contrary, when the first French consul-general, Montigny, “bravely” settled down, the original French Concession was covered in tombs and foul-smelling ponds.

⁴ The French built their settlement at the insistence of Montigny in 1850 when only 10 foreign citizens were living there, as opposed to 210 in the British Settlement. By 1857, there were only 13 foreign land renters (Fredet and Maybon, 1929).

⁵ The first foreign banks opened branches in Shanghai were the Oriental Bank Corporation in 1845, the Mercantile Bank of India and the Commercial Bank of India in 1854, the Chartered Bank of India in 1858, the Central Bank of Western India in 1861, and the Asiatic Banking Corporation and the Bank of Hindustan in 1864. The first trading companies such as Dent & Co., Gibb Livingston & Co., Jardine Matheson and Russell & Co. were operated by the British or Americans, who had already gained experience from the transactions with the Chinese businesspeople in Canton, Hong Kong, and Macaw.

⁶ The number of foreign people who lived in the French Concession remained approximately only one-tenth of that in the International Settlement until the 1920s (see Appendix Table 1).

⁷ See Appendix Table 2.

The fact that Shanghai went through troubled times also makes it difficult to identify clear shocks. A series of great historical events happened in Shanghai during the first decades of the 20th century, which usually did not bring equivalent or simultaneous impacts on the two Settlements. For example, the 1925 May Thirtieth Movement concentrated in the International Settlement, where the Shanghai Municipal Council, supported by the British and Japanese military forces, engaged in the confrontation with the Chinese (Shen, 1986). The French Concession, meanwhile, almost stayed out of the conflict. The French government even criticized the British as cruel in public (p. 125) (Shen, 1986). One of the results of the May Thirtieth Movement was the rendition of the Mixed Courts in Shanghai.⁸ The authority in the International Settlement, as the party at fault identified by the “Investigation Committee of Shanghai Case”, surrendered legal jurisdiction to the Chinese authorities in 1927, whereas the same rendition in the French Concession occurred four years later in 1931. Such eventful history of Shanghai blurred the treatments, making the “shocks” ambiguous as in Levine et al. (2021). Under this circumstance, the advantages of RD design become more apparent, as it ensures that the differences arise purely from the existence of the border. This paper, to the best of my knowledge, is the first to apply the RD design to colonial Shanghai, and it also is the first to provide a quantitative comparison between the British and French Settlements based on land value, an overall economic indicator.

The importance of land value in colonial Shanghai can never be overemphasized. In the absence of corporate tax and income tax, land tax and rental tax based on the assessed land value were the major costs of living and operating a business in any of the settlements, constituting more than half of the fiscal revenue of the authorities (see Section 4.4). In addition to real estate, land value was also critical to the financial market. The period studied in this paper, 1903–1934, marked a tumultuous era in Chinese modern history⁹, when the weak governments together with the turbulent domestic and international situations infused the market with continuous uncertainty. In Shanghai Settlements, however, land property endorsed by the title deeds was protected under the extraterritoriality signed in the Treaty. The high degrees of security and liquidity made it the most trusted collateral property for credit, helping Shanghai grow to the financial center of China in the early 20th century (Feetham, 1931). As

⁸ The Mixed Court, made up by the Chinese magistrate and the western assessor sitting together, dealt with commercial, civil and criminal cases where Chinese were defendants within settlement limits and was responsible for dispute resolution, criminal administration, and the enforcement of order (Stephens, 2017). The rendition marked the culmination of a long series of negotiations which could be dated back to the early 1910s (Ma and Qian, 2015), almost right after the 1911 Revolution, when the local Qing authorities collapsed, the Mixed Court asserted its complete independence, and the Chinese residents came under *de facto* foreign jurisdiction.

⁹ Stimulated by the military defeat by the Western allied forces in 1901, the Qing government started a limited modernization reform in 1905 but failed to put the fractured empire back together again. In 1911 the Qing was buried by the Revolution. China then entered the Republican era (1911–1949), experiencing the Beiyang decades (1911–1927), the Nanking decade (1927–1937), the Japanese invasion (1937–1945), and the Chinese Civil War (1945–1949).

depicted by Shiroyama (2011), real estate mortgage was an essential way of raising funds for commercial and industrial ventures in Shanghai, where the modern stock and bond markets were underdeveloped. In this sense, the fluctuation in land value should closely reflect the variation in investor confidence.

Whether different legal systems exerted different influences on land value? In this paper, I use an RD design to estimate the effects on land value of being located inside the International Settlement, compared to land lots just outside the boundary in the French Concession. The focus is the original British Settlement and French Concession that were claimed in the 1840s; however, the findings based on the extensions claimed in the 1900s and 1910s also align with the basic results (see Appendix Fig. 4). The land value is collected from the land assessments conducted by the municipal councils. Each land lot is geo-coded into ArcGIS based on its location drawn in the cadastral maps, before its distance to the border is calculated. Table 1 presents the bias-corrected RD estimates with robust standard error estimator obtained from the local linear regression, in which distance to the border is positive for the land lots in the International Settlement and negative for those in the French Concession. Statistically significant discontinuities were found in 1903 and 1907, but later vanished. In 1934, such gaps, if there were any, were found to be in favor of the French Concession. The discrete drop in land value across the border from the original British Settlement to the French Concession, even sixty years after the British and the French obtained land in Shanghai, passes various robustness checks (see Section 4.2). These findings indicate that the French legal code may have indeed caused difficulties in attracting residents and businesspeople at first. However, under constant competition from the International Settlement, the French were perfectly capable of modifying the manners in which they operated their institutions, making the French Concession a competitive location for carrying out business in the 1930s at the latest.

Table 1: Bias-corrected RD Estimates from Local Linear Regression

	1903	1907	1911	1916	1934
	0.7958***	0.9111***	0.4066***	0.3302***	-0.0270
	(0.0941)	(0.1271)	(0.1283)	(0.1265)	(0.0823)
Effective # of obs (l, r)	127, 116	127, 116	127, 116	127, 116	127, 116

Notes: This table reports the estimated discontinuities in land value at the border between the original British Settlement and the French Concession. The dependent variable is expressed in natural logarithm so the coefficients stand for percentage changes. Robust standard errors are noted in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

To eliminate the possibility that the initial discontinuity came from some geographic feature of the border, this paper investigates the original British and American Settlements as a placebo test. The American Settlement was claimed in 1848, just before the establishment of the French Concession. Though claimed independently by the American consul-general, the American Settlement had much in common with the

British ever since its founding. The administration was conducted uniformly by the Shanghai Municipal Council from its inception, and in 1863 the two Settlements were amalgamated into one (i.e., the International Settlement). The border between them was demarcated by the Soochow Creek, a much wider river than Yang-king-pang (the border between the British and French before 1914), but discontinuity was hardly discernible between the original British and American Settlements until 1932, when the latter was damaged and then captured by the Japanese via the January 28 Incident.

Catch-up in land value since the late 1910s proved that the French legal system *per se* was not a barrier to economic growth. According to the official records and anecdotal reports, discrepancy in legal origin did lead to discrepancies in institutions, but were probably limited to those that had no significant effect on economic outcomes. Although the two Settlements exhibited entirely different governing philosophies, with self-rule under merchant elites or oligarchies in the International Settlement versus administrative rule under consular officials in the French Concession, the French legal system did not generate “inferior” institutions in the French Concession—at least, not those that weaken the market attractiveness or hinder the economic development. It provided a comparable environment in terms of taxes, sanitation and public goods. The “property rights institutions” (Acemoglu and Johnson, 2005) worked equally well in the two Settlements. Like the land value, neither firm density nor industrial structure changed discontinuously at the border.

The remainder of this paper proceeds as follows: Section II gives a brief background of colonial Shanghai. Section III introduces the data and empirical strategy. Section IV identifies the boundary effect on the land value between the original British Settlement and French Concession. Section V presents a placebo test on the original British and American Settlements. Section VI discusses the institutions. Section VII describes the similarities in firm distribution, and Section VIII concludes.

2 Background

2.1 The Establishment and Expansion of the Shanghai Settlements

Soon after China was forced to open to the world in 1840, Shanghai, located at the mouth of the Yangzi River, was picked as one of the first trading ports under the Treaty of Nanjing, which allows the foreigners to live and engage in trade in the city. The 1910s–1920s was regarded as the golden era of Shanghai—with the help of the unique institutions, Shanghai transformed to a European style city-state, providing effective public security and private property rights for both Chinese and foreign business within its jurisdiction (Ma, 2006, 2008). In the 1930s, Shanghai accounted for more than 50% of China’s foreign trade, 45% of foreign investment, 50% of industrial production, and 40% of workers and industrial capital (Tang, 1989), becoming a sparkling representation of industrialization and urbanization of China. In the *Decennial Reports on the Trade*

Navigation Industries 5 (1922–1931), Layford (1932) attributes Shanghai’s prosperity to its more stable political and social environment relative to the other regions of China, which effectively encouraged long-range investments.

On November 7, 1843, Shanghai, once a county of Songjiang Prefecture, formally opened. Foreign firms like Dent & Co., Gibb Livingston & Co., and Jardine Matheson flocked to Shanghai, seizing the best sections of land by the Huangpu River. To avoid chaos and conflicts, foreigners were confined within a specific district known as “settlement”. Their request to buy land was rejected, but a “perpetual lease” was employed. In 1854 the first general Land Regulations—the city charters, as they may be called, were arranged between the British consul-general and the local authorities, acting under Imperial instruction. Through these regulations, foreign persons were allowed to rent land within defined limits; and a foreigner of any nationality could lease land in any of the settlements. The tenancy period was listed as “forever,” as the original owners were not allowed to recover the land unless the foreign tenants returned it. By these types of land leases, or to some degree, the land sale¹⁰, a large amount of land was developed, and a real estate market was thereby established. Fig. 1 shows the steady increase in land values since 1903 (1902) in the British Settlement (French Concession), with the starting values=100. From the 1900s to the 1930s, land value increased six-fold in the British Settlement and more than nine-fold in the French Concession.

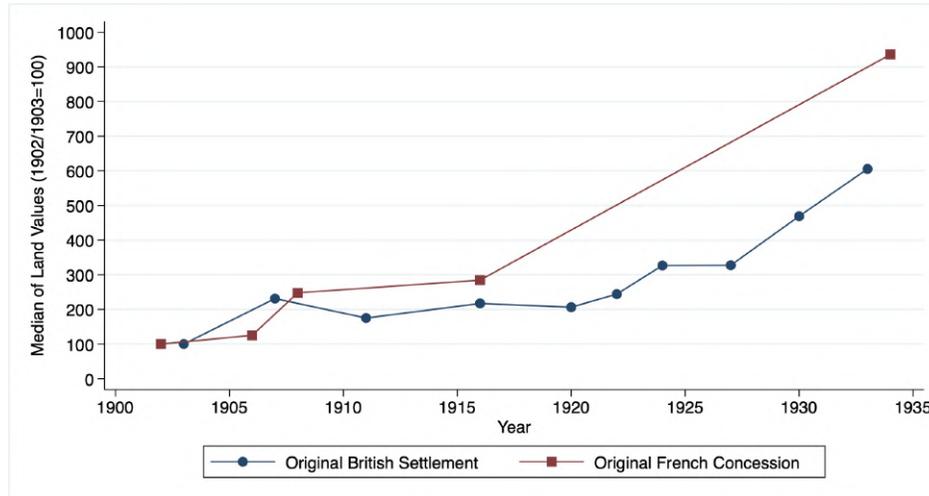


Fig. 1: Increase in Land Value in the Shanghai Settlements

Notes: This figure shows the medians of land values in the original British Settlement and French Concession. The raw data are obtained from the land valuation schedules posted by the municipal councils and then adjusted based on the cost of living indices in Yan (2010). The starting values are set as 100.

¹⁰ In the land lease process, the foreign businessperson and the original landowner signed a contract after they reached an agreement on the rental. Next, the foreigner would send their application to a foreign consulate; the title deed went into effect after it passed audits by both the foreign consul and Shanghai Daotai (an administrator in Shanghai).

Between the 1840s and 1940s, there were mainly three Settlements in Shanghai: the British Settlement, the American Settlement, and the French Concession. They all experienced several waves of expansion, as shown in a map included in the 1931 report by Richard Feetham¹¹ (Fig. 2). The British Settlement, located to the west of the Huangpu River and south of the Soochow Creek, was officially set up at the end of 1845. Its initial area was 0.56km^2 (Region A) and then increased to 1.88km^2 (Regions A and B) in 1848. The American Settlement, located to the north of the British Settlement, was set up in 1848 with an initial area of 1.86km^2 , and its boundary was officially defined in 1863 (Region C). The French Concession, located between the British Settlement and the old Shanghai town, was built in 1849 with an initial area of 0.66km^2 (Region 1). The British and American Settlements combined to form the International Settlement in 1863. The largest expansions (Regions D, D₁ and 3, 4, 5) occurred at the turn of the century. Limited by data availability, however, this paper focuses solely on the original British Settlement (Regions A and B) and the original French Concession (Regions 1 and 2), which have remained the most populous and prosperous commercial district of Shanghai (see Appendix Fig. 1).

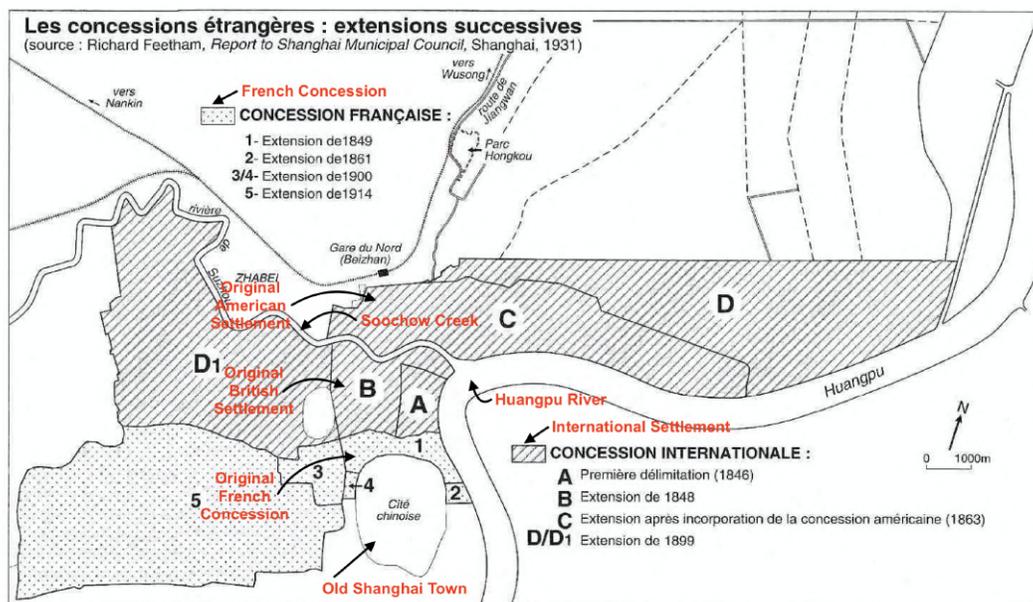


Fig. 2: Expansion of Settlements in Shanghai

Notes: This figure shows the territory of the Shanghai Settlements at different times. This paper mainly focuses on the original British Settlement and the original French Concession due to data limitations—the newly developed extensions of the French Concession (Regions 3, 4 and 5) was not assessed until 1924. The comparison between the original British Settlement and the original American Settlement is employed as a placebo test. Source: Marie-Claire Bergère, *Historie de Shanghai* (History of Shanghai).

¹¹ He was appointed in 1931 by the Shanghai Municipal Council to investigate the possibility of the end of extraterritoriality in China.

The border between the original British Settlement and French Concession previously was a canal called Yang-king-pang, but people could travel from one Settlement to the other via bridges built at each intersection of the south-north thoroughfares and the Yang-king-pang about every 200m. In the same manner, they crossed the border, the Soochow Creek, between the original British and American Settlements. Unlike the Soochow Creek, Yang-king-pang was filled by the authorities in the two Settlements and transformed into a new thoroughfare in 1914 named Avenue Edward VII, which then evolved to today's Yan'an Elevated Road. Once having crossed the Yang-king-pang (or later, the Avenue Edward VII), one was required to comply with different laws and regulations. For example, a Jinriksha driver needed a different license, and police from one Settlement was not allowed to arrest criminals in the other.



Yang-king-pang in 1907



Avenue Edward VII in the 1930s

Fig. 3: Yang-king-pang and Avenue Edward VII

Notes: These figures depict the border of the International Settlement and French Concession, which was a canal before 1914, and a thoroughfare after that.

In the beginning, the Chinese were not permitted to own land in the foreign Settlements, and neither the foreign consuls nor the Chinese government anticipated them living there. However, in the 1850s, the Small Sword Uprising and Taiping Rebellion motivated Chinese people living in the old Shanghai town and its surrounding cities to seek shelter in the Settlements, nullifying the rule of exclusion. The logarithm of foreign and native populations plotted in Fig. 4 shows that the Chinese were always in the majority. Another pattern that coincides with the main findings of this paper

is that the French Concession was closing its population gap from the International Settlement in the first half of the 20th century.

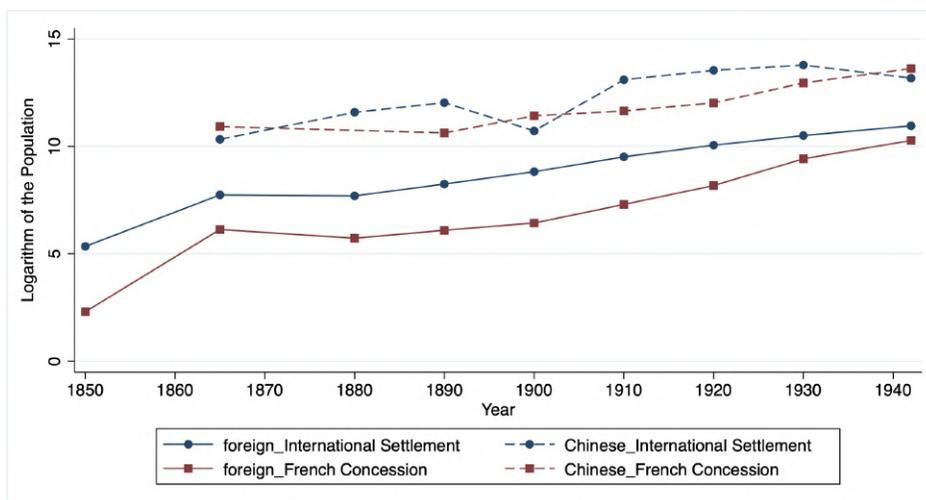


Fig. 4: Foreign and Chinese Population in the Shanghai Settlements

Notes: This figure shows the log of the population in the International Settlement and French Concession. The numbers are obtained from the annual reports published by the two municipal councils (1892–1933; 1893–1940).

2.2 Municipal Administration in Shanghai Settlements

In local affairs, the foreign residents governed themselves and the natives within the Settlements by means of the municipal councils, which existed under the authority of the “Land Regulations.” They also had legislative institutions (at first the Land Renters’ Meeting and then the Rate Payers’ Meeting) and judicial institutions (the Consular Courts for the foreigners, and the Mixed Courts for the Chinese and unrepresented foreigners), replicated from their home countries.

In the International Settlement, the “Committee of Roads and Jetties,” originally consisting of “three upright British Merchants,” who were appointed by the British consul-general, became in 1855 the “Municipal Council,” elected by the land renters. When the revised Land Regulations came into force in 1870, the Council underwent elections in January of each year by all householders who paid rates on an assessed rental of five hundred taels, or owners of land valued at five hundred taels and over. As described by Jackson (2017), the Shanghai Municipal Council “combined elements of English municipal councils with the New England tradition of town hall meetings, with the former emphasizing decisions deliberated on by committees informed by salaried officials, and the latter promoting a form of democratic representation through speeches and voting on local business at public meetings” (p. 4).

The counterpart of the Shanghai Municipal Council in the French Concession was the Conseil d'administration municipale (hereafter, the French Council). In 1854, to defend the Settlements from the Small Sword Uprising, the French Concession combined itself with the British-American Settlement, acquiescing to the rule of the Shanghai Municipal Council. In 1862, as different opinions toward administrative affairs could not be reconciled, the French consul-general Route Edan initiated the French Council, which then carried out governance independently in the French Concession. The French Council also consisted of a board of directors and multiple functional departments, with the former making policies and the latter dealing with specific matters (Fredet and Maybon, 1929; Ma and Jiang, 2016). The first directors were selected and nominated by Edan, but in later years, the members were elected by all owners of land in the Concession, or occupants paying a rental of a thousand francs per annum, or residents with an annual income of four thousand francs. This, it can be noted, more closely approaches “universal suffrage” than the franchise of the other Settlement.

According to the annual reports of the two municipal councils (1892–1933; 1893–1940), they were in charge of public goods provision, including police, water, electricity, sanitation, road maintenance, and public transportation. Regular income mainly came from land tax, rental tax, dues on goods, and all types of license fees.

Though had much in common, authorities in the two Settlements exhibited different philosophies of government. The International Settlement was more like a charter city that emphasized self-governance.¹² In the 1850s, during the time of the Taiping Rebellion the Shanghai Municipal Council proposed a “free city” plan, with the almost unanimous consent of the land renters and residents, to make Shanghai independent from any country. The plan was declined by the foreign governments¹³, but the Shanghai Municipal Council gained immense power by amending the constitution in 1866. Within the Settlement, the ultimate authority resided with the board of directors, which was elected from (the largest) ratepayers. It had supreme decision-making power over any relevant issue, with no responsibility to the foreign governments. The French Concession, on the other hand, exhibited more features of centralization. Its ultimate authority belonged to the French Consul-General, who had full control over the Concession’s police forces, and could veto any resolution put forward by the French Council. The only person to whom he was beholden was the French ambassador to China. When there were disputes between the French consul-general and the board,¹⁴ the former had the right to dismiss the latter and nominate new directors.¹⁵

¹² As noted by Ma (2008), this is an institutional feature that distinguished the International Settlement from not only most other treaty ports in China but also the neighboring French Concession.

¹³ Unlike the businesspeople, the foreign governments looked beyond the economic interests.

¹⁴ The relative status of the two partners was changing over time, largely due to the personalities of the consul-general and the directors (Fredet and Maybon, 1929).

¹⁵ During the approximately 80 years since its foundation, the board had been dismissed six times (Shi et al., 2001).

3 Data

The prime data for this paper is land value, which comes from land assessments conducted every few years by the Shanghai Municipal Council and the French Council¹⁶ between the 1860s and 1940s, served as a basis for collecting land tax. The goal, as defined in the preface of the land valuation schedules, was to “place the properties as near as possible to their fair market value,” and thereby to provide a more reasonable tax base than the initial sale price. If the assessed value was thought to be unfair, the landowner had the right to raise an objection and ask for a revaluation. The revised result would be published and presented to the ratepayers for their final approval.

Generally, the outputs of a land assessment included the following: (1) the cadastral maps showing the location of each land lot, and (2) the land valuation schedule, which records the name of the renter, cadastral number, area, and assessed land value for each land lot. Appendix Fig. 2 shows one part of the 1931 cadastral maps in the French Concession, from which the location of land lots with cadastral numbers 1 through 49 can be noted. Appendix Fig. 3 shows one page of the 1911 *Land Assessment Schedule* in the International Settlement, from which information of the cadastral number, registered owner, area, and value per *mu* can be obtained. Relatively complete and detailed data of land assessments in the International Settlement are well preserved in the Shanghai Municipal Archive¹⁷. The author, together with Fusheng Luo¹⁸, have digitized all the land valuation schedules between 1900 and 1933, which are available upon reasonable request. The availability of land assessments in the French Concession is much more limited. The latest ones are kept in the Shanghai Municipal Archive, while some of the earlier ones can be found only in the French archives, with the total number of them unknown. Christian Henriot (An Keqiang)¹⁹ and his team have made great efforts in collecting, organizing, and digitizing these French land assessments. The author is grateful for their admirable work and generous sharing, which make the comparative study on the two Settlements possible.

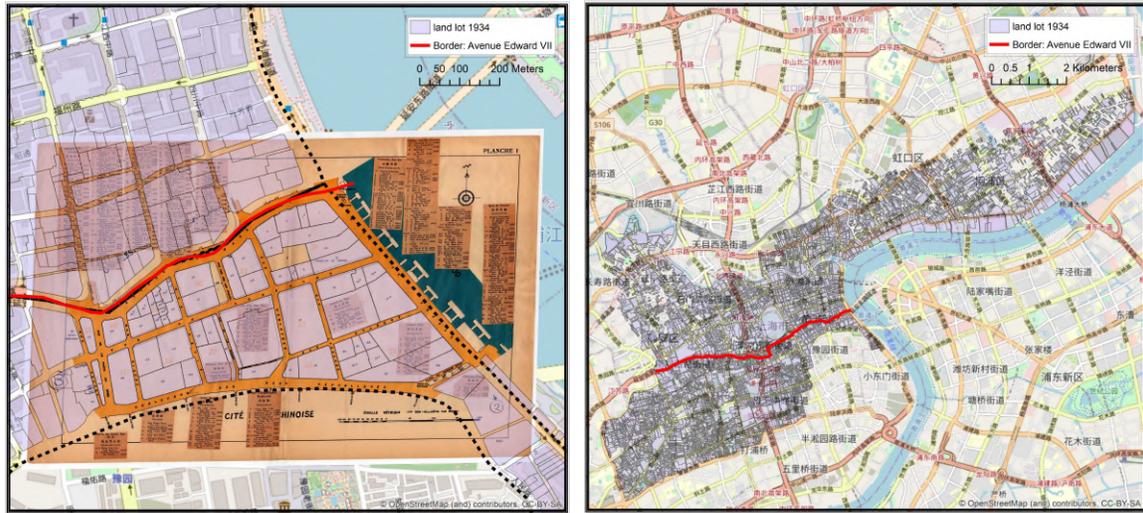
Based on the cadastral number, each land lot is geo-located in ArcGIS, so its distance to the border can be calculated. Fig. 5 demonstrates the general geo-coding process, where a cadastral map showing a piece of land in the French Concession near the Bund is geo-referenced; next, 49 land lots on the map are drawn as features by hand. In this manner, the spatial information of nearly 15,000 land lots has been recorded.

¹⁶ Land assessments appeared in the French Concession as early as in the 1860s (Fredet and Maybon, 1929), but were much less accurate before 1900, where land lots were usually classified simply into several grades according to their locations (Shi et al., 2001).

¹⁷ Namely, land valuation schedules in 1867, 1869, 1874, 1876, 1880, 1882, 1889, 1892, 1897, 1900, 1903, 1907, 1911, 1916, 1920, 1922, 1924, 1927, 1930, and 1933, to which the cadastral maps of each district were attached after the 1900s

¹⁸ <https://lsa.umich.edu/history/people/graduate-students/fusheng.html>

¹⁹ <https://ankeqiang.org>



Geo-referencing and Creating Land Lots as Features

All Land Lots Assessed in 1934

Fig. 5: Geo-coding of the Land Lots

Notes: These figures demonstrate how the location information of the land lots are obtained from the cadastral maps and recorded into ArcGIS.

Land assessments acted as fundamental reference sources in land transactions. According to a comprehensive guide for property investment in Shanghai published in 1933, the most common method of property evaluation was to borrow from the land assessment schedules posted by both municipal councils: “Empirically, the market price was always set as the assessed value with a 25% appreciation, subject to rentals in the neighborhood” (p. 192) (Chen, 1933). The similar positive relationship between the assessed value and the market value presented in Section 4.4 can serve as a solid testimonial to the common recognition of the land assessment in the two Settlements.

Data of the years 1903, 1907, 1911, 1916, and 1934 are used in this paper.²⁰ No data in the 1920s are used to get the basic results because the only land survey conducted during the 1920s in the French Concession, the 1924 assessment, contains land values only in the extensions but not in the original French Concession. It also is the first one that reports land values in these extensions, making it less informative to compare them to the extensions in the International Settlement (i.e., the data are much more limited than those used in the comparison of the original Settlements). Nevertheless,

²⁰ Land assessments were not conducted simultaneously in the two Settlements. In most of the years, land valuation schedules were published in one Settlement but not in the other. For comparison, I interpolate data for the corresponding years with a constant growth assumption as follows: assessed values in 1934 of the International Settlement are interpolated using the assessments of 1930 and 1933; assessed values in 1903 of the French Concession are interpolated using the assessments of 1902 and 1906; assessed values in 1907 of the French Concession are interpolated using the assessments of 1906 and 1908; assessed values in 1911 of the French Concession are interpolated using the assessments of 1908 and 1916.

RD estimation applied to the extensions in only two years (1924 and 1934) reveals a similar process of catching up in the French Concession (see Appendix Fig. 4).

Fig. 6 shows the locations and values of land lots assessed in 1916. The border is marked in red, and the area studied is marked with a black dashed line. The numbers of observations within the area studied in the 1916 assessments for the International Settlement and the French Concession are 777 and 255, respectively. As time went by, one land lot could be divided into several lots. For example, the entirety of Lots 17, 17A, 17B, 17C, 17D, and 17E in the original British Settlement in 1916 was only one piece of land in 1903—Lot 17. To fairly compare land value across time, this paper views 17A-E as one unit as Lot 17, the value of which was the average of the six pieces of land, weighted by their respective areas. Such an adjustment reduces the number of observations in the original British Settlement in 1916 to 675 and French to 234.

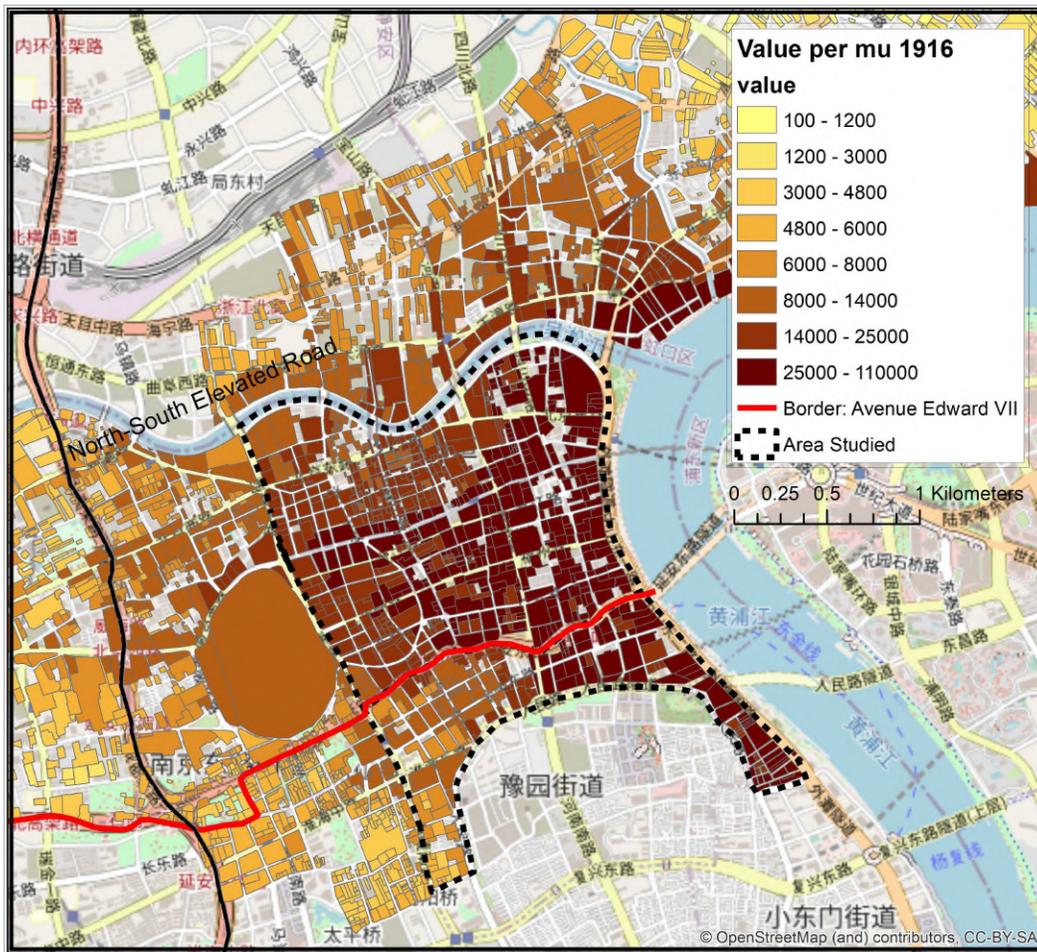


Fig. 6: Land Value Gradient 1916

Notes: This figure plots the land lots that were assessed in 1916.

Summary statistics for 1903, 1916 and 1934 are reported in Table 2.²¹ The unit for area is mu ²², and for value is tls. per mu ²³. As shown in Table 2, the mean value in the French Concession was about 65% of that in the British Settlement in 1903. In 1916 this ratio increased to 80%; and in 1934, it increased to 87%. Although the land lots in the British Settlement were still more expensive on average, a closer look at the neighborhood around the border indicates that the land markets in the two Settlements had already become highly integrated at that time. Area, on the other hand, was relatively similar, and no significant discontinuity was found at the border (see Fig. 8).

Table 2: Summary Statistics of Land Lots

	1903		1916		1934	
Original British Settlement	Value	Area	Value	Area	Value	Area
Min	4,500	0.05	10,000	0.03	41,667	0.02
Max	37,500	48.65	110,000	48.65	371,667	48.65
Mean	11,859.49	3.39	28,542.88	3.28	128,137.50	3.02
Std. Dev	5,720.44	4.25	16,798.79	3.90	52,591.96	3.78
Obs	663	663	675	675	713	713
Original French Concession	Value	Area	Value	Area	Value	Area
Min	2,150	0.02	3,500	0.02	29,400	0.02
Max	16,663	22.90	80,000	23.62	245,063	23.61
Mean	7,653.85	3.46	22,832.57	3.41	111,433.40	3.51
Std. Dev	4239.54	3.53	16,593.60	3.52	45,444.59	3.64
Obs	232	232	234	234	230	230

Notes: This table presents the summary statistics of the land lots in the original Settlements. The unit for area is mu , and for value is tls. per mu . Data are collected from the corresponding land valuation schedules.

4 Empirical Results

4.1 Basic Results

The changing discontinuity can be illustrated straightforwardly using a graphical presentation of the RD design. As plotted in Fig. 7, where each dot denotes an average log of land value in some bin, in 1903 the discontinuity was nearly 80%, with higher land values associated with the International Settlement. In the 1910s such gap closed substantially. In 1934, although dots in the British Settlement were still on average higher, no significant discontinuity can be found at the cutoff.

²¹ Data of 1903 of the French Concession are interpolated using the assessments of 1902 and 1906; Data of 1934 of the International Settlement are interpolated using the assessments of 1930 and 1933.

²² Unit for area was recorded in mu , fen , li , with $1mu = 10fen = 100li = 674.45m^2 = 0.1667acre$.

²³ According to *Zhongguo de Duiwai Maoyi he Gongye Fazhan: 1840-1948 (Foreign Trade and Industrial Development in China: 1840-1948)* (Zheng, 1984), tls.1=\$0.640 in 1903, \$0.790 in 1907, \$0.650 in 1911, \$0.790 in 1916, \$1.240 in 1920, \$0.810 in 1924, \$0.690 in 1927, \$0.460 in 1930, and \$0.526 in 1934.

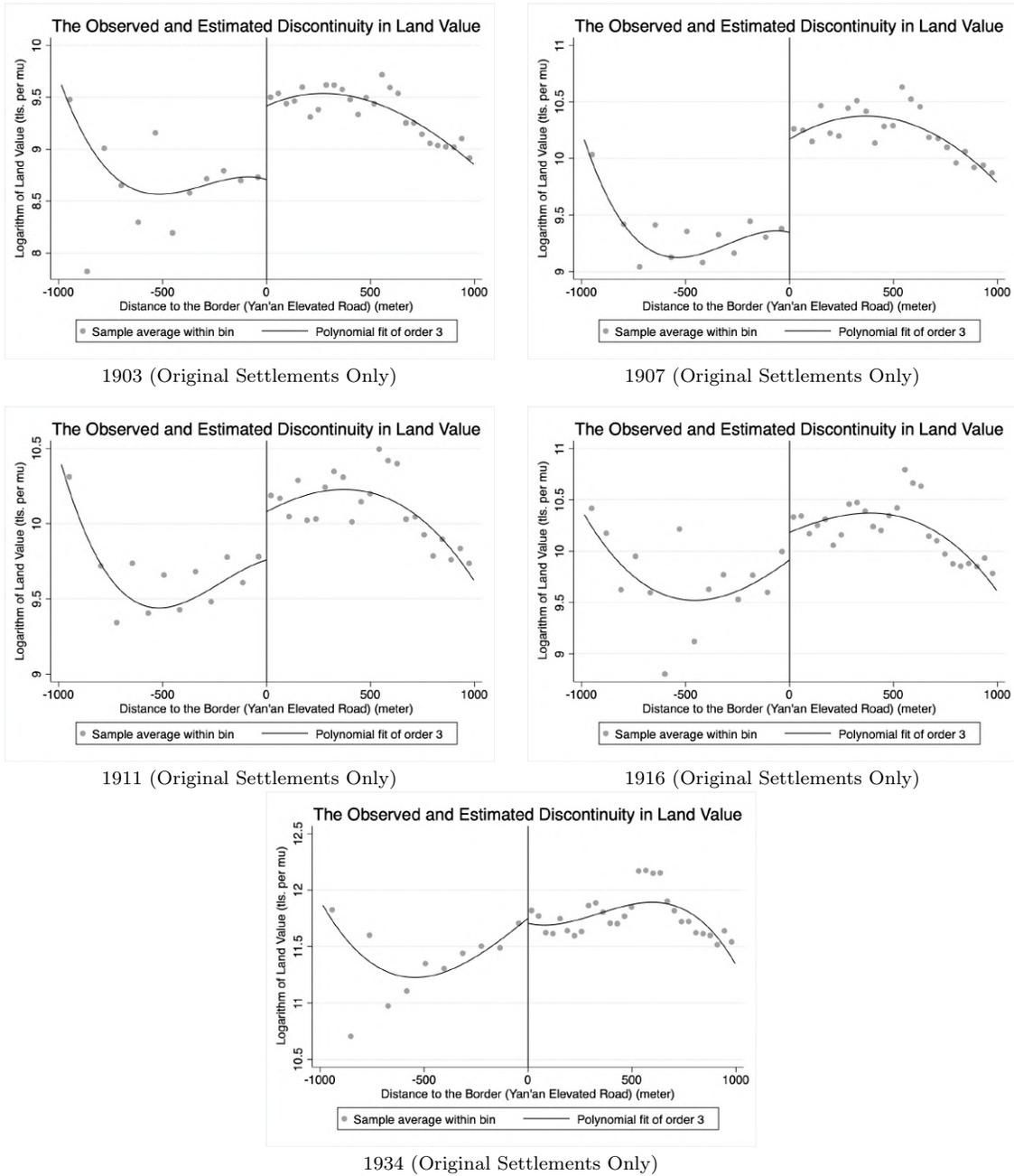


Fig. 7: Discontinuity between the original British and French Settlements

Notes: These figures show the changing discontinuity in land value at the border. Distance to the border is positive for the land lots in the International Settlement and negative for those in the French Concession.

To quantitatively assess the effects of being inside the original British Settlement relative to the French Concession on land value, I estimate the following equation using (1) local linear regression, (2) local quadratic regression, and (3) local cubic regression, respectively.

$$Y_i = \alpha_l + \tau D_i + \beta_l X_i + (\beta_r - \beta_l) D_i \times X_i + \epsilon_i \quad (1)$$

In Equation (1), Y_i denotes the logarithm of the average value of land lot i ; X_i denotes the distance to the border of land lot i and is positive for land lots in the International Settlement while negative in the French Concession; $D_i = 1$ if $X_i > 0$ and $D_i = 0$ otherwise; the interaction term is included to allow the regression functions (e.g., the slope of the linear function) to differ on both sides of the cutoff; and ϵ_i is the error term.

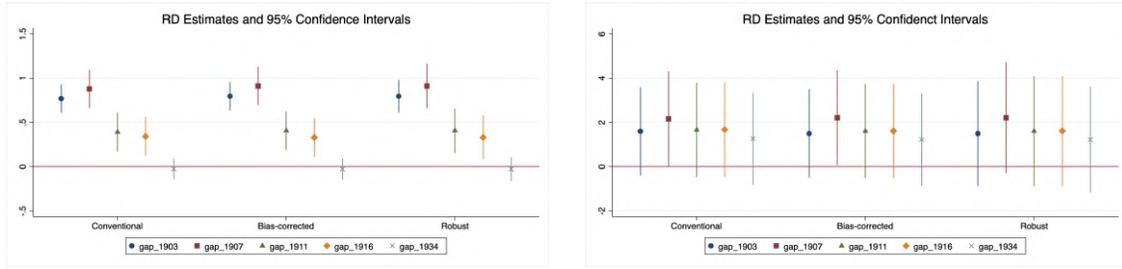
Table 3 presents the results, which largely mirror the patterns in Fig. 7. In each column (a), the bandwidth is selected to be the same for the two Settlements, while in each column (b), the bandwidth is set differently for different sides of the border. In all the columns, the bandwidth is selected based on the 1903 data and kept consistent across years. The bandwidth is allowed to be selected separately for each year using the contemporary data in Appendix Table 3, leading to narrower bandwidths (and thus fewer numbers of observations) in 1916 and 1934. But the pattern stays almost the same, with the exception that the original French Concession overtook the British Settlement in 1934.

As shown in Table 3, the estimated coefficient on the treatment, τ , is significantly positive by 1916 under most of the specifications. Since adding higher-order polynomials does not result in additional efficiency, I will refer to the local linear regression as the favorable model. Estimates in column (b) with polynomial=1 and two different MSE-optimal bandwidth selectors perfectly replicate those magnitudes of discontinuity at the cutoff in Fig. 7 and therefore are selected as the baseline result to be visualized in Fig. 8. Both the conventional and the bias-corrected RD estimates strongly reject the null hypothesis that there was no discontinuity at the border in the 1900s and 1910s. The estimated coefficients imply that, compared to the land lots in the original French Concession that were just below the border, land lots in the original British Settlement that were just above the border had an average of 80% higher assessed values in 1903 and 91% higher assessed values in 1907. Such a vast premium, however, was not carried into the 1910s but shrank by more than half. In 1911, crossing the border from the French to the British side was just associated with a 41% appreciation in land value. This premium further dropped to 33% in 1916. Eighteen years later, in 1934, there was no significant boundary effect at all.

Table 3: RD Estimates Between the Original British and French Settlements

Year	Polynomial=1		Polynomial=2		Polynomial=3		
	(a)	(b)	(a)	(b)	(a)	(b)	
1903	(1)	0.7687*** (0.0826)	0.7686*** (0.0818)	0.7827*** (0.0965)	0.7458*** (0.0975)	0.7617*** (0.1137)	0.7275*** (0.1151)
	(2)	0.7824*** (0.0826)	0.7958*** (0.0818)	0.7948*** (0.0965)	0.7415*** (0.0975)	0.7586*** (0.1137)	0.7132*** (0.1151)
	(3)	0.7824*** (0.0964)	0.7958*** (0.0941)	0.7948*** (0.1073)	0.7415*** (0.1107)	0.7586*** (0.1229)	0.7132*** (0.1270)
Effective # of obs (l, r)		117, 119	127, 116	144, 187	134, 238	157, 248	152, 344
1907	(1)	0.8807*** (0.1125)	0.8794*** (0.1110)	0.9015*** (0.1314)	0.8494*** (0.1338)	0.9054*** (0.1543)	0.8337*** (0.1575)
	(2)	0.9025*** (0.1125)	0.9111*** (0.1110)	0.9228*** (0.1314)	0.8505*** (0.1338)	0.9128*** (0.1543)	0.8275*** (0.1575)
	(3)	0.9025*** (0.1310)	0.9111*** (0.1271)	0.9228*** (0.1456)	0.8505*** (0.1506)	0.9128*** (0.1663)	0.8275*** (0.1728)
Effective # of obs (l, r)		117, 119	127, 116	144, 187	134, 238	157, 248	152, 344
1911	(1)	0.3834*** (0.1131)	0.3904*** (0.1119)	0.3734*** (0.1315)	0.3123** (0.1336)	0.3351** (0.1542)	0.2685* (0.1576)
	(2)	0.3730*** (0.1131)	0.4066*** (0.1119)	0.3753*** (0.1315)	0.3003** (0.1336)	0.3262** (0.1542)	0.2478 (0.1576)
	(3)	0.3730*** (0.1316)	0.4066*** (0.1283)	0.3753** (0.1459)	0.3003** (0.1509)	0.3262* (0.1669)	0.2478 (0.1738)
Effective # of obs (l, r)		117, 119	127, 116	144, 187	134, 238	157, 248	152, 344
1916	(1)	0.3248*** (0.1110)	0.3418*** (0.1104)	0.2700** (0.1282)	0.1910 (0.1277)	0.1851 (0.1533)	0.1149 (0.1490)
	(2)	0.2851*** (0.1110)	0.3302*** (0.1104)	0.2409* (0.1282)	0.1507 (0.1277)	0.1533 (0.1533)	0.0691 (0.1490)
	(3)	0.2851** (0.1286)	0.3302*** (0.1265)	0.2409* (0.1418)	0.0018 (0.1447)	0.1533 (0.1613)	0.0691 (0.1648)
Effective # of obs (l, r)		117, 119	127, 116	144, 187	134, 238	157, 248	152, 344
1934	(1)	-0.0436 (0.0693)	-0.0248 (0.0723)	-0.0735 (0.0893)	-0.1473** (0.0846)	-0.1330* (0.0787)	-0.1968*** (0.0752)
	(2)	-0.0704 (0.0693)	-0.0270 (0.0723)	-0.1003 (0.0893)	-0.1800*** (0.0846)	-0.1603** (0.0787)	-0.2370*** (0.0752)
	(3)	-0.0704 (0.0794)	-0.0270 (0.0823)	-0.1003 (0.1025)	-0.1800** (0.0968)	-0.1603* (0.0851)	-0.2370*** (0.0836)
Effective # of obs (l, r)		117,119	127, 116	144, 187	134, 238	157, 248	152, 344

Notes: This table reports the estimated discontinuities in land value at the border of the original British Settlement and the original French Concession. The dependent variable is expressed in natural logarithm so the coefficients stand for percentage changes. Row (1)'s report the conventional RD estimates with conventional standard error estimator. Row (2)'s report the bias-corrected RD estimates with conventional standard error estimator. Row (3)'s report the bias-corrected RD estimates with robust standard error estimator. In column (a)'s one common MSE-optimal bandwidth selector is used: $[-250.793m, 250.793m]$ when polynomial=1, $[-386.004m, 386.004m]$ when polynomial=2, and $[-503.690m, 503.690m]$ when polynomial=3, all selected based on the data of 1903. In column (b)'s two different MSE-optimal bandwidth selectors are used: $[-273.558m, 244.677m]$ when polynomial=1, $[-323.681m, 486.363m]$ when polynomial=2, and $[-435.097m, 689.532m]$ when polynomial=3, all selected based on the data of 1903. Standard errors are noted in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.



Estimated Discontinuity in Land Value Robustness Check: No Discontinuity in Area
 Fig. 8: Estimated Discontinuity in Land Value and Area

Notes: The figure on the left is a visualisation of column (b) under polynomial=1 in Table 3. The figure on the right presents the results from the same equation but with area as the outcome variable.

4.2 Robustness Checks

The identification assumption of the RD design requires that the individuals be unable to (precisely) manipulate the assignment variable. Though it sounds odd that the land lots were capable of “locating” themselves, there remains a possibility that area, the baseline covariate, changed discontinuously at the cutoff. If this is true, the boundary effect favoring the original British Settlement may simply have reflected the imbalance in this covariate: land lots in the British Settlements may be generally larger, and larger land lots tended to be more valuable.²⁴ In this regard, I test for the discontinuity in area at the border by estimating Equation (1) with area as the outcome variable. The right panel in Fig. 8 presents the RD estimates of such discontinuity using a local linear regression with two different MSE-optimal bandwidth selectors. None of them is statistically significant at the 5% level, ruling out the possibility that the higher land value in the British Settlement was a result of generally larger size in its land lots.

Another type of robustness check is the authenticity of the discontinuity. If the discontinuities in land value found in the 1900s and 1910s were authentic, but not coincidental, they should be sensitive to the cutoff, and insensitive to the bandwidth. Therefore, I cook up some “pseudo” cutoffs (as illustrated in Appendix Fig. 5) and “nonoptimal” bandwidths, based on which the local linear regression is reconducted.

Fig. 9–11 present the RD estimates under those false assumptions. Pseudo cutoffs are set at the 10th, 20th, and 25th percentiles on both sides in Fig. 9 and are set as the thoroughfares closest to the border in Fig. 10. Unlike in the baseline regression with the true cutoff, almost none of the coefficients obtained with the pseudo cutoffs is significant. Fig. 11 shows the RD estimates with the “nonoptimal” bandwidths as 25%, 50%, ..., 200% of the “optimal” bandwidth selected in the favorable model. Except for the bandwidth that is 25% of the “optimal” bandwidth, at which the numbers of observations become scarce, the results are not significantly altered.

²⁴ This is verified with the data in either the original British Settlement or French Concession. That larger land lots had higher land value per *mu* may be because they were more flexible in use.

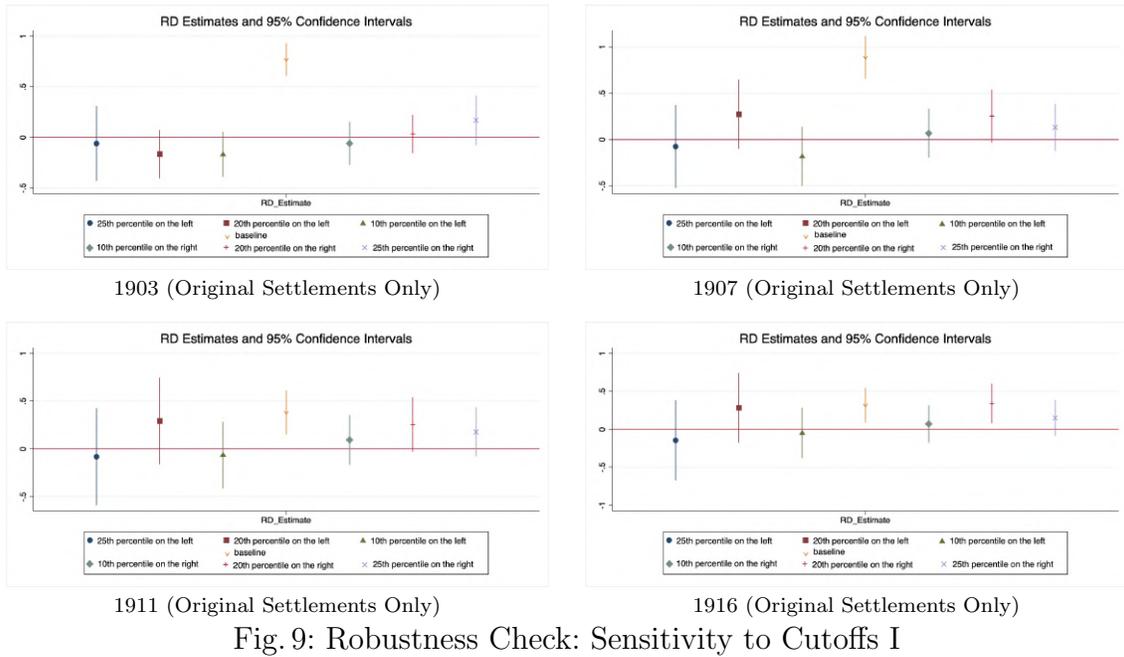


Fig. 9: Robustness Check: Sensitivity to Cutoffs I

Notes: These figures demonstrate the sensitivity of the discontinuities to the choice of cutoff. The pseudo cutoffs are set at the 10th, 20th, and 25th percentiles of the distances to the border.

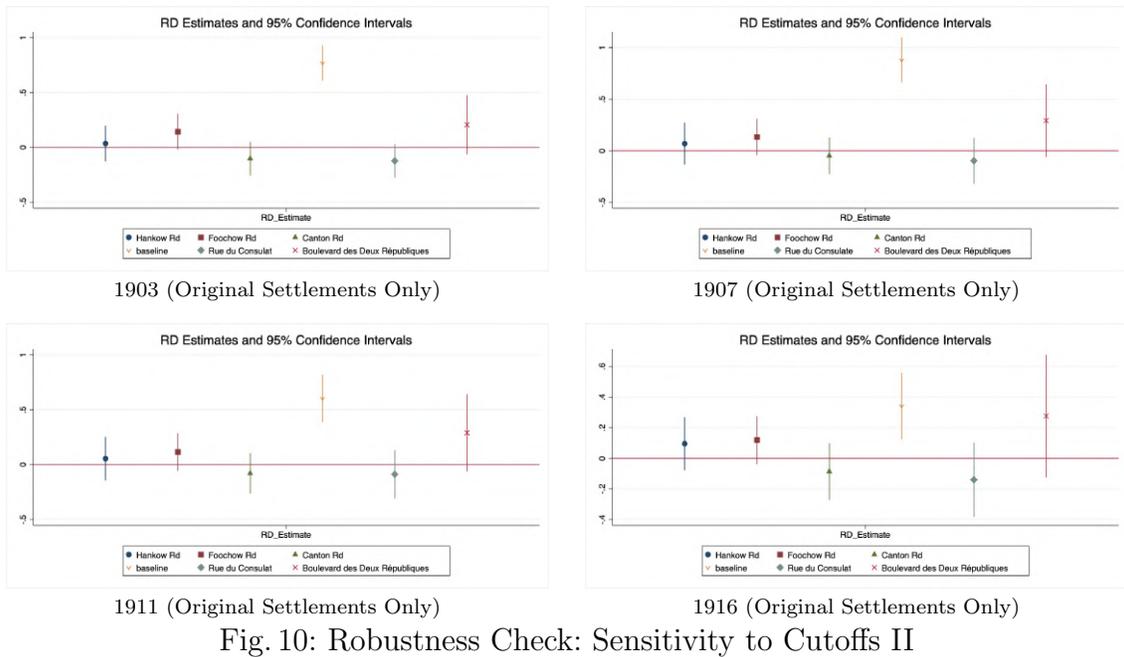


Fig. 10: Robustness Check: Sensitivity to Cutoffs II

Notes: These figures demonstrate the sensitivity of the discontinuities to the choice of cutoff. The pseudo cutoffs are set as the thoroughfares closest to the border.

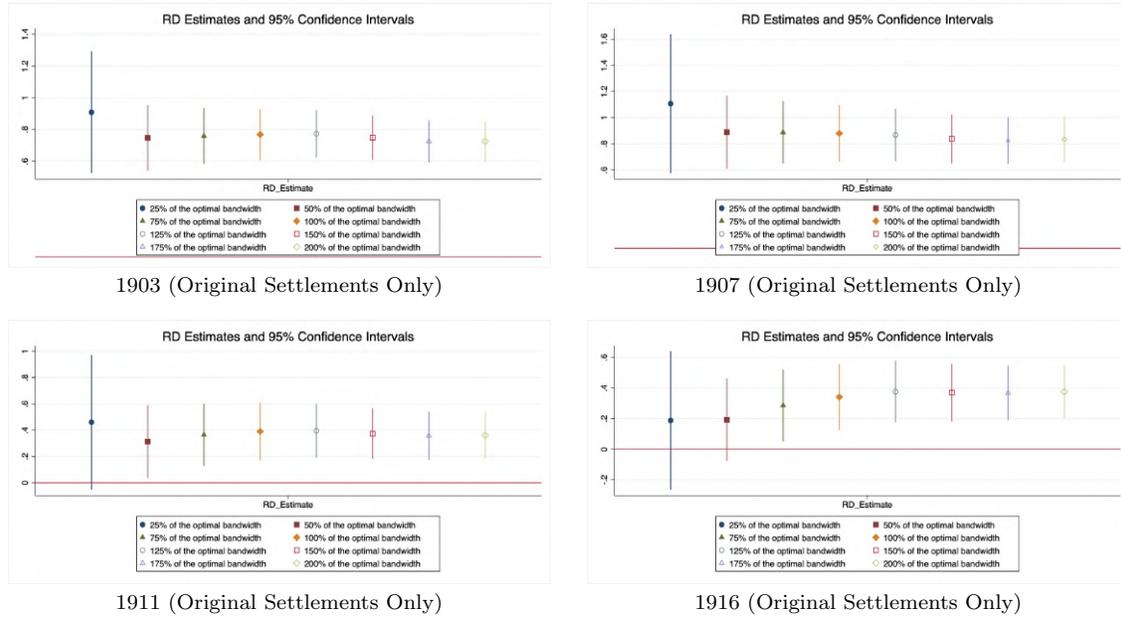


Fig. 11: Robustness Check: Insensitivity to Bandwidth

Notes: These figures demonstrate the insensitivity of the discontinuities to the bandwidth. The “nonoptimal” bandwidths are set as 25%, 50%, ..., 200% of the “optimal” bandwidth selected in the favorable mode.

4.3 Heterogeneity Analysis

In the previous subsections, the discontinuities in land value at the border between the original British Settlement and French Concession in the 1900s and 1910s have been identified clearly. A natural question to ask is whether the discontinuity varied along the border. If the scale of discontinuity was the same at first and then dissipated at the same speed everywhere along the border, it is more likely that the catch-up of the original French Concession was purely an economic convergence or even an outcome of the modification in land valuation. To learn whether the development along the border was balanced or not, I choose nine crossroads as the focal points and estimate the very “local” regression discontinuity around each of them. The nine crossroads are the intersections of the border and those north-south thoroughfares, from the Bund at the eastern end to the Yunnan Road at the western end.

As shown in Fig. 12, the overall discontinuity in the year of 1903, 0.80, breaks into eight discontinuities in eight segments of the border, ranging from 0.27 to 1.00. The gap between the two Settlements was more pronounced in the area to the west of the Honan Road, implying that the French Concession used to be a laggard in westward development. The Bund was another area that displayed a significant discontinuity—although the French Bund was undoubtedly the most prosperous district within the French Concession, it still lagged behind its British counterpart that owned large banks like the Hongkong and Shanghai Banking Corporation, long-standing trading compa-

nies like the Sassoon & Co., and the first department stores like the Hall & Holtz, Limited. By and large, the scale of discontinuity varied much along the border in 1903. Not only were the land markets of the two Settlements far from integrated, but there was no sign of a universal boundary effect.

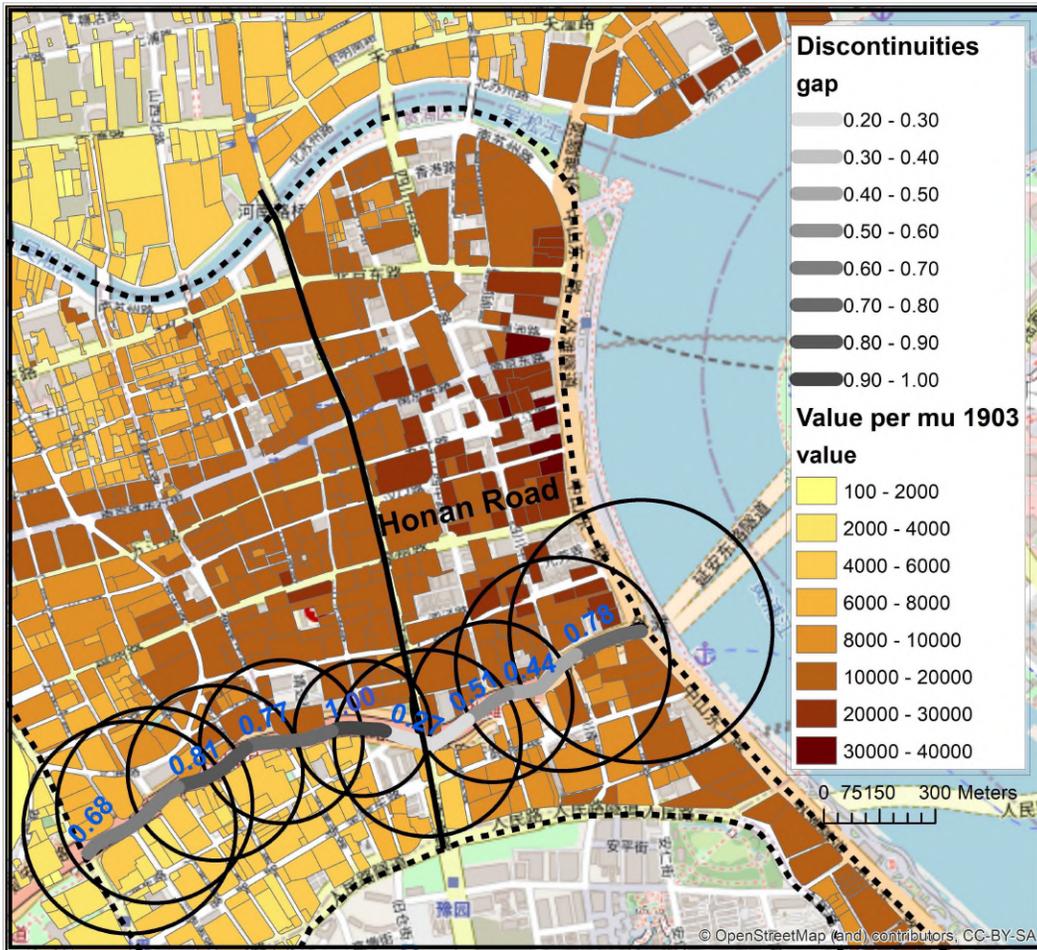


Fig. 12: RD Estimates in Different Sections of the Border, 1903

Notes: This figure shows the heterogeneity in discontinuity along the border in 1903. RD is conducted on the land lots that are within each circle, the center of which is one of the nine crossroads along the border.

Table 4 presents the RD estimates at each crossroad from west to east in 1903, 1907, 1911, 1916, and 1934. In each row (1), the bandwidth is selected based on the 1903 data and kept consistent across years, while in each row (2), the bandwidth is selected separately for each year using the contemporary data. They point to a similar heterogeneity in the speed of catch-up: the land lots near the Bund closed the gap first, yet all of them followed the same trend. As early as in 1911, no discontinuity could be

found to the east of the Honan Road, while in the area to the west of it, crossing the border was still associated with discrete changes in land value.

Table 4: RD Estimates along the Border

Year		West → East								
		Yunnan Road	Kwangse Road	Chekiang Road	Fokien Road	Shantung Road	Honan Road	Kiangse Road	Szechuen Road	The Bund
1903	(1)	0.6819*** (0.0879)	0.6771*** (0.0728)	0.8101*** (0.0634)	0.7654*** (0.1045)	0.9958*** (0.1238)	0.2723** (0.1326)	0.5141*** (0.1001)	0.4389*** (0.1390)	0.7801*** (0.1763)
	Effective # of obs (l, r)	35, 19	38, 26	42, 24	31, 22	12, 17	29, 22	15, 20	27, 34	21, 20
1907	(1)	0.7769*** (0.1101)	0.8633*** (0.0800)	1.1654*** (0.0766)	0.8373*** (0.0749)	0.9887*** (0.1496)	0.0707 (0.1867)	0.4686*** (0.1206)	0.5743*** (0.2062)	0.8385*** (0.3074)
	Effective # of obs (l, r)	35, 19	38, 26	42, 24	31, 22	12, 17	29, 22	15, 20	27, 34	21, 20
1907	(2)	0.7756*** (0.1054)	0.8862*** (0.1001)	1.1480*** (0.0748)	0.8373*** (0.0767)	0.9888*** (0.1471)	0.0230 (0.1972)	0.4932*** (0.1298)	0.5403*** (0.2019)	0.7983*** (0.2933)
	Effective # of obs (l, r)	35, 23	42, 36	43, 28	32, 23	13, 18	25, 16	14, 18	29, 36	27, 29
1911	(1)	0.2753 (0.1797)	0.3075*** (0.1154)	0.6022*** (0.0975)	0.3491*** (0.1151)	0.2662* (0.1477)	-0.4661** (0.2372)	-0.0381 (0.0981)	0.0833 (0.2372)	0.1954 (0.2993)
	Effective # of obs (l, r)	35, 19	38, 26	42, 24	31, 22	12, 17	29, 22	15, 20	27, 34	21, 20
1911	(2)	0.2893* (0.1645)	0.3557*** (0.1298)	0.6263*** (0.0982)	0.3487** (0.1171)	0.2912* (0.1502)	-0.5006** (0.2381)	-0.0205 (0.1023)	0.0386 (0.2254)	0.2137 (0.2963)
	Effective # of obs (l, r)	35, 24	46, 36	47, 33	35, 26	13, 18	27, 19	14, 18	29, 37	27, 27
1916	(1)	0.2852 (0.3291)	0.1849 (0.1957)	0.5433*** (0.1650)	0.3930* (0.2237)	0.0226 (0.2968)	-0.5425* (0.2943)	-0.0171 (0.1345)	0.0503 (0.2735)	0.2175 (0.2643)
	Effective # of obs (l, r)	35, 19	38, 26	42, 24	31, 22	12, 17	29, 22	15, 20	27, 34	21, 20
1916	(2)	0.2617 (0.2298)	0.2980 (0.1890)	0.6299*** (0.1560)	0.3913* (0.2250)	0.0714 (0.2729)	-0.5972* (0.3077)	-0.0172 (0.1359)	0.0053 (0.2579)	0.2359 (0.2779)
	Effective # of obs (l, r)	52, 41	52, 47	53, 38	33, 24	18, 21	27, 18	16, 22	29, 38	20, 18
1934	(1)	0.0985 (0.2212)	-0.0913 (0.1306)	0.1837 (0.1335)	-0.0129* (0.1298)	-0.0895 (0.2015)	-0.1523* (0.0858)	-0.1924 (0.1432)	-0.1952 (0.2154)	0.1073 (0.1473)
	Effective # of obs (l, r)	35, 19	38, 26	42, 24	31, 22	12, 17	29, 22	15, 20	27, 34	21, 20
1934	(2)	0.1095 (0.1906)	-0.0235 (0.1357)	0.1861 (0.1244)	-0.0139 (0.1323)	-0.1102 (0.1931)	-0.1677* (0.0916)	-0.1742 (0.1170)	-0.1719 (0.1412)	0.0995 (0.1455)
	Effective # of obs (l, r)	47, 31	48, 37	49, 37	30, 21	13, 18	27, 18	24, 33	49, 75	20, 16

Notes: This table reports the estimated bias-corrected discontinuities in land value in different sections along the border of the original British Settlement and French Concession. The dependent variable is expressed in natural logarithm so the coefficients stand for percentage changes. In each row (1) the bandwidth is selected in 1903 and remain the same across years. In each row (2) the bandwidth is selected in each corresponding year. Bias-corrected standard errors are noted in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

In Table 5, where the distance to the Bund is used as an explanatory variable, the heterogeneity can be viewed as two phases: from 1903 to 1911, the farther away from the Bund, the less the growth rate, while after 1911, the farther away from the Bund, the greater the growth rate. It is consistent with the fact that the French Concession sped up development in the 1910s, with three remarkable events: (1) the demolition of the wall of the old Shanghai Town in 1912, making the native city more accessible, (2) the filling-in of the Yang-king-pang in 1914 and the construction of the thoroughfare Avenue Edward VII in 1915, and (3) the significant expansion in the west in 1914. All of these events made it easier for commuters to travel from east to west, and therefore should benefit land in the west more than the well-developed land near the Bund.²⁵

²⁵ In the 1910 annual report of the French Council (p. 118), when discussing the problem of the heavy traffic in the French Concession, it was said that “Le seul remède complètement efficace être la couverture du

Table 5: Uneven Development in along the Border

A: Dependent variable is the difference in the logarithm of land value between 1903 and 1907		
	Original British Settlement	Original French Concession
(1) Distance to the Bund	-0.1670*** (0.0332)	-0.4028*** (0.0239)
# of obs	121	124
(2) Distance to the Bund	-0.1524*** (0.0309)	-0.3787*** (0.0234)
# of obs	139	141
B: Dependent variable is the difference in the logarithm of land value between 1907 and 1911		
	Original British Settlement	Original French Concession
(1) Distance to the Bund	-0.0190 (0.0258)	-0.1492*** (0.0239)
# of obs	121	124
(2) Distance to the Bund	-0.0196 (0.0229)	-0.1530*** (0.0218)
# of obs	139	141
C: Dependent variable is the difference in the logarithm of land value between 1911 and 1916		
	Original British Settlement	Original French Concession
(1) Distance to the Bund	0.0675*** (0.0205)	0.0655** (0.0273)
# of obs	121	124
(2) Distance to the Bund	0.0799*** (0.0185)	0.0454* (0.0250)
# of obs	139	141
D: Dependent variable is the difference in the logarithm of land value between 1916 and 1934		
	Original British Settlement	Original French Concession
(1) Distance to the Bund	0.4899*** (0.0336)	0.8090*** (0.0460)
# of obs	121	124
(2) Distance to the Bund	0.4743*** (0.0300)	0.8086*** (0.0418)
# of obs	139	141

Notes: This table reports the estimated coefficients of the land value appreciation on the distance to the Bund. In each row (1) the sample is restricted to the land lots that were less than 250m to the border. In each row (2) the sample is restricted to the land lots that were less than 300m to the border. Standard errors are noted in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Fig. 12 and Table 4–5 also indicate that the canal Yang-king-pang could not explain, at least entirely, the discontinuity in land value in the 1900s and 1910s. Before the construction of the Avenue Edward VII, in the Yang-king-pang era, there was a bridge at each thoroughfare, with the distance between every two of them approximately 200m. Had the inconvenience caused by the canal been the entire reason for the discontinuity, the discontinuity would have disappeared every 200m at the intersections, which is not the case shown in Fig. 12. In addition, the fact that by 1911 there had already been no boundary effect to the east of the Honan Road shown in Table 4 rejects the hypothesis that the catch-up was simply a market integration introduced by the construction of Avenue Edward VII in 1914 or that the Yang-king-pang held back land value appreciation everywhere before 1914.

Yang-King-Pang et son remplacement par une vaste Avenue (the only effective remedy is to fill in the Yang-king-pang and replace it with a thoroughfare)”.

4.4 Assessed Value versus Market Value

When comparing the land value between the two Settlements using land valuation schedules, one might be concerned with determining to what extent the assessed value can represent the fair market value. Although this is exactly the goal of the two municipal councils, the discrepancy may still exist, as the valuation was conducted by different bureaus that could apply different measurements. More seriously, if one municipal council kept the assessed value lower on purpose (for example, to attract businesses and residents through lower tax), a systematic discrepancy would be created, making the comparison meaningless. However, hereafter in this subsection, I will document this is not a problem with three pieces of evidence: tax collection, land expropriations, and land transaction.

First of all, according to the annual reports (1892–1933; 1893–1940) of the two municipal councils, income was adjusted through tax rates rather than tax bases. The main source of public revenue consisted of four parts: (1) land tax (“impôt foncier” in the French Concession), which was levied on the assessed values from the land renters; (2) rental tax (“general municipal rate” in the International Settlement and “impôt locatif” in the French Concession), which was levied on the assessed rentals of houses from the occupants; (3) wharfage dues (“droits de quayage” in the French Concession), which was levied on all goods passed through the Custom-house; and (4) license fees. In the early 1900s, land tax accounted for approximately 20% in the International Settlement and 10% in the French Concession of the ordinary revenue. From the late 1900s to the early 1920s, it accounted for approximately 25% and 15% in the two Settlements, respectively. Next, in the French Concession this types of income kept growing to 25% of its ordinary revenue in the 1930s. The time series of the land tax rate and rental tax rate are shown in Table 6.

Because of its large scale, the land tax income was susceptible to the tax rate. For example, in the International Settlement, when the tax rate increased from 0.5% to 0.6% in 1908, the portion of annual income accounted for by land tax increased from 23.01% (tls. 456,330) to 28.51% (tls. 685,105). In the French Concession, when the tax rate increased from 0.5% to 0.6% in 1919, the portion of annual income accounted for by land tax increased from 16.13% (tls. 153,315) to 18.19% (tls. 190,256). Such sensitivity made the tax rate a convenient tool for adjusting revenue. In 1927, the Shanghai Municipal Council raised the land tax rate from 0.7% to 0.8% to balance the budget. When suffering great losses during the Anti-Japanese War (mostly due to defense and refugee relief), both municipal councils increased the land tax rate urgently, to as high as 2.5% in the International Settlement (in 1943) and 1.6% in the French Concession (in 1942). Compared with tax rates, the tax base (i.e., the assessed value of land), was not flexible enough, and in the Rate Payers’ Meetings no one had ever proposed a raise or reduction of the assessed value for fiscal purposes.

Table 6: Land Tax Rate and Rental Tax Rate

Year	Land Tax Rate		Rental Tax Rate (within the settlement)		Rental Tax Rate (beyond the settlement)	
	International Settlement	French Concession	International Settlement	French Concession	International Settlement	French Concession
1900-02	0.5%	0.5%	10%	5%, 11% *		
1903-06	0.5%	0.5%	10%	8%, 12% *		
1907	0.5%	0.5%	10%	8%, 12% *	5%	5%
1908-14	0.6%	0.5%	12%	8%, 12% *	6%	8%
1915-18	0.6%	0.5%	12%	8%, 12% *	6%	**
1919	0.7%	0.6%	14%	10%, 12% *	12%	**
1920-25	0.7%	0.6%	14%	12%, 12% *	12%	**
1926-27	0.7%	0.7%	14%	12%, 12% *	12%	**
1928-29	0.8%	0.8%	16%	14%, 14% *	14%	**
1930-31	0.7%	0.8%	14%	14%, 14% *	12%	**
1932-35	-	0.8%	-	13%, 13% *	-	**

Notes: This table lists the land tax rates and rental tax rates in the two Settlements across years. The rates are obtained from the annual reports published by the two municipal councils (1892–1933; 1893–1940).

* The former was applied to the Europeans and the latter was applied to the Chinese.

** Since the last extension was officially granted in 1914 there had been no “land beyond the settlement” in the French Concession.

The second piece of evidence is the same compensation strategy adopted by the two municipal councils when expropriating land. According to the annual reports (1892–1933; 1893–1940), both councils paid compensation at the assessed value plus 10% (at least from the 1900 to 1930) for compulsory surrender and probably less (plus) some deduction (compensation) for betterment (destruction).

In 1916, to maintain the Bund and Canton Road, part of Lot 56 in the Central District of the International Settlement was expropriated. The compensation was tls. 7,943, and it was calculated as: $0.249mu \times \text{tls. } 87,000/mu$ (as assessed in the 1911 *Land Valuation Schedule*) $\times 110\%$ (for compulsory surrender) $\times 1/3$ (for betterment). In the same year, the surrender from Lot 109 in the French Concession was associated with a compensation of tls. 16,504.66 ($= 0.9029mu \times \text{tls. } 14,000/mu \times 110\% + \text{tls. } 2600$)²⁶.

The last piece of evidence is discerned from the actual land transactions. The only well-preserved and organized records of land transaction are the title deeds signed between the foreign buyers and the local Chinese owners when new pieces of (farm) land were sold. For each land lot, only the price of the very first transaction was recorded. A positive aspect of this type of recording is that the land transacted for the first time was generally unimproved, so the price reflected just the value of the land itself, excluding the attachment, which would absolutely generate a large variation in market price.²⁷

²⁶ Tls. 2600 is the compensation for the loss in rentals of 16 Chinese houses and the removal expense of one European house.

²⁷ Although the land offices usually considered attachments when assessing land, land with attachments was not necessarily recognized as more valuable by the market, as it may cost more to pull down the outdated buildings (Chen, 1933).

Title deeds spanning from 1847 to 1911 have been compiled in the 30-volume book *Shanghai Title Deed*, which was published in 2005 (Cai, 2005), while the remainder is not publicly available. There are approximately 10,700 pieces presented, including volumes of Britain, America, France, and other countries, among which 7,500 were approved by the British consulate, 1,700 by the American consulate, and 399 by the French consulate. A typical piece of title deed contains information about (1) Shanghai Daotai and the foreign consul who were responsible for this land lease, (2) the original Chinese owner, (3) the foreign tenant and his or her nationality, (4) the acreage of the land, (5) the cash pledge (equivalent to the land price²⁸), (6) the annual rental (the replacement of the land tax paid to the Chinese government), (7) the location of the land, (8) the four boundaries, and (9) the rights and obligations of the original owner and the tenant. Subsequent transactions were tracked, but new prices were not recorded.

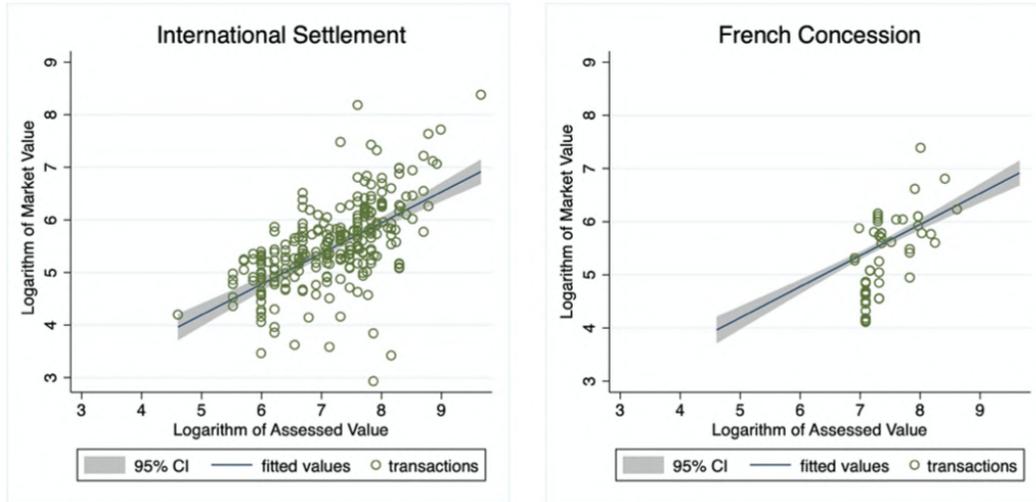
As it was reported in both documents, the title deed number can act as a bridge connecting the title deeds and land valuation schedules. However, due to frequent combination and partition in the ensuing years, only a tiny portion of land lots recorded in the title deeds obtained or kept cadastral numbers, and thus was reported in the land valuation schedules. In the British volume of the *Shanghai Title Deed*, 1,907 land transactions between 1901 and 1908 were recorded, but only 266 of them had corresponding cadastral numbers in land assessment of 1903 or 1907. Among the 274 land transactions recorded in the French volume during the same period, only 55 had corresponding cadastral numbers in 1902, 1906, or 1908. Assuming a constant rate of change, I interpolate the assessed land values each year from 1901 to 1908 and compare them to the actual market values based on the 266 land transactions in the International Settlement and the 55 transactions in the French Concession, as shown in Fig. 13.

As plotted in Fig. 13, the actual market values and the assessed values for land lots transacted between 1901 and 1908 were highly correlated in either the International Settlement or the French Concession, and the relationship was similar. The OLS regression of market value on assessed value and acreage gives the coefficients 0.7678*** in the International Settlement and 0.7359*** in the French Concession, indicating that every 1% increase in the assessed value was associated with 0.77% and 0.74% increases in the market value in the two settlements, respectively.²⁹ Such similar relationships between the market values and the assessed values once again prove the common recognition of the land valuation schedules. The discrepancy, if there was any, favors the basic conclusion that there used to be a discontinuity in land value at the

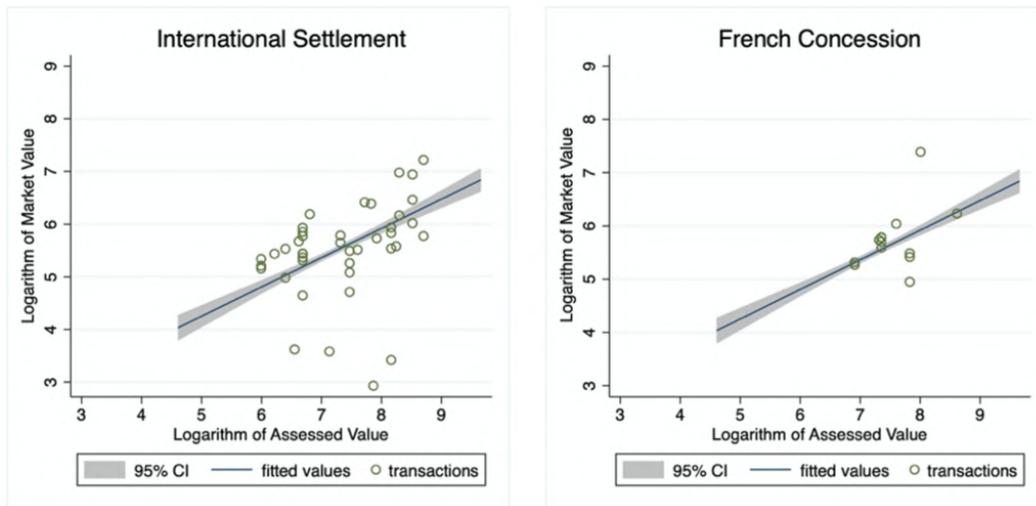
²⁸ The cash pledge was decided by the two parties other than the governments and therefore can be viewed as a reflection of the market price.

²⁹ Unlike in the later years, when the land was always sold at the assessed value with some appreciation, in the 1900s, land prices in the first transactions were lower than the assessed values. This may be because (1) the land lots were unimproved, and (2) the local Chinese sellers always lacked information and bargaining power (Du, 2012).

border and the International Settlement was superior because land valuation seemed to be slightly more conservative there. As a robustness check, Panel B presents the results obtained from a subsample containing only land lots transacted in the years when a land assessment was conducted (so that there is no need for interpolation). The numbers of observations drop sharply to 41 and 13, leading to wider 95% confidence intervals. However, the relationships still follow the same pattern. The estimated coefficients for the assessed value are 0.7556^{***} and 0.7607^{***} in the subsample.



A. All



B. Subsample: Transacted and Assessed in the Same Year Only

Fig. 13: Land Transactions between 1901 and 1908

Notes: These figures plot the log of market values against the log of assessed values of the land lots transacted (for the first time) from 1901 to 1908. The market values are obtained from the *Shanghai Title Deed* (Cai, 2005) while the assessed values are obtained from the land valuation schedules.

5 Placebo Test

Thus far, the analysis focuses on two adjacent Settlements that had different legal origins. Did discontinuities exist between Settlements with the same legal origin? Comparison between the British and American Settlements suggests not. Besides the British and French, in the 1840s, the Americans also claimed a plot of land in Shanghai. The original American Settlement was established in 1848 and unified with the British Settlement in 1863. As early as 1854, the Shanghai Municipal Council, fueled by the threat from the Small Sword Uprising, was administrating all the three Settlements uniformly. After the exit of the French in 1862, the British and American Settlements formally combined, becoming the Central District, and the Northern and (part of) Eastern Districts of the International Settlement, respectively. This pair of adjacent Settlements with the same legal origin and even the same municipality provides a perfect placebo test for the comparison between the British and French.

Fig. 14 presents the RD estimates and 95% confidence intervals between the original British and American Settlements, as an analogy to the figure on the left of Fig. 8, but with a significant contrast: before the 1930s, there was no significant discontinuity in land value at the border at all, even though the border, the Soochow Creek, was a much wider river than the Yang-king-pang.³⁰

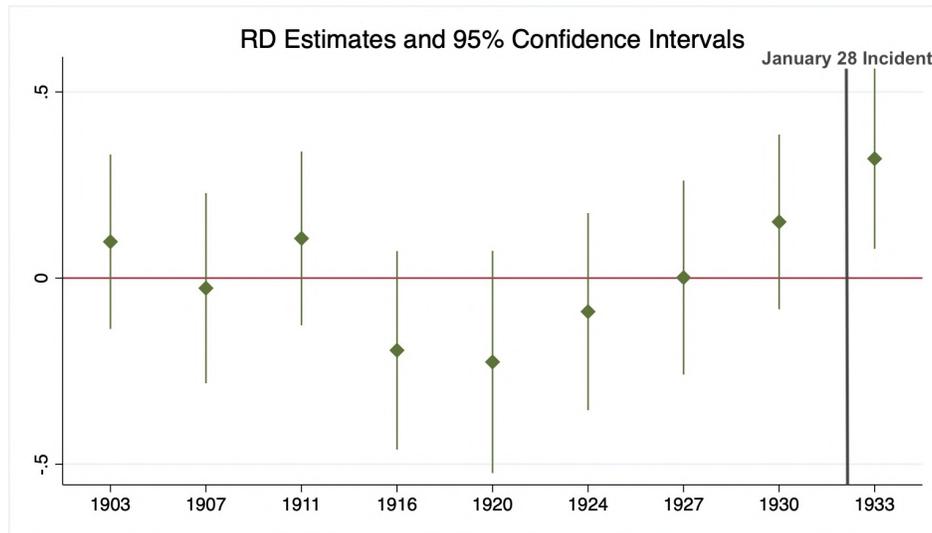


Fig. 14: RD Estimates between the Original British and American Settlements

Notes: This figure shows the bias-corrected RD estimates with robust standard error estimator at the border between the original British and American Settlements. Distance to the border is positive for the land lots in the original British Settlement and negative for those in the original American Settlement.

³⁰ To fairly compare the two districts, I exclude the land lots to the east of the Hongkew Creek as they were too far away from the Soochow Creek and thus the original British Settlement (i.e., I compare land value between the Central District and the Northern District of the International Settlement).

The placebo test reinforces the basic results in that the river was not a major obstacle to the land market integration. In spite of the existence of the Soochow Creek between the original British and American Settlements, people connected the Settlements by constructing bridges at all the thoroughfares, and no discontinuity in land value was found at the border before the 1930s. In 1933, the lagging of the original American Settlement could be explained by the damaged factories and refugees during the January 28 incident, a battle that took place on January 28, 1932, between the Republic of China and the Empire of Japan.³¹

In Fig. 15, I present the predicted values for the land lots that were closest (on both sides) to the Yang-king-pang (Avenue Edward VII after 1914, and Yan'an Elevated Road after 1949) and Soochow Creek. They are predicted based on the coefficients obtained from the local linear regressions and therefore can be viewed as the representative land values at the borders. It is clear that the filling-in of Yang-king-pang in 1914 and the construction of the Avenue Edward VII in 1915 did not generate a significant enough impact on the French side to deviate the predicted land value from its long-run trend. To rule out the possibility that the 1911 assessed land values in the French Concession, which are interpolated from the assessments of 1908 and 1916, were pulled up by the 1916 land values, I plot another prediction by replacing the 1911 interpolated values with the 1908 values adjusted for inflation. As denoted by the orange triangle, the 1911 predicted value based on the information from 1908 was only slightly lower than the previous one containing information from both 1908 and 1916 (576.73 versus 629.67 in 2021 USD per square meter). Still, the land value discontinuity dropped sharply from 1907 to 1911, at which time Yang-king-pang had not been filled in. Appendix Fig. 8 provides additional such predicted land values at the intersections on both sides of the borders. Before the authorities decided to fill in the Yang-king-pang, the French Concession had already caught up with or even overtaken its British neighbor in some segments along the border. Overall, the transformation from the canal to the thoroughfare led to integration more from east to west, rather than from north to south.

³¹ After World War I the Japanese textile industry made a significant push into Shanghai, building lots of cotton and spinning mills in the Northern and Eastern Districts of the International Settlement. A steady stream of Japanese was thereby attracted by the thriving industry. Since 1923, the influx of the Japanese had been further encouraged by the newly opened sea route between Shanghai and Nagasaki. Though the Northern District used to be the American Settlement, Japanese people soon became the majority there. In 1925, they even sent troops to this district on the excuse of “protecting” the Japanese nationals from the May Thirtieth Movement. Hostility between the Chinese and the Japanese peaked in the beginning of the 1930s, when the Wanpaoshan Incident and the Mukden Incident fueled the anti-Japanese movement and the boycott of Japanese goods in Shanghai, which eventually caused the battle in 1932. On the eve of the January 28 Incident, the Eastern and part of the Northern Districts had already been designated as the Japanese sectors (see Appendix Fig. 6). In 1932, they became the battlefield that was greatly destroyed (see Appendix Fig. 7). As stated in the 1933 annual report of the Shanghai Municipal Council (p. 10), “the Sino-Japanese disturbances had a marked effect on the Council’s revenue and it was deemed equitable to accord relief to taxpayers in the Northern and Eastern Districts who were directly affected by these disturbances.”

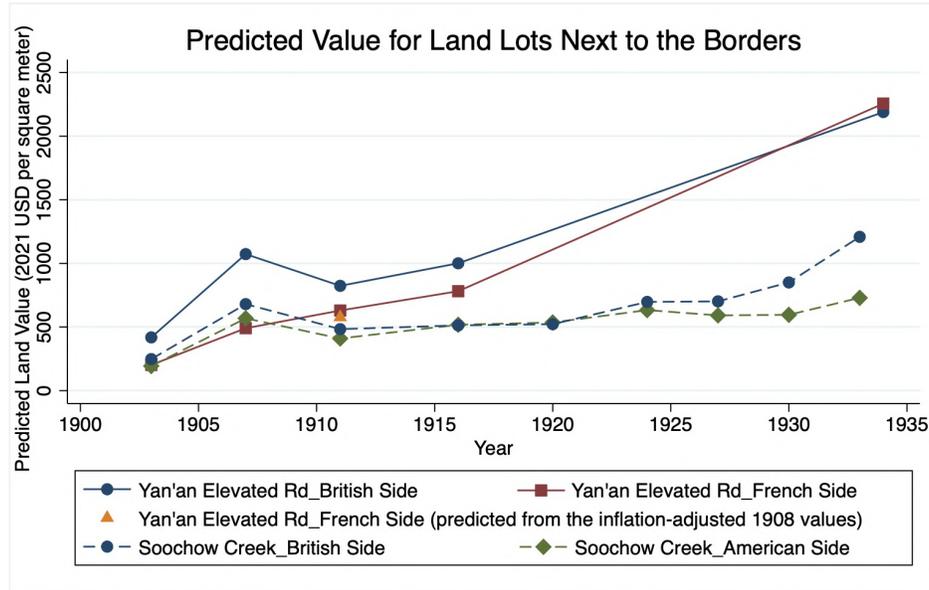


Fig. 15: Predicted Land Value at the Borders

Notes: This figure shows the predicted land value on both sides of both borders. The solid lines denote the predicted values in the small neighborhood of Yang-king-pang/Avenue Edward VII (today's Yan'an Elevated Road), while the dashed lines denote the predicted values in the small neighborhood of Soochow Creek. The initial unit tls. per mu has been converted to 2021 USD per m^2 , based on the exchange rates (Zheng, 1984) and the inflation rates.

6 Institutions: How the Foreigners Operated in the Settlements

Colonial Shanghai tells a story that the French, as a late mover, caught up with their British neighbor in terms of the land value in the Settlements. It provides evidence that in places where the European colonialists could safely settle and were willing to elaborately operate, the French law could do at least as well as the British. This is particularly related to the work of Acemoglu et al. (2001), where they propose a theory of institutional differences among countries colonized by the Europeans and argue that it is the conditions in the colonies, other than the identity of the colonizer or legal origin, that matter for the economic development.

Shanghai is undoubtedly one of those places that are suited for long-run development, yet whether the reason for catching up was that the different legal systems have bred similar institutions or that the differences between the institutions did not matter at all remains unanswered. Although the lack of data, especially in the French Concession, makes it unrealistic to expect a definite answer, the official records and anecdotal reports did suggest a combination of the two explanations—differences in institutions existed, but were probably limited to those that had no significant effect on economic outcomes. This is consistent with the findings in Acemoglu and Johnson (2005). In

this paper about the importance of different sets of institutions, they define “property rights institutions” as the rules and regulations protecting citizens against the power of the government and elites, while “contracting institutions” as the rules and regulations governing contracting between ordinary citizens, and find that the legal origin only significantly affects contracting institutions (e.g., the legal formalism), which do not have a first-order effect on long-run economic growth, because private contracts or other reputation-based mechanisms can, at least in part, alleviate the problems originating from weak contracting institutions.

As two adjacent Settlements competing for international reputations and residents voting with their feet, both the International Settlements and the French Concession worked diligently to establish good (at least from their own perspectives) institutions, making Shanghai the “model settlement.” The two Settlements had different “city charters”, in which the British pragmatism and liberalism were promoted in the International Settlement, while the Jacobin tradition of universalism was promoted in the French Concession (Aldrich, 1996). The value system of the French Concession exhibited more equal formal rights and centralization, which, as pointed out by Bergère (2002), “were not those of Anglo-American civilization” (p. 117). In the French Concession, the elections were run by more universal suffrage³²; the French consul-general was endowed with greater power over the Concession’s governance³³; and the consular officials had a larger influence in the Mixed Court³⁴.

The discrepancy in legal origin led to discrepancies in institutions. The Shanghai Municipal Council acted as the representative of the common interest of all taxpayers, especially the merchant elites, who cared most about the economic profits, whereas the French Council was more cautious in the integrated planning (Bergère, 2002). For example, on Oct. 10, 1910, the French Council introduced construction regulations that any new building to the west of the Songshan Road must be constructed from bricks and stones in European style unless the French consul-general agrees not; and the design plans be approved by the engineers of the French Council. Due to the strong disagreement from the Chinese property owners, the French Council canceled the regulation that forbids Chinese style constructions on Dec. 28 but insisted that the building be constructed using bricks and stones. Such kinds of regulations brought consistency of architectural style in the French Concession—as a contrast to the International Settlement. In 1916 a foreign resident wrote to the Shanghai Municipal Council asking

³² While suffrage was restricted to landowners and householders in the International Settlement, the right to vote was even given to non-proprietor residents in the French Concession. Chinese members had also been allowed to sit on the board of the French Council since 1914, 12 years before the International Settlement invited the Chinese to be part of their government.

³³ Among the 18 articles written in the 1866 “Règlements d’administration municipale” (Municipal Administrative Regulations), nearly half was in support of the French consul’s authority.

³⁴ Before 1911, consuls in the International Settlement had no right to intervene the civil cases involving only the Chinese; while in the French Concession, the vice-consul took part in the joint hearing of every case, and the lawyers could only be French (Shi et al., 2001)

why the International Settlement could not be planned as elaborately as the French Concession. The Council replied that it did not have the right to “constrain the building types in any place within the Settlement.”

A more pronounced discrepancy lay in the judicial system. According to the consular jurisdiction and extraterritoriality codified in the treaties³⁵, disputes among foreigners were to be tried by the consular officials according to the foreign laws and jurisdiction in their home countries; disputes between foreigners and Chinese were to be resolved through negotiation between the consular officials and the Chinese Authorities, and the foreign criminals should be punished according to foreign laws while Chinese criminals should be punished by Chinese laws. In 1869, as Chinese people had flooded in, the two Settlements set up Mixed Courts to deal with people of Chinese nationality accused of offenses or crimes committed within the Settlements. The International Mixed Court and the French Mixed Court (“Cour Mixte Française” in French) were based on different Regulations and functioned differently. Shi (2001) (p. 286–293) and Hou (2017) provide detailed comparisons between them, from which the French Mixed Court did seem to exhibit a slightly higher degree of legal formalism.

Yet did the different styles of administration and legal formalism affect economic growth? In *Unbundling Institutions*, Acemoglu and Johnson (2005) find that the coefficient on legal formalism turns insignificant and gets a “wrong” sign (i.e., countries with more formalism have higher GDP per capita) when they control for property rights institutions. In colonial Shanghai, there was no evidence that people migrate just to avoid the procedural complexity that would be experienced in court. Instead, they were more sensitive to the differences in tax rates and (the accessibility and prices of) public goods. For example, in the 1910s, Chujiu Huang, a famous Chinese businessman, intended to build a super playground (“Dashijie”) in the International Settlement, but finally changed his mind, accepting the invitation from the French Council that offered more preferential terms.

It is also noteworthy that, as the cost of migration between the Settlements was negligible, the two Municipal Councils adopted quite similar economic policies, especially in tax rates.³⁶ In the early years, the French Concession was in the enviable position of having low tax rates (Fredet and Maybon, 1929), but when it was able to provide comparable living conditions and business environments, the tax rates converged to those in the International Settlement (see Table 6). The possible consequence of losing ratepayers forced both authorities to be prudent in policy-making. For example, in a

³⁵ For example, the “Supplementary Treaty of the Bogue” (Humen Tiaoyue)

³⁶ Constrained by the Treaty, the authorities actually had a limited ability to legislate in the Settlements. The tools exploited most were the land tax, rental tax, and all types of license fees. There was no income tax or corporate tax, so within an industry where the license was not required, a firm needed only to pay land tax and/or rental tax to the council. License fees were often used as a means to regulate business and industries, as licensing premises entitled the police and inspectors to enter corresponding buildings to check the health and safety conditions. In many cases, the license fees were symbolic and small in scale. As shown in Appendix Table 4, in 1925, license fees did not vary much between the two Settlements.

meeting on December 28, 1925, when discussing methods of improving revenue, the Representative Committee of the French Council agreed that it was better not to raise the *impôt locatif* (rental tax) and decided to retain the gap of 2% in the tax rate from the International Settlement on purpose as a compensation for the more expensive electricity in the French Concession. As another example, in 1927, the Shanghai Municipal Council increased the general municipal rate (rental tax rate) from 14% to 16%, with a corresponding increase in land tax from 0.7% to 0.8%. When the ratepayers' instructions were put into effect, considerable opposition was experienced, as the new tax rates incurred significant costs for tenants and landowners³⁷. Although it is difficult to estimate the influence of such an increase in tax rates on firms and residents, annual reports (1892–1933) show that the Shanghai Municipal Council, for the first time in its history, cut back the tax rates to 14% and 0.7% in just three years.

In addition to tax rates and license fees, similar policies were also noted in aspects of social life, especially in sanitation and public goods provision. When the Anglo-French settlers first came to East Asia, perhaps the foremost difficulty they were confronted with involved the sanitary conditions. Delaye (2004) provides many examples of how the British and French collaboratively fought diseases via scientific studies of medicine, quarantine rules, and vaccine-promotion programs. Once they safely settled down, public goods would be another urgent issue for their consideration. The second half of the 19th century and the first half of the 20th century happened to be the time period of increased innovation. Oftentimes, the British led the pack, but once a new technology or policy was proven efficient in the International Settlement, the French immediately applied it to their own Concession. Table 7 shows briefly how similar their institutions were in these two aspects and therefore, how similar city lives were enjoyed by the citizens in the two Settlements.

Finally, and most importantly, the property rights institutions, defined by Acemoglu and Johnson (2005) as the rules and regulations protecting citizens against expropriation by the government and powerful elites, worked equally well in both the International Settlement and the French Concession. In the Settlements, land expropriation policies were publicly available and transparent: at least from the 1900 to 1930, both councils paid compensation at the assessed value plus 10% for compulsory surrender and probably less (plus) some deduction (compensation) for betterment (destruction). Similar to the land assessment, when disputes arose, different parties would negotiate at the land commission until a fair compensation was determined. The annual report 1916 (p. 30B) of the International Settlement records a case where the landowners of Lot 605 in the Central District refused to accept the compensation suggested by the council. The owners claimed that the frontage of the lot, prior to the strip being surren-

³⁷ For example, the landowner of Lot 49 in the Central District at the Bund, where the Hongkong and Shanghai Banking Corporation were located, had an extra burden of tls. 1,816 (= tls. 190,000/*mu* × 9.558*mu* × 0.1%), which was equivalent to \$1,253 in 1927. As a reference, tls. 1=\$0.69 in 1927, and the retail prices of beef (sirloin), codfish, tomatoes, and apples were \$0.29, \$0.27, \$0.14 and \$0.22 per pound, respectively.

Table 7: Sanitation and Public Goods Provision in the Settlements

Category	Start Time		Price	
	International	French	International	French
Sewerage System	1862	1870s	-	-
Food Inspection	1868	1896	-	-
Dairy Inspection	1882	1910	-	-
Slaughter House	1876	1903	-	-
Health Department	1898	1905	-	-
Isolation Hospital	1900	1907	-	-
Free Vaccination	1871	1871	-	-
Bacteriological Laboratory	1896	1890s	-	-
Tramway	1908	1908	-	-
Railless Trolley	1914	1926	-	-
Gas	1865*	1867**	uniform price	uniform price
Electricity	1882†	1882††	0.025/kWh (1920s–1930s)	tls. 0.04/kWh (after 1926)
Water	1883★	1883★★	no more than 5% of the rental for most users by the 1930s	5% of the rental before 1908, tls. 0.075/m ³ 1908–1924, and tls. 0.0875/m ³ after that

Notes: This table reports the start time and the prices (if applicable) of the public goods. The information is collected from Shi et al. (2001).

*supplied by the Shanghai Gas Co. Ltd.

**supplied by the French Gas Co. Ltd. before 1891, and the Shanghai Gas Co. Ltd. after that

†supplied by the Shanghai Power Co. before 1888, the New Shanghai Electric Co. Ltd. between 1888 and 1893, the Electrical Department of the Shanghai Municipal Council between 1893 and 1929, and the Shanghai Electric Co. Ltd. after that

††supplied by the Shanghai Power Co. before 1888, the New Shanghai Electric Co. Ltd. between 1888 and 1893, the Power Plant of the French Council between 1893 and 1905, and the Compagnie Française de Tramways et d' Eclairage after that

★ supplied by the Shanghai Water Works Co.

★★ supplied by the Shanghai Water Works Co. before 1902, the French Water Works Co. between 1902 and 1908, and the Compagnie Française de Tramways et d' Eclairage after that

dered, was sufficient to admit of eight Chinese shops being built facing the Chekiang Road, a populous business street; while after the strip surrendered was deducted, the frontage would only allow of seven shops. So the surrender would cause a loss of rental, which was calculated at tls. 123 per year. They further capitalized the tls. 123 to tls. 2,050 at 6%. After adding 10% for compulsory surrender (tls. 205) and deducting the cost of building one shop (tls. 350), they asked for a payment of tls. 1,905. The acting land commissioner rejected this petition, denying the equivalence between the loss of 8 feet of Chekiang Road frontage and the loss of one shop. He emphasized that “if compensation is paid at a higher rate per mow than that at which the property is assessed for taxation, the assessment of the lot will automatically be increased under Resolution V of the Ratepayers passed in 1909”, which meant the corresponding land tax would increase a lot in the following years. Through negotiation, the two parties eventually reached an agreement that the general betterment accruing to Lot 605 was offset by the reduction in the frontage facing the Chekiang Road and therefore the sum

of Tls. 809.60 as compensation should be awarded, based on the assessed value of the area surrendered, plus 10% for compulsory surrender.

Similar petitions could also be found in the annual reports of the French Concession (e.g., p. 109-112 of the 1922 *Compte-Rendu de la Gestion Pour L'exercice*). When the landowners asked for higher compensation than the one suggested by the la Commission Foncière (land commission) based on the assessed land value, they would be offered the option to comply with a new assessment and therefore pay more land tax in the ensuing years (or repay the tax over the past years). Like in the International Settlement, legal rules clearly prescribed which kinds of buildings could not be expropriated unless it is necessary and which kinds of buildings should be subordinate to the collective interests. By this means, all the disputes that occurred during the land expropriation had been resolved properly. Although the French consul-general had the supreme power, he had never exerted his power beyond the law.

7 Firm Distribution

The previous section attempts to document, although based on limited data, that the discrepancies in institutions between the two Settlements, if there were any, should not result in big differences in market incentives. Previous literature has found that in some places the authorities with a civil law tradition tend to impose stricter regulations (Djankov et al., 2002) and worse protections (La Porta et al., 1999a), and therefore failed to provide a beneficial environment for industrial and commercial development, colonial Shanghai, however, provide new evidence that the civil law itself did not seem to be accountable. The French legal system could function well if interpreted and implemented properly. In this section, I use firm data to further support this conclusion.

Fig. 16 shows the distribution of firms whose locations can be obtained from the 1925 *Comacrib Directory of China*.³⁸ The discrepancy is barely discernible at the border. The two districts were more like one: a prosperous business district that had (financial) services near the Bund and trades everywhere. Firm density in the original British Settlement have been higher in general than those in the French Concession, but in the neighborhood just around the border, they were comparable.

To see whether there was indeed no discontinuity in the density of firms, I estimate Equation (1) with Y_i denoting the corresponding firm density in block i , which is calculated by dividing the the number of firms within block i by block i 's area (square

³⁸ To the best of my knowledge, all the existing street maps of Shanghai with street numbers were published after 1934, at which time the street number of the city was recoded. This significantly increases the difficulty in geo-locating firms before 1934 because, for example, “No. 24 Nanking Road” in 1925 was not the same place indicated by a 1947 street map. In practice, I first derive the complete numbering system prior to 1934 based on firms that existed both before and after 1934 and then pin down each firm accordingly. For most firms, it is impossible to pinpoint the exact location. The geo-location is thus accurate down to the block.

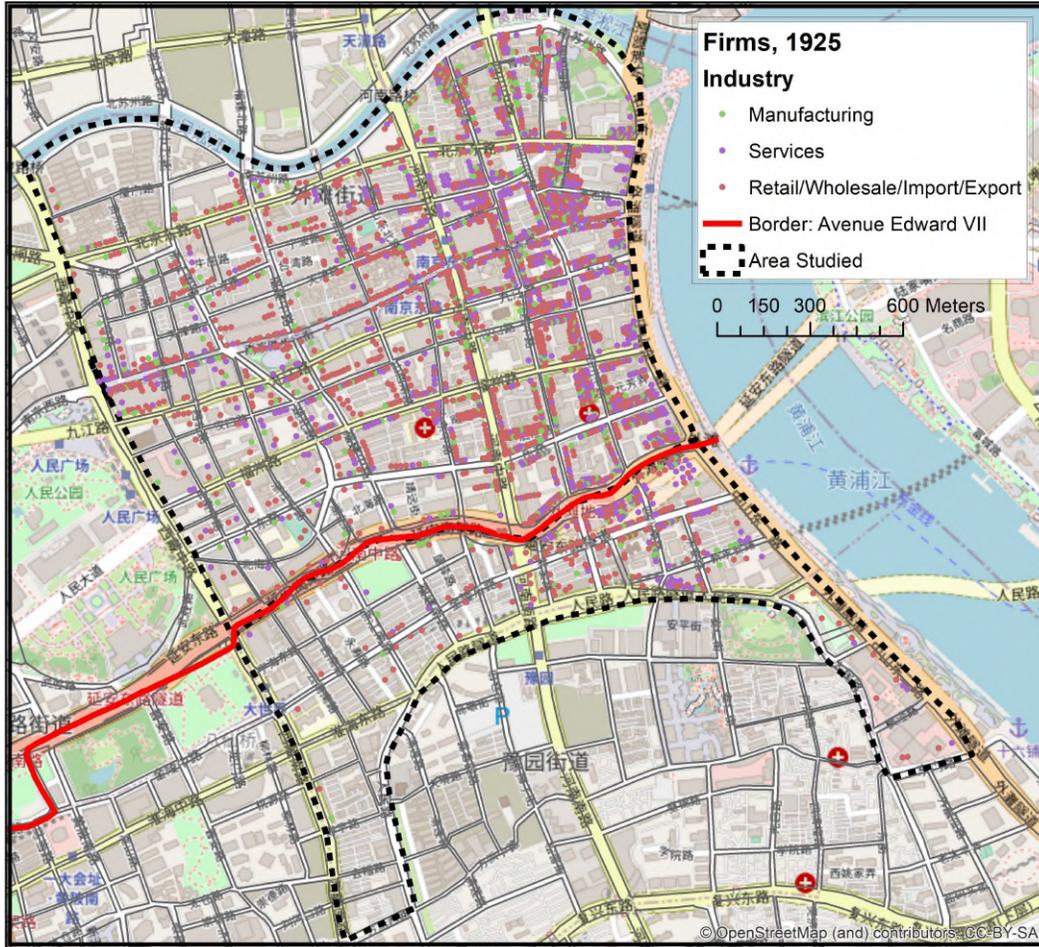


Fig. 16: Firm Distribution in the Original British and French Settlements, 1925

Notes: This figure shows the distribution of firms in 1925 in the original British Settlement and French Concession. The addresses are collected from the 1925 *Comacrib Directory of China*.

kilometers). As shown in Table 8, there was no significant discontinuity for whichever industry. The graphical presentation can be found in Appendix Fig. 9.

In addition to firm density, Table 8 also implies that the two Settlements were similar in terms of industrial structure. To determine whether this was a long-run trend, I count the number of firms in each category listed in the *Chronicle and Directory for China* in all available years between 1904 and 1925. With firms being classified into three industries, the Dissimilarity Index (Duncan and Duncan, 1955) is calculated as:

$$D = \frac{1}{2} \sum_{i=1}^3 \left| \frac{a_i}{A} - \frac{b_i}{B} \right| \quad (2)$$

Table 8: Discontinuity in Firm Density, 1925

	All	Manufacturing	Services	Trade
(1)	-486.60 (1232.00)	-48.33 (159.08)	-165.14 (528.77)	-281.81 (602.87)
(2)	-776.31 (1232.00)	-88.94 (159.08)	-419.72 (528.77)	-349.27 (602.87)
(3)	-776.31 (1629.10)	-88.94 (204.89)	-419.72 (694.23)	-349.27 (804.79)
Effective # of obs	23, 27	28, 27	18, 31	26, 25

Notes: This table reports the estimated discontinuities in firm density at the border between the original British Settlement and French Concession. Row (1)’s report the conventional RD estimates with conventional standard error estimator. Row (2)’s report the bias-corrected RD estimates with conventional standard error estimator. Row (3)’s report the bias-corrected RD estimates with robust standard error estimator. Standard errors are noted in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

where $i = 1, 2, 3$ denotes manufacturing, services, and trades, respectively. a_i denotes the number of firms in industry i in the original British Settlement, while b_i denotes the number of firms in industry i in the original French Concession. A and B are the total numbers of firms in the corresponding Settlements. The following chart shows the share of each industry for both Settlements and the calculated Dissimilarity Index over time.

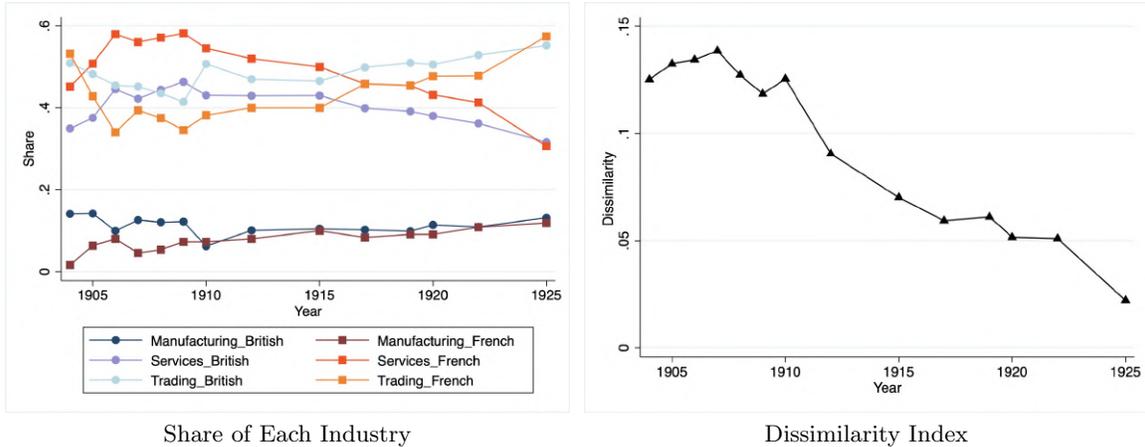


Fig. 17: Dissimilarity between the Original British and French Settlements

Notes: The figure on the left shows the share of each industry in the original British Settlement and French Concession. The figure on the right shows the Dissimilarity Index of these two Settlements in terms of industrial structure.

In Fig. 17, the decrease in dissimilarity indicates that the two Settlements were indeed becoming more and more similar in terms of industrial structure from 1904 to 1925, especially during the second decade of the 20th century. Behind this pattern was a relative increase in the share of trading industry plus a decrease in services. The share

of manufacturing industry increased slightly in both Settlements, but most of the firms were less capital-intensive and more consumer-oriented, such as hosiery factories and printing companies. Overall, the original British Settlement and the French Concession began evolving into an integrated business district in the first half of the 20th century.

To further demonstrate the above conclusion, I partition each Settlement into two districts for N times using the N thoroughfares within it, and compare the N dissimilarities between the two districts (but within each of the Settlements) to the dissimilarity between the two Settlements in 1925. As shown in Fig. 18, the dissimilarity (marked by the red dashed line) between the two Settlements was not significantly greater than the dissimilarities within the Settlements. The two graphs on the right indicate that the dissimilarities between the east and the west were generally greater than those between the north and the south, which was also clear in Fig. 16. In sum, aligning with the basic results documented by the land value, the Avenue Edward VII in the 1920s has already acted as a border only politically, rather than economically.



Fig. 18: Dissimilarities within the Settlements

Notes: These figures show the Dissimilarity Indexes within the original British Settlements and French Concession, respectively. Each dot denotes one dissimilarity between two districts within a Settlement partitioned by one of its thoroughfares. The dissimilarity between the two Settlements is denoted by the red dashed line.

8 Conclusion

Colonial Shanghai provides a perfect setting for the comparative study of the legal system. During nearly 100 years, from the 1840s to 1940s, the International Settlement (with a common law tradition) coexisted with the French Concession (with a civil law tradition). Applying the RD design to these Settlements, this paper finds a process of catching up in the French Concession from the 1900s to the 1930s. Namely, crossing the border from the original French Concession to British Settlement was associated with a more than 80% appreciation in land value in the 1900s, but the premium vanished by more than half in the 1910s and eventually disappeared in the 1930s. This changing discontinuity implies that the legal system does matter, but the French legal institutions are capable of adapting to become compatible with economic activities. This suggests that the French legal system *per se* was not a barrier to economic growth, but rather it could function well if interpreted and implemented properly. Discrepancies derived from the legal origins were limited to the kind of institutions that did not have a significant effect on economic growth. Although exhibiting a Jacobin tradition of universalism (Aldrich, 1996), the French Concession became more and more like its British neighbor in the 20th century in terms of economic policies, living conditions, and industrial distribution. Via the study of colonial Shanghai, this paper aims to emphasize the important role of institutions, but also points out the possibly weak connection between legal origin and economic growth.

Reference

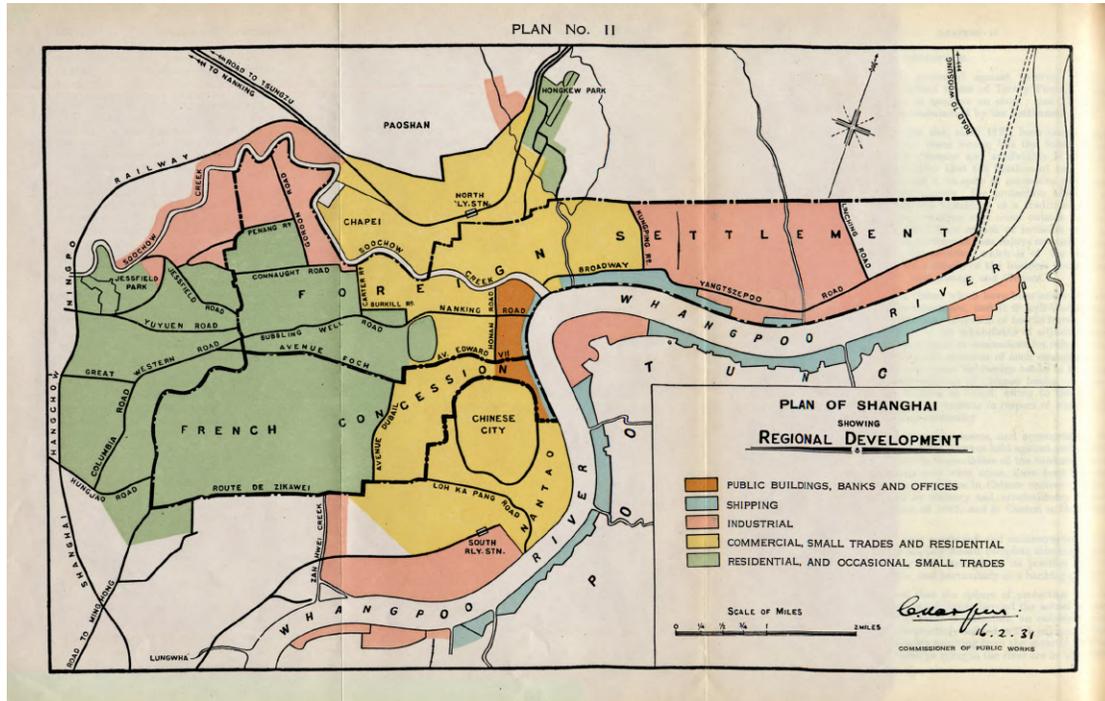
- Daron Acemoglu and Simon Johnson. Unbundling Institutions. *Journal of political Economy*, 113(5):949–995, 2005.
- Daron Acemoglu, Simon Johnson, and James A. Robinson. The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review*, 91(5):1369–1401, 2001.
- Daron Acemoglu, Simon Johnson, and James A Robinson. Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution. *The Quarterly Journal of Economics*, 117(4):1231–1294, 2002.
- Daron Acemoglu, Simon Johnson, and James A Robinson. Institutions as a Fundamental Cause of Long-run Growth. *Handbook of Economic Growth*, 1:385–472, 2005.
- Robert Aldrich. *Greater France: A History of French Overseas Expansion*. Macmillan International Higher Education, 1996.
- Merima Ali, Odd-Helge Fjeldstad, Boqian Jiang, and Abdulaziz B Shifa. Colonial Legacy, State-Building and the Salience of Ethnicity in Sub-Saharan Africa. *The Economic Journal*, 129(619):1048–1081, 2019.
- Neeraj G Baruah, J Vernon Henderson, and Cong Peng. Colonial Legacies: Shaping African Cities. *Journal of Economic Geography*, 21(1):29–65, 2021.
- Daniel Berger. Taxes, Institutions and Local Governance: Evidence from a Natural Experiment in Colonial Nigeria. *Unpublished manuscript*, 2009.
- Marie-Claire Bergère. *Shanghai: China’s Gateway to Modernity*. Stanford: Stanford University Press, 2002.
- Juan C Botero, Simeon Djankov, Rafael La Porta, Florencio Lopez-de Silanes, and Andrei Shleifer. The Regulation of Labor. *The Quarterly Journal of Economics*, 119(4):1339–1382, 2004.
- Yutian Cai. *Shanghai Title Deeds (Shanghai Daoqi): 1847-1911*. 2005. URL https://books.google.com/books?id=_mLLzQEACAAJ.
- Yanlin Chen. *Shanghai Dichan Daquan (A Guide of Real Estate in Shanghai)*. 1933. URL <https://books.google.com/books?id=4bbMtgAACAAJ>.
- Denis Cogneau and Alexander Moradi. Borders that Divide: Education and Religion in Ghana and Togo since Colonial Times. *The Journal of Economic History*, 74(3):694–729, 2014.
- Denis Cogneau, Sandrine Mesplé-Somps, and Gilles Spielvogel. Development at the Border: Policies and National Integration in Côte d’Ivoire and Its neighbors. *The World Bank Economic Review*, 29(1):41–71, 2015.
- Shanghai Municipal Council. *Annual Report of the Shanghai Municipal Council*. 1892–1933.
- Conseil d’administration municipale de la Concession française. *Compte rendu de la gestion pour l’exercice*. 1893–1940.

- Karine Delaye. Colonial Co-Operation and Regional Construction: Anglo-French Medical and Sanitary Relations in South East Asia. *Asia Europe Journal*, 2(3):461–471, 2004.
- Simeon Djankov, Rafael La Porta, Florencio Lopez-de Silanes, and Andrei Shleifer. The Regulation of Entry. *The Quarterly Journal of Economics*, 117(1):1–37, 2002.
- Simeon Djankov, Edward Glaeser, Rafael La Porta, Florencio Lopez-de Silanes, and Andrei Shleifer. The New Comparative Economics. *Journal of Comparative Economics*, 31(4):595–619, 2003a.
- Simeon Djankov, Rafael La Porta, Florencio Lopez-de Silanes, and Andrei Shleifer. Courts. *The Quarterly Journal of Economics*, 118(2):453–517, 2003b.
- Xuncheng Du. Jindai shanghai zaoqi chengshihua guocheng zhong de nongtian shougou yu liyi fenpei (farmland acquisition and profits allocation during the early urbanization of modern shanghai). *Researches in Chinese Economic History*, (3):3–15, 2012.
- Otis Dudley Duncan and Beverly Duncan. A Methodological Analysis of Segregation Indexes. *American Sociological Review*, 20(2):210–217, 1955.
- Yannick Dupraz. French and British Colonial Legacies in Education: Evidence from the Partition of Cameroon. *The Journal of Economic History*, 79(3):628–668, 2019.
- Richard Feetham. *Reprot of the Hon. Mr. Justice Richard Feetham to the Shanghai Municipal Council*. Shanghai: North China Daily News and Herald, Ltd., 1931.
- Jean Fredet and Charles B. Maybon. *Histoire de la Concession Française de Changhai*. Plon, 1929.
- Qingbin Hou. Wanqing zhongwai huishen zhidu zhong huayang faguan de falv suyang yu shenpan fengge: Yi Shanghai fazujie huishen gongxie weili (Chinese and foreign judges’ trial style and legal literacy in the joint-trial system of late Qing: Evidence from the Mixed-Court of the French concession in Shanghai). *Xueshu Yuekan*, 49(1):165–176, 2017.
- Lakshmi Iyer. Direct versus Indirect Colonial Rule in India: Long-term Consequences. *The Review of Economics and Statistics*, 92(4):693–713, 2010.
- Isabella Jackson. *Shaping Modern Shanghai: Colonialism in China’s Global City*. Cambridge University Press, 2017.
- Wolfgang Keller, Ben Li, and Carol Shiue. Shanghai’s Trade, China’s Growth: Continuity, Recovery, and Change since the Opium Wars. *IMF Economic Review*, 61:336–378, 2013.
- Rafael La Porta, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert W Vishny. Legal Determinants of External Finance. *The Journal of Finance*, 52(3):1131–1150, 1997.
- Rafael La Porta, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert W Vishny. Law and Finance. *Journal of Political Economy*, 106(6):1113–1155, 1998.
- Rafael La Porta, Florencio Lopez-de Silanes, and Andrei Shleifer. Corporate Ownership around the World. *The Journal of Finance*, 54(2):471–517, 1999a.

- Rafael La Porta, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert Vishny. The Quality of Government. *The Journal of Law, Economics, and Organization*, 15(1): 222–279, 1999b.
- Rafael La Porta, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert Vishny. Investor Protection and Corporate Valuation. *The Journal of Finance*, 57(3):1147–1170, 2002.
- Rafael La Porta, Florencio Lopez-de Silanes, Cristian Pop-Eleches, and Andrei Shleifer. Judicial Checks and Balances. *Journal of Political Economy*, 112(2):445–470, 2004.
- Rafael La Porta, Florencio Lopez-de Silanes, and Andrei Shleifer. The Economic Consequences of Legal Origins. *Journal of Economic Literature*, 46(2):285–332, 2008.
- L. H. Layford. *Decennial Reports on the Trade Navigation Industries, Etc., of the Ports Open to Foreign Commerce in China and Corea, and on the Conditions and Development of the Treaty Port Provinces*. 1932.
- Alexander Lee and Kenneth A. Schultz. Comparing British and French Colonial Legacies: A Discontinuity Analysis of Cameroon. *Quarterly Journal of Political Science*, 7:1–46, 2012.
- Ross Levine, Chen Lin, Chicheng Ma, and Yuchen Xu. The Legal Origins of Financial Development: Evidence from the Shanghai Concessions. Technical report, National Bureau of Economic Research, 2021.
- Debin Ma. Shanghai-Based Industrialization in the Early 20th Century: A Quantitative and Institutional Analysis. 2006.
- Debin Ma. Economic Growth in the Lower Yangzi Region of China in 1911–1937: A Quantitative and Historical Analysis. *The Journal of Economic History*, 68(2): 355–392, 2008.
- Jun Ma and Jie Jiang. *Shanghai fazujie shi yanjiu (A Study on the History of the French Concession in Shanghai)*. Shanghai Academy of Social Sciences Press, 2016. ISBN 9787552011142. URL <https://books.google.com/books?id=RpqkDAEACAAJ>.
- Xueqiang Ma and Jun Qian. *Jindai Shanghai chengshi de teshu jiyi: Fazujie huishengongxie yu jingwuchu jiuzhi (A Special Memory of Modern Shanghai: The French Mixed Court and Police Office)*. Shanghai People’s Publishing House, 2015.
- Kerrie. L. MacPherson. *A Wilderness of Marshes: The Origins of Public Health in Shanghai, 1843–1893*. Oxford University Press, Hong Kong, 1987.
- John F McCauley and Daniel N Posner. African Borders as Sources of Natural Experiments Promise and Pitfalls. *Political Science Research and Methods*, 3(2):409–418, 2015.
- Casey B Mulligan and Andrei Shleifer. Conscriptio as regulation. *American Law and Economics Review*, 7(1):85–111, 2005a.
- Casey B Mulligan and Andrei Shleifer. The Extent of the Market and the Supply of Regulation. *The Quarterly Journal of Economics*, 120(4):1445–1473, 2005b.
- Douglass C North. Institutions, institutional change and economic performance. 1990.
- Douglass C North and Robert Paul Thomas. *The Rise of the Western World: A New Economic History*. Cambridge University Press, 1973.

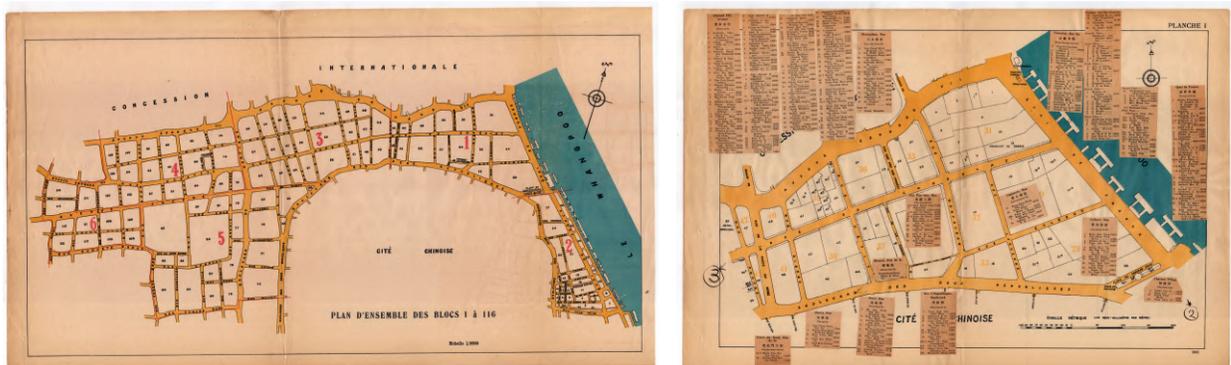
- Yunlong Shen. Wusa tongshi (The Tragic History of the May Thirtieth Movement). *Jindai Zhongguo Shiliao Congkan 16 (Collection of Historical Materials of Modern China)*, 1986.
- Meiding Shi, Changlin Ma, and Shaoting Feng. *Shanghai zujie zhi (History of the Shanghai Settlement)*. Shanghai Academy of Social Science Press, 2001. ISBN 9787806189092. URL <https://books.google.com/books?id=YbF6AAAAIAAJ>.
- Tomoko Shiroyama. The Shanghai Real Estate Market and Capital Investment, 1860–1936. *The Treaty Port Economy in Modern China: Empirical Studies of Institutional Change and Economic Performance*, 2011.
- Thomas B Stephens. *Order and Discipline in China: The Shanghai Mixed Court 1911–1927*. University of Washington Press, 2017.
- Zhenchang Tang. *Shanghai Shi (History of Shanghai)*. Shanghai People’s Publishing House, 1989. ISBN 9787208004948. URL <https://books.google.com/books?id=GAERAQAAMAAJ>.
- Daniel Treisman. The Causes of Corruption: A Cross-national Study. *Journal of Public Economics*, 76(3):399–457, June 2000.
- Se Yan. Real Wages and Wage Inequality in China, 1858–1936. *The Journal of Economic History*, 70(2):454–458, 2010.
- Youkui Zheng. *Zhongguo de duiwai maoyi he gongye fazhan: 1840–1948 (Foreign Trade and Industrial Development in China: 1840–1948)*. Shanghai Academy of Social Sciences Press, 1984.
- Yiren Zou. *Jiu Shanghai renkou bianqian de yanjiu (A Study on the Demographic Transition in the Old Shanghai)*. Shanghai People’s Publishing House, 1980. URL https://books.google.com/books?id=d_8PAQAIAAJ.

Appendix Figures and Tables



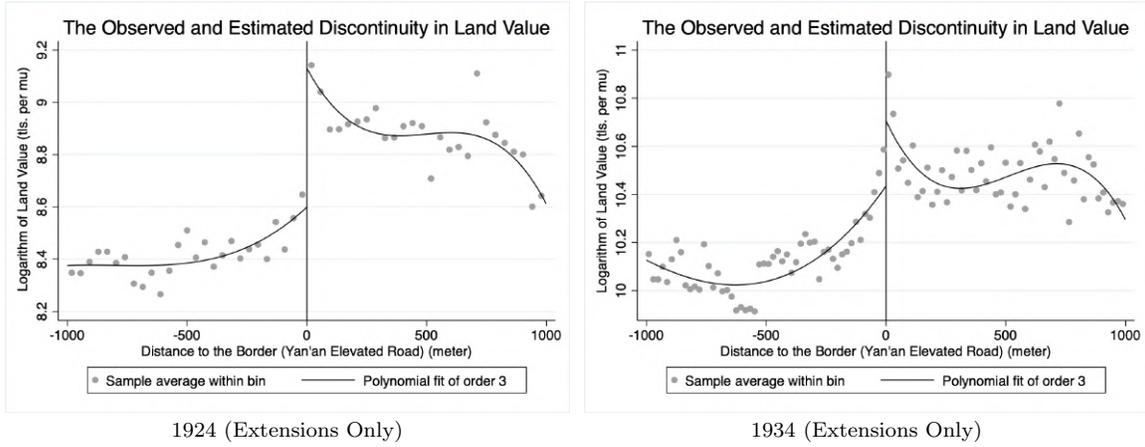
Appendix Fig. 1: Plan of Shanghai, 1931

Notes: This map shows the regional development of Shanghai in 1931. Source: virtualshanghai.net, ID404.



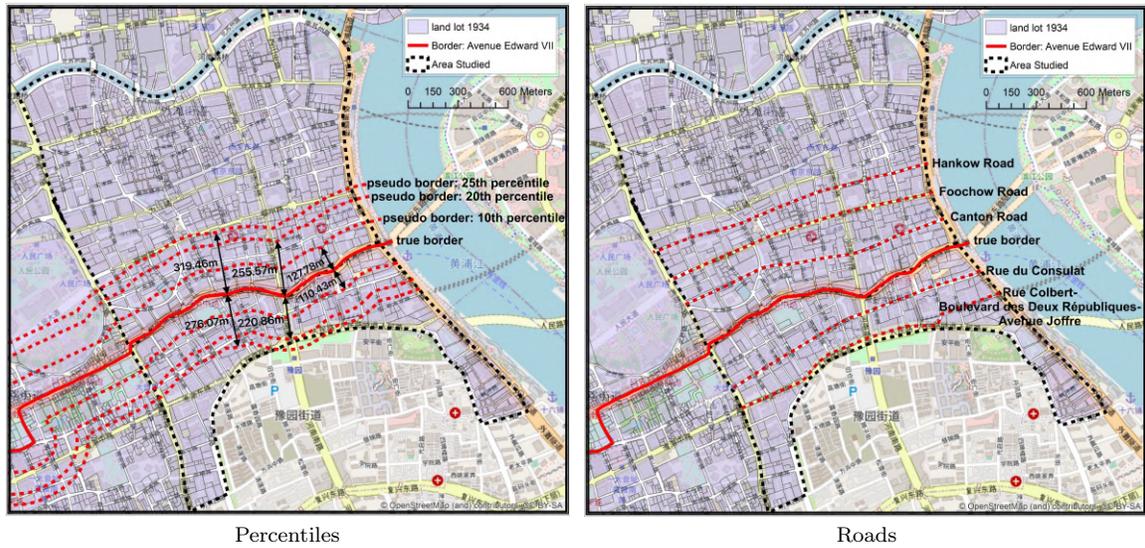
Appendix Fig. 2: Cadstral Map of The French Concession, 1931

Notes: These figures show part of the 1931 cadastral map of the French Concession. The figure on the left shows the entire original French Concession while the figure on the right shows the land lots located in the north-east (as indexed by 1).



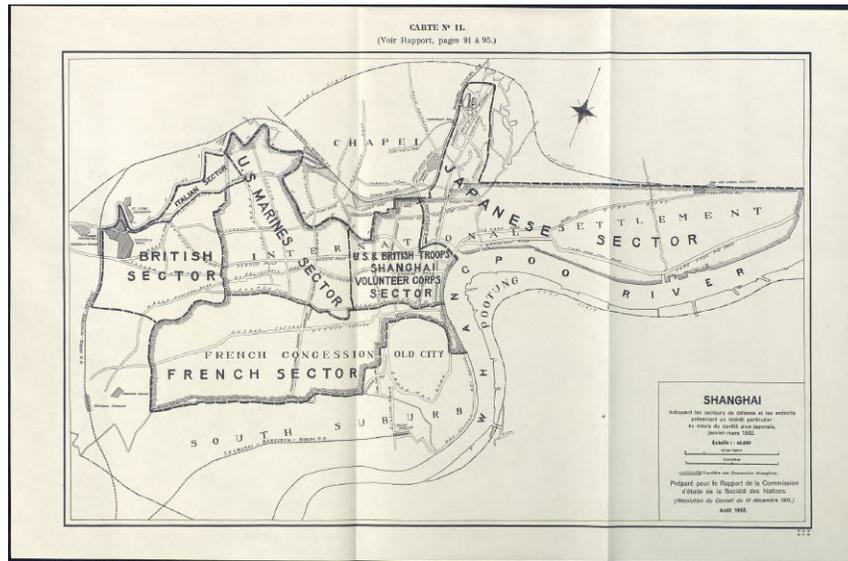
Appendix Fig. 4: Discontinuity between the Extensions

Notes: These figures show the changing discontinuity in land value at the border of the extensions of the International Settlement and French Concession. Distance to the border is positive for the land lots in the International Settlement and negative for those in the French Concession.



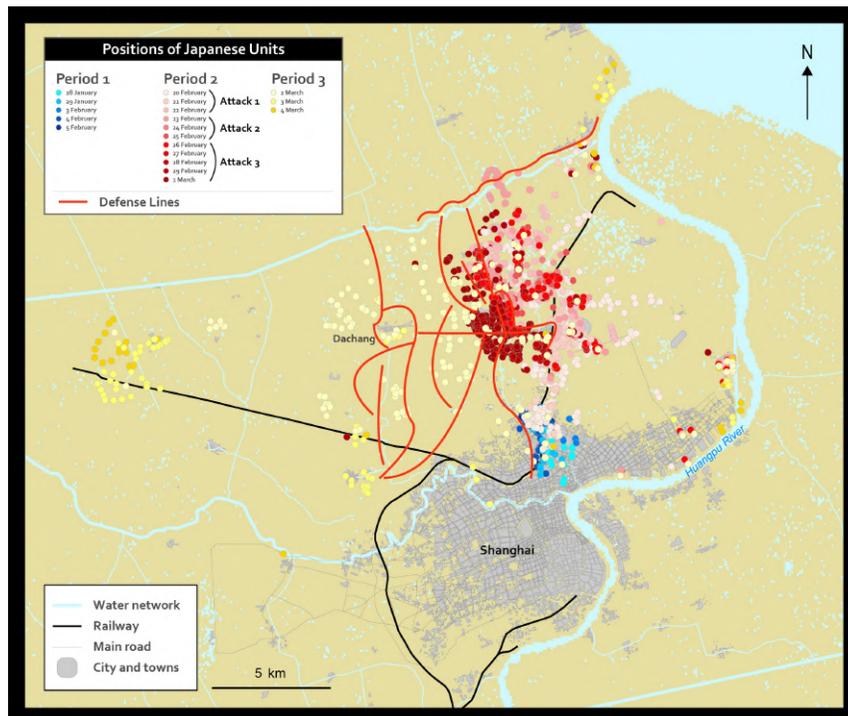
Appendix Fig. 5: Pseudo Borders

Notes: These figures illustrate the pseudo cutoffs employed in the robustness checks.



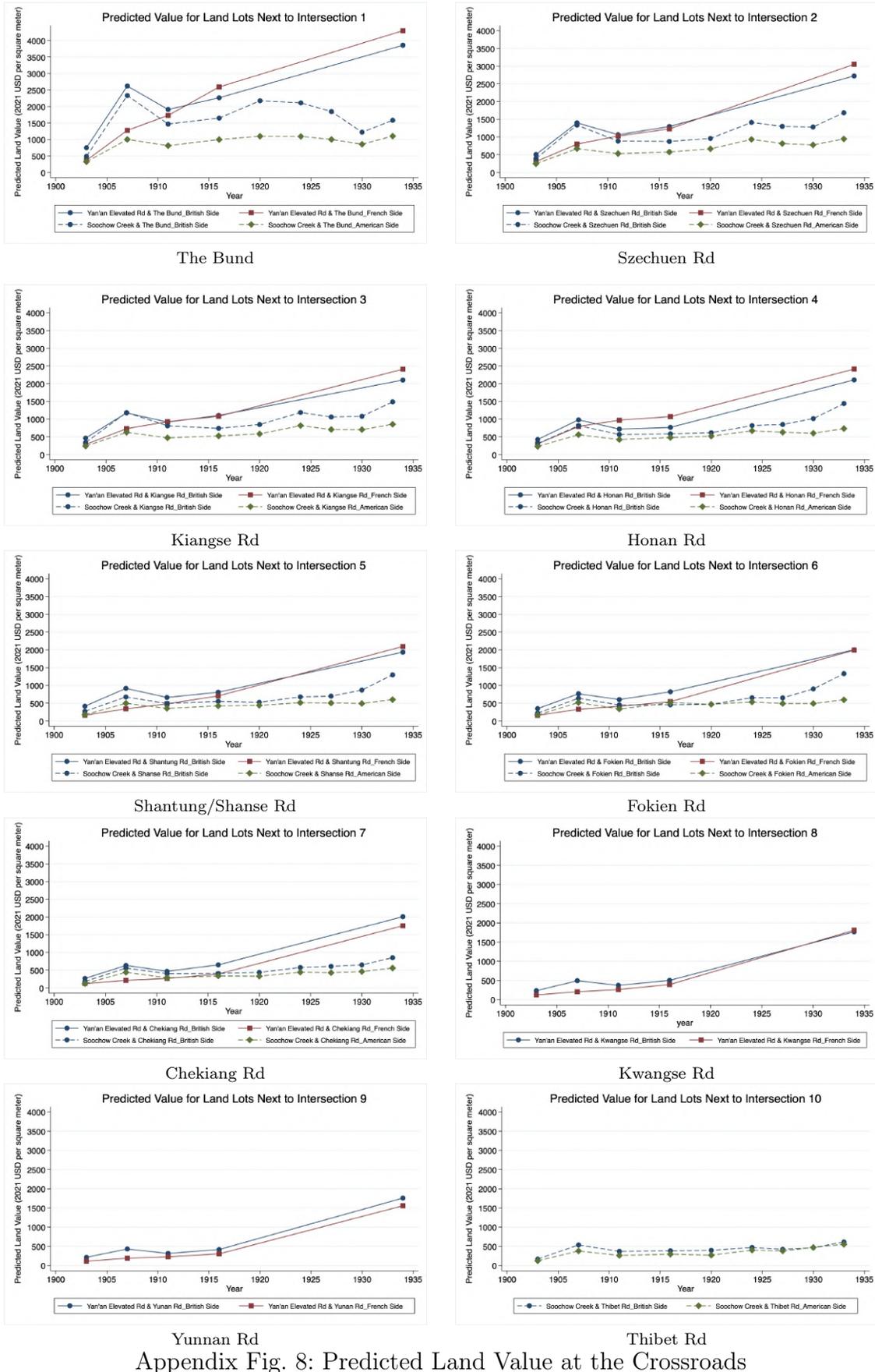
Appendix Fig. 6: Defense Areas, 1932

Notes: This map shows the defense areas in 1932. Source: virtualshanghai.net, ID1857.



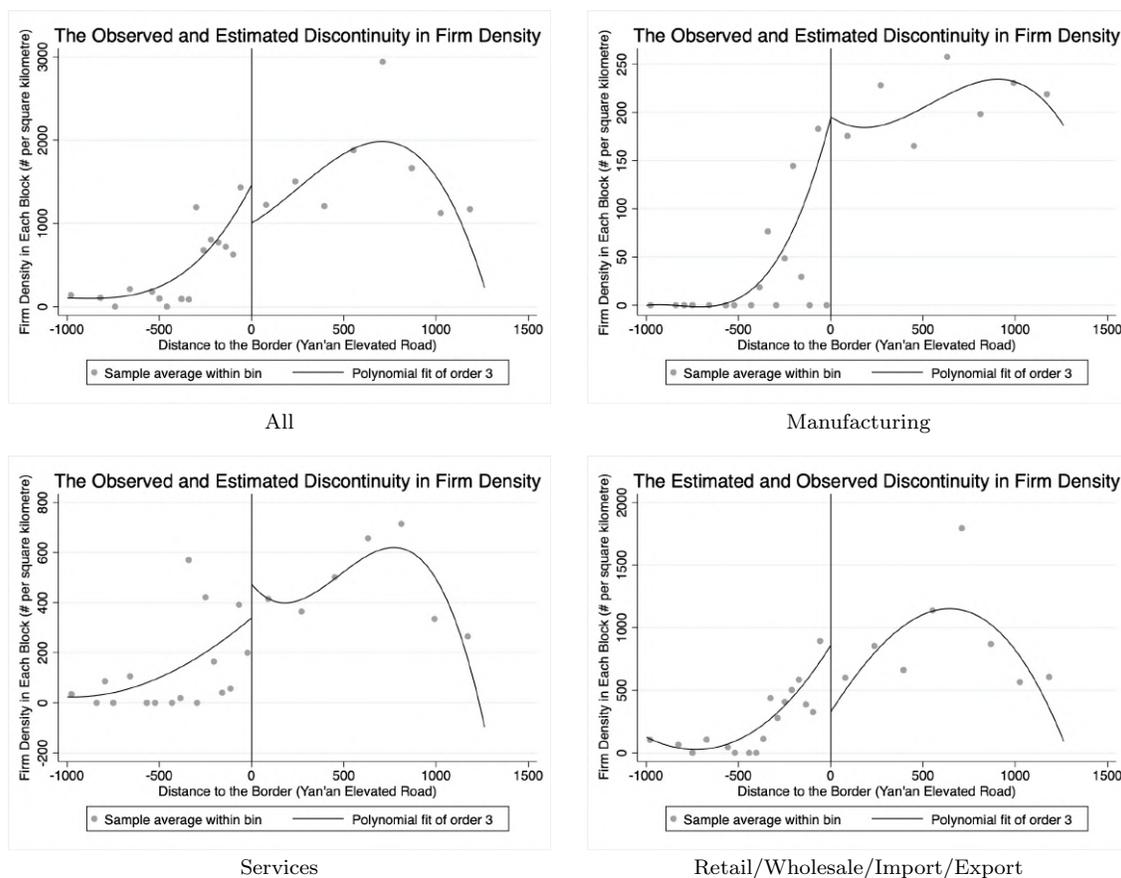
Appendix Fig. 7: Space-Time of the 1932 Shanghai Battle

Notes: This map shows the space-time of the 1932 Shanghai Battle. Source: virtualshanghai.net, ID2181.



Appendix Fig. 8: Predicted Land Value at the Crossroads

Notes: These figures show the predicted land values at the intersections on both sides of the borders.



Appendix Fig. 9: Discontinuity in Firm Density, 1925

Notes: These figures show the discontinuities in the density of firms in different industries between the original British Settlement and French Concession in 1925.

Appendix Table. 1: Foreign and Native Population of Shanghai

Year	International Settlement		French Concession	
	Foreign	Native	Foreign	Native
1850	210	-	10	-
%	-	-	-	-
1865	2,297	30,587	460	55,465
%	6.99%	93.01%	0.82%	99.18%
1880	2,197	107,812	307	-
%	2.00%	98.00%	-	-
1890	3,821	168,129	444	41,172
%	2.22%	97.78%	1.07%	98.93%
1900	6,774	345,276	622	91,646
%	1.92%	98.08%	0.67%	99.33%
1910	13,536	488,005	1,476	114,470
%	2.70%	97.30%	1.27%	98.73%
1920	23,307	759,839	3,562	166,667
%	2.98%	97.02%	2.09%	97.91%
1930	36,471	971,397	12,341	422,466
%	3.62%	96.38%	2.84%	97.16%
1942	57,351	1,528,322	29,038	825,342
%	3.62%	96.38%	3.40%	96.60%

Notes: This table reports the foreign and native population in the International Settlement and French Concession between 1850 and 1942. Data Source: Zou (1980).

Appendix Table. 2: Ordinary Revenue and Ordinary Expenditure

Year	International Settlement		French Concession	
	Revenue (tls.)	Expenditure (tls.)	Revenue (tls.)	Expenditure (tls.)
1881	261,308.00	272,863.00	115,209.86	114,723.03
1882	330,115.00	318,795.00	118,074.80	110,801.05
1883	397,490.00	385,071.00	122,681.50	117,461.64
1884	318,127.00	346,322.00	107,665.27	97,631.45
1885	358,249.00	362,464.00	110,884.03	103,509.80
1886	387,296.00	363,964.00	129,975.23	156,877.32
1887	412,943.00	404,321.00	172,771.59	167,163.20
1888	505,801.00	492,980.00	159,159.81	156,081.61
1889	432,692.00	425,988.00	136,891.43	148,575.50
1890	445,044.00	462,222.00	138,478.22	138,110.33
1891	449,279.00	442,575.00	160,629.21	141,769.60
1892	502,643.00	525,982.00	140,109.28	145,074.68
1893	517,791.00	504,340.00	147,623.30	142,765.69
1894	562,504.00	551,593.00	150,319.21	145,323.68
1895	582,814.00	581,990.00	154,167.43	132,687.13
1896	734,741.00	853,497.00	160,422.35	155,517.07
1897	640,006.00	592,900.00	-	-
1898	753,270.00	753,098.00	196,638.55	315,254.19
1899	916,611.00	797,464.00	214,098.45	177,500.55
1900	1,045,177.16	916,885.55	274,929.20	369,157.98
1901	1,097,719.71	938,661.34	321,803.83	483,105.99
1902	1,209,175.24	1,016,058.85	343,447.82	294,321.26
1903	1,341,570.03	1,194,020.12	375,072.18	329,660.39
1904	1,505,402.00	1,185,475.00	411,606.22	339,152.03
1905	1,780,414.00	1,295,885.00	456,351.18	390,944.15
1906	1,866,398.01	1,525,844.34	490,712.38	498,252.69
1907	1,983,431.83	1,611,038.37	510,888.29	649,648.25
1908	2,403,164.00	1,987,652.56	547,650.99	559,699.74
1909	2,521,600.00	2,101,009.92	-	-
1910	2,555,056.00	2,200,154.46	581,442.42	741,900.67
1911	2,589,628.00	2,347,690.11	592,217.26	773,278.42
1912	2,734,245.00	2,372,766.71	664,638.92	761,205.02
1913	2,858,006.00	2,484,282.59	735,286.65	782,790.02
1914	2,934,382.00	2,700,218.93	754,708.00	943,397.26
1915	3,051,017.00	2,781,734.20	798,789.35	746,221.02
1916	3,333,151.00	2,905,572.51	970,081.57	843,866.47
1917	3,455,128.00	3,379,440.34	901,001.97	964,562.29
1918	3,864,576.00	3,596,795.91	950,674.51	1,035,782.93
1919	4,419,961.00	4,568,917.45	1,045,890.63	1,080,890.56
1920	4,823,483.00	4,829,895.41	1,344,196.46	1,346,369.43
1921	5,951,258.00	5,651,239.89	3,351,156.19	2,529,077.87
1922	6,391,200.00	6,474,580.17	1,726,370.55	1,626,696.61
1923	7,203,797.00	7,027,737.96	1,885,101.94	1,828,704.31
1924	8,028,824.00	7,963,324.68	2,163,754.70	2,065,936.16
1925	9,152,409.00	9,488,482.92	2,382,925.21	2,332,228.72
1926	10,100,856.00	10,250,648.21	2,812,860.60	2,775,513.18
1927	11,161,792.35	11,713,011.86	3,195,724.37	3,126,200.10
1928	12,691,714.00	11,620,593.00	3,691,436.95	3,338,208.00
1929	12,473,292.00	9,440,066.00	4,330,847.76	3,724,567.86
1930	12,679,208.00	13,942,470.00	4,920,906.17	4,736,881.83
1931	14,795,038.00	16,715,099.00	5,622,301.38	5,659,085.78
1932	21,216,158.00	22,949,578.00	6,038,521.68	5,680,698.89
1933	22,111,660.00	24,107,357.00	6,809,594.62	6,229,539.16

Notes: This table reports the ordinary revenue and expenditure of the two Settlements 1881–1933. Data Source: annual reports of Shanghai Municipal Council and French Council (1892–1933; 1893–1940).

Appendix Table 3: RD Estimates Between the original British and French Settlements, with Different Bandwidth across Years

Year		p(1)		p(2)		p(3)	
		(a)	(b)	(a)	(b)	(a)	(b)
1903	(1)	0.7687*** (0.0826)	0.7686*** (0.0818)	0.7827*** (0.0965)	0.7458*** (0.0975)	0.7617*** (0.1137)	0.7275*** (0.1151)
	(2)	0.7824*** (0.0826)	0.7958*** (0.0818)	0.7948*** (0.0965)	0.7415*** (0.0975)	0.7586*** (0.1137)	0.7132*** (0.1151)
	(3)	0.7824*** (0.0964)	0.7958*** (0.0941)	0.7948*** (0.1073)	0.7415*** (0.1107)	0.7586*** (0.1229)	0.7132*** (0.1270)
Effective # of obs (l, r)		117, 119	127, 116	144, 187	134, 238	157, 248	152, 344
1907	(1)	0.8806*** (0.1102)	0.8761*** (0.1078)	0.8838*** (0.1264)	0.8389*** (0.1242)	0.9055*** (0.1519)	0.8368*** (0.1536)
	(2)	0.8987*** (0.1102)	0.9044*** (0.1078)	0.8920*** (0.1264)	0.8445*** (0.1242)	0.7586*** (0.1519)	0.8296*** (0.1536)
	(3)	0.8987*** (0.1286)	0.9044*** (0.12475)	0.8920*** (0.1406)	0.8445*** (0.1394)	0.9108*** (0.1643)	0.8296*** (0.1700)
Effective # of obs (l, r)		125, 125	129, 126	151, 208	148, 264	159, 259	155, 350
1911	(1)	0.3781*** (0.1145)	0.3801*** (0.1153)	0.3567*** (0.1390)	0.2870** (0.1377)	0.3364** (0.1559)	0.2723* (0.1575)
	(2)	0.3730*** (0.1145)	0.3809*** (0.1153)	0.3373** (0.1390)	0.2697** (0.1377)	0.3284** (0.1559)	0.2534 (0.1575)
	(3)	0.3730*** (0.1347)	0.3809*** (0.1319)	0.3373** (0.1569)	0.2697* (0.1570)	0.3284* (0.1688)	0.2534 (0.1739)
Effective # of obs (l, r)		117, 115	117, 108	138, 153	131, 238	156, 239	152, 352
1916	(1)	0.2588** (0.1196)	0.2035* (0.1208)	0.1630 (0.1445)	0.0255 (0.1556)	0.1671 (0.1568)	0.0798 (0.1578)
	(2)	0.1987* (0.1196)	0.1680 (0.1208)	0.1089 (0.1445)	0.0018 (0.1556)	0.1361 (0.1568)	0.0402 (0.1578)
	(3)	0.1987 (0.1394)	0.1680 (0.1400)	0.1089 (0.1640)	0.0018 (0.1752)	0.1361 (0.1686)	0.0402 (0.1726)
Effective # of obs (l, r)		105, 93	96, 105	128, 129	112, 214	154, 220	146, 352
1934	(1)	-0.0859 (0.0693)	-0.1575** (0.0723)	-0.1668* (0.0893)	-0.2045** (0.0846)	-0.1677** (0.0852)	-0.2806*** (0.0894)
	(2)	-0.1407** (0.0693)	-0.1876*** (0.0723)	-0.2124** (0.0893)	-0.2253*** (0.0846)	-0.1838** (0.0852)	-0.3115** (0.0894)
	(3)	-0.1407* (0.0794)	-0.1876** (0.0823)	-0.2124** (0.1025)	-0.2253** (0.0968)	-0.1838** (0.0916)	-0.3115*** (0.0954)
Effective # of obs (l, r)		92, 75	57, 88	109, 98	102, 194	147, 195	134, 314

Notes: This table reports the estimated discontinuities in land value at the border of the original British Settlement and French Concession. It differs from Table 3 in that it allows the bandwidth to change across years, i.e., to be selected based on the contemporary data. The dependent variable is expressed in natural logarithm so the coefficients stand for percentage changes. Row (1)'s report the conventional RD estimates with conventional standard error estimator. Row (2)'s report the bias-corrected RD estimates with conventional standard error estimator. Row (3)'s report the bias-corrected RD estimates with robust standard error estimator. In column (a)'s one common MSE-optimal bandwidth selector is used. In column (b)'s two different MSE-optimal bandwidth selectors are used. Standard errors are noted in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Appendix Table 4: License Fees per Quarter, 1925

Category	IS	FC	Category	IS	FC
Hotel	*Tls. 90-200	*Tls. 75-240	Foreign Liquor Seller	Tls. 75	-
Tavern	*Tls. 90-200	*Tls. 75	Chinese Wine Shop	*Tls. 3-40	-
Restaurant	*Tls. 10-45	Tls. 75	Tea Shop	*Tls. 1.5-150	-
Lodging House, Foreign	\$1.5	\$1.5	Tobacco Shop	*Tls. 1-25	-
Lodging House, Chinese	*Tls. 3-80	\$1.5	Exchange Shop	*Tls. 1-25	-
Food Shop	*\$1-20	*\$1-20	Sing Song House	\$10	-
Vendor of Ice Drinks	*\$1-20	*\$1-20	Sing Song or Story Teller	*Tls. 18-150	-
Food Hawker	\$6	\$2	Vendor of Noxious Drugs	*Tls. 5-50	-
Fruit Shop or Fruit Stall	\$10	\$2	Vendor of Uncooked Rice	\$0.5	-
Bakery	\$2	\$2	Lottery or Raffle	*Tls. 1-100	-
Dairy	\$2	\$2	Chinese Club	Tls. 25	-
Laundry	\$2	\$2	Public Garage	*Tls. 5-25	-
Tailor's Shop	\$2	\$2	Livery Stable: Horse, Mule, Donkey	\$3	-
Gold and Silversmith's Shop	*Tls. 5-25	*Tls. 5-25	Livery Stable: Carriage	\$12	-
Private Slaughterhouse	\$10	*\$1-20	Private Market	\$25	-
Ice Factory and Ice house	*\$2-20	*\$2-20	Aerated Water Factory	*\$2	-
Chinese Theatre	*Tls. 60-300	*Tls. 60-600	Foreign Theatre	Tls. 0.3-5 for every day or night open	-
Dancing Saloon	Tls.0.3-5 for every day or night open	Tls. 90	Music Hall, Circus, Fair	Tls.0.3-5 for every day or night open	-
Pawnshop	0.2-1% per annum on business done	*Tls. 5-25	Billiard or Bowling Saloon	Tls. 3 for each table or alley	-
Cinematograph	*Tls. 60-300	*Tls. 5-25	Antiques Dealer	-	*\$0.5
Construction	*†	*†	Pharmacy	-	*\$0.5-12.5
			Veterinarian	-	*\$2

Notes: This table presents the standards of license fees for different industries imposed by the Shanghai Municipal Council and the French Council, respectively. Information is collected from the 1925 annual reports of the Shanghai Municipal Council and French Council.

*According to class.

†According to nature of article sold.