Capital Markets and Colonial Institutions in China*

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Abstract

This paper studies the economic consequences of the West's foray into China after the Opium War (1840-42), when Western colonial institutions were introduced in dozens of so-called treaty ports. These institutions came in two forms, trade institutions centered on the Maritime Customs Service, and legal institutions associated with consular courts in China. Employing a model of equilibrium storage together with detailed grain price information, we show that the performance of capital markets improved with the arrival of Western institutions. Both Western legal institutions and trade institutions contributed to the lowering of regional interest rates. This institutional effect is robust to accounting for the introduction of foreign banks and the development of the local banking system. We show that the improvements in capital market performance were not limited to the treaty port regions but with a geographical reach of at least 400 kilometers surround each treaty port they affected a substantial part of China.

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1 Introduction

The First Opium War (1840-42) was a watershed in the history of China. Up to that point, only one port in China, Canton, located in the southern province of Guangdong, was open to European traders. After the Opium Wars, Britain and other Treaty Powers forced open ports throughout China that had been previously closed to international trade and reduced tariffs on foreign goods imported in the country. Chinese institutions of trade were abolished and re-organized under Western management, and Western powers became the custodian of China's tariff revenues. Western legal institutions were introduced in China in form of courts and legal practices, and foreigners were tried not according to China's laws but according to the laws of their country of origin (extraterritoriality). Little is known on what Western institutions meant for China's economy. In this paper, we study the impact of Western institutions over the period 1820 to 1900 by contrasting the capital market performance in regions in which Western institutions were present with those regions that were geographically far from Western influence.[1]

Foreign powers relinquished control in these areas in China only in 1943, one hundred years after the first British gunboats arrived. Over the century-long era of foreign intervention, there are accounts that Western presence permeated wide-ranging areas in China, affecting the handling of trade, foreign investments, manufacturing, property rights and security, governance, and the judiciary system. At the same time, China as a country was not colonized in the way that India, for example, was colonized by Britain, and it has been challenging to find out how far Western influence in China in fact went. By using capital market functioning as our performance measure and a regional approach that covers virtually all of China in its 19th century boundaries, we are able to estimate the impact of Western institutions both in the treaty ports themselves as well as in regions that are more or less distant from these epicenters of Western influence in China. Our estimates indicate that on average, the Western presence reduced interest rates in these regions by about 15 percent on average. Both trade and legal institutions contribute to this and are roughly of equal importance quantitatively. We also find that this influence of Western institutions significantly reduces interest rates in areas of with a radius of up to 400 kilometers away, thereby covering a substantial part of China.

Western influence on Chinese capital markets, specifically a lower interest rate, can be the result of a

[1] Japan's influence in China started at the very end of the 19th century and its strategy was quite different from that of Western countries.

number of mechanisms. One is that Westerner might have transferred capital to China from their home country. Second, it is possible that Western institutions have contributed to the modernization of China's banking system. A third channel is that Western influence may lead to lower levels of risk in economic transactions, and the fall in the interest rate thus primarily reflects a fall in the risk premium.[2] In line with the third channel is the trendwise decline in interest rates China faced for international government loans that have been attributed to the greater security because China's tariff revenues served, under Western management, as collateral. Furthermore, consistent with the risk premium channel is anecdotal accounts that many Chinese fled into treaty ports during periods of domestic warfare because of the protections provided, for example during the chaos of the Taiping Rebellion (1850-64). Our analysis will also examine the role of the changing banking system in China.

While there is a large literature on the economic impact of Western (European) influence in the Americas (Acemoglu, Johnson, and Robinson 2001, Engermann and Sokoloff 2002), much less is known on the experiences in other parts of the world.[3] At one level, Western colonizing influence has often been seen as negative along the lines of world-systems theory (Immanuel Wallerstein) or positive as in modernization theory (Max Weber). Analyses of the economic impact of the West are typically qualitative in nature and typically also divided, pointing on the one hand to the introduction of modern machinery in China from the West while on the other hand noting that this may have led to crowding out of traditional crafts producers in China. More recent research has found that protestant missionaries originating from Europe contributed to China's modernization in the later 19th and early 20th century (Bai and Kung 2015). While Jia (2013) is primarily interested in the effect of Chinese treaty port openings of the 19th century today she shows that these regions had relatively high population growth in the 19th century. We complement these analyses by comparing the influence of different institutions, in particular legal on which little is known to date. We also unpack the relative effects of institutions, and analyzing the influence of Western institutions with a new measure, the development of capital markets.

Even though accounts on the influence of the West in China varies, on one point there is virtual agreement. Whether Western influence in China is is positive or negative, the view is widely held that it must be quite

[2]In the case of Britain, North and Weingast (1989) have argued that the institutions that evolved in Britain following the Glorious Revolution (1688) created a representative democracy in which the arbitrary powers of the crown were constrained, leading to an environment in which there was more security in property rights for private citizens. The increased credibility of the government thus lowered the costs of capital, and economic growth followed with the Industrial Revolution of the 1760s.

[3]See Yoo and Steckel (2016) on impacts of Japanese colonization.

limited because Western influence was highly concentrated in the treaty ports (Rawski 1970, Fairbank 1978, and Feuerwerker 1978). Indeed, much of modern industries was, as in almost all countries, initially concentrated in a very small part of China. By estimating capital market performance at a relatively granular regional level for virtually all of China, we present a framework that allows to quantify how far, geographically, the influence of Western institutions penetrated into China. Key to this is our approach, building on Keller, Shiue, and Wang (2019, 2020), of employing an equilibrium storage model together with regional grain prices to assess capital market development in terms of interest rate levels. This sheds a new and specifically spatial light on the influence of Western institutions in China.

The remainder of this paper is as follows. The following section 2 introduces the storage cost approach with which we can assess regional capital market development. Section 3 provides a brief historical overview and introduces the data that will be employed. Section 4 presents our estimation approach, while the empirical results on the impact of Western legal and trade institutions in China are shown in section 5. The following two sections examine the role of the Chinese banking system and estimate the scope of Western institutional spillovers in China in the geographic dimension. A concluding discussion is found in section 8.

2 The Storage Approach to Regional Capital Market Performance

This section introduces our approach to assessing regional capital market performance. In a nutshell, the interest rate in a given region and year is obtained as the gradient of the local grain price. This grain-as-asset-in-storage-equilibrium method goes back to Kaldor (1939) and Working (1944) and has been employed in an influential paper by McCloskey and Nash (1984) to estimate medieval interest rates in England. The approach has recently been employed to compare capital market development in China and Britain between 1770 and 1860 (Keller, Shiue, and Wang 2020). Recent work comparing grain-price based interest rates and other interest rate estimates (including bank rates) for regions in the early 19th century United States has found that this storage approach to capital markets captures differences in interest rates and capital market integration across regions quite well (Keller, Shiue, and Wang 2019).

The following provides an overview of this approach.[4] Consider a merchant living in region i at time t who

[4]More details can be found in Keller, Shiue, and Wang (2019, 2020).

can buy Q_{it} units of grain from a farmer at price P_{it}. The merchant can store the grain for one period and sell it at time t+1 at a price P_{it+1}. Instead of buying the grain, the merchant can also invest the costs of buying the grain ($P_{it}Q_{it}$) in a risk-free asset and receive $(1 + \varrho_{it})$ times $P_{it}Q_{it}$ at time t+1, where ϱ_{it} is the rate of return on a risk-free asset. The merchant and farmer would contract on an agreement that specifies the merchant's purchase price from the farmer P_{it} as well as the price at which the farmer buys back the grain from the merchant, F^j_{it+1}, where j denotes the particular transaction. The price F^j_{it+1} at which the merchant will store grain, depends on the costs and benefits of grain storage.

We distinguish three types of costs. First, there is the opportunity cost related to the risk-free rate, which captures the fact that if the merchant does not buy grain from the farmer he has an income of no less than $(1 + \varrho_{it}) P_{it}Q_{it}$ at time t+1, whereas if he stores the grain for one period, then no interest is earned. Second, when the merchant stores the grain the potential income is tied up in the granary and subject to risk. In particular, by storing grain the merchant faces the risk that the grain market between t and t+1 does not perform as expected. We denote the interest rate inclusive of risk factors by r^j_{it}, where $r^j_{it} \geq \varrho_{it}$. Third, grain does not store perfectly but is subject to spoilage (mold, mice, etc.). Per-unit storage costs are denoted as c_{it}. The benefit of storage is the value of the marginal unit of grain storage, which is usually referred to as convenience yield. We denote the convenience yield by b_{it}. Given b_{it} , c_{it}, and r^j_{it}, as well as the current price P_{it}, for the merchant to be indifferent between storing and the alternative investment, the price F^j_{it+1} in the contract between merchant and farmer would have to be

$$F^j_{it+1} = P_{it}\left(1 + r^j_{it} + c_{it}\right) - b_{it}, \tag{1}$$

or, the price specified in the contract has to be such that risk-inclusive interest and storage costs net of convenience yield are covered.

To apply this approach empirically we make a number of assumptions. First, we do not observe the transaction-specific risk for each contract; consequently, the superscript j is dropped and it is assumed that we capture the average level of risk, r_{it} (with $r_{it} \geq \varrho_{it}$). Second, since we do not observe the price F^j_{it+1} in the contract we assume that it is equal to the spot price of grain in period t+1, that is $F^j_{it+1} = P_{it+1}$. Finally, we do not observe the convenience yield, and we assume that b_{it} is zero.

