Central Administration and the Rise of Local Institutions: Evidence from Imperial China*

Haikun Zhan †

The University of Melbourne

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Abstract

In this paper, I study whether a strong centralized state facilitated the development of local institutions in Imperial China from 1000 A.D. to 1900 A.D. I exploit plausibly exogenous variation in the state administrative capacity in the local area induced by regime changes. Using a novel and newly digitized prefecture-level panel dataset, I find that local institutions flourished when the state administrative capacity was strong and prevalent. This is likely because a strong centralized state could better co-opt local institutions, which granted them political power. Further investigation reveals that local regions exposed to weaker state administrative capacity did not receive compensating investments in public goods from the central state. This illustrates an important development issue: places with weak centralized states lack public goods provision both from the state and local institutions. As a result, these regions might face more developmental difficulties.

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†Department of Economics, Level 4, FBE Building, 111 Barry Street, University of Melbourne. Email: h.zhan@student.unimelb.edu.au

1 Introduction

Local institutions are organized by rules and norms created and enforced by social groups in the local region. These institutions play a crucial role in society. They influence cultural norms, and what's more, some are often involved in public goods provision. These local institutions overcome the problem of achieving collective action and enjoy the benefits of cooperative solutions. However, what fosters cooperative behavior among some communities and provides incentives to establish local institutions and provide public goods in local regions?

Understanding these questions is vital as local institutions shape individuals' beliefs and behavior, cultural changes, and the formation of social norms (Putnam, Leonardi, and Nanetti, 1994; Greif, 1994; Greif and Tabellini, 2010, 2017; Enke, 2019). Therefore, they can have long-term implications for political behavior as well as economic and social development.

This paper focuses on one possible explanation—the role of the central administration in the development of local institutions. Fukuyama (1995) and Putnam, Leonardi, and Nanetti (1994), among others, argue that a centralized state crowds out local institutions in the process of the state performing its functions, including public goods provision, disaster relief, and more. The Norman State in southern Italy is an example of this. However, others, such as Streeck and Schmitter (1985), Vogel (1986), and Ostrom (1990) argue that the state can transform perceptions of the costs and benefits of cooperation and thus lead to the provision of collective goods and the emergence of local institutions. A more recent study by Acemoglu and Robinson (2017) argues that this relationship can be ambiguous and depends on initial conditions.

Although it may not be possible to provide a definite answer to this relationship that transcends specific contexts, my paper provides one of the first empirical investigations of the relationship between the central administration and the development of local institutions in Imperial China.

Investigating this question empirically presents two main challenges. The first is to measure the emergence of local institutions. These local institutions can exist in many different ways and function in a variety of forms, making it difficult to measure their existence and systematically compare the variations across space and time. Powerful clans in Imperial China during the second millennium (about 1000 A.D. to 1911 A.D.) provide a good opportunity to systematically measure local institutions. The clan was the most important local institution in the core region of China during the second millennium (Greif and Tabellini, 2010, 2017; Xu and Yao, 2015; Fukuyama, 2012). A powerful clan in historical China was

capable of providing relief to the poor, elders, orphans, and members in need; educating the young; conducting religious services; building bridges; and constructing dams. The clan had its own rules on moral standards, property rights, and justice, and was able to enforce them. In this paper, I focus on clans that had possession of communal land, which provided it with a source of communal funding and enabled it to provide collective goods.

The second challenge is to measure the strength of the central state administration and identify plausibly exogenous variation in its power since the local institutions might strategically interact with the state or even be involved in state formation. Regime switches during the second millennium in Imperial China provide a good setting to address this problem. Each regime switch involves redrawing provincial boundaries and relocating provincial capitals. Areas closer to the provincial capital would have had stronger state influence; however, they might have lost this influence when the distance between them and provincial capital increased as a result of a regime switch. The provincial boundaries were more like "administrative accidents" rather than a result of delineation by human activities (Skinner, 1977). Provincial capital relocations were mainly based on the concerns of military defense against invaders and the transmission of information and resources. Hence, such changes in the proximity to provincial capitals were plausibly exogenous to the local institutions, which allows me to use these changes as a proxy for the strength of the central state administration.[1]

I construct a prefecture-dynasty panel dataset of 267 prefectures in the core regions of China (China Proper) during the second millennium over three dynasties: Song, Ming, and Qing.[2] The panel feature allows for the inclusion of prefecture fixed effects, which control for prefecture-specific effects on local institution establishments. This can help isolate the effect of state administrative capacity from other time-invariant factors such as culture and geography. I can focus on within-prefecture variation and ask whether moving a prefecture closer to the provincial capital–thus exposing to stronger state administration–increases or decreases the probability of establishing a new powerful clan (local institutions). To address concerns that local institutions might play a role in negotiating the location of provincial capitals and provincial boundaries or that the state might strategically locate the provincial capitals and decide the provincial boundaries to better control the local institutions, I provide empirical evidence showing that proximity was not correlated with the existence of local institutions in the previous dynasty.

[1]Empirically, I show that changes in proximity to provincial capitals are not correlated with population density or clan land establishments in the previous dynasty.

[2]Please see the shaded area Figure A1 in the appendix for the China Proper region. The Yuan dynasty also appears in the second millennium; however, it is not included in the analysis because of the unavailability of data. Detailed discussions are provided in Section 2.

I find that local institutions in each dynasty emerge where state administrative capacity is stronger (i.e., closer to the provincial capital). In particular, if a prefecture's distance to its provincial capital doubles (increases by 100%), this will reduce its probability of having a local institution established by 9.4%, a 30% change from its mean. Historical Wuhan can be used as an example.[3] Wuhan was near the provincial border and about 210 km away from its provincial capital (Jiangling Fu) in the Song dynasty, but it gained provincial capital status in the Ming and Qing dynasties. This status increases Wuhan's probability of having local institutions (powerful clans) established by 30%. This finding is still robust when controlling for population density, which can help isolate the effects of both population size and economic development. The result is also robust to various specifications, including using grid-level analysis as well as using models that take spatial autocorrelation into account.

What might explain the positive relationship? Like any large empire at the time, Imperial China faced difficulties in reaching the local regions and inhabitants, as well as governing its vast empire. The state often sought help from local elites, co-opting them as agents and delegating tasks to them. This inevitably gave local elites more power and prestige (Mann, 1989). Elites were thus incentivized to invest in the local institutions, which in turn helped to consolidate their growing power. Knowing that these local elites could eventually gain political power, outgrow their role as agents, and go against the state meant that the state had to evaluate this option carefully. More specifically, the state faced the following trade-off: on the one hand, it was easier for the state to monitor local elites to ensure their loyalty in areas with a stronger capacity (closer to the capital). On the other hand, a strong local capacity also meant that the state had less need to delegate these tasks as the state was able to administer the tasks directly (Levi, 1989). In this case, if the costs of monitoring the local elites increased drastically as the state's administrative capacity decreased, and thus the net benefits of co-opting local elites diminished, we would observe local institutions flourishing when the state had relatively strong administrative capacity. as demonstrated in the empirical findings.

Further investigation shows that regions farther away from provincial capitals with a weaker state influence not only had fewer local institutions for the provision of public and club goods but also received fewer public goods directly from the imperial state, such as schools and academies. This suggests that weak state administrative capacity constrained the ability of local institutions to develop social capital and limited their access to goods and services, which might have had long-term implications for social and economic development.

[3]Wuhan was called Ezhou in the Song dynasty and Wuchang in the Ming and Qing dynasties.

To the best of my knowledge, this paper is the first to empirically demonstrate the relationship between state administrative capacity and the development of local institutions using unique historical panel data during the second millennium in Imperial China. This paper provides the first empirical evidence to the state and civil society debate by showing their possible complementarity. Acemoglu and Robinson (2017) call this complementarity *inclusive institutions*, with their model showing that an equilibrium point can be reached where the state and the civil society are initially in balance, which triggers an ongoing competition whereby they both become stronger. This work empirically shows a similar but slightly different story: a relatively strong centralized state (but not absolutely strong since it is still limited in its capacity to rule local regions) creates incentives for civil society to grow in its administrative process.

More broadly, this paper contributes to understanding the long-term legacy of historical institutions. Many scholars have discussed that social capital is the channel through which historical institutions have made a long-run impact on contemporary outcomes (Dell, Lane, and Querubin, 2018; Chaudhary, Rubin, Iyer, and Shrivastava, 2020; Lowes, Nunn, Robinson, and Weigel, 2017). Dell, Lane, and Querubin (2018) finds that a historically strong state has a long-run effect on local cooperation and civic engagement cross-sectionally. This paper complements their findings by showing a contemporaneous effect using a historical panel dataset, which supports their arguments on the persistent effect. Xue (2020) demonstrates that historical state repression impedes social capital, which has persistent long-run effects. This paper complements her finding and shows that the state administration process can also incentivize locals to invest in social capital.

This paper is also related to the broad literature on state co-option. Existing literature has shown the importance of co-opting the local elites in helping local governance and the effectiveness of co-opting local elites in managing conflicts and tax collection (Balan, Bergeron, Tourek, and Weigel, 2020; Basurto, Dupas, and Robinson, 2020; Acemoglu, Reed, and Robinson, 2014; Acemoglu, Cheema, Khwaja, and Robinson, 2020; Mustasilta, 2019). This paper illustrates an unintentional and possibly positive outcome of co-option: the development of local institutions. A mechanism through which co-opting local elites has been found highly effective in administering local affairs is that co-opted local elites also invested in local people to consolidate the power and prestige they receive from being a state agent. Additionally, the literature reveals that the state can tap local institutions and local power to aid the development of the state (Satyanath, Voigtländer, and Voth, 2017; Acemoglu, Reed, and Robinson, 2014). This paper shows that the state can also aid the growth of local institutions.

Additionally, this paper provides new insights into understanding Imperial China's political logic in state-building and the state-elite relationship (Wang, 2021b,a; Chen, Wang, and Zhang, 2021; Sng, 2014; Bai and Jia, 2021). This work highlights the role of the centralized state in developing local institutions and illustrates the logic behind co-opting local institutions when governing local regions.

Finally, this paper also contributes to the literature on the costs of being located far away from the state administrative center. Existing literature has documented the economic disparities caused by greater distance (Asher, Nagpal, and Novosad, 2018; Fafchamps and Wahba, 2006; Feyrer, 2009). This paper implies that being away from the administrative center not only has economic costs but also social costs, possibly local cooperation and thus the formation of social capital.

The rest of this paper proceeds as follows. Section 2 provides a brief background on regime switches, provincial boundary changes and provincial capital relocations, and the clan as a local institution. Section 3 gives an overview of the data used in this paper. The empirical framework and empirical results are presented in Section 4 and Section 5 respectively. Section 6 concludes.

2 Background

This section provides a brief background on provincial boundaries changes and provincial capital relocations involved in regime switches and examines the clan as a local institution. Four imperial regimes existed during the second millennium, namely the Song (960–1279), Yuan (1279–1368), Ming (1368–1644), and Qing (1644–1911) (see Figure 1 for a timeline). The Yuan dynasty is not included in this paper because the clan, more specifically clan land, had limited development during the dynasty. More crucially, clan land data is unavailable for the Yuan dynasty.[4]

2.1 Regime Switches, Provincial Boundaries, and Capitals

2.1.1 Levels of Administrations

A three-tier administrative system (county-prefecture-province) has been highly stable since the Song dynasty (960 A.D.). The central state directly appointed and rotated officials

[4]According to Zhang (1991), there was a pause in clan land growth throughout the Yuan dynasty, with fewer than ten well-known clan land establishments. This pause would result in a lack of spatial variation for the analysis.

at all levels, although provincial governors often played a role in recommending promotion, demotion, or removal of their subordinate officials. The "hometown avoidance" rule was employed when appointing officials at all levels to avoid nepotism. Officials were not assigned to their hometown province and would not be appointed close to where their family members were appointed, if any.

The province is the top tier of the administration system. The most crucial node is the provincial capital, through which the central state can connect with local regions within the province.[5] The provincial capital has two primary roles: (i) serving as the central administration for fiscal affairs, judicial matters, and welfare issues within a province; and (ii) transferring resources and information between the central government and all the prefectures within a province. The provincial-level administration is often seen as representing the emperor. Provincial governors are responsible for supervising the performance of prefecture prefects and county magistrates, dispatching supervisors to regularly monitor and evaluate the local administrations. As the Emperor Yong Zheng once said: "the provincial governors are representing me as the emperor to govern the local matters. So do the vice-governors who are also representing me as the emperor to carry out my orders."

Prefecture prefects and county magistrates received orders from their provincial governors and focused on local issues, including local peace and security, tax collection, population registration, and judicial affairs. As higher-level administrative officials, prefecture prefects took care of more significant issues than county magistrates. For example, county magistrates only adjudicated minor crimes, and most cases had to be settled in the prefecture court. In the case of major crimes, the provincial governors needed to be consulted and were responsible to render the final decision, while a death sentence required approval from the central government. On the other hand, due to the "hometown avoidance" rule, prefects and magistrates were unfamiliar with local conditions and usually faced difficulties reaching the local populations. Therefore, they heavily relied on local elites to carry out their administrative duties (Chu, 1962; Bai, 2003).

2.1.2 Regime Switches, Provincial Boundary Changes and Provincial Capital Relocations

Each regime change involved redrawing provincial boundaries and relocating the provincial capitals. Hence, the proximity changes used in this paper come from these two sources of variation: the province to which the prefecture belongs to and the capital it is distant from.

[5] Figure A2 shows the location of provincial capitals in all three dynasties.

In what follows, I will discuss the determinants of such changes.

Provincial Boundary Changes

Provincial boundaries were drawn at the beginning of each dynasty when the new rulers had scant knowledge of local conditions. Those borders usually persisted until the end of the dynasty, with only rare exceptions that changed in between dynasties (Tan, 1982; Bai and Jia, 2021).

In early Chinese history, almost all levels of administrative or territorial boundaries followed natural boundaries such as rivers or mountains. This is known as "following the forms of mountains and rivers." The Song dynasty (960–1279 A.D., the first dynasty in my sample) also adhered to this principle when drawing the provincial boundaries.

When the Mongols rose to power in the Yuan dynasty (1277–1368 A.D.), they adopted another principle, known as "interlocked like dog's teeth," which means that boundaries encompassed rivers and mountains within the provinces. This was mainly to prevent regional power holders (such as provincial governors, dukes, and military commissioners) gaining too much local autonomy and posing a military threat to the regime while keeping the administrative costs low (Ge, 1985; Zhou, 1998; Sng, Chia, Feng, and Wang, 2018).[6]

Figure A3 uses the Yangtze River as an example. The Yangtze was used to create provincial boundaries during the Song dynasty (pre-Yuan, left panel), while in the Ming and Qing dynasty (post-Yuan, middle and right panels, respectively), the Yangtze River was interlocked within the province. Zhou (1998, 2013) documents many other examples, including the Qin Mountain and the Taihang Mountain .

The new "interlocked like dog's teeth" principle was inherited when the Ming dynasty (1386–1644 A.D.) and the Qing dynasty (1644–1911 A.D.) came into power. The location of the provincial boundaries was set merely to prevent provincial power holders (provincial governors) who had military power to challenge the emperor's supremacy, and as a result, the borders failed to consider local conditions. Hence, provincial boundaries in late Imperial China were widely considered as "administrative accidents," as they seldom coincided with culture or any human and economic activities in the local regions (Skinner, 1977; Zhou, 1998, 2013).[7]

Note that this change in the principle of drawing provincial boundaries resulted in significant changes from the Song dynasty to the Ming dynasty. The Qing dynasty preserved

[6]See Appendix II.I for a detailed discussion on the logic of both principles and why the principle changed in the Yuan dynasty.

[7]See Appendix II.II for more discussions on the exact location of the provincial boundaries.

most of the Ming dynasty's provincial boundaries but divided three provinces considered too large in half.[8]

Locations for Provincial Capitals

A major role of provincial capitals was to connect the central government with all prefectures within the province. Proximity and connectivity were a primary concern when choosing provincial capitals. Bai and Jia (2021) illustrates that the central state would weigh the trade-off between governing a province (proximity to all prefectures within the province and hence centroid of the province) and connecting to the central state for transferring and delivering resources and information (proximity to the imperial capital), and choose the provincial capitals that balance the two. Hence, as the provincial boundary changes, the provincial capitals would require relocation.

As provincial capitals were the centers for fiscal and judicial affairs, geographic suitability to accommodate frequent, high-volume visitors was a significant factor to consider (He, 2009; Guy, 2017). Hence, provincial capitals were usually located on a plain with a low elevation and beside rivers or canals that offered natural advantages for transportation. A vital consideration was also that the capitals must be agriculturally suitable to produce sufficient food for traders, visitors, and bureaucrats. Proximity to rivers also ensured sufficient water supply for irrigation (He, 2009; Guy, 2017).

Military defense was another major concern when choosing provincial capitals. Prefectures that geographically had advantages for military defense, such as being located at the foot of a hill or beside a major river, were the primary candidates for provincial capitals (Guy, 2017).[9] As such, any invaders would not easily conquer any provincial capital. For example, Xi'an has three sides surrounded by mountains and its east side faces the Yellow River. Guiyang, the capital of Guizhou province, shares similar features. Almost all provincial capitals had a major river nearby, probably because rivers offer all the key benefits mentioned above.[10]

[8] This includes dividing Jiangnan province into Jiangsu province and Anhui province (this case is depicted in Figure A3); dividing Shangxi province into Shangxi province and Gansu province; and dividing Huguang province into Hunan province and Hubei province.

[9] Major rivers in China flow from the west to the east, while all the external military threats come from the north. Therefore, a major river would stop the enemy's invasion rather than facilitate their arrival.

[10] In my data, only three provincial capitals across three dynasties do not contain a major river. One of the three is a coastal city.

2.2 The Clan

A clan consists of several patrilineal households who trace their origins to a *self-proclaimed* common male ancestor. In some cases, clans were not related by blood. During the late Qing dynasty, some households with distinct surnames who knew that they did not share the same ancestor also identified themselves as a clan.[11] The lineage head was often a well-reputed person within the clan who oversaw all internal affairs, including justice and fiscal-related issues. He usually was a local elite who passed the civil exam and earned gentry status.

The clan as a local institution has been shown to have positive short- and long-run effects. These include serving as risk-sharing institutions and promoting economic development, deterring government land-taking and other government expropriations, as well as promoting local governance and administering the provision of public goods when democratic elections were introduced (Chen and Ma, 2021; Cao, Xu, and Zhang, 2020; Zhang and Zhao, 2014; Xu and Yao, 2015). In what follows, I provide a brief overview of the development of the Chinese clan and its institutional roles.[12]

Clan Development Since the Song Dynasty

The clan is deeply rooted in Chinese history, although it was solely aristocratic and nobility-based for a lengthy historical period. It was the privilege of the aristocracy to hold activities such as ancestor worship rites and genealogies compilation. However, by the end of the Tang Dynasty (618–907 A.D.), wars and massive migrations had destroyed the social structure, aristocracy, and nearly all existing clans. Order was not restored until the Song Dynasty was several decades old. The Song philosopher Zhang Zai (1020–1077) was known to be the first to stress the role of clans in restoring social order. A few decades later, Zhu Xi (1130–1200), a well-known philosopher, authored the book *Jia Li* [Family Rites]. In this work, Zhu provided practical guidelines for establishing clans, such as constructing ancestor temples, worshipping ancestors, and establishing communal clan land. These guidelines were considered influential in Chinese history and were widely followed.

Meanwhile, the rise of *Keju* (a civil exam system used to choose officials) since the Song Dynasty created a large space for clans to flourish and turned clans into commoner-based institutions. First, *Keju* selected virtually all levels of government officials based on merit rather than family background. People who passed the entry level of the civil service exam would be admitted to the gentry class and would be entitled to various benefits and privileges,

[11] There were even cases where several households altered their surnames to claim themselves to be a clan.

[12] Clans were not the only local institutions that provided public goods in Imperial China. In Appendix II.III, I provide a brief discussion on other local institutions and why they are less suitable for this study.

including exemptions from tax and corvee labor, and high social status.[13] In addition, as the intergenerational succession of rank, advantages, and power, and hence aristocracy, were broken down by this exam system, the social standing, authority, and privilege obtained through the civic test became less stable. This gave additional incentives for those who reaped the benefits after passing the civil service exam to invest in their clan to strengthen their social standing with the hope of helping other members in the lineage pass the exams and support themselves. Liu Zai, who obtained *Jinshi* (the highest degree) in the Song dynasty's civil exam, expressly said that "investing in a clan is the only way to retain wealth."

Therefore, from the Song dynasty, the clans became commoner-based. Many commoners started to organize their clans following Zhu Xi's guidelines. A typical clan would have their own rules enforced by their lineage head. Justice and local affairs were usually dealt with in the lineage hall, and local officials would not intervene. Different households within a clan would help each other with farming, cultivation, and other economic activities. An organized clan would document members' accomplishments and contributions in their clan genealogy with the goal of encouraging individuals to contribute to their clan and to incentivize collectiveness.

A small percentage of clans held communal assets, with communal clan land as the most common. This resource provided clans with communal funding for lineage hall repairs, large-scale worship ceremonies, relief for the poor and disaster relief, the operation of clan schools, and other organized public or club goods provision. The lineage head would be in control of funding, and clan members could request relief funds when needed. As Fei (1986) describes, "[A clan] is a community inside a society." The clan then became a core part of civil society as a support system, safety net, provider of local public goods, and many other collective actions.

The clan's development was constrained throughout the Yuan dynasty, due in part to the nature of the Mongolian ruling regime. During the Yuan dynasty, only a few parcels of clan land were documented. According to Zhang (1991), there was a pause in clan land growth throughout the Yuan dynasty, with fewer than ten well-known clan land establishments.

During the Ming and Qing dynasties, clans and clan land growth flourished. Clans were

[13]Historical China divided people into four classes: scholar, farmer, artisan, and merchant. Educated scholars who passed the civil service exam would obtain high status and prestige in society, which could be reflected in many aspects. For example, commoners must greet officials on bent knees, while members of the gentry do not.
Corvee labor: in Imperial China, the state would often need labor for military and construction projects such as roads, canals, irrigation systems, and more. Hence, the state would regularly conscript free labor (corvee labor) and locals had an obligation to meet the state's demands by law. However, the scholars who passed the civil service exam, and often their family members, were exempted from the forced labor.

prevalent across China at the end of the Qing dynasty (Feng, 2008).[14]

Communal Clan Land

Having communal land meant that a clan had a stable source of communal funds to provide club goods and public goods. In this paper, communal clan land is also used as a measure for powerful clans.

The first clan land was established in 1049 A.D. by Fan Zhongyan (989–1052 A.D), who donated his personal land to his clan. The clan began in two counties in the Suzhou prefecture, sized about 6 *mu* (Zhang, 1991).[15] The goal was to "help members regardless of relationship. Everyone could have food and clothing, as well as funds for weddings or funerals." (Zhang, 1991). Afterward, ever more clans followed suit and began to create clan land. Most of the clan land was donated by one or a few clan members, who would gain respect, status, and power in return.

Establishing clan land was frequently viewed as a necessary strategy for unifying clan members and consolidating the authority of elites. Qing philosophers Fang Bao and Gu Yanwu both believed that the clan land from Fan, which was also expanded by the future generations and eventually reached around 5,000 *mu*, is the key reason why Fan's descendants were all well off and their clan was effective in preserving internal order as well as influencing external affairs (Fang, 1985; Gu, 1998).

Clan land was usually lent out for others to cultivate and receive rent, but sometimes it could also be collectively cultivated by the clan members. In either case, the return from the land would be put into a communal fund. The state made it illegal for any clan member to sell their communal clan land. Any attempt would be severely punished (Xu, 1957; Huai, 1999).

State and Clan

The progress of centralization during Imperial China and the expansion of the territories resulted in a heavier demand on bureaucratic officials. The state's fiscal capacity, on the other hand, did not allow for a massive expansion in statesmen (Zelin, 1992).[16] In such a scenario, the state was forced to rely on local institutions such as clans, and coordinate with

[14] Even though the Qing dynasty, similar to the Yuan dynasty, was also ruled by ethnic minorities, they were known to be more integrated to ethnic Han culture and therefore, clans could still be prosperous during the Qing dynasty.

[15] *mu* is a unit for land size. 1 $mu = 666.67m^2$

[16] In fact, Imperial China had a relatively low proportion of government officials, as has been extensively reported .

local elites.

Consequently, the states and emperors attempted to coordinate and enhance the benefits of founding clans and lineage heads, even though they were not directly involved in clan formation. There were many such examples. During the Song dynasty, emperors allowed and encouraged commoners to record genealogy and form clan trusts. In the Qing dynasty, the Emperor *Kangxi* stated in the *Sacred Edict of the Kangxi Emperor* that "consolidating clans can bring harmony in the society" and encourage everyone to "establish lineage temples for worshipping ancestors, clan schools for educating next generations, clan land for having funds to relieve the poor, and compiling genealogy for connecting the distant."

In addition, the imperial states built their economic system and governed human interactions using Confucianism, which placed a strong emphasis on filial piety. This practice also legitimized clan rules and clan orders. For example, states enacted laws that bolstered the clan hierarchy. The law was written such that sons must obey their parents, while juniors had to obey their elders. Seniors' faults would be forgiven, but juniors' mistakes would be punished harshly. These laws favored the elderly, the lineage head, and other local elites as well as granted them authority, status, and prestige. As a return, clans carried out duties including tax collection, social orders, and peace within the clan, among other things, as well as local public goods provisions such as dams, roads, bridges, and more (Feng, 2008).

3 Data

3.1 Clan Land Data

Clan land data have been collected by Li and Jiang (1998), including information on prefectures or counties where newly established clan land was located during the Song, Ming, and Qing dynasties.[17] The primary information on these historical clan lands was recorded in various places, including local gazetteers, clan genealogies, biographies, and others. Most of these were recorded in the private sector, such as genealogies and biographies, while local official records such as county or prefecture gazetteers also contributed some data.

However, this data is not a census for all the clan land, even though Li and Jiang (1998) exhausted all accessible resources to compile the list. As a result, there would be measurement errors in counting how many clans had clan land in each prefecture in each dynasty. To

[17]See Figure A4 in the appendix for a snapshot example of the raw data for the Ming Dynasty. Li and Jiang (1998) did not collect data for the Yuan dynasty. This is probably because clan land did not develop much during the Yuan dynasty, as mentioned previously.

address this issue, I employ a binary variable that takes the value of one if a prefecture has at least one recorded clan land established in the corresponding dynasty, to indicate a *historical prefecture with powerful clans*.

Figure 2 depicts the spatial distribution for *historical prefectures with powerful clans* in each dynasty (i.e., prefectures with at least one clan land recorded in the corresponding dynasty). First, note that more prefectures had powerful clans over time, which is consistent with other historians' views (Zhang, 1991; Feng, 2008; Chang, 1994). Moreover, the data show that these *historical prefectures with powerful clans* are particularly prominent in southeastern China where clan culture is generally known to be prevalent. Nevertheless, there is also variation in northern and northwestern China.

3.2 Administrative Boundaries and Provincial Capitals

Administrative boundaries, including prefecture and provincial levels, and provincial capitals for Ming and Qing dynasties, are provided by The China Historical Geographic Information System (CHGIS, 2016). I digitize prefecture and provincial boundaries of the Song dynasty from *The Historical Atlas of China* (Volume VI) (Tan, 1982), which is the most comprehensive as well as the most widely used map for historical China.[18]

I restrict my study area to the core region of China (which is often called China Proper by historians, see Figure A1 for reference), where more than 98% of the population is ethnic *Han*, and clans are the relevant local institutions.[19] China Proper regions include territories within the Great Wall to the north, the thick tropical rainforests of Indochina to the south, vast mountain ranges—including the Himalayas—to the west, and the Pacific Ocean boundary to the east. Typically, China Proper was referred to as the Qing eighteen provinces or the Ming fifteen provinces, which are equivalent to nineteen provinces and four province-level municipalities in today's P.R. China.[20]

[18] *The Historical Atlas of China* is also the base map for the CHGIS project.

[19] Despite focusing on China Proper regions, there were still ethnic minorities where clans were not relevant local institutions. However, since those ethnic minorities rarely migrate, this effect would be captured by prefecture fixed effects.

[20] That is, today's China excluding Liaoning, Jilin, and Heilongjiang provinces; Inner Mongolia; Tie-bat; Xinjiang; and Qinghai. All territories in the Song dynasty are within the China Proper regions.

3.3 Prefecture Panel Construction and Proximity to Provincial Capital

Although prefecture boundaries were relatively stable over regimes, many changes also occurred. To construct a prefecture panel, I map prefecture boundaries in each dynasty to a fixed layer—P.R. China 2010 prefecture boundaries—in the analysis.

How to transform the dummy variable that indicates *historical prefectures with powerful clans* onto the P.R. China 2010 prefecture boundary? I construct the following two variables for each dynasty: (i) a dummy variable indicating a prefecture is a clan prefecture if *historical prefectures with powerful clans* cover more than 50% of its territory; that is, historical prefectures cover the majority of a prefecture's land with powerful clans. I also explore alternative thresholds to show that the results are robust to different cutoffs. (ii) a continuous variable, ranging from 0 to 1, measures the proportion of a prefecture that overlaps with the *historical prefectures with powerful clans* in the original dynasty. In a robustness check, I also map historical prefectures into fixed grids whose size is close to the average prefecture size. The results are very close, both qualitatively and quantitatively.[21]

To calculate the proximity of a prefecture to its provincial capital, I need to assign each prefecture in P.R. China 2010 to a historical province in each dynasty. Due to the prefecture boundary changes, it could be the case that a prefecture in the base layer (P.R. China 2010) spans more than one province in each dynasty. In such cases, I allocate the prefecture to the province that has the biggest share of its territories.[22]

Finally, *Proximity* is defined as the negative log-distance between the prefecture centroid to the provincial capital of the assigned historical province in each dynasty.[23]

3.4 Auxiliary Data

Population density data is digitized from Liang (1980), *Historical Statistics of Population, Land and Taxation in China* and Ge (2013) *China Population History*. These books provide prefecture-level population density data. In this paper, I use the population density of the years 980, 1394, and 1776, which are the earliest available data in the years covering

[21] The result for grid-level analyses can be found in Table A1 in the Appendix.

[22] Results are the same if I assign the prefecture to the province based on where the prefecture centroid locates.

[23] In the Song dynasty, to avoid provincial leaders gaining too much power, the emperor divided provincial capital duties into judicial and fiscal and might allocate to different capitals. Indeed, half of the provinces have two provincial capitals. In this case, I use proximity to the fiscal capital because it is the major capital and is more stable Tan (1982). Moreover, the clan measure—clan land—is more related to fiscal administration. My results still hold if I use the proximity to judicial capitals (see Table A2 in the appendix).

the Song, Ming, and Qing dynasties, respectively.[24] To construct the prefecture-dynasty panel, I then calculate a weighted average population density based on the area covered to map population density from the historical prefecture to the base layer (P.R. China 2010).

$$PopDen_{it} = \frac{\sum_{j=1}^{J} Area_{ijt} * PopDen_{jt}}{Area_i}$$

Clan genealogical data is from *The Comprehensive Catalogue of Chinese Genealogies* edited by Wang Heming (Wang, 2009). Wang Heming and his team have cataloged roughly 51,200 genealogy books from the end of the first millennium (the beginning of the Song Dynasty) to the present day in a print registry. This effort represents the most comprehensive registry of known Chinese clan genealogies to date. The data are collected from local and national archives and libraries, private holdings, and overseas collections, including all 10,000 microfilmed genealogy records archived by the Genealogical Society of Utah—the most extensive overseas collection of Chinese genealogy. This collection can therefore be considered as a census for Chinese genealogy.

The data used in this paper is digitized by Dincecco and Wang (2021), which extracts information on each clan's location, the year that the genealogy book was compiled, the number of volumes in the genealogy books, the lineage original ancestor's location, and their migration year. I use this dataset to complement my clan land data to further investigate the clan migration history and clan activities at an intensive margin. Specifically, I extract the following two sets of information and construct the corresponding prefecture-dynasty panel: (i) prefecture and dynasty where the genealogies were compiled, and (ii) prefecture and dynasty where the ancestor migrated to.[25]

Agricultural suitability indexes data, provided by FAO (2012) GAEZ data portal version 4, are also used in this paper as control variables. The data are originally available at the grid level, which can be mapped into fixed boundaries used in the analysis and provide a cross-sectional variation. These suitability indexes use a rain-fed water supply and a low level of inputs.

[24] These years correspond to the 21st year, the 26th year, and 134th of each dynasty.

[25] This data provides the county in which the clan is located in P.R. China, which allows me to directly construct the panel data in P.R. China 2010.

3.5 Summary Statistics

Table 1 presents the summary statistics. Clan land became more prevalent over dynasties. Recall that I define proximity as the negative log-distance between the prefecture centroid to its provincial capital. The Song dynasty had relatively close proximity as it had smaller territory but was divided into more provinces. In contrast, on average, the Ming dynasty had the furthermost proximity given its smallest number of provinces. Population density increased over time, as expected. Notice that even though the historical prefectures are mapped onto the fixed boundaries of P.R. China 2010, the Song dynasty had 25 fewer prefectures as its whole territory does not cover the entire China Proper regions (see Figure 2 for details. The top left panel shows that the Song dynasty does not cover some of the western territories in the China Proper regions).

4 Empirical Framework

In the empirical analysis, I exploit plausibly exogenous changes in proximity derived from the re-division of provincial boundaries and the relocation of provincial capitals over the dynasty. This analysis assesses the relationship of the central administration measured by the proximity to the provincial capital and the rise of local institutions, namely powerful clans. In this section, I start by showing a stylized example using the raw data and follow by introducing the empirical specification using the prefecture-level panel data.

4.1 A Stylized Example

Figure 3 depicts a stylized example in the raw data in today's Hebei and Shandong Provinces. The provincial boundaries are gray in both dynasties, and clan prefectures are shaded in color (blue in Song and green in Ming). The dots (triangle in Song and pentagon in Ming) are the corresponding provincial capitals.

The left panel of the Figure 3 shows the case in the Song dynasty. The highlighted prefecture (dark blue boundary) is Daming Fu, which is also the provincial capital for its province Hebeidong Lu. In the Song dynasty, it is considered as a historical prefecture with powerful clans based on my data.

In the Ming dynasty, this prefecture was divided and administrated in two provinces (North Zhili and Shandong Provinces), but it is relatively far away from either provincial capital (the right panel of the Figure 3). No additional powerful clan (clan land) establishments are recorded in the data. In comparison, prefectures towards its east were relatively

far from their provincial capitals in the Song dynasty, but they became much closer to its provincial capital. Meanwhile, we also observe powerful clan (clan land) establishments in those prefectures in the Ming dynasty.

4.2 Empirical Specification

To examine the relationship between the central administration and the establishment of local institutions, I construct a prefecture-level panel dataset (as described in Section 3) and employ the following difference-in-difference specification:

$$Clan_{ijt} = \beta_1 Proximity_{ijt} + \alpha_i + \lambda_j^t + \theta X_i \times \gamma_t + \varepsilon_{ijt} \tag{1}$$

The unit of observation is prefecture i in province j, dynasty t. $Proximity_{ijt}$ is the negative log-distance for prefecture i to its provincial capital in province j in dynasty t.[26] $Clan_{ijt}$ is, as mentioned in Section 3.3, either (i) a dummy variable that indicates whether *historical prefectures with powerful clans* cover at least 50% of a prefecture's territory in the base layer, or (ii) a continuous variable measures that the proportion of prefecture i's territory (in 2010 base layer) is covered by *historical prefectures with powerful clans* in dynasty t.

Province fixed effects λ_j^t account for province-specific administrative effects in each dynasty. Recall that each dynasty redivided the provincial boundaries. Thus, each province is dynasty specific. In this case, dynasty fixed effects, which can absorb the effect from different numbers of provinces and different average proximity across dynasties, are also captured by the province fixed effects. α_i are the prefecture fixed effects, which account for any location-specific time-invariant characteristics, such as clan culture, ideology, etc.

As my analysis covers a long time span (around 1000 A.D. to 1911 A.D.), I additionally include interaction terms of prefecture's geographic and agricultural characteristics (X_i) and dynasty fixed effects $X_i \times \gamma_t$ as controls to allow the impact of these prefecture characteristics X_i to vary across dynasties. X_i includes the average slope, elevation, longitude, latitude, and dummies indicating whether the prefecture contains a major river, whether a prefecture is a coastal city, and agriculture variables including crop suitability of wheat, rice, fox millet, maize, and sweet potato. The first three are the major old-world crops, while the latter two are the new-world crops introduced to China during the late Ming dynasty to the Qing dynasty. These agricultural variables can also account for the effect of different agriculture practices on family ties and preference for collective actions (Ang and Fredriksson, 2017).

[26] The distance's metric is 100km

The coefficient of interest here is β_1. A positive β_1 suggests strong state administrative capacity will crowd in local institutions and result in local institution establishment; while a negative β_1 indicates state administration will crowd out local institutions. An important assumption is that the changes in proximity to provincial capitals induced by boundaries redrawn and provincial capitals relocated are exogenous to powerful clan (i.e., clan land) establishments. This is based on the idea that the provincial boundaries were "administrative accidents" and did not coincide with human or economic activities. I will validate this assumption in several ways in Section 5.2, by showing that proximity is neither correlated with population density nor the location of powerful clans in the previous dynasty.

The standard errors are clustered at the prefecture level for the baseline analysis. Alternatively, I also use standard errors that allow for spatial dependence within various radii following Conley (1999). A spatial autoregressive model is used to address potential concerns for spatial autocorrelation.

5 Results

5.1 Main Results

Table 2 reports the estimates of Equation (1). The dependent variables of columns (1) and (2) use a dummy measure (i.e., it takes the value of 1 if at least 50% of a prefecture in the base layer is covered by *historical prefectures with powerful clan*), while columns (3) and (4) use a continuous measure (i.e., the proportion of a prefecture's area in the base layer that is covered by *historical prefectures with powerful clans*). Columns (1) and (2) include prefecture fixed effects and province (in each dynasty) fixed effects; columns (3) and (4) additionally control for prefectures' geographic and agricultural characteristics interacting with dynasty fixed effects.

The results suggest that local institutions grow where state administrative capacity is stronger (i.e., closer to the provincial capital). In particular, the point estimate from column (2) suggests if a prefecture's distance to its provincial capital doubles (increase by 100%), this will reduce its probability of having a local institution established by about 9.4%, a 30% change from its mean. Put differently, we can use the stylized example depicted in Figure 3 as an illustration. Part of the prefecture highlighted in blue boundaries is mapped to today's *Handan* prefecture. Moving away from the provincial capital in the Ming dynasty reduces the probability of having local institutions (powerful clan) established by 10%. As the stylized example illustrates, no local institution was established in the Ming dynasty.

This result is consistent with Dell, Lane, and Querubin (2018), where they exploit a similar setting in Asia. By leveraging a cross-sectional variation in historical strength in state governance, the authors found that villagers who experienced stronger state governance in the past exhibit more civic engagement and better organize public goods and redistribution through civil society. Moreover, Dell, Lane, and Querubin (2018) hypothesize that this occurs because historical strong state governance crowds in local cooperation and local collective actions, and these norms persist even after the differential formal state governance disappears. My result complements their findings by providing direct evidence showing that a strong historical state can indeed crowd in local institutions, which was the heart of local cooperation and collective action using a unique historical panel dataset.

5.2 Threats to Identification

Economic Development and Population Size

Could these results be capturing the effect of economic development or population size on local institutions instead of central administration? That is, economic development or population density might be omitted variables. It might be the case that clans simply grew in more economically developed regions, and provincial capitals were also relocated to those regions. Alternatively, people might find it more efficient to cooperate in a prefecture with a denser population.

In either case, the population density data, which can also be used as a proxy for economic development, can help address the concerns. I first regress the earliest available population density data in each dynasty on the proximity to see whether provincial capitals are strategically relocated to economically developed and/or populated places, conditional on prefecture fixed effects. The earliest available population density is the best proxy for the conditions when the provincial boundaries were drawn. Columns (1) and (2) in Table 3 show that this is not the case.[27] Regardless, I also additionally control for the earliest available population in each dynasty when estimating Equation (1). Results are still consistent with previous findings (columns (3)–(6) in Table 3).[28]

Reverse Causality

[27]The earliest available population data is the year of 980, 1394, and 1776 for each respect dynasties. These years correspond to the 21st year, the 26th year, and 134th of each dynasty. This result still holds when excluding the Qing dynasty (see Table A3 in the appendix).

[28]Note that even the earliest population density for each dynasty might be an outcome of the proximity changes (e.g., selective migration or population booming). Thus, it might be a bad control, and the results from columns (3)–(6) in Table 3 should be interpreted with caution.

Alternatively, would it be the case that the new provincial capitals were chosen, or the provincial boundaries were redrawn so that provincial capitals were closer to places where clans were powerful to control them better? If so, the results suffer from reverse causality. This is not likely as many scholars have argued that the administrative boundaries did not coincide with human activities (Skinner, 1977; Zhou, 1998, 2013); while provincial capitals were mainly determined by geography for information and resources transmission and military defense.

Nevertheless, I conduct a forward lag test in which I assign Ming dynasty proximity to Song's clans and Qing proximity to Ming's clans to see whether the proximity is correlated with the previous dynasty's powerful clan. This test can also be viewed as a balanced test to see whether pre-existing powerful clans are balanced across different proximity in the new regime. Table 4 presents the results, which reassure us that the prefecture's proximity changes are likely to be exogenous to the local clan power.

Sample Selection

There are two major concerns associated with sample selection. One is associated with Li and Jiang (1998)'s data collection process. They might face difficulties in reaching a particular prefecture for data collection. In this case, this effect will be captured by prefecture fixed effects.

The other is about historical data recording bias or survival bias. In this case, prefecture fixed effects are also helpful. For example, suppose a particular prefecture might have had difficulty preserving historical archives for various reasons (such as the archive did not survive during the early communist era). This effect would be captured in prefecture fixed effects.

This concern can also be prefecture-dynasty varying so as not to be captured by prefecture fixed effects. For example, each dynasty's records might be easier to preserve when a prefecture was closer to the provincial capital. Alternatively, it might be the case when there were more incentives to take the record when a clan is located in a prefecture close to the provincial capital. However, if this is the main driving force for the results shown on Table 2, we should expect the results are more salient among provinces that were close to imperial capitals.

To this end, I amend Equation (1) by adding an interaction term between proximity and a dummy variable indicating if a prefecture belongs to the province whose distance from the imperial capital is above the median level in the dynasty. We would expect this coefficient to be positive and significant if the results are indeed driven by the aforementioned data

recording bias or survival bias. Table 5 does not find such an effect.

5.3 Mechanisms

5.3.1 State Co-option

So far, I have established a positive relationship between central state administrative capacity and the development of local institutions. In what follows, I will discuss how state co-option can be a key driving force for this complementary relationship and its implications.

In ancient times, the central state faced many challenges to rule a geographically large and culturally diverse empire, such as Imperial China. It was almost impossible for the central state to aggregate information from all local regions and dealt with issues in time (Morris and Scheidel, 2009). Furthermore, limited fiscal capacity constrained the state's ability to appoint a leviathan of officials to handle all administrative tasks (Sng, 2014).

As a result, the state often has to delegate many duties to local elites, such as tax collection, peacekeeping, and local public goods provision. These local elites have a better knowledge of the local conditions and are better connected with local people, and hence can better understand and adapt to changing local conditions (Levi, 1989). Local elites then invest in local institutions to consolidate their power and social status, making it easier for them to carry out those duties.

However, co-opting local elites to perform administrative duties, hence giving ample room for local institutions to flourish, inevitably grants local elites political power. Empowered local elites might eventually withdraw from their role as agents and fight against the state. Therefore, the state has to incur costs to monitor these local elites while enjoying the benefits co-option brings.

Therefore, the state faces a trade-off when co-opting local elites, which varies on the level of state administrative capacity (i.e., proximity to provincial capitals). On the one hand, it is more costly for the state to monitor local elites to ensure their loyalty in areas where the state has a weaker capacity (far from its provincial capital). On the other hand, a weak state administrative capacity also means that the state has more needs to delegate these tasks as those are the regions where the state faces more difficulties in administration (please see Appendix III for a simple model, which illustrates this trade-off more formally).

This situation suggests it is theoretically ambiguous whether a state would be more likely to co-opt local elites when it has a strong administrative capacity. However, when the state considers the costs of monitoring the local elites as increasing drastically, and thus the net benefits of the local institutions decline as state administrative capacity becomes weaker, we

would observe local institutions flourishing when the state had strong administrative power.

5.3.2 Alternative Mechanisms

Selective Migration

It could be the case that more people migrated to places near the provincial capitals, and those migrants invested more in clans to make their clans more powerful when facing the external challenges in the novel environment. To assess this possibility, I exploit the migration information in the genealogical data to see whether among the clans that eventually had genealogies, their founding ancestors indeed moved closer to provincial capitals. I use the number of clans' founding ancestors migrating to prefecture i in province j during dynasty t (in natural logarithm) as the dependent variable, and regress it to proximity.[29] Results are shown in Table 6. In columns (3) and (4), I also include population density in the regression to account for the possibility that more clan genealogies were compiled in populated prefectures. Overall, the results do not support the selective migration story across all specifications.

Enemy Elimination

Another hypothesis is that clans might tap on the state's power to eliminate other clans, thus becoming more powerful. Indeed, there were many cases of armed inter-clan conflicts toward the end of the Qing dynasty (Du, 2008). As such, in prefectures that had stronger state administrative capacity, some clans could use state power to eliminate other clans and gain power. If this were the case, we would expect that there would be fewer organized clans in prefectures that were close to the provincial capitals over a dynasty.

To examine this hypothesis, I divide each dynasty into four equal lengths to see if there were fewer organized clans closer to the provincial capitals over time. The number of organized clans is measured by the number of clans' compiled genealogies. This information is provided by the *Comprehensive Catalogue of Chinese Genealogies*. Figure 4 shows that prefectures closer to provincial capitals had more clan activities in later years into a dynasty rather than at the beginning of a dynasty. This finding suggests that the aforementioned enemy elimination mechanism is unlikely to explain the rise of local institutions.

Of course, enemy elimination can work in a different way: warfare between clans might be more likely to happen where state capacity is weaker since the state could not intervene

[29] To account for some prefectures with zero founding ancestors migrated to in a dynasty, I add 1 to the number of clans migrated before taking the natural logarithm.

to stop the warfare. Since the conflict sapped the vitality among all active clans, no powerful clans emerged when the state administrative capacity was weak (far from provincial capitals).

In this case, we would expect the main results to be more salient in the Qing dynasty as inter-clan conflicts were most known during that dynasty. To check this, I add an interaction term between the proximity and an indicator variable for the Qing dynasty. Table 7 shows this is not the case.

5.4 Public Goods Provision

Knowing that local institutions flourished when the state had a more substantial administrative capacity, one might wonder whether the state inserts more direct administrations in the areas where they had weaker capacity, even though it was harder to do so. To see this, I check the provision of schools, which was a key public good provided by the state. I assess whether the state provides more schools to regions with weaker capacity and, therefore, no local institution to delegate these tasks.

The first four columns in Table 8 use county schools. Unlike academy schools built by private and local forces, county schools were administered by the imperial state. County schools received funding from the state and were mainly used to educate local people for the civil service exam. Columns (1) and (2) use the number of county schools per capita established in each dynasty, while columns (3) and (4) use the number of county schools per capita in operations in each dynasty. The results show that there was no differential in the provision of county schools across regions.[30]

Of course, it could be the case that the state does not directly discriminate the provision of public goods, but rather the distribution occurs through regional bureaucrats. Although regional bureaucrats during Imperial China had limited roles in doing many administrative tasks since they were unfamiliar with local conditions due to the avoidance rule, they were still the state's front "face" of the state. Columns (5) and (6) in Table 8 evaluate the academy schools per capita that were built by the regional bureaucrats. The results show that, if anything, regional bureaucrats provided more academy schools when the state had a stronger administrative capacity.[31]

[30] County-school data was not available for the Qing dynasty, which results in a fewer number of observations. Note that the major variation in proximity comes from the Song dynasty to the Ming dynasty, so missing county-school data for the Qing dynasty does not lose much variation other than through sample size.

[31] This might be because regional bureaucrats' performance was more likely to be observed and thus got rewarded. Alternatively, it could be that these regions had local institutions, and therefore, local people could have stronger bargaining power in asking regional bureaucrats to provide these public goods, as argued

Taken together, this suggests that regions with weaker state administrative capacity suffer from an inadequate provision of goods and services from the central state and lack local institutions to organize and help overcome collective action problems.

5.5 Robustness Checks

Spatial Autocorrelation

Figure 2 shows that clan prefectures are largely clustered in the southeast. This could affect the standard error of the point estimates. Moreover, the spatial correlation might directly affect the process of forming a powerful clan (i.e., it is a spatial stochastic process), which means that the determinants of powerful clan formation are partly due to direct contagion. In this case, results in Table 2 also pick up some spatial noise, and as a result, the point estimates might also be biased.

I address the first concern by allowing spatial correlation in the error terms by using standard errors that allow for spatial dependence within various radii following Conley (1999). Results are shown on Panel A of the Table 9. By varying different spatial correlation cutoffs (100 km and 1000 km), I show that the standard errors of the main coefficients do not vary much.[32]

Regarding the second concern, I employ a spatial autoregressive model, which modifies the original specification by adding a spatial lag for the dependent variable and a spatially lagged error term. Results are shown on Panel B of the Table 9, and they remain consistent.[33]

Alternative Clan Data

If the positive relationship between the state administrative capacity and the development of local institutions is indeed due to state co-option, we should observe this relationship in both extensive and intensive margins since one clan, no matter how strong it is, would have limited capacity to carry out state delegated tasks. However, the measurement error in the clan land data counts from Li and Jiang (1998) prevents me from testing the hypothesis in the intensive margin.

In this case, I employ an alternative dataset—the *Comprehensive Catalogue of Chinese Genealogies*, which can be considered a census for Chinese genealogy–to see if the main results

by Lee (1997).

[32]The standard errors change minimally using other radii.

[33]Table 9 has fewer observations from Table 2 because a strongly balanced panel is required to do a spatial autoregressive model. The Song dynasty has a relatively smaller territory and, therefore, a few prefectures only exist in the Ming and Qing dynasty. These prefectures will not be in the sample when conducting a spatial autoregressive model.

of this paper still hold. Compiling genealogy can also be regarded as a clan activity, which can be viewed as having a certain level of clan power (Dincecco and Wang, 2021). In fact, the correlations between the number of clans' compiled genealogy (in its natural logarithm) and the two measures of powerful clan prefectures (dummy and coverage) are significantly positive (see Table A4 in the appendix).[34]

I then use the number of clans' complied genealogies (in its natural logarithm) as a dependent variable to estimate Equation (1), and we still see positive significant coefficients (columns (1) and (2) onTable 10). In columns (3) and (4), I also include population density to control for the possibility that more clan genealogies were compiled in populated prefectures and results still hold. This finding confirms that a strong state does crowd in the development of local institutions, also at an intensive margin.

However, one caveat of the *Comprehensive Catalogue of Chinese Genealogies* dataset is that there were scant few clans that had a genealogy in the Song dynasty, which provides minimal variation in the data.[35] Meanwhile, the transition from the Song dynasty to the Ming dynasty provides the major variation of the proximity changes as this is when provincial boundaries and provincial capitals had significant changes. Thus, this result should be interpreted with caution.

Proximity to Imperial Capitals

In my main analysis, I use proximity to provincial capitals to measure the state's administrative capacity instead of proximity to imperial capitals. All the imperial capitals were located in the east side of China, which causes less variation in the proximity to imperial capitals, especially for those in the West. Furthermore, this geography also suggests that the proximity to imperial capitals is more likely to suffer from geographic influence despite comprehensive sets of control variables and thus be endogenous to the development of local institutions.

Nevertheless, suppose the development of local institutions is indeed due to state administration. In that case, we should expect to see similar and perhaps even stronger effects when using proximity to imperial capitals as a proxy. Indeed, in Table 11, when I replace the main explanatory variable with proximity to the imperial capital, although the standard deviation

[34]To account for some prefectures having no clans with compiled genealogy, I add one to the number of clans' compiled genealogy before taking the natural logarithm.
The correlations between the number of clans' compiled genealogies (in its natural logarithm) and the two measures of powerful clan prefectures (dummy and coverage) in the raw data are 0.3016 and 0.3375, respectively, which is reasonably high given that the underlying source of data variations is entirely different.

[35]Table A5 in the appendix shows the distributions of clan genealogy compiled for each dynasty. Each circled dot in purple represents one clan's compiled genealogy in the corresponding dynasty.

of the proximity measures is relatively similar (0.80 for proximity to provincial capitals and 0.78 for proximity to imperial capitals), the size of the coefficients is much larger.[36] Although the proximity to imperial capitals is not an ideal measure, this gives us more confidence that the results in Table 2 can be interpreted as the effect of state administration.

Alternative Threshold for Clan Prefecture

In the main analysis, I define a P.R. China 2010 prefecture as a clan prefecture (dummy) if more than 50% of its territory is covered by *historical prefectures with powerful clans* in a given dynasty. To show that the results are consistent with different thresholds, I use various cutoff points to define the dependent variable. Results are shown on Figure 5. The top panel replicates column (1) in Table 2 while the bottom panel replicates column (2). We continue to see a robust positive relationship between proximity and the local development of institutions.

6 Conclusion

This paper examines the role of centralized state administration on the development of local institutions in Imperial China from around 1000 A.D. to 1900 A.D. Imperial China provides two crucial advantages for studying this relationship. Powerful clans, which are the most important local institutions across the entire core region of China and over dynasties, allow for the systematic measurement of local institutions across time and space. Meanwhile, changes in the proximity to administrative centers resulting from regime switches during the period provide a plausibly exogenous variation in state administrative capacity in local prefectures.

Using a prefecture panel dataset of 267 prefectures over three dynasties, I find that local institutions flourish when the state administrative capacity is stronger. One explanation of this result is that states with a stronger administrative capacity were more likely to co-opt local elites and delegate administrative duties to them since the net benefits of doing so were higher. Co-opted local elites were empowered and invested in local institutions to consolidate the power, prestige, and privileges they received.

Moreover, further investigation shows that the state did not provide more public goods to regions with weaker administrative capacity and fewer local institutions. This suggests that peasants in those regions might suffer from an inadequate provision of goods and services.

[36] The Ming dynasty effectively had two imperial capitals, one in today's Nanjing and the other in today's Beijing. I use the smaller distance to either capital when constructing the proximity.

This positive relationship might not be an affirmative answer in all contexts. Nevertheless, to the best of my knowledge, this research provides the first empirical evidence on this topic and demonstrates that a complementary relationship does exist. Going forward, it would be interesting to test this relationship in different institutional settings, for example in Europe or Africa. This analysis would aid in understanding the mechanism behind the relationship of state administration to the development of local institutions.

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Figures and Tables

Figure 1: Timeline

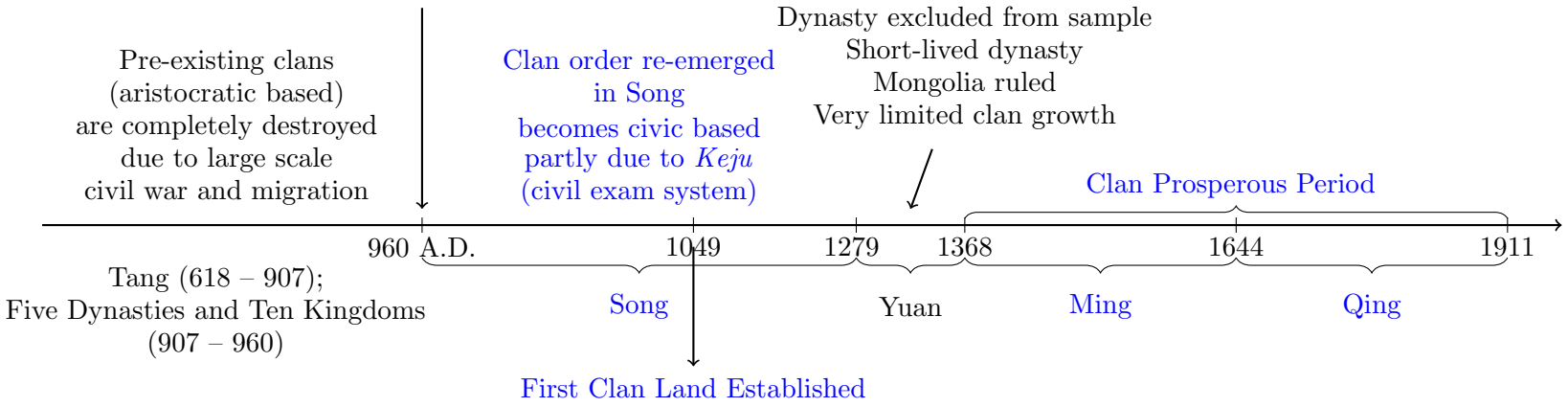


Figure 2: Spatial Distribution of Strong Clan Prefectures

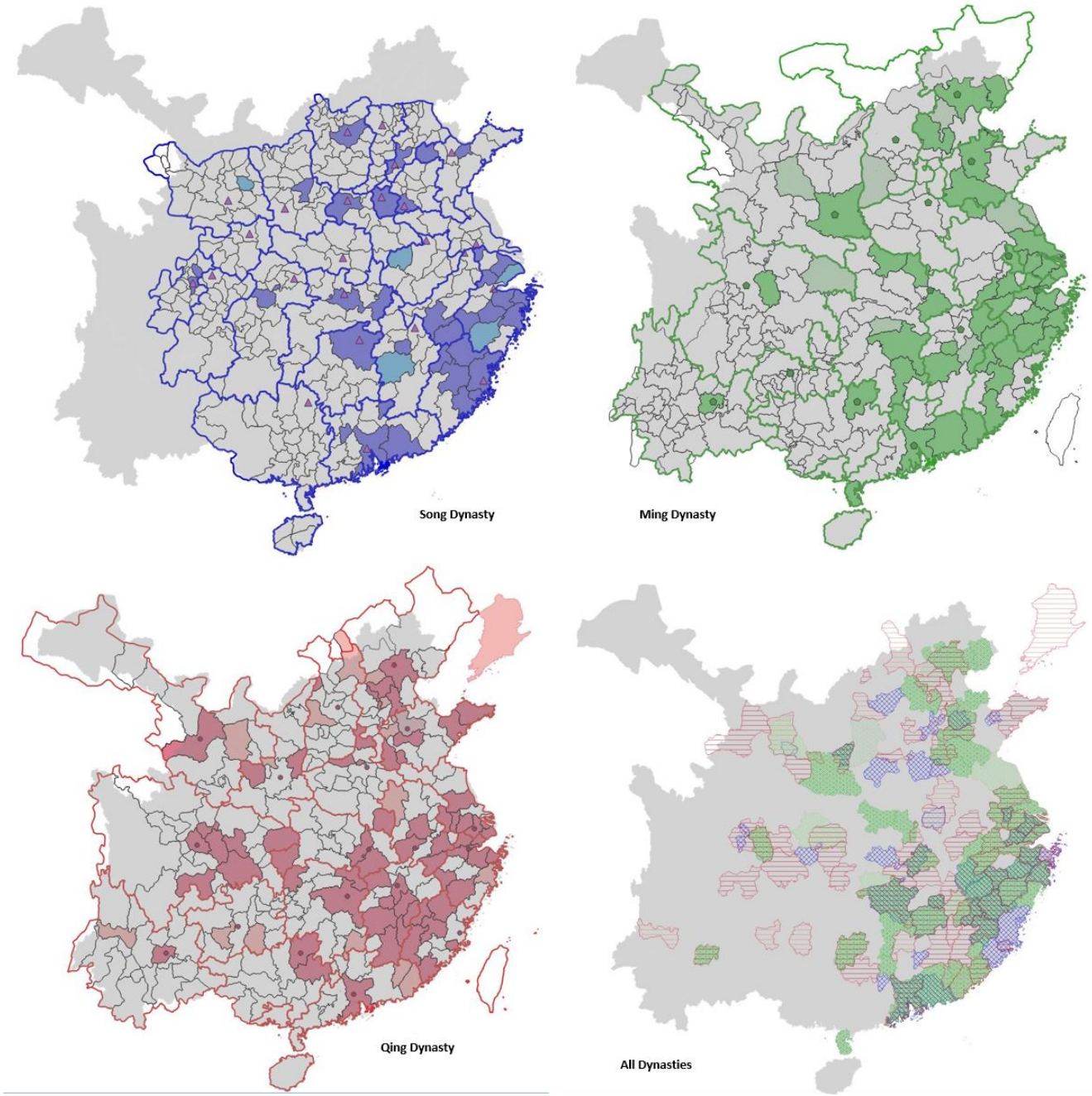
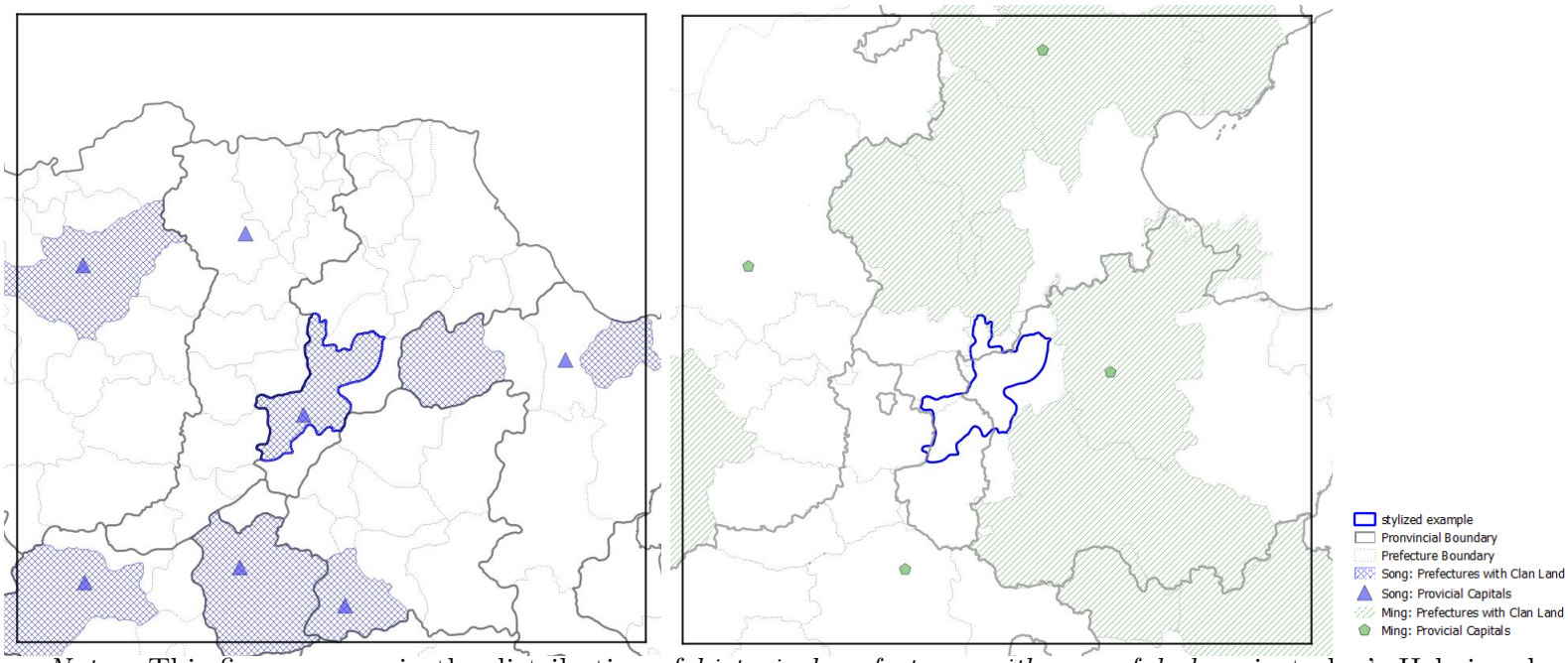
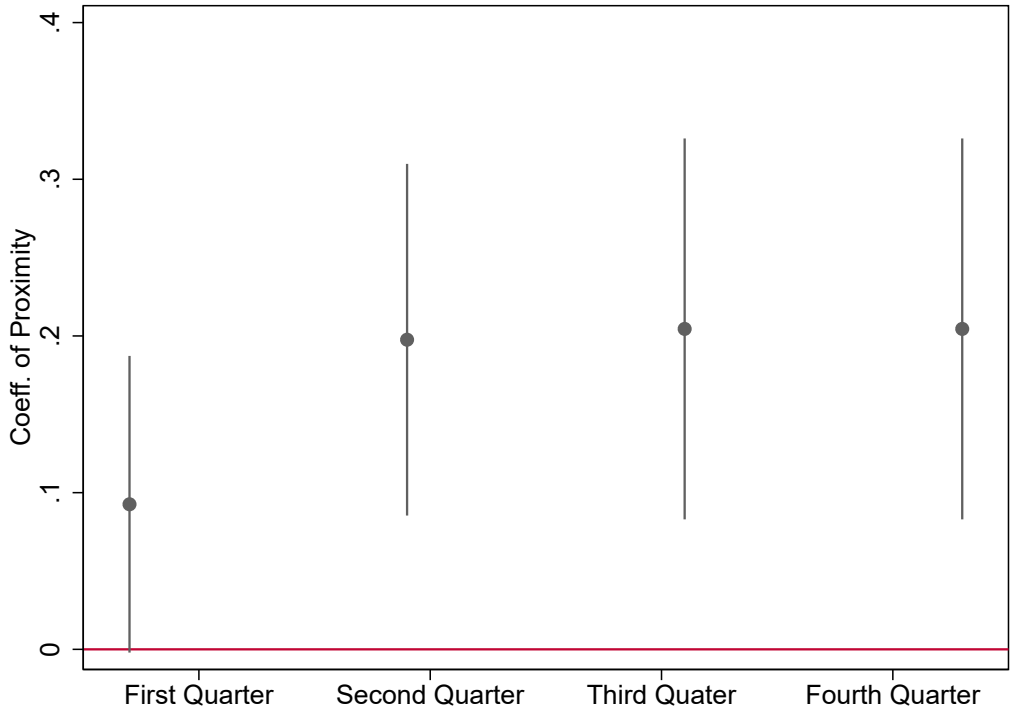


Figure 3: Stylized Example



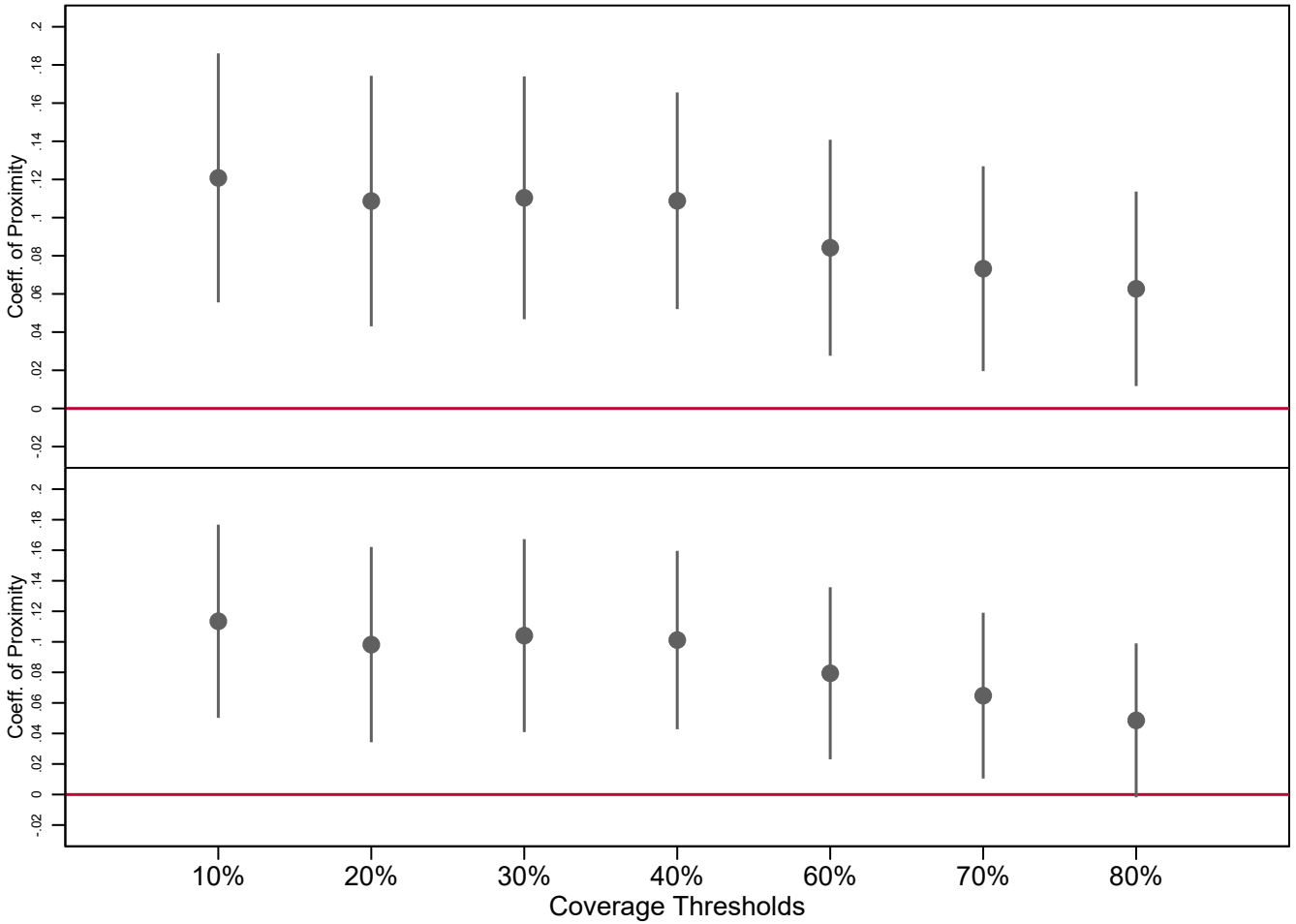
Notes: This figure zooms in the distribution of *historical prefectures with powerful clans* in today's Hebei and Shandong Provinces. The left panel shows the distribution in the Song dynasty and the right panel shows that of the Ming dynasty. The provincial boundaries are in gray in both dynasties, clan prefectures are shaded in color (blue in song and green in Ming). The dots (triangle in Song and pentagon in Ming) are the corresponding provincial capitals.

Figure 4: Number of Clans Compiled Genealogy by Quarter



Notes: Each dynasty is divided into four equal lengths (four quarters). Point estimates (with 90% confidence intervals) for the number of clans compiled genealogy in each quarter are shown.

Figure 5: Alternative Threshold for Clan Prefecture



Notes: Point estimates (with 90% confidence intervals) are shown for each threshold used in defining the dummy measure of a clan prefecture. The top panel includes prefecture fixed effects and province by dynasty fixed effects. The bottom panel additionally controls for interaction terms of prefecture characteristics with dynasty fixed effects. Prefecture characteristics include average slope, elevation, longitude, latitude, dummy variables indicating whether the prefecture contains a major river and a prefecture is a coastal city, as well as agriculture suitability indexes for wheat, rice, fox millet, maize and sweet potato.

Table 1: Summary Statistics

	Song	Ming	Qing	All
Raw Data				–
Number of Prefecture	335	245	266	–
Historical Prefectures with Strong Clans	39	53	81	–
Number of Provinces	24	15	18	–
Prefecture Panel				
Number of Prefectures	242	267	267	–
Proximity	-0.471	-0.608	-0.494	-0.526
	[0.851]	[0.786]	[0.762]	[0.800]
Clan Prefecture(dummy)	0.194	0.363	0.363	0.301
	[0.396]	[0.482]	[0.482]	[0.459]
Clan Coverage (Percentage)	0.204	0.361	0.368	0.315
	[0.338]	[0.429]	[0.399]	[0.399]
Population Density	0.119	0.288	1.164	0.537
	[0.112]	[0.443]	[1.046]	[0.811]

Notes: The top panel shows the statistics based on the raw data, while the bottom panel shows the summary statistics from the prefecture-panel dataset. Counts or variable means are shown in each column. Standard deviations are in brackets.

Table 2: Proximity and Clan Land Establishment

Dependent Variable:	Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)
Proximity	0.099***	0.094***	0.089***	0.081***
	(0.034)	(0.035)	(0.029)	(0.029)
Observations	776	776	776	776
R-squared	0.278	0.320	0.318	0.366
Number of Prefectures	267	267	267	267
Controls	N	Y	N	Y
Std. Dev. Proximity	0.800	0.800	0.800	0.800
Mean. Proximity	-0.526	-0.526	-0.526	-0.526
Dep. Var Mean	0.311	0.311	0.315	0.315

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The dependent variable for columns (1) and (2) use a dummy measure which takes a value of 1 if *historical prefectures with powerful clans* cover more than 50% of the prefecture's territory; while columns (3) and (4) use a continuous measure which equals to the proportion of the prefecture's territory is covered by *historical prefectures with powerful clans*. All columns include prefecture fixed effects and province fixed effects. Columns (2) and (4) also control for interaction terms between prefecture characteristics and dynasty fixed effects. Prefecture characteristics include average slope, elevation, longitude, latitude, dummy variables indicating whether the prefecture contains a major river and a prefecture is a coastal city, and agriculture suitability indexes for wheat, rice, fox millet, maize, and sweet potato.

Table 3: Economic Development

Dependent Variable:	Dynasty Earliest Pop. Density		Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)	(5)	(6)
Proximity	0.063	0.026	0.094***	0.092***	0.085***	0.079***
	(0.053)	(0.049)	(0.035)	(0.035)	(0.029)	(0.029)
Dynasty Earliest Pop. Density			0.085*	0.092*	0.068*	0.078*
			(0.046)	(0.052)	(0.037)	(0.043)
Observations	776	776	776	776	776	776
R-squared	0.831	0.884	0.283	0.324	0.322	0.370
Number of Prefecture	267	267	267	267	267	267
Controls	N	Y	N	Y	N	Y
Dep. Var Mean	0.537	0.537	0.311	0.311	0.315	0.315

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. Dynasty's earliest population density refers to the earliest population density data available for each dynasty. The dependent variable for columns (3) and (4) use a dummy measure which takes a value of 1 if *historical prefectures with powerful clans* cover more than 50% of the prefecture's territory; while columns (5) and (6) use a continuous measure which equals to the proportion of the prefecture's territory is covered by *historical prefectures with powerful clans*. All columns include prefecture fixed effects and province fixed effects. Even-numbered columns additionally control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table 4: Forward Test (Reverse Causality)

Dependent Variable:	Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)
Next Dynasty's Proximity	-0.079	-0.009	-0.065	-0.009
	(0.063)	(0.064)	(0.054)	(0.055)
Observations	534	534	534	534
R-squared	0.386	0.426	0.424	0.475
Number of Prefectures	267	267	267	267
Controls	N	Y	N	Y
Dep. Var Mean	0.270	0.270	0.273	0.273

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The next dynasty's proximity is the main explanatory variable (i.e., the Ming dynasty's proximity to the clan variables in the Song dynasty and the Qing dynasty's proximity to the clan variables in the Ming dynasty). The dependent variable for columns (1) and (2) use a dummy measure which takes a value of 1 if *historical prefectures with powerful clans* cover more than 50% of the prefecture's territory; while columns (3) and (4) use a continuous measure which equals to the proportion of the prefecture's territory is covered by *historical prefectures with powerful clans*. All columns include prefecture fixed effects and province fixed effects. Even-numbered columns additionally control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table 5: Data Selection Bias

Dependent Variable:	Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)
Proximity	0.115***	0.110***	0.096***	0.087***
	(0.040)	(0.039)	(0.034)	(0.033)
Proximity $\times$ $\mathbb{1}_{>\text{Median Distance to Imperial Capital}}$	-0.068	-0.073	-0.027	-0.029
	(0.055)	(0.056)	(0.046)	(0.047)
Observations	776	776	776	776
R-squared	0.280	0.322	0.318	0.366
Number of Prefectures	267	267	267	267
Controls	N	Y	N	Y

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The dependent variable for columns (1) and (2) use a dummy measure which takes a value of 1 if *historical prefectures with powerful clans* cover more than 50% of the prefecture's territory; while columns (3) and (4) use a continuous measure which equals to the proportion of the prefecture's territory is covered by *historical prefectures with powerful clans*. A dummy variable indicating whether a prefecture belongs to a province whose distance from the imperial capital is above the median interacts with proximity. All columns include prefecture fixed effects and province-by-dynasty fixed effects. Columns (2) and (4) also control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table 6: Migration

Dependent Variable:	ln (# Clans Migrated +1)			
	(1)	(2)	(3)	(4)
Proximity	-0.054	-0.057	-0.048	-0.055
	(0.053)	(0.052)	(0.053)	(0.052)
Observations	776	776	776	776
R-squared	0.641	0.669	0.642	0.669
Number of Prefecture	267	267	267	267
Controls	N	Y	N	Y
Population Density	N	N	Y	Y

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The dependent variable is among clans that eventually had genealogies, the number of their founding ancestors who migrated to each dynasty's prefecture in natural logarithm. Considering some prefectures might have none founding ancestors migrated in a dynasty, I add 1 to the number of clans before taking the natural logarithm. All columns include prefecture fixed effects and province fixed effects. Columns (3) and (4) also include population density as a control. Even-numbered columns additionally control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table 7: Enemy Elimination

Dependent Variable:	Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)
Proximity	0.092**	0.096**	0.085***	0.084***
	(0.037)	(0.038)	(0.032)	(0.032)
Proximity $\times \mathbb{1}_{Qing}$	0.021	-0.007	0.012	-0.010
	(0.049)	(0.053)	(0.038)	(0.040)
Observations	776	776	776	776
R-squared	0.279	0.320	0.318	0.366
Number of Prefectures	267	267	267	267
Controls	N	Y	N	Y
Dep. Var Mean	0.311	0.311	0.315	0.315

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The dependent variable for columns (1) and (2) use a dummy measure which takes a value of 1 if *historical prefectures with powerful clans* cover more than 50% of the prefecture's territory; while columns (3) and (4) use a continuous measure which equals to the percentage of the prefecture's territory is covered by *historical prefectures with powerful clans*. A dummy variable for the Qing dynasty interacts with proximity, and it takes a value of 1 if observations are for the Qing dynasty and 0 otherwise. All columns include prefecture fixed effects and province-by-dynasty fixed effects. Columns (2) and (4) also control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table 8: Public Goods Provided by the State

Dependent Variable:	ln(Number of Schools per Capita)					
	New Established County Schools		Total County Schools		Official Built Private Academies	
	(1)	(2)	(3)	(4)	(5)	(6)
Proximity	-0.003	-0.003	-0.003	-0.004	0.247*	0.236†
	(0.002)	(0.003)	(0.002)	(0.003)	(0.146)	(0.146)
Observations	504	504	504	504	776	776
R-squared	0.235	0.263	0.244	0.274	0.521	0.567
Number of Prefectures	267	267	267	267	267	267
Controls	N	Y	N	Y	N	Y
Dep. Var Mean	0.0202	0.0202	0.0211	0.0211	4.728	4.728

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. Columns (1)-(4) use sample for the Song and Ming dynasties only. All columns include prefecture fixed effects and province fixed effects. Even-numbered columns additionally control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table 9: Spatial Correlation

Panel A: Conley Standard Error								
Radius:	100 Km				1000 Km			
Dependent Variable:	Clan Prefecture (Dummy)		Clan Coverage (Percentage)		Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Proximity	0.099***	0.094***	0.089***	0.081***	0.099***	0.094***	0.089***	0.081***
	(0.027)	(0.026)	(0.021)	(0.020)	(0.029)	(0.034)	(0.023)	(0.025)
Observations	776	776	776	726	776	776	776	726
Number of prefectures	267	267	267	267	267	267	267	267
Panel B: Spatial Autoregressive Model								
Weighting Matrix:	Inverse Distance				Contiguity			
Dependent Variable:	Clan Prefecture (Dummy)		Clan Coverage (Percentage)		Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Proximity	0.100***	0.097***	0.086***	0.071**	0.104**	0.099**	0.083***	0.077***
	(0.035)	(0.036)	(0.029)	(0.029)	(0.037)	(0.036)	(0.030)	(0.030)
Lag Dep.Var	-0.097	-0.438	0.391	0.239	-0.074	0.105	0.083	0.127
	(0.477)	(0.560)	(0.333)	(0.388)	(0.267)	(0.234)	(0.192)	(0.187)
Lag Error	-0.050	-0.378	0.541	1.033***	0.431†	0.166	0.525***	0.446**
	(0.579)	(0.712)	(0.380)	(0.021)	(0.272)	(0.290)	(0.191)	(0.206)
Observations	726	726	726	726	726	726	726	726
Number of prefectures	242	242	242	242	242	242	242	242
Controls	N	Y	N	Y	N	Y	N	Y

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The top panel adjusts the standard errors by allowing for spatial dependence within various radius following Conley (1999). The bottom panel uses a spatial autoregressive model by adding a spatial lag for the dependent variable and the error term. All columns include prefecture fixed effects and province fixed effects. Even-numbered columns additionally control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table 10: Alternative Clan Data

Dependent Variable:	ln (# Clans Complied Genealogy +1)			
	(1)	(2)	(3)	(4)
Proximity	0.228***	0.218***	0.212***	0.212***
	(0.074)	(0.077)	(0.073)	(0.077)
Observations	776	776	776	776
R-squared	0.836	0.862	0.838	0.863
Number of Prefectures	267	267	267	267
Controls	N	Y	N	Y
Population Density	N	N	Y	Y
Dep. Var Mean	0.908	0.908	0.908	0.908

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The dependent variable is the number of clans compiled genealogy (in natural logarithm). Considering some prefectures might have zero clans compiled genealogies in a dynasty, I add 1 to the number of clans before taking the natural logarithm. All columns include prefecture fixed effects and province fixed effects. Columns (3) and (4) also include population density as a control. Even-numbered columns additionally control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table 11: Proximity to Imperial Capital

Dependent Variable:	Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)
Proximity to the Imperial Capital	0.125**	0.189***	0.153***	0.201***
	(0.063)	(0.066)	(0.056)	(0.058)
Observations	776	776	776	776
R-squared	0.272	0.318	0.314	0.368
Number of Prefectures	267	267	267	267
Controls	N	Y	N	Y
Std. Dev. ln Distance	0.780	0.780	0.780	0.780
Mean. ln Distance	-2.007	-2.007	-2.007	-2.007
Dep. Var Mean	0.311	0.311	0.315	0.315

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. Proximity to the imperial capital is used as the main explanatory variable. In the case of the Ming dynasty, which effectively had two imperial capitals, closer proximity to either capital is used. Even-numbered columns additionally control for interaction terms between prefecture characteristics and dynasty fixed effects.

Appendix I

Figure A1: China Proper Regions

Notes: Prefectures for P.R. China 2010 are shown. The shaded areas are China proper regions.

Figure A2: Provincial Capitals

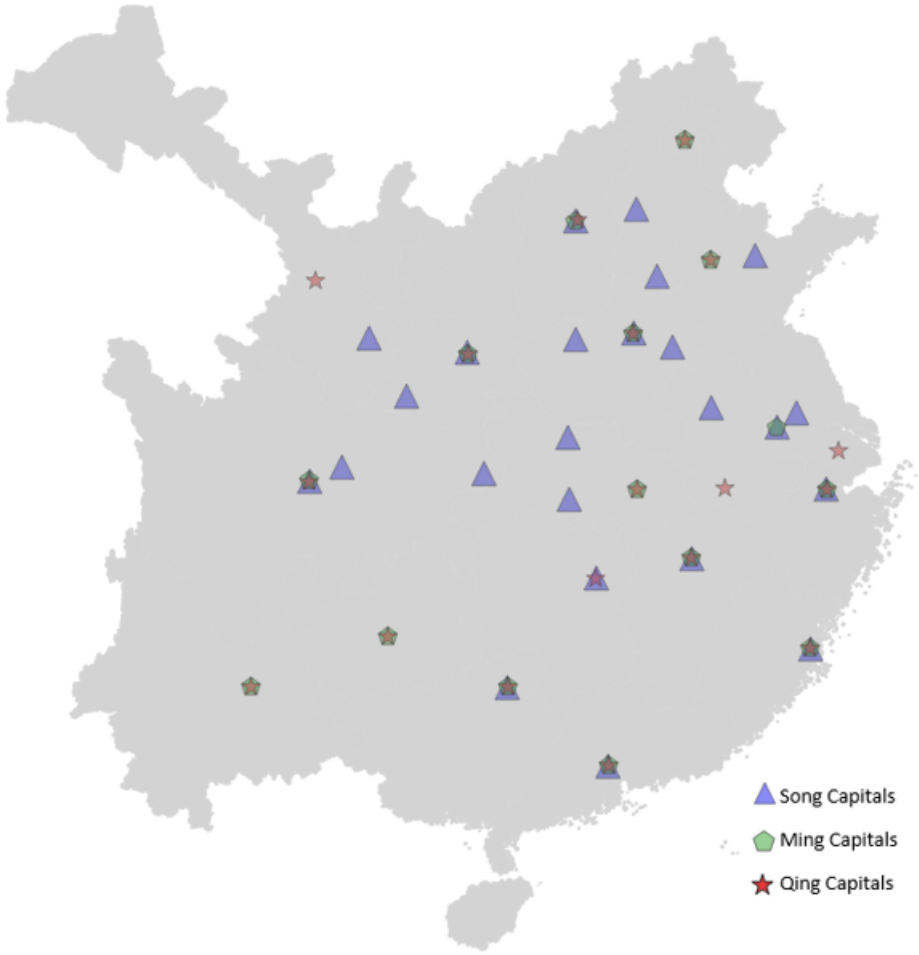
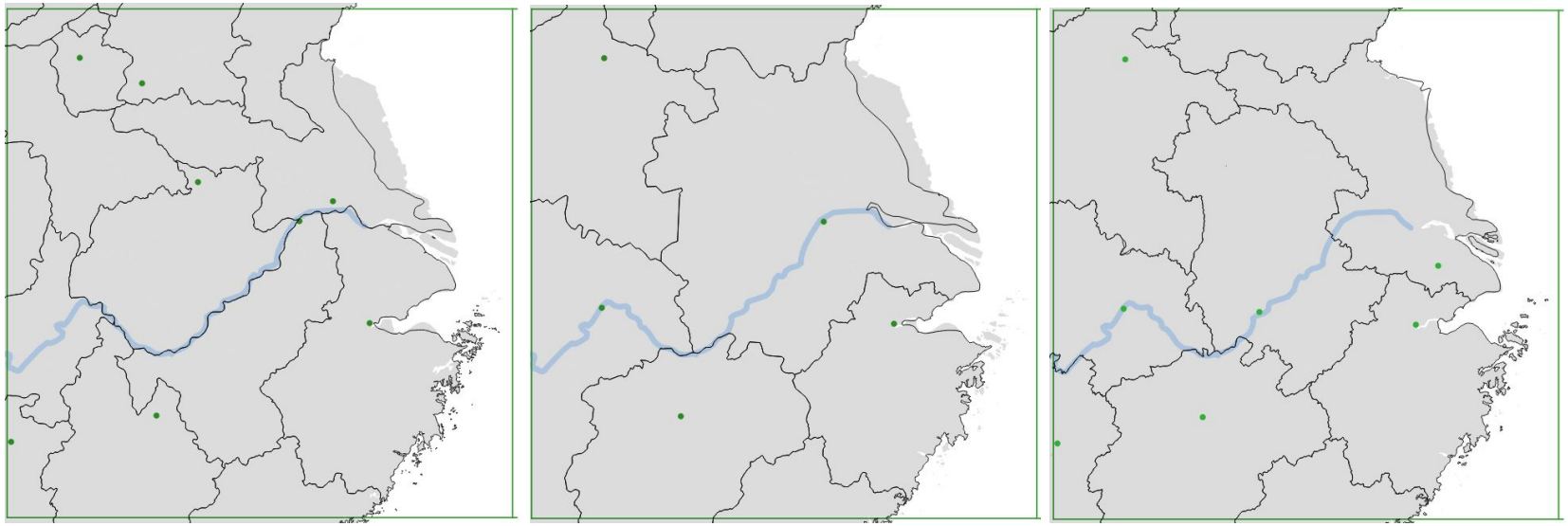


Figure A3: Yangtze Rive Regions



Notes: Gray boundaries are provincial boundaries for each dynasty. The blue line is the Yangtze River.

Figure A4: Raw Data

Emperor period | Location | contributor | area | Notes | Sources

年代	省县	建置人	面积(亩)	备　注	资料来源
嘉靖	宜兴	任卿	2800	置学田 1000 亩，义田 1000 亩，役田 800 亩。	《古今图书集成·学行典》，卷 243，《笃行部》。
明	宜兴县	陈一经(子官御史)		"置义塾义田，子于廷克成其志"。	《古今图书集成·学行典》，卷 249，《笃行部》。
	宜兴县	徐溥	800		张萱：《西园闻见录》。
明	宜兴县	吴驭(詹事府主簿)	200	"割上腴田二顷为祠田以赡宗族"。	《古今图书集成·学行典》，卷 249，《笃行部》。
	宜兴县	徐显卿	300	役田。	张萱：《西园闻见录》。
明末	上海?	唐锦端		"置义田若干亩"。	《古今图书集成·学行典》，卷 245，《笃行部》。
明后期	山阳县	丘氏		建祠堂以祀先祖，置祭若干亩。至清初"山阳丘氏之子弟多孝谨，守家法"。	《八旗文经》，卷 43。
万历	吴江县	沈氏	430		乾隆《吴江县志》，卷 37。
明	常州	伍某		义田，禁典卖。	李绂祯：《大拙山房集》，卷 56，《伍氏义田记》。
	常州府	吴情	1800	其中赡族十之三，助役占十之七(为乡人助役)	申时行：《常州府志》。
明	长洲县	徐某		义田，禁典卖。	张萱：《西园闻见录》，卷 5，《教睦·徐显卿·义田家训》。

identify at county level

Only identify at prefecture level

Translation

Emperor Period	Location	Contributor	Area	Notes	Sources
Jiaqing Emperor	Yixing	Ren Qing	2800		
Ming	Yixing County	Chen Yijing	.		
	Yixing County	Xu bo	800		
Ming	Yixing County	Wu yu	200		
	Yixing County	Xu Shiqing	300		
End of Ming	Shanghai	Tang Yaojing	.		
Later Ming	Shanyang County	The Qiu	.		
Wanli Emperor	Wujiang County	The Shen	430		
Ming	Changzhou	The Wu	.		
	Changzhou Prefecture	WU Qing	1800		
Ming	Changzhou County	The Xu	.		

Figure A5: Clans Genealogy

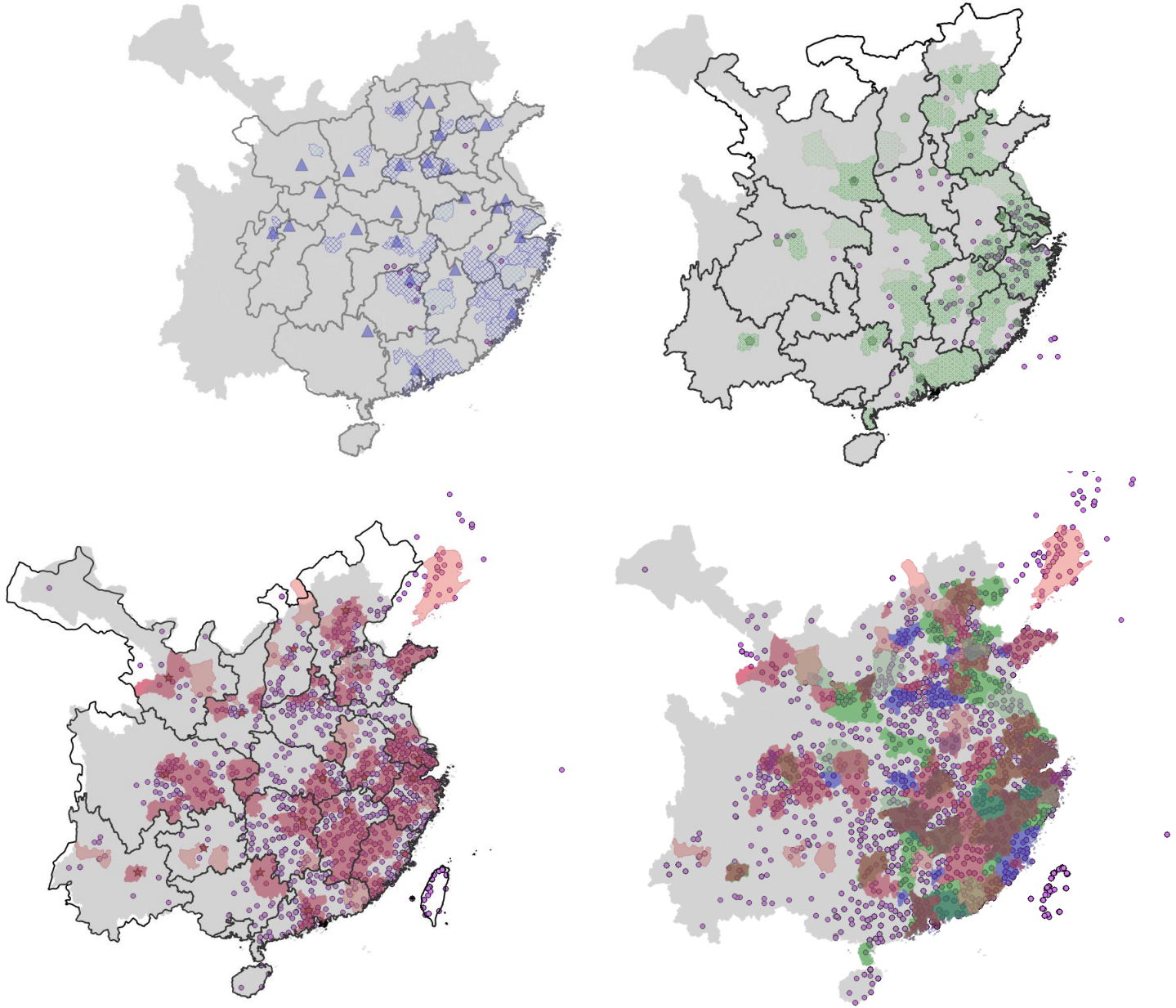


Table A1: Proximity and Clan Land Establishment (Grid-level Analysis)

Grid Size:	100 Km^2 Grid		1 Degree Grid		150 Km^2 Grid	
Dependent Variable:	Clan (Dummy)	Clan (Percentage)	Clan (Dummy)	Clan (Percentage)	Clan (Dummy)	Clan (Percentage)
	(1)	(2)	(3)	(4)	(5)	(6)
Proximity	0.229***	0.115***	0.146***	0.100***	0.178***	0.062**
	(0.045)	(0.030)	(0.042)	(0.025)	(0.059)	(0.030)
Observations	1,109	1,109	1,105	1,105	627	627
R-squared	0.334	0.355	0.339	0.378	0.402	0.424
Province by Dynasty FE	Y	Y	Y	Y	Y	Y
Cluster at Grid	Y	Y	Y	Y	Y	Y
Grid FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Dep. Var Mean	0.391	0.227	0.356	0.189	0.381	0.182
Number of Grids	441	441	444	444	253	253

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. Panel datasets are at the grid-dynasty level. The dependent variable for odd-numbered columns uses a dummy measure which takes a value of 1 if more than 50% of the grid is covered by *historical prefectures with powerful clans*; while even-numbered columns use a continuous measure which equals to the proportion of the grid is covered by *historical prefectures with powerful clans*. All columns include prefecture fixed effects and province effects. Even-numbered columns additionally control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table A2: Proximity and Clan Land Establishment (Judicial Capitals)

Dependent Variable:	Clan Prefecture (Dummy)		Clan Coverage (Percentage)	
	(1)	(2)	(3)	(4)
Proximity	0.049*	0.050*	0.050**	0.048**
	(0.027)	(0.029)	(0.022)	(0.023)
Observations	776	776	776	776
R-squared	0.271	0.314	0.310	0.360
Number of Prefectures	267	267	267	267
Province by Dynasty FE	Y	Y	Y	Y
Cluster at Prefecture	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y
Controls	N	Y	N	Y
Dep. Var Mean	0.311	0.311	0.315	0.315

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The dependent variable for columns (1) and (2) use a dummy measure which takes a value of 1 if *historical prefectures with powerful clans* cover more than 50% of the prefecture's territory; while columns (3) and (4) use a continuous measure which equals to the proportion of the prefecture's territory is covered by *historical prefectures with powerful clans*. Proximity to judicial capitals for the Song dynasty is used as the explanatory variable. All columns include prefecture fixed effects and province fixed effects. Columns (2) and (4) also control for interaction terms between prefecture characteristics and dynasty fixed effects.

Table A3: Economic Development (Song, Ming Dynasties only)

Dependent Variable:	Dynasty Earliest Pop. Density	
	(1)	(2)
Proximity	-0.001	-0.033
	(0.014)	(0.024)
Observations	509	509
R-squared	0.667	0.770
Number of Prefectures	267	267
Controls	N	Y
Dep. Var Mean	0.208	0.208

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The sample uses the Song and Ming dynasties only. Dynasty's earliest population density refers to the earliest population density data available for each dynasty. Both columns include prefecture fixed effects and province-by-dynasty fixed effects. Column (2) additionally controls for interaction terms between prefecture characteristics and dynasty fixed effects.

Table A4: Clan Genealogy Data and Clan Land Data

Dependent Variable:	Clan Prefecture (Dummy)			Clan Coverage (Percentage)		
	(1)	(2)	(3)	(4)	(5)	(6)
ln(# Clans Compiled Genealogy +1)	0.091***	0.079***	0.064**	0.087***	0.058***	0.044*
	(0.011)	(0.026)	(0.028)	(0.009)	(0.021)	(0.023)
Observations	776	776	776	776	776	776
R-squared	0.086	0.283	0.320	0.107	0.317	0.362
Number of Prefectures	267	267	267	267	267	267
Cluster at Prefecture	Y	Y	Y	Y	Y	Y
Province by Dynasty FE	N	Y	Y	N	Y	Y
Prefecture FE	N	Y	Y	N	Y	Y
Controls	N	N	Y	N	N	Y

Notes: Robust standard errors, clustered at the district level, are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The dependent variable for columns (1) and (2) use a dummy measure which takes a value of 1 if *historical prefectures with powerful clans* cover more than 50% of the prefecture's territory; while columns (3) and (4) use a continuous measure which equals to the proportion of the prefecture's territory is covered by *historical prefectures with powerful clans*. The number of clans compiled genealogy (in natural logarithm) is used as the explanatory variable. Considering some prefectures might have zero clans compiled genealogies in a dynasty, I add 1 to the number of clans before taking the natural logarithm. Columns (2) and (5) include prefecture fixed effects and province-by-dynasty fixed effects. Columns (3) and (6) also control prefecture characteristics' interaction with dynasty fixed effects.

Appendix II: Additional Background

II.I Two Principles of Drawing Provincial Boundaries

During the early history, it was a very natural choice to adopt the principle of "following the forms of mountains and rivers" to draw provincial boundaries since it serves many economic and political benefits. Firstly, natural boundaries usually coincide with the agricultural regions, which form different agriculture types and therefore different cultures and norms. In addition, it vastly lowers the administrative cost since crossing mountains or rivers would have resulted in huge transportation costs. Lastly and arguably most importantly, natural boundaries serve an essential role in military defense. For example, during the three Kingdoms period (220—280 A.D.), Zhuge Liang–the chancellor and later the regent of one of the three Kingdoms Shu Han–suggested to his King (Liu Bei) to occupy Yizhou (roughly today's Sichuan province), since mountains surround it. The hills create natural barriers to prevent the other kingdoms' attacks. This strategy indeed really helped. It is commonly acknowledged that Shu Han was a much smaller kingdom and had a relatively weak military. Still, Shu Han managed to sustain conflict with the other Kingdoms for a long period of time because its natural boundaries protected it.

However, despite the benefits of using natural boundaries, its drawbacks also became more evident and severe as national territories got larger. The most important one is the central state could easily lose control over the territories as regional power holders (such as provincial governor, duke, military commissioners, etc.) could take advantage of natural boundaries to isolate the territories from the central state. This happened many times in history. For example, a long period of war and chaos was experienced at the end of the Tang dynasty (618 – 907 A.D.) because governors or military commissioners gained significant autonomy, and many became warlords and defected from the central state. The central empire could not suppress them despite many attempts because the natural boundaries now became barriers for the central forces to regain control. The breakaway of and occupation of territories eventually led to the collapse of the dynasty.

One solution would be dividing the whole nation into many smaller provinces. This way could limit the power and autonomy each regional power holder can get. Hence, although the Song dynasty (960–1279 A.D.) had much smaller territories, it had many more provinces than any of the following dynasties. The shortcoming of this solution is also apparent: the administrative costs would be extremely high. Having more provinces means hiring more officials at each level.

This solution became very unattractive for the Yuan dynasty (1277—1368 A.D.) when

the Mongols came to rule, as their territories became immense. As a result, another principle is known as "*interlocked like dog's teeth*", which means including rivers and mountains within provinces, was adopted. The benefit of this new principle is that it can prevent the regional power-holders from gaining autonomy while keeping the administrative costs low. As a result, despite the humongous territories, it only had ten provinces.[37]

When the Ming dynasty and the Qing dynasty came into power, they mixed the two principles (more of the second principle), which also resulted in more provinces than the Yuan dynasty (15 provinces and 18 Provinces in China proper regions for the Ming dynasty and the Qing dynasty respectively).

II.II How were the provincial boundaries in the Ming, Qing dynasties drawn?

How were the exact provincial boundaries drawn in the Song, Ming, and Qing dynasties? The Song dynasty, as mentioned before, was primarily determined by natural boundaries. The Ming dynasty redrew all the provincial boundaries by combining both the principles of "*following the forms of mountains and rivers*" and "*interlocked like dog's teeth*". However, not many studies exist of the precise process for drawing the provincial boundaries. Zhou (2013) mentioned that some provinces' boundaries were the frontline of the war when the fire was ceased. It took the Ming's army a long time–21 years in total– to overthrow the Yuan dynasty completely, and hence, the Ming army would draw the boundary as the new territories were conquered and start its governance. In some other provinces, the boundaries were drawn based on the emperor's ideology. For example, the first emperor of the Ming dynasty wants to include his hometown in the same province as the Imperial capital (Nanjing), which is almost 200km away. This resulted in Nanjing becoming a huge province, which is equivalent to the three provinces in today's China.

The Qing dynasty inherited most of the Ming dynasty's boundary, except for dividing three provinces that were considered too large in half. This includes dividing Jiangnan province into Jiangsu province and Anhui province; dividing Shangxi province into Shangxi province and Gansu province; and dividing Huguang province into Hunan province and Hubei province.

Although the precise boundary location was not clearly documented–probably because of the randomness in its nature—one thing was clear: as many scholars pointed out (Skinner, 1977; Zhou, 1998, 2013), the administrative boundaries in late Imperial China seldom coincide with culture or any human and economic activities and