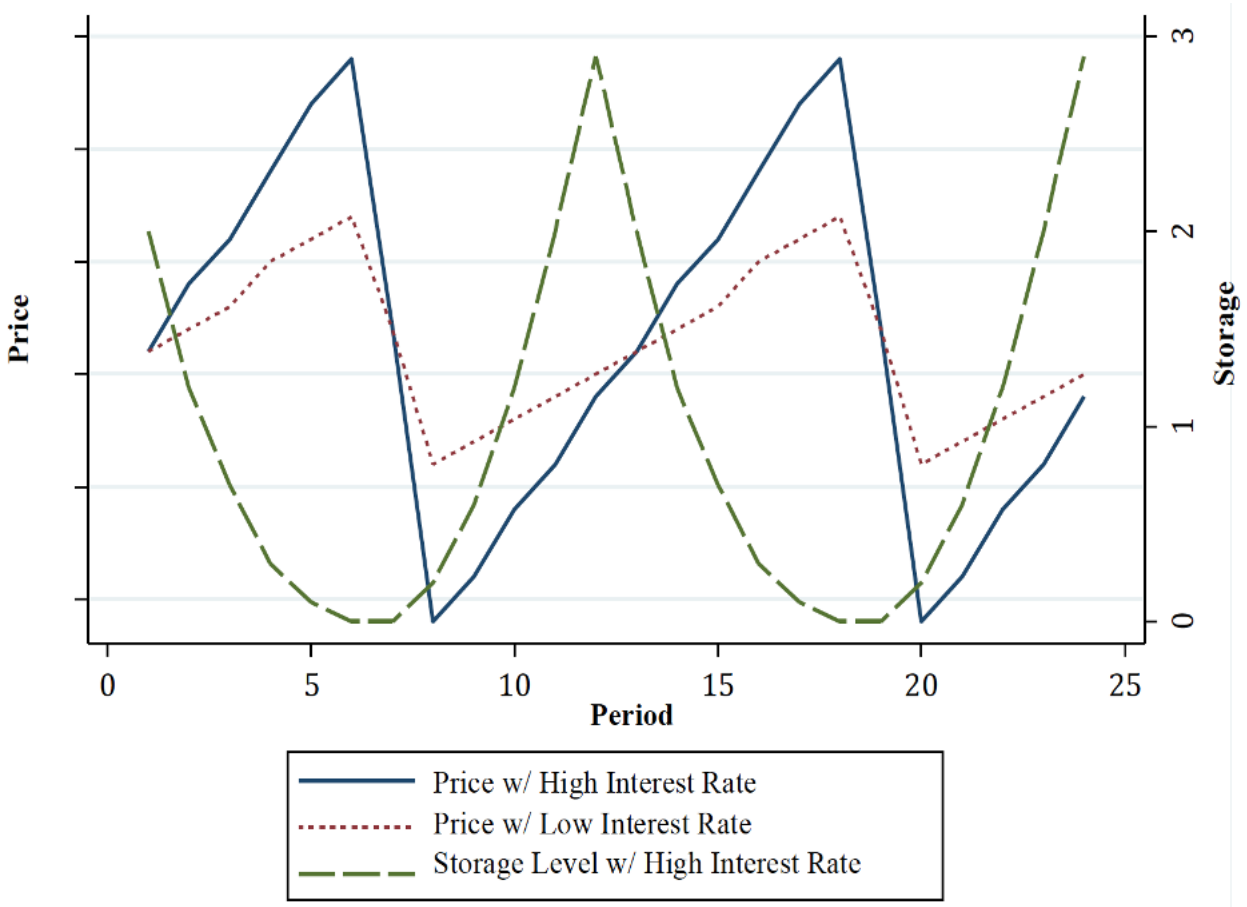
With these assumptions, equation (1) can be rewritten as

$$\hat{p}_{it} \equiv \frac{P_{it+1} - P_{it}}{P_{it}} = r_{it} + c_{it}. \tag{2}$$

Equation (2) shows that in a storage equilibrium the rate of grain price change is equal to the risk-inclusive interest rate r_{it} plus grain-specific storage cost factors, c_{it}. The term $\hat{p}_{it}$ in equation (2) is often referred to as the carry cost of grain.

To characterize the relationship between grain storage and interest rates we employ a standard model of equilibrium commodity storage (see Williams and Wright 1991). The equilibrium storage and pricing behavior of the model is shown in Figure 1. Beginning with the first price (solid line) we see that upon arrival of the new grain from the harvest, the price falls, reaching a first minimum in period 8. This is the beginning of the new harvest year. The price rises until period 18 when the maximum is reached, and the cycle repeats itself.

Figure 1: Interest Rates and Grain Prices in a Storage Model



Between period 8 and period 12, storage level and price rise together, while after period 12 the price increase is accompanied by declining storage. The last unit of stored grain is withdrawn just before the new harvest arrives. The new grain supply causes a fall in price; in this way, storage has the consequence of dampening price fluctuations. Figure 1 shows a second price series, denoted with a dotted line. Notice that it has lower amplitude and is flatter than our earlier price series. This second equilibrium price is computed for a lower interest rate than in the first case, with all else equal. The key result is that the steeper the increase of the price within the harvest year, the higher is the interest rate that agents face. This is the basis for the approach of inferring interest rates from grain prices. In principle, the approach can be applied to other storable commodities. What makes grain particularly attractive in this context is that the see-saw price pattern of Figure 1 is more discernable for grain than for other commodities given that grain is typically harvested only once per year; furthermore, grain price data (but not prices of other

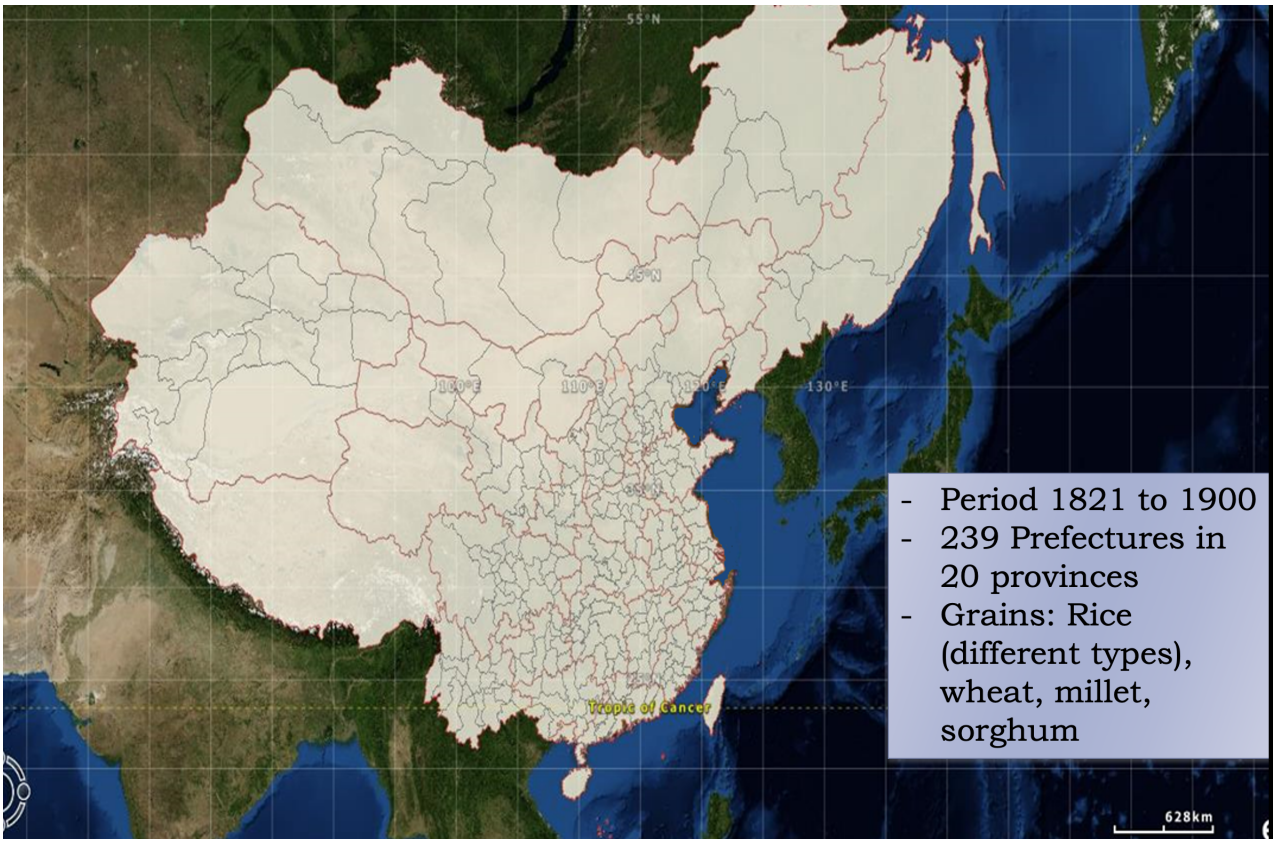
commodities) is available regionally for our sample at a high-frequency level.

3 Historical Background and Data

This section provides an introduction of the historical setting with a focus on the data that will be used. Additional information on China's trade history can be found in Keller, Li, and Shiue (2011) and the sources cited there.

The sample period for our study consists of the years 1821 to 1900, roughly eight decades in the 19th century. This is the later part of China's Qing dynasty (1644 to 1911). This sample period means that there are more than two decades before the first Chinese region was exposed to post-Opium War (1842-) Western influence. At the same time, a sample period until 1900 ensures that we observe a substantial number of years post-opening also for most of the treaty ports that were established in the later part of the treaty port era. The final years of the Qing dynasty were characterized by turmoil which is reflected in comparatively inconsistent data collection, and consequently we drop this period from our sample. The unit of analysis is region x year, where regions are Chinese prefectures. Figure 2 shows the prefectural boundaries in the year 1820.

Figure 2: Prefectures in China, 1820



3.1 Trade and the Customs System

Institutional changes from Western countries were introduced in steps. One pillar of Western influence in China were (often called 'unequal') treaties that established trading rights. The first of these treaties was the Treaty of Nanjing, which concluded the First Opium War (1840-42). With this treaty, Britain and subsequently all Western countries–based on the application of the most favored nations clause–obtained trading rights at five ports: Canton (today Guangzhou), Shanghai, Ningbo, Fuzhou, and Amoy (today Xiamen).[5] This meant that foreign traders could not be prevented from trading (and settling) in these cities.

Over time, China signed 30 treaties with 16 extraterritorial countries from 1843 to 1918, and 8 treaties with Britain alone. In our analysis, we capture this announcement effect of which ports would become a Treaty

[5]In the case of Canton, the Treaty of Nanjing expanded the the more limited trading opportunities (only 13 firms, bilateral monopoly) for Western countries afforded by the so-called Canton system.

Port by coding the dates and the locations of each port. The dates of when specific cities were designated as Treaty Ports are specified in the relevant international treaties, and given in Chinese Maritime Customs (CMC 1938).[6] The first CMC treaty ports were established in 1842; the last of these ports were named in 1907 (see Lyons 2003). By 1915, there were a total of 92 treaty ports, of which 44 were self-opened ports, and 48 were CMC ports with extraterritoriality rights of the Treaty Powers. Our analysis focuses on the formal CMC ports. Figure 3 gives evidence on the timing of the establishment of these ports open to trade with Western countries.

Figure 3: The Spread of Treaty Ports in China, 1842 to 1900

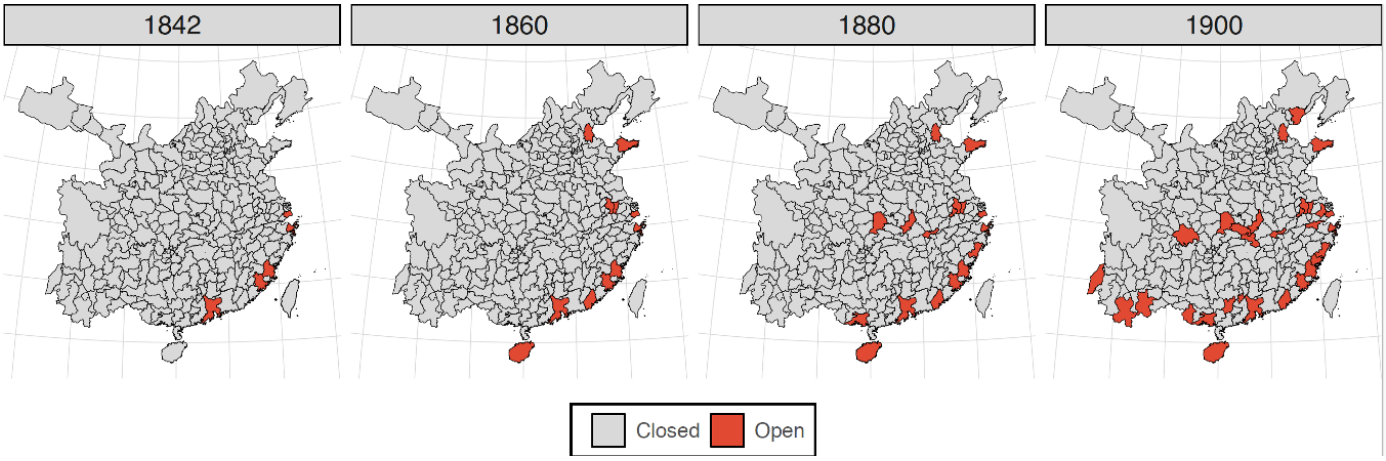


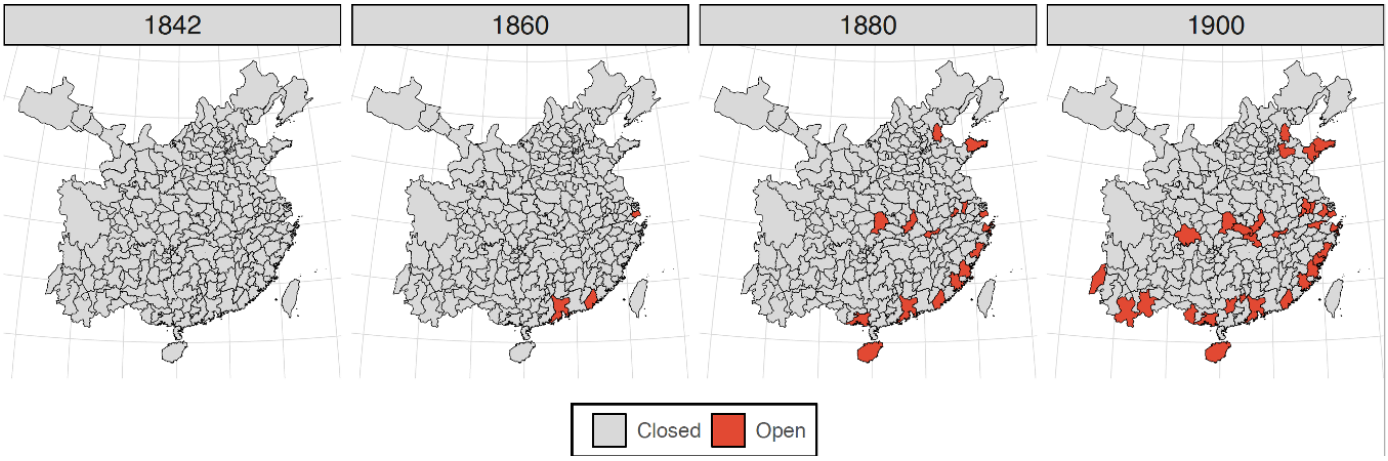
Figure 3 indicates that while Chinese treaty ports were located initially predominantly in major coastal cities in the southeast of China, over time treaty ports were established also in the North (Shandong peninsula) and with Tianjin relatively close to Beijing. Several treaty ports were established in the Southwest, close to Indochina, as well as inland, at international border crossing as well as in the center of China along the Yangzi river.

Trade with Western countries at the new ports required the establishment or expansion of customs houses. A new customs system was necessary not least because the tariffs that were to be charged, albeit low, meant that every international transaction of import and export had to be recorded. However, there were always lags in time between when the port changed status, and when the Customs officers could actually begin to inspect vessels passing through the port, and the dates were different for different locations. Thus, Customs was established in 1854 in Shanghai, 1861 in Ningbo and Fuzhou, and 1862 in Xiamen

[6] See p. 645 "List of Treaty Ports with Dates of Opening"; also Brunero (2004).

even though all four locations became Treaty Ports at the same time. Figure 4 documents the evolution of operating customs houses over time.

Figure 4: Customs House Openings, 1842 to 1900



Comparing the patterns of the nominal treaty port openings in Figure 3 and beginning of customs operations in Figure 4, this adds an additional dimension of variation that allows us to see if the function of the CMC went beyond the effect of adding a new Treaty Port. Table A in the Appendix gives the dates at which the Customs House was established for each of the Treaty Ports.

Although Chinese in name, the CMC Service was built up under British direction and eventually took over from the Chinese the supervision and assessment of duties. The CMC operated continuously between 1859 and 1948 to assess tariffs and record the quantity and value of shipped goods of both foreign and domestic origin. The British run CMC was a much more reliable operation compared to the native customs inspectors. In 1928, when China's land tax was turned over to the provincial governments, the CMC still presided over customs revenues, effectively becoming the international custodian of China's single largest source of government revenue. Even though much of this revenue was used to pay indemnities, the reliability of the CMC was instrumental in establishing the international credibility of public finance in China.

After the British took control of the Chinese Maritime Customs Service, the revenues from this source were considered secure collateral. The security of revenue from this system was such that China was able to use the tariff revenue as credible collateral in international loans. As noted above, this decline in the risk of default of Chinese government loans resulted in a significant decline in interest rates on China's foreign

loans. The authority of the Chinese Maritime Customs Service, under foreign oversight, also expanded into other functions not traditionally held by the Chinese office—postal delivery, money orders between Treaty Ports, lighthouse maintenance, and the policing of trade routes became part of the CMC's task list. Since even the expanded areas of operation tended to focus on matters related to the organization of trade, we categorize it as primarily an economic institution of tax and trade. In particular, the CMC was not the formal arbiter of conflicts and did not exercise authority over disputes amongst traders. For this reason, we categorize the CMC's customs operations as separate from legal institutions, to which we turn now.

3.2 Legal Institutions: Extraterritoriality and Courts

This section introduces the nature of western influence in the legal realm. Since this is less well-known compared to the trade institutions in the economics literature, we provide a somewhat broader overview. For more details, see e.g. Cassel (2012).

Besides for the economics institutions maintained by the Chinese Maritime Customs service, western governments established another set of institutions which were primarily legal in nature. It was based on the courts and consular services introduced in China after the Opium Wars. Before 1842, the opportunities for friction between Chinese and Western traders were somewhat limited by the fact that this trade was tightly controlled and limited to one port, where only specially designated members of the Co-hong could interact with the foreign traders. Almost immediately after Britain opened the first additional ports of entry in 1842, there arose the need for British and other foreign residents to have a way of resolving property disputes and conflicts of interest both with Chinese agents as well as amongst Western traders themselves. After having rejected the legitimacy of the Chinese system of law and justice, there was a vacuum of legal administration in the case of disputes between foreigners and between foreigners and Chinese. Thus, already in the earliest of the treaties, the 1842 Treaty of Nanjing, which concluded the first Opium War, the provision for extraterritorial rights included the stipulation that allowed the Britain Consular Service in China to handle cases involving British residents in China.

Within a few years of the opening of the first Treaty Ports, Britain established the position of a Consul, who represented the interests of the British citizen in China in judicial matters. A similar set of rights of extraterritoriality was made explicit in the American treaty of 1844 between the U.S. and China. That

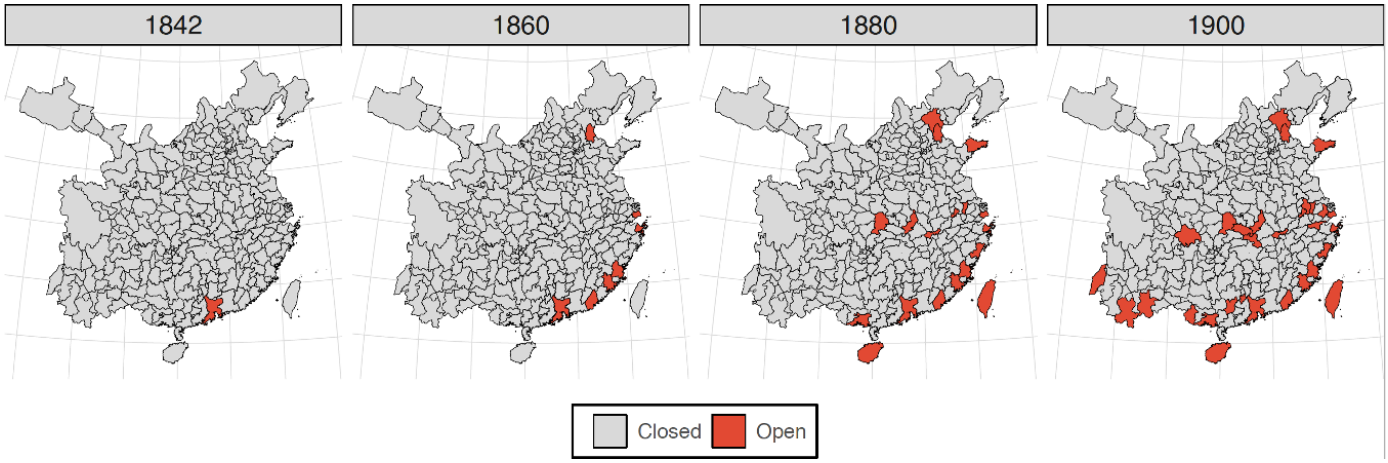
agreement describes the Consul in terms similar to that of the authority of a court: "citizens of the United States who may commit any crime in China shall be subject to be tried and punished only by the Consul or other public functionary of the United States thereto authorized according to the laws of the United States." (Article XXI). By Article XXV: "All questions in regard to rights, whether of property or person, arising between citizens of the United States in China, shall be subject to the jurisdiction of and regulated by the authorities of their own Government." The treaty of 1844 for France, and the Treaty of 1847 with Norway and Sweden, substantially granted the same set of rights to these countries as well.

By 1847, 19 nations had extraterritoriality provisions with China. From the histories of the consular services, there was a learning curve as the Western nations tried to maneuver and establish new rules of engagement within China and with the nationals of other countries in China. Treaties marked the beginning of this process in which it was no longer the case that Westerners could consider themselves above the law. If before 1842 the foreigner ignored Chinese laws, the consular courts attempted to ensure that there was a framework of legality that would allow familiar rules of conduct to continue. In addition, Chinese citizens could obtain redress against complaints towards a U.S. citizen in the Mixed Court. In cases that involved a Chinese citizen and a foreign citizen, the Consul acted as an intermediary representative, as is clear in the following clause, which is from the American Treaty: "The Chinese Government will not hold itself responsible for any debts which may happen to be due from subjects of China to citizens of the United States, or for frauds committed by them; but citizens of the United States may seek redress in law; and on suitable representation being made to the Chinese local authorities through the Consul, they will cause due examination in the premises, and take all proper steps to compel satisfaction The paragraph continues: "...if citizens of the United States be indebted to subjects of China, the latter may seek redress in the same way through the Consul...".

Extraterritoriality was legitimized in the Sino-American Treaty of Tientsin of 1858, but this was only a formality. Even before Western courts were established in China, Western residents had rights of extraterritoriality from the beginning of the Treaty Port Era in which foreigners had the right to own property, trade and carry on manufacturing according to the laws of their own state rather than Chinese law. The Most Favored Nation clause, present in many of China's treaties, automatically granted to all Treaty Powers the rights which China was compelled to allow to any one nation, expanding the influence of the Treaty Powers as a block. It also made it unnecessary for each foreign country to sign new bilateral

treaties as the powers of Treaty countries expanded. The shift from the opening of trade, to the establishment of a consular service allows us to examine the influence of legal courts separately from that of simply allowing trade to take place. Table B gives the list of British Consular Courts and the dates of their establishment. Some of the consulates were established in areas that were not Treaty Ports. In other cases, ports were opened by treaty first, and then a consular court was established. By 1925, there were over 120 foreign consulates in China, including 46 British consular courts, 18 U.S., 35 Japanese, 4 Belgian, 17 French, 5 Italian, and 4 Dutch.[7] Figure 5 gives information on the establishment of consulates in China during the sample period. It is clear from the figure that the presence of trade and legal institutions often coincided. This will be addressed below.

Figure 5: The Establishment of Consulate Services and Courts in China, 1842 to 1900



Anecdotal evidence supports the idea that the protection of trade and the decline in interest rates are directly related. According to Hao (1986), low interest rates in the Treaty Ports came about in part due to foreign competition to make loans to the Chinese in order to cultivate business. However, this competition was possible only if capital was relatively secure. The British company Jardine extended loans to Chinese merchants, secured with stock deeds and titled property—collateral that was easy to recognize and simple to handle should default occur. Other, more scattered anecdotal reports suggest the presence of foreign institutions may have had spillover effects into Chinese society in other markets besides for commodity markets. For instance, landholding rights in foreign settlements or concessions were set forth in treaty provisions. Since disputes related to property registered to foreigners would be heard in Western courts,

[7]Report (1930) also lists the locations and the number of judges that sat on so-called modern Chinese courts as of that year.

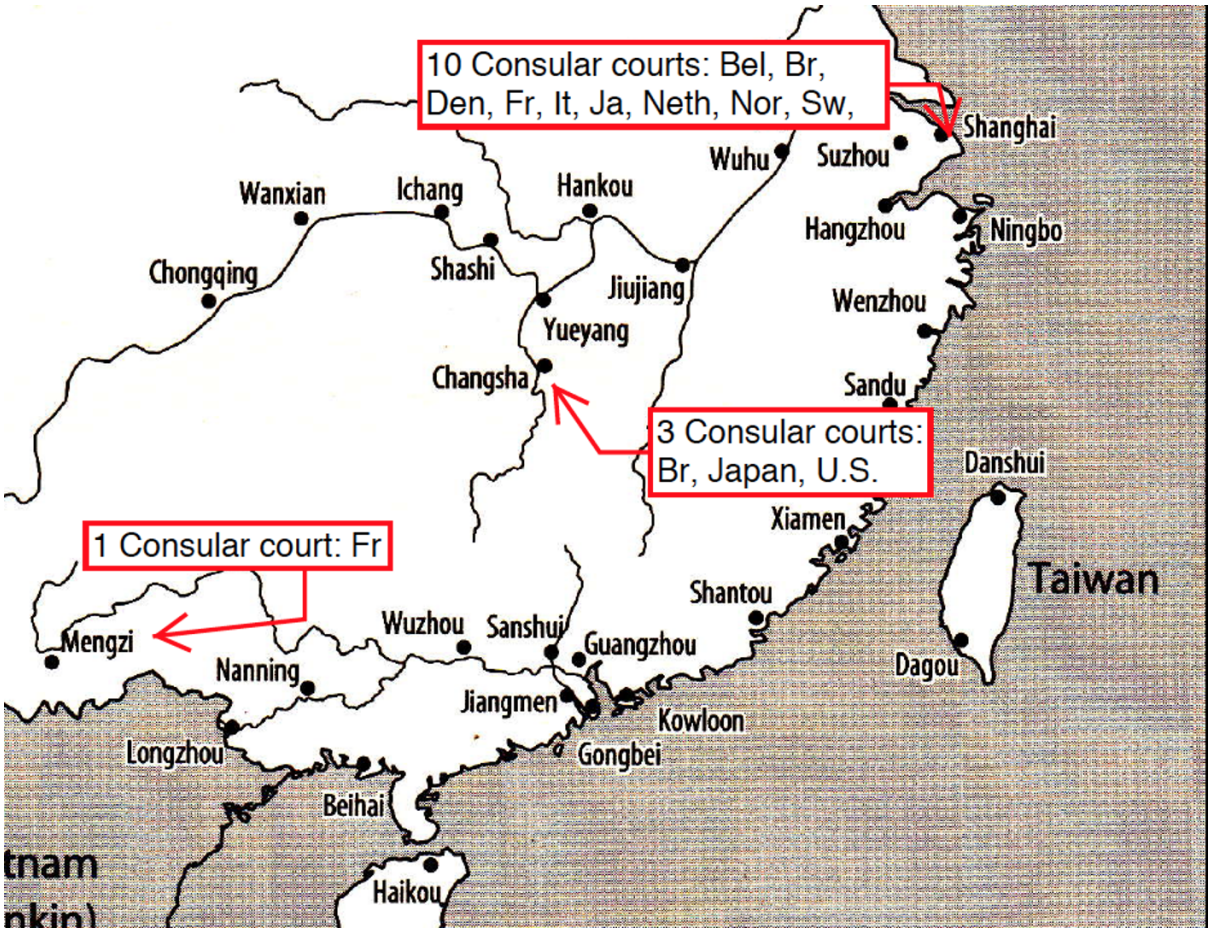
"many" Chinese placed their land under foreign protection indirectly by leasing the property to foreigners, who would register the land with their consulates (Willoughby 1920, 696). The linking of courts and Western business practices may have changed traditional ways of contracting, and this may be linked to reductions in risk. Case studies from Kirby (1995) and Chung (2010) give suggestive evidence of how this might have taken place. Traditionally, Chinese businesses operated under a firm's name only. Often, there was no record of the nature of ownership among the owners. Company Law of 1865 enacted in British Hong Kong required the registration of names of people who were owners. Those that did not register would not be recognized in court as having a legal basis. Over time, however, more and more Chinese businesses began registering their firms to certain owners to avail themselves of the advantages of using the courts to resolve disputes. One of the early roles of the Consul was to act in an administrative capacity between the Chinese official (Taotai) and the Customs collection that were part of the treaties of 1842. The Chinese Customs Service was responsible for assessing and accounting for the tariff duties that were under the treaty and for enforcing the treaty trade regulations. Its staff would examine cargo, prevent smuggling, appraise goods, assess, collect, and account for duties, and it would compile the returns of trade, eventually taking on more wide-ranging activities. In principle, merchants who arrived at the Customs House after 1842 could trade freely so long as they paid the treaty tariff rates on their goods. However, this did not always happen and smuggling was difficult to control. Therefore, the British appointed the position of the Consul, an official who was to reside at each of the (initially) five open ports to ensure that the dues were paid. The procedure was such that after the arrival of a vessel at an open port the captain had within 24 hours to go to the British Consulate and deposit the ship's papers, bills of landing, etc., and the Consul would then send a written notice to the Superintendent of Customs specifying the cargo and tonnage. Customs then examined the goods, and once the dues were paid the ship received clearance and was allowed to depart. Thus, the first tasks of the Consuls were to prevent smuggling and ensure proper payment of duties. As of 1858, the Chinese Customs Service administration of customs included an Inspector of Customs that consisted of Chinese and Foreign staff, set under the power of the Treaty Power Consuls. A second role of the consul concerned the provision of extraterritoriality, the beginnings of which were already present in the supplementary articles of treaties of 1843, which stipulated that British subjects were to be tried by British officials according to British laws and that in mixed civil cases between British and Chinese there was to be joint adjudication. Other foreign countries that came

to China also wanted to exercise similar extraterritorial rights. By 1847, extraterritorial arrangements were negotiated and took effect between China and the United States, France, Sweden, and Norway. In all, there were originally 19 states that negotiated extraterritoriality. They were, in chronological order or treaty establishment: Russia, Great Britain, the U.S. France, Sweden, Norway, the German Customs Union, Denmark, The Netherlands, Spain, Belgium, Italy, Austria-Hungary, Peru, Brazil, Portugal, Japan, Mexico, and Switzerland. Extraterritoriality was a long-standing situation for the majority of foreign powers during this semi-colonial era. By 1920, 16 states were still exercising those rights in China.[8]

Although all foreign countries had the desire to exercise extraterritoriality, there were differences in the degree to which different countries were interested in, and able to carry out those practices. In addition, individual countries also had their own (different) laws to begin with, so there was an additional source of heterogeneity in the application of extraterritoriality in China. To assess the differences across how countries implemented their legal interests and to evaluate the foreign legal presence in China, we use four different measures. These are constructed from a review of reports in the early 20th century and are in our view important from several standpoints. The major areas of where the legal presence is evaluated in terms of the following: 1) jurisdiction of the consul or the judge (in civil and criminal cases); 2) right to appeal the decision of the consul of judge; 3) the use of foreign assessors in Chinese (or mixed) cases; 4) presence of foreign prisons in China. The information on these characteristics is time-invariant and retrospective; it comes from Report (1930). However, there is important variation by foreign country, as shown in Figure 6 indicates.

[8]China abrogated the extraterritorial rights of Germany and Austria-Hungary in 1917 and suspended the rights of Russia in 1920.

Figure 6: Within-China Variation in the Nature of Western Institutions



3.2.1 Jurisdiction

When the extraterritorial foreigner is the defendant or the accused, the court of the nationality of the foreigner has jurisdiction. The question of jurisdiction has to do with the power of the consul or the consular court in deciding civil and criminal cases. Cases that appear in court may range from relatively minor disputes involving smaller amounts of money and less serious infractions to more major disputes over large amounts of money or serious crimes. One clear indication of the competence of the consul and consular court is thus whether the cases that they can decided upon has been curtailed to relatively non-contentious cases or disputes that involved less than a pre-specified amount of money. In addition, the question of jurisdiction may vary and depend on whether the case is a civil or a criminal one. Consuls were not necessarily trained lawyers or judges, they may have been given the right to decide over smaller cases, or only certain cases, while more serious cases were considered their beyond their jurisdiction. The

jurisdiction of the consul and consular court (which was often presided over by the consul himself plus a few other members of the staff) was thus in part based on the competence of the consul, and the rights to which each country endowed this person. Based on these considerations, distinctions can be made. For example, in the case of Portugal, consuls sit alone on decisions less than $400 Mexican doll, and in cases over that amount the consul presides with three assessors. For criminal cases in Portugal, the consul sits alone on cases that do not surpass $2000 (Mexican) in fines, and the consular courts can decide on cases more serious than that, but not all—the specific exceptions are more crimes involving more lengthy imprisonment, expulsion, or exile. In these cases, the cases have to be sent to the judicial court in Macao. In our coding, Portugal is described as being able to hear both civil and criminal cases, but there is a limitation to the power of jurisdiction of Portuguese courts in China. In contrast, the consul and consular court of Belgium has jurisdiction in civil matters in China, with the consul having full jurisdiction in cases involving less than 100 francs, but all persons committing criminal offenses are sent to Brussels to be tried by the assizes of the Province of Brabant. In our coding, we measure this by giving a code indicating that only civil cases are heard. Both Belgium and Portuguese consular courts had more limited jurisdiction than Great Britain, where provincial courts existed in each consular district in China, and in addition the British Supreme Court was presided over by two trained judges and a professional staff giving it unlimited jurisdiction over all civil and criminal cases. In all, only two countries--Britain and the United States—ever established special courts with professional staff members. France and Italy each had a special judge rather than a full staff.

3.2.2 Right to Appeal

The right of appeal is another important difference across countries, and our second indicator is whether the decision of the consular court can be appealed. Countries allowed right of appeal for certain types of cases, typically those that involve more serious cases or cases of higher value. Because these differences are relatively slight, we focus on another difference in the rights of appeal, and that is whether or not the appeal can be heard in China. Belgium and Portugal are both examples of countries where appeals are possible, but the appeal cannot be made in China. Appeals to decisions of the consular court for Belgium are made to the final court of appeal in Brussels, and in the case of Portugal, appeals may be made only in the high judicial court of Goa, Portuguese India. Further appeals on the question of law and procedure

may be made only at the Supreme Court of Justice in Lisbon, whose decision then is final. By contrast, the full court of the three judges, which presided over the British Supreme Court for China, exercised the same powers as the court of appeal in England. In certain instances of civil matters of great interest to public importance appeals could be made to the Privy Council of London, but in criminal matters there was no appeal to the Privy of London, except by leave of the Privy Council. From these and other examples, the key difference that appears in matters of appeals is whether or not the appeal could be heard in China or whether it could only be appealed by taking the case abroad to a higher court of the home country.

We can expect that the greater the legal presence of the courts of one's nationality, the more protections for the rights of that group, and less uncertainty about the security of one's position in China with respect to property and personal security. For instance, if a British national is accused of a serious crime, the case is heard in the British consulate court, and the accused could appeal the decision without having to return to Britain. Being able to resolve an appeal without having to leave China reduces the costs of appeal. If the appeal has to be taken to a distant court in a separate country, we consider that equivalent to weaker rights of appeal.

3.2.3 Foreign Assessors

When there is adjudication of claims and complaints of foreigners against Chinese, that is, when the foreigner is the plaintiff or complainant, then the Chinese court has jurisdiction. Some countries had the right to have a foreign assessor represent the interests of the foreign plaintiff or complainant in the Chinese court. When the foreign party is allowed to have an assessor present, then the case is referred to as a "mixed case" and the court is a "mixed court". The foreign assessor was not necessarily trained in law, but was present in order "to examine and cross-examine witnesses" and to "protest against the proceedings in detail]" (Quigley, 1926). The role of the foreign assessor in the Chinese court thus was part of the policy of extraterritoriality in China. The presence of foreign assessors in Chinese courts is historically important because even foreign observers of the time regarded the proceedings in the mixed court as a being subjected to the partiality of the assessor and the magistrate for their own subject.

The variations arise regarding the use of assessors in mixed cases. Great Britain and the United States had the right of being represented by assessors at trials of Chinese courts in which their nationals are plaintiffs.

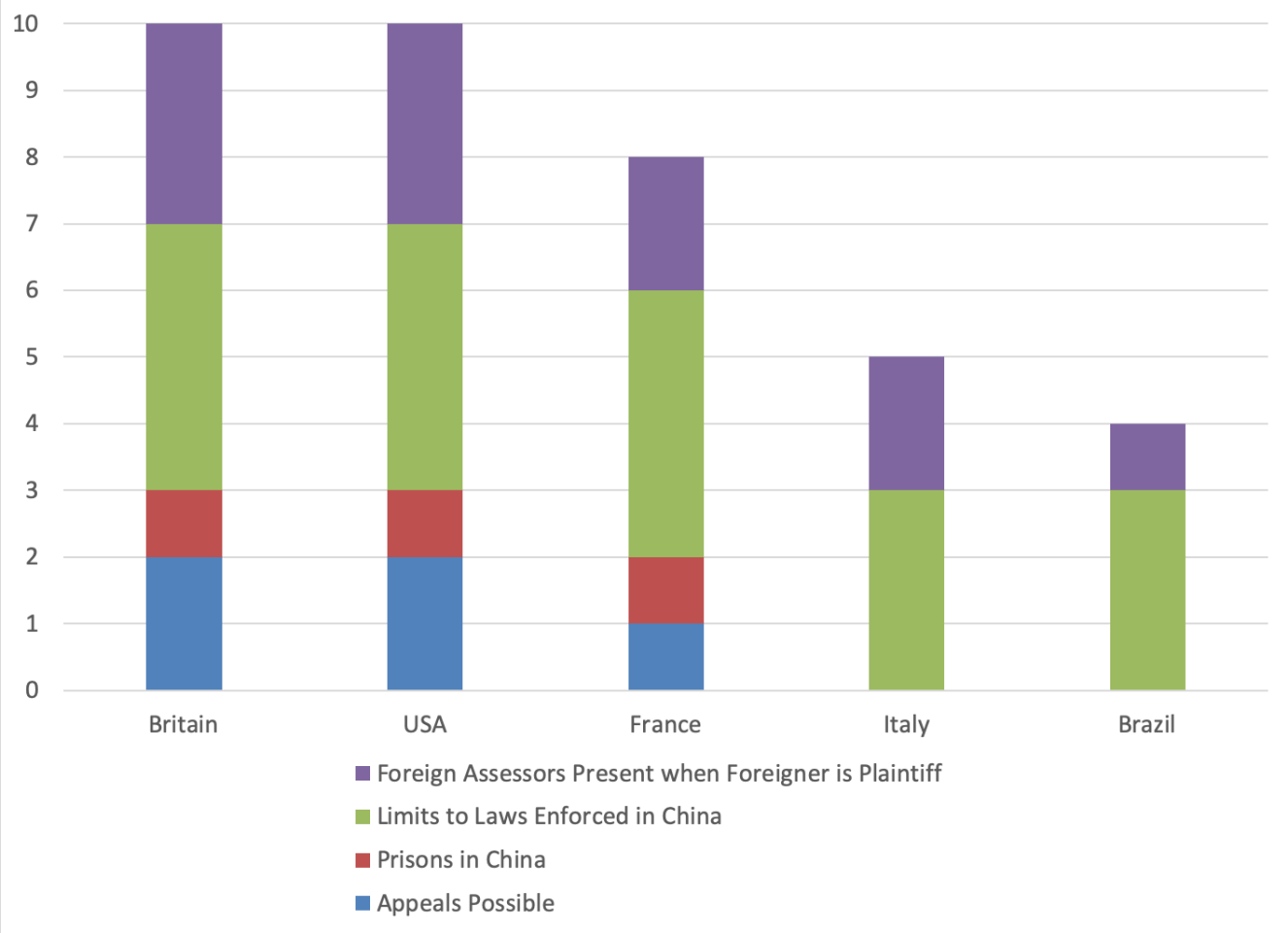
This right was reciprocal, but in general the Chinese did not exercise their right to have a Chinese assessor present in the foreign court. In the case of Brazil, Mexico, and Japan, the rule of exclusive jurisdiction is applied on both sides, so no foreign assessor or arbiter is present in either the civil or the criminal cases. For the remainder of countries, the largest group, civil cases involving a foreign plaintiff are heard jointly by the foreign consul and the Chinese officials, whereas criminal cases are dealt with in the Chinese court, without foreign assessors present. The resolution of the civil cases is thought to be one of mediation and more in accordance with Chinese practice.

3.2.4 Prisons

Beyond the decision of the court, prison facilities are another measure we take as indication of the completeness with which a country locates its legal presence into China. It relates the commitment to carry out the sentences that have been decided upon by the court. In order to enforce the sentence that was reached in the foreign court, there would have to be some sort of prison facility. Since foreign countries determined that the conditions of Chinese prisons were extremely poor and inadequate for housing prisoners, foreign prisoners were either sent to foreign prisons in China, or to prisons outside of China, where this usually depended on the length of the sentence. Only four powers had prisons in China: the United States, Britain, France, and Japan. All the other counties had to either sent their prisoners outside of China, or make arrangements with one of the four countries that had prisons in China to use those prisons. We now turn to describing other data that will be employed in the analysis.

Figure 7 shows how quantitatively the legal footprint of the West varied by country. Shown are indicators of the differences across Western country in terms of the four indicators just discussed. A higher numerical value reflects a stronger foreign presence in China.

Figure 7: Western Legal Institutions in China: Differences across Western Countries



Britain and the US structured their legal institutions in China in the same, relatively expansive way. First, in their courts, they allowed for appeals, which not all Western countries did, and the appeals process would take place in China (not in the respective Western country). Second, both the US and Britain operated prisons in China, as did France.[9] Third, there were no limits to laws, civil as well as criminal, that the US and Britain would enforce in China; it was not necessary to send particularly serious cases to the respective Western country's courts in the home country. And finally, both the US and Britain always send a foreign assessor to the Chinese court in cases when one of their citizens was the plaintiff.

Covering many legal aspects in a relatively forceful way, we expect the institutional impact of the British and US legal system in China to be stronger than that of Italy's or Brazil's, for example, whose legal systems performed only a subset of these functions. Additional variation in the impact of Western legal

[9]The source of this information is Report (1930).

institutions comes from the fact that some Western countries had more consulates in China than other countries.

3.3 Grain Prices and Interest Rates

By the beginning of the early 18th century, an extensive network of grain price reports had become a standard and routine aspect of the Qing bureaucracy. The government did not set prices, but compiled voluminous price observations. All prices originally were collected at markets serving the county towns, where the county represented the lowest level of government. Equivalent to the county unit were less common designations—such as the department, autonomous department, or autonomous subprefecture. These county reports were made every ten days to a month (Chuan and Kraus 1975), and included not only prices, but also reports on the crop harvest and notes on weather. These price reports were sent to the next higher administrative level, the prefecture, where prefectural officials summarized the county reports. At the prefectural level, the highest and the lowest prices for each of the main crops of the prefecture were recorded. We do not know from which county a particular price came as the county level price records have, for the most part, been destroyed. Today, only the prefectural price summary reports are available. These give the highest and lowest prices in each prefecture, at lunar-monthly intervals. The prices were recorded in copper cash per sheng and converted to silver taels (kuping liang) and bushels (shi). The price reports also record the cash-to-silver exchange rates used. Given the large variations in regional exchange rates, it is reasonable to assume that the local officials, the people who were most intimately familiar with local conditions, were the ones who originally made the conversions.

Historical analysis and empirical studies both suggest that the data on prices are generally of high quality. There are countless examples in the documentary evidence in which government officials refer to the grain prices to infer regional supply and demand, or compare price levels within provinces or across different provinces. These statements by contemporaries would have been completely illogical if people did not regard the prices to be in comparable units of currency from region to region. The price data was not only useful as an early warning system of areas of potential crises to Qing officials, but another practical use of the price records was that the government was a major consumer and purchaser of rice, and thus desired to know where prices were relatively low. According to Wang (2003), the prices collected were wholesale prices, and this is a plausible conclusion as these would have been more easily observable to government

officials. The government would have also directly participated in wholesale markets, rather than in small retail markets. In addition to the regular price reports, a dual system of reporting existed which was less well-known and less systematic, but which nevertheless helped to maintain the accuracy of the regular reporting system. Our own empirical studies have related the grain prices to independently collected information, such as weather shocks (based on historical gazetteer data), and the costs of transportation (based on distance and the location of waterways), and they show that the grain prices are consistent for the 18th century (Shiue 2002, Keller and Shiue 2007).

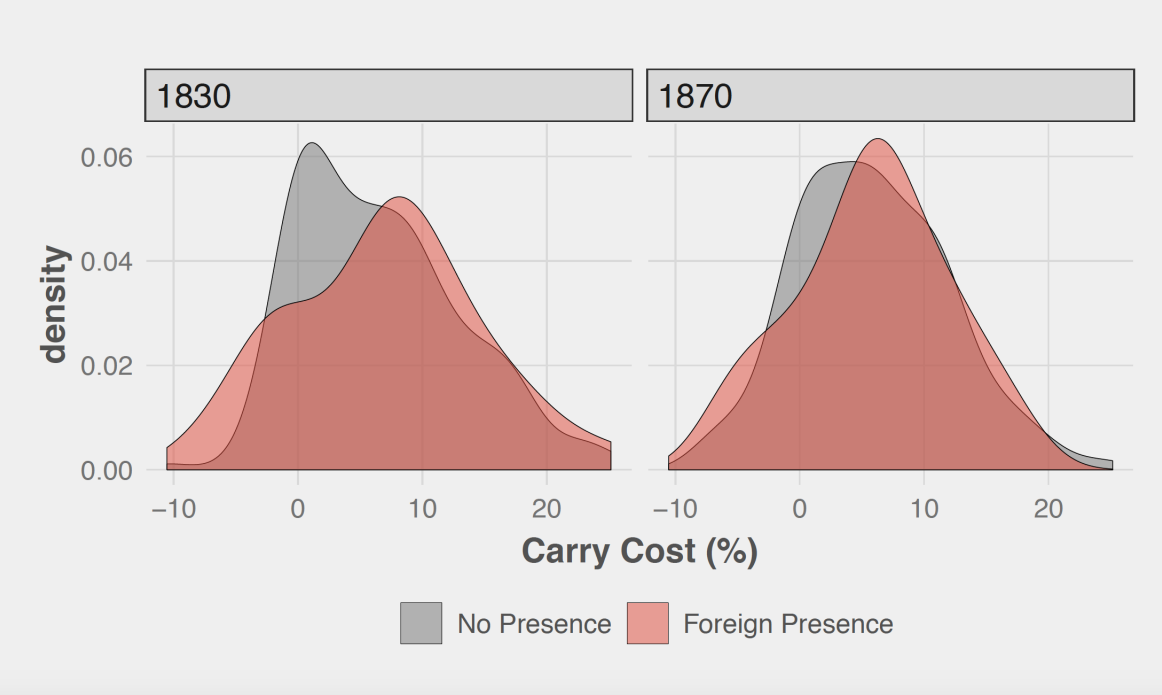
We use monthly data for 22 different grain price series to compute the within-harvest year price gradient shown in Figure 1. Our final sample covers regions in 20 provinces and about 240 prefectures of China during the period 1821 to 1900. The sample covers the major centers of residence and economic activity (Xinjiang province is missing). Each prefecture typically will have anywhere from three to six types of grain, depending on what crops are indigenous for that region. Wheat and barley are likely seen in the northern provinces, whereas rice is common in the central and southern provinces. Soybeans are also relatively commonly observed. Rice, when recorded, often consists of 3 types of grades: high quality, standard, and low quality. High and low prices in each prefecture and month are recorded, typically, also for each of the three gradations of rice quality. We compute the mid-price as the average of high and low price for a prefecture in a given month.

To compute the average price gradient for a given prefecture and year (see Figure 1), we restrict the sample in a number of ways. First, we drop months for which the one-month price change is typically negative; such months, for example because the harvest comes in, do not help to estimate the price gradient. Second, we focus on the central 98 percent interval of one-month price changes to reduce the impact of outliers.[10]

Taking the average of these one-month price changes yields N = 95,089 carry costs, $\hat{p}_{it}$ (see equation 2) which vary by prefecture, year, and grain. These carry costs can be seen as estimates of interest rates inclusive of risk and physical storage costs. They average about 8% per year in China during this period. Our interest lies in whether there was a difference in interest rates between regions affected by foreign presence, or not. Figure 8 shows the distribution of carry cost estimates by whether in a given region there was ever a Western foreign presence in any form.

[10] See Keller, Shiue, and Wang (2019) for additional discussion.

Figure 8: Regional Carry Costs over Time by Foreign Presence

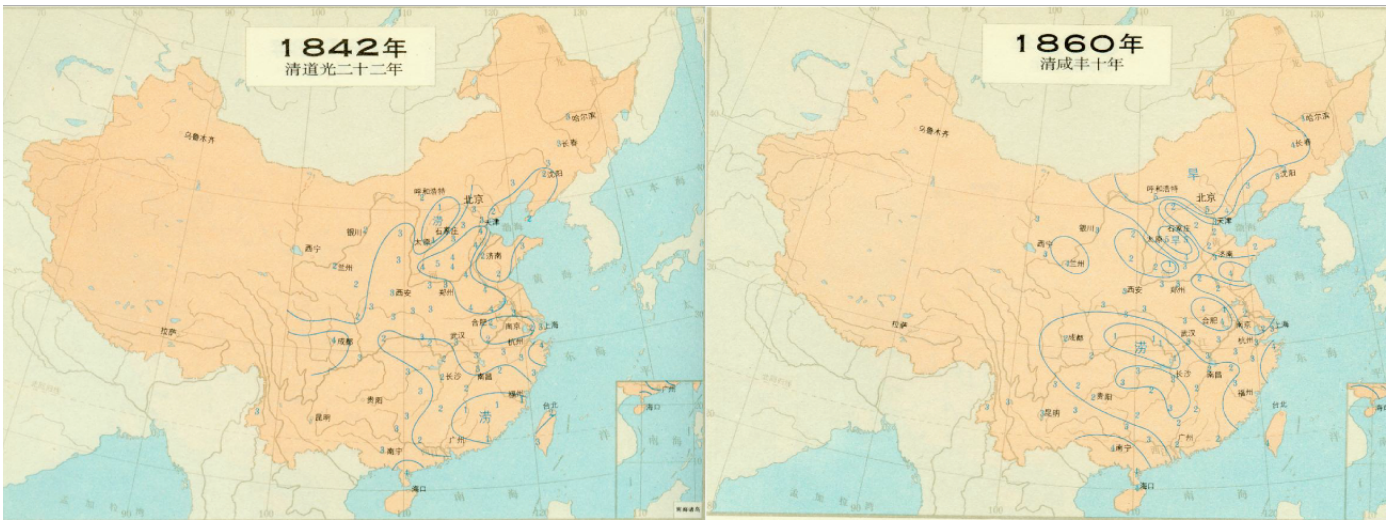


The distributions of Figure 7 show that in a given region and year, carry cost estimates based on the storage cost approach can take on a wide range of values (also negative, when grain prices secularly fall). At the same time, in our approach we will exploit within-region variation using close to 100,000 annual carry cost estimates. Taking difference between prefectures and over time, as well as a relatively large sample, existing research indicates that the storage cost approach accurately reflects differences in capital market performance. Figure 7 also provides evidence that regions with foreign presence experienced a decline in interest rates over time compared to regions without foreign presence (notice the leftward shift in the mode of the Foreign Presence distribution). In section 4 below we will examine this more formally.

3.4 Weather

The storage costs of grain are highly sensitive to climatic conditions, and we employ historical weather data to assess the role of physical storage costs in our analysis. Weather data come from published data by the State Meteorological Society (1981). The original materials were based on more than 2,200 local histories and gazetteer writings, and "more than 2 million and two hundred thousand characters". See Figure 9 for the historical information on weather for two sample years in form of contour maps.

Figure 9: Historical Weather Information for 1842 and 1860

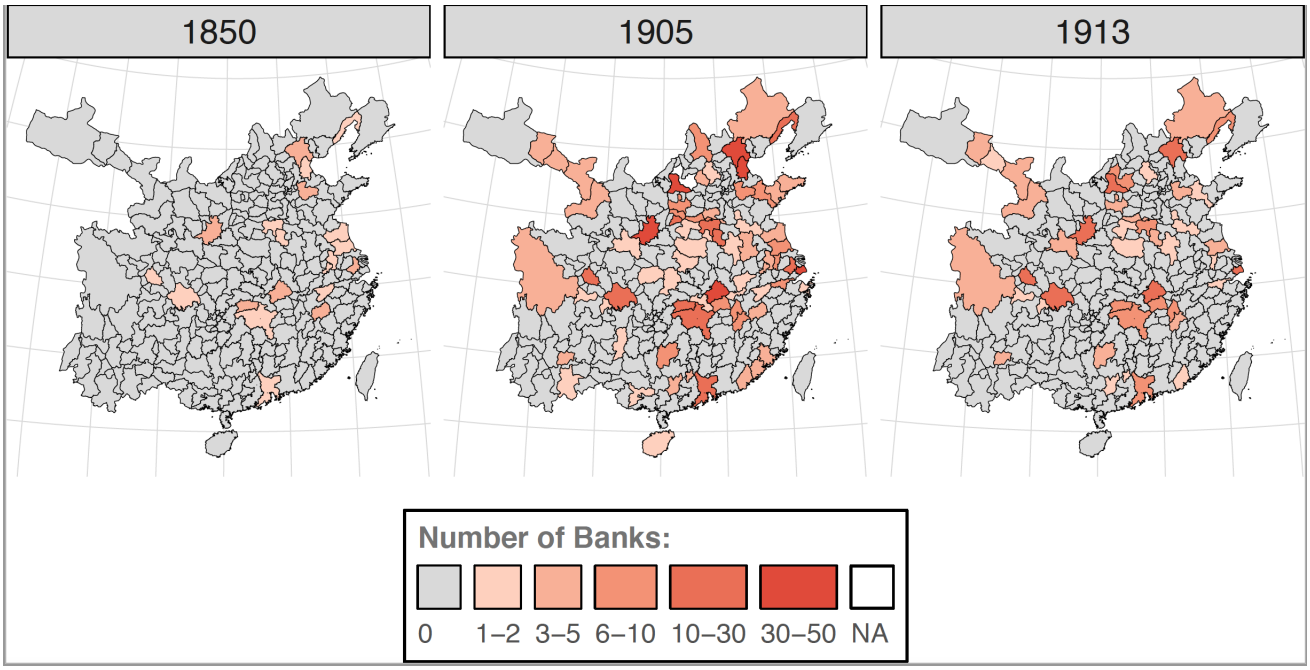


The reference produces annual tables and maps of dryness and wetness in 120 regions, each region of which corresponds to one or two prefectures in the present administration of China. The degree of dryness and wetness in classified into 5 grades: grade 1 is very wet; grade 2 is wet; grade 3 is normal; grade 4 is dry; and grade 5 is very dry, normalized according to what is considered average for a particular region. We exploit the fact that extreme weather is associated with higher storage costs for grain. For each of our prefectures and for each year, we take the weather, 1 to 5, of the nearest weather station of the 120 regions to be the weather of this prefecture in a given year. Adjusting the results for physical storage cost differences related to weather shocks reduces our sample because we do not have weather observations for the entire sample.

3.5 Development of the Chinese Banking System

[Incomplete] The following Figure 10 shows the main regional patterns in the development of China's banking system.

Figure 10: Regional Developments in China's Banking System



4 Estimation Approach

We employ a difference-in-differences estimation approach in which the change in interest rates over time in regions exposed to Western presence is compared to the change in interest rates over time in regions that were not subject to Western presence. Formally, we estimate by OLS the following equation

$$\hat{p}_{igt} = \beta_0 + \beta_1 For_{it} + \beta' X + \mu_t + \theta_{ig} + \varepsilon_{igt}, \tag{3}$$

where For_{it} is a measure of foreign presence in prefecture i in year t, such as the indicator variable of opening of customs shown in Figure 4; μ_t and θ_{ig} are year and prefecture by grain fixed effects, respectively, and X is a vector of additional variables, such as the weather in prefecture i and year t. We assume that the error term ε_{igt} is mean zero and well-behaved but allow for heteroskedasticity. The presence of prefecture by grain fixed effects means that identification comes solely from within-changes over time.

5 Empirical Results

5.1 Baseline Results

Results of estimation equation (3) are shown in Table 1. We develop the equation (3) specification step by step so that it becomes apparent what matters, and also provide a number of immediate checks. The definition of foreign presence in Table 1 is an indicator variable that is equal to one if in a given year and prefecture, there was any foreign presence in terms of treaty port , a consulate, or a military occupation, and zero otherwise. At this point we do not distinguish whether there is one or more open treaty ports in a given prefecture (and analogously for consulates and military occupations).

Table 1: Chinese Interest Rates and Foreign Presence

	(1)	(2)	(3)	(4) Only Rice	(5) No Shanghai
Foreign	-0.350^{*}	-1.262^{**}	-1.265^{**}	-1.705^{**}	-1.323^{**}
	(0.142)	(0.143)	(0.266)	(0.337)	(0.272)
Year FE		Y	Y	Y	Y
Pref-Grain FE			Y	Y	Y
R^2	0.000	0.047	0.181	0.238	0.181
N	95,089	95,089	95,065	50,149	94,463

Notes: Dependent variable is carry cost of grain; estimation by OLS. Foreign is equal to one if in this prefecture and year the port was open to trade with Western countries, or there was one or more Western consulates. Robust standard errors clustered at the prefecture-grain level in parentheses. **/*/+ means significant at a 1%/5%/10% level.

We see that Western presence tends to be associated with lower carry costs, as indicated by column (1). It is worth keeping in mind that the dependent variable is the carry cost, not interest rate, and it could be that physical storage costs are correlated with foreign presence. Adding year fixed effects leads to a more strongly negative coefficient on For_{it} , see column (2). Chinese interest rates generally tended to increase during the 19th century, reflecting the turmoil towards the end of the Qing and other factors, and one interpretation of our results is that the increase was less strong in regions exposed to Western presence than in other regions. Next, we add prefecture x grain fixed effect. Column (3) shows that while these fixed effects help to explain variation in carry-costs (note the R^2), the point estimat on the foreign presence variable is largely unchanged.

Next, we examine the robustness of the results by type of grain on which the carry cost estimates are

based. Rice is the major grain in China, and for this reason earlier reseach has often focused on this (e.g., Shiue 2002). The focus on rice also implies a geographic sample restriction due to the fact that rice is not grown in the north of China. Because of its importance it may also be the case that rice prices are especially well recorded by the Qing state. If we focus on carry costs derived from rice price data, the coefficient on foreign presence increases somewhat (in absolute value), see column (4). This indicates that the role of Western presence for local interest rates is relatively large when we focus on rice-based figures. The final specification in Table 1 excludes the Shanghai region from the analysis. Shanghai was of particular importance for China's international trade at the time (see Keller, Li, and Shiue 2013), and one might be concerned that the results are driven by a single region. Comparing results in columns (5) and (3) shows that this is not the case.

5.2 Threats to Identification

This section considers concerns about the estimation results that might arise from pre-trends and sample selection. We also conduct a placebo exercise on the impact of trade institutions.

One form of pre-trends that would be a concern is that foreigners had chosen as treaty ports those locations that exhibited already before the Western arrival relatively high interest rate declines, the impact of foreign presence would be overestimated. There is no doubt that deliberate decisions were made as to which Chinese ports to open to Western trade. Shanghai, for example, was chosen because of its location where the Yangzi River meets the East China sea, even though in the centuries before 1842 the Chinese customs station of Shanghai was long overshadowed by those in Hangzhou and Nanjing. Similarly, Hankow (Wuhan) was chosen because of its central role for the middle- and upper Yangzi trade. In order to examine the role of pre-existing trends we have calculated for each prefecture the average rate of interest rate growth between 1821 and 1842, and interacted this with the Foreign variable. If the decline of interest rates in areas of post-1842 foreign presence would reflect pre-existing trends this interaction variable, and not the linear Foreign variable, would enter significantly in the regression. However, the results in Table 2 show that pre-trends do not play a major role (column 2). Another concern is that the large majority of Chinese prefectures were never subject to any local Western presence. This form of 'treatment' took place for only15% of the prefectures, leaving the possibility that 'treated' regions are in some ways fundamentally different from 'untreated' regions. To address this issue we perform inverse-probability weighted regression

adjustment (IPWRA). For each prefecture, we calculate the propensity score of having Western presence, in the sense of Foreign being equal to one for at least one year. We do so by running a probit regression of Foreign on a number of exogenous and pre-determined prefecture characteristics: latitude, longitude, population in the year 1776, population growth between 1776 and 1820, coastal location, or location on either the Yangzi or the Pearl rivers. Among these determinants, latitude, 1776 population, and coastal location turn out to be significant predictors of the propensity score (the prediction of the probit regression). With the propensity score in hand we perform the inverse-probability weighted regression adjustment. It does not lead to a big change in our results, as indicated by comparing columns (3) and (1). Thus, it does not appear that sample selection plays a major role for our results.

Table 2: Interest Rate Effects of Foreign Institutions: The Roles of Pre-Trends and Sample Selection

	(1)	(2)	(3)	(4)	(5)
			IPWRA	Placebo	
Foreign	−1.246**	−1.179**	−1.125**	−1.186**	
	(0.266)	(0.281)	(0.266)	(0.246)	
Foreign x Pre-Interest Rate Growth		0.012			
		(0.007)			
Treaty Port but no Customs				0.309	−0.286
				(0.392)	(0.372)
N	95,065	94,082	95,065	95,065	95,065

Notes: Dependent variable is carry cost of grain; estimation by OLS. Foreign is equal to one if in this prefecture and year the port was open to trade with Western countries, or there was one or more Western consulates. All specifications include year and prefecture x grain fixed effects. Columns (4) and (5) also include IPWRA. Robust standard errors clustered at the prefecture-grain level in parentheses. **/*/+ means significant at a 1%/5%/10% level.

Furthermore, we perform a placebo analysis by exploiting the fact that there was a lag between the year of the treaty that opened a port for Western trade and the time at which the maritime customs was established in this port. While anticipation effects are possible, we would generally think that the main effect of foreign institutions, if any, is related to the actual presence of the new customs system, placing 'boots on the ground', as opposed to the less tangible treaty that opens the port. For example, the port of Shanghai was opened through the Treaty of Nanjing in the year 1842, but only in the year 1854 did the Western-led customs system of the Chinese Maritime Customs (CMC) begin to operate. Our placebo variable for Shanghai is equal to one for years 1843 to 1851, and zero otherwise.

As seen from Table 2, there is no evidence the opening of a port by treaty as such affected regional interest rates. Adding the placebo yields a positive coefficient that is insignificant at standard levels (column 4). Finally, including the placebo variable by itself yields a negative but imprecisely estimated coefficient (column 5). Overall, the analyses in Table 2 indicate that the estimated impact of Western presence in China is not driven by key issues such as sample selection.

5.3 The Influence of Physical Storage Costs: Weather Shocks

Recall from equation (2) that the carry costs are equal to interest rates (inclusive of risk) plus physical storage costs. In this section, we employ historical weather data to take account of the role of physical storage costs by exploiting the fact that grain storage costs are known to depend on the weather. In particular, both excessively dry and wet weather is associated with higher storage costs due to the effect of pests and molding, respectively. The following Table 3 shows evidence on the impact of Western presence on regional interest rates controlling for regional weather.

Table 3: Foreign Presence and Interest Rates: the Role of Physical Storage Costs

	(1)	(2)	(3)
Foreign	−1.246**	−1.218**	−1.426**
	(0.266)	(0.268)	(0.323)
Very Wet		0.289*	
		(0.125)	
Wet		0.056	
		(0.087)	
Dry		0.645**	
		(0.093)	
Very Dry		1.877**	
		(0.165)	
Deviation from Normal			0.393**
			(0.093)
Foreign x Deviation from Normal			0.256
			(0.214)
N	95,065	91,727	91,727

Notes: Dependent variable is carry cost of grain; estimation by OLS. Foreign is equal to one if in this prefecture and year the port was open to trade with Western countries, or there was one or more Western consulates. Deviation from Normal is the absolute value of the difference between actual weather and normal weather (=3). All specifications include year and prefecture x grain fixed effects. Robust standard errors clustered at the prefecture-grain level in parentheses. **/*/+ means significant at a 1%/5%/10% level.

We see evidence from the results in Table 3 that dry or wet weather has the effect of increasing storage

costs. First, the baseline finding is repeated for convenience in column 1 of Table 3. Adding an indicator for each of the weather categories, with normal weather being the excluded category, we see that deviations from normal weather are associated with higher carry costs, as expected. Furthermore, storage costs are higher when the weather is more extreme, and especially very dry weather tends to raise storage costs (column 2). The coefficient for very dry weather of about 1.9 means that carry costs might be increased by almost 25% through weather-related physical storage costs. At the same time, the impact of foreign presence is estimated to be quite similar to before.

Furthermore, we examine whether there is evidence that foreign presence has strongly affected physical storage costs in China. For example, if the introduction of Western warehousing in the treaty ports was important for storage technology overall, this would be a technology adoption rather than a Western institutions effect. According to column 3, however, there is little evidene that foreign presence affected storage technology for grain as identified by our weather data.

6 The Role of the Local Banking System

[To come]

6.1 Trade versus Legal Institutions

In this section we examine the relative importance of trade institutions and legal institutions. Table 4 shows the results. In all specifications we control for physical storage cost effects by including fixed effects for each weather category.

Table 4: Legal versus Trade Institutions

	(1)	(2)	(3)	(4)
Customs	−1.006**		0.318	−1.226**
	(0.282)		(0.383)	(0.292)
Consulates		−1.403**	−1.651**	
		(0.270)	(0.375)	
Consulates but no Customs				−1.302**
				(0.378)
N	91,727	91,727	91,727	91,727

Notes: Dependent variable is carry cost of grain; estimation by OLS. Foreign is equal to one if in this prefecture and year the port was open to trade with Western countries, or there was one or more Western consulates. All specifications include year, prefecture x grain, and weather fixed effects. Robust standard errors clustered at the prefecture-grain level in parentheses. **/*/+ means significant at a 1%/5%/10% level.

We see that regions in which CMC customs are open have typically interest rates that are one percentage point lower (column 1). Thus, there is evidence that trade institutions have the impact of lowering local interest rates. The same is the case for legal institutions, measured by whether there is at least one open Western consulate in the region during this year. The results from running a horse-race is shown in column (3). Including both forms of institutions simultaneously, we do not find an interest-rate lowering effect from trade institutions, while the legal institutions coefficient is negative and significant (see column (3)).

As seen in Figures 4 and 5 above, both trade and legal institutional presence of Western countries in China was concentrated in certain areas; indeed, the correlation between the variables *Customs* and *Consulates* is 0.84. Consistent with this, the *Consulates* coefficient when both variables are included is somewhat larger in absolute value compared to when it enters the regression by itself (column 2). To obtain separate magnitudes we construct an indicator variable that is equal to one when a region has an open consulate but no maritime customs. This variable enters with a coefficient of -1.3, not too different from the coefficient of Consulates in column (2). Also, the *Customs* coefficient is with -1.2 somewhat larger than before, suggesting that some of the legal impact loads on the trade variable. Overall, the results suggest that trade and legal institutions both have the effect of substantially reducing local interest rates. The following section investigates the strong effect from legal institutions further.

6.2 Legal Mechanisms

In this section we investigate the role of different aspects of the Western legal institutions in China. Table 5 shows the results.

Table 5: Mechanisms of Legal Institutions in China

	(1)	(2)	(3)	(4)
Possibility of Appeals	-0.410^{**}			
	(0.116)			
Prisons in China		-0.302^{**}		
		(0.106)		
Limits to Local Persecution			-0.387^{**}	
			(0.117)	
Presence of Assessors				-0.623^{**}
				(0.160)
N	91,727	91,727	91,727	91,727

Notes: Dependent variable is carry cost of grain; estimation by OLS. Foreign is equal to one if in this prefecture and year the port was open to trade with Western countries, or there was one or more Western consulates. All specifications include year, prefecture x grain, and weather fixed effects. Robust standard errors clustered at the prefecture-grain level in parentheses. **/*/+ means significant at a 1%/5%/10% level.

The results indicate that the stronger the Western legal presence, measured in a number of different dimensions, is in China, the larger is the reduction in local interest rates. Given that the mean and the standard deviation of each of the four indicators is similar, there is some evidence that the biggest impact comes from whether the Western country typically sends assessors to the trial in China (column 4).

7 The Geographic Scope of the Western Institutions Effect

In this section we generalize the approach of section 4.1 and examine the impact of foreign institutions on regional interest rates not only in the region in which the foreign presence (treaty port, court, or military occupation) is located but also in geographically nearby regions. To do so we define two additional indicators of foreign presence, $[For \star 0 \star 200]_{it}$ and $[For \star 200 \star 400]_{it}$ the former is the count of the foreign presence(s) in a particular region I in year t that are at a distance of greater than zero and less than 200

kilometers, while the latter is correspondingly for distances between 200 and 400 kilometers. We estimate the following equation

$$\hat{p}_{it} = \beta_1 For_{it} + \beta_2 \left[For \star 0 \star 200\right]_{it} + \beta_3 \left[For \star 200 \star 400\right]_{it} + \beta' X + \theta_{ig} + \mu_t + \varepsilon_{igt},$$

where weather fixed effects are included in the vector X. We find that in addition to a negative coefficient β_1, also at distances between 0 and 200 as well as 200 and 400 kilometers, the presence of Western institutions in China has lowered local interest rates. This provides evidence that the interest-rate lowering impact of Western institutions had geographic spillover effects for broader parts of China.

[More to come]

8 Conclusions

This paper has studied the economic consequences of the West's foray into China after the Opium War (1840-42), when Western institutions were introduced in dozens of cities, known as treaty ports. We have shown that in cities where there was a Western presence, interest rates declined significantly and capital market performance improved. Both trade institutions centered on Chinese Maritime Customs Service—which was run by Western countries--as well as the legal institutions of the Western courts contributed to the lowering of regional interest rates. There is also evidence that interest rates in the areas surrounding the treaty ports up to a distance of 400 kilometers declined.

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A Additional Material

The following table gives the data at which in the various treaty ports the maritime customs (CMC) began its operation.

Table 6: Opening of Customs Operations in Different Treaty Ports

Date	Location	Date	Location
1854	Shanghai	1897	Sanshui
1861	Ningbo		Wuzhou
1861	Fuzhou	1898	Yuezhou
1862	Xiamen	1899	Sanduao
1859	Guangzhou		Wusong
1864	Niuzhuang		Jinan
1863	Zhifu		Zhoucun
1861	Zhenjiang		Weifang
1860	Shantou	1900	Tengyue
1876	Qiongzhou	1902	Qinhuangdao
1899	Nanjing	1904	Jiangmen
1861	Tianjin		Changsha
1862	Hankou	1907	Nanning
1861	Jiujiang		Shengjing
1877	Yichang		Dandong
	Wuhu		Dadonggou
	Wenzhou		Xinmintun
	Beihai		Tieling
1889	Longzhou		Tongjiangzi
	Mengzi		Fakumen
1890	Chongqing		Fenghuang
1896	Shashi		Liaoyang
	Suzhou		
	Hangzhou		
	Simao		

Table 2 shows the opening of British consulates in China.

Table 7: Opening of British Consulates in China

Date	Location	Date	Location
1843	Xiamen	1877	Wuhu
	Guangzhou	1896	Hangzhou
	Shanghai		Suzhou
	Huangpu	1897	Sanshui
1844	Fuzhou		Shashi
	Ningbo		Simao
1860	Shantou		Wuzhou
	Tianjin	1899	Tengyue
1861	Yantai	1900	Nanjing
	Zhenjiang		Yuezhou
	Hankou	1902	Chengdu
	Jiujiang		Yunnanfu
	Yingzi (Yingkou)	1904	Kashi
	Tainan		Jiangmen
1862	Dagu	1905	Changsha
	Danshui	1906	Fengtian
1864	Dagou		Jinan
1867	Luoxing	1908	Andong
1869	Qilong	1910	Harbin
1876	Haikou	1913	Dajianlu
1877	Chongqing	1919	Qingdao
	Yichang	1930	Weihaiwei
	Beihai		
	Wenzhou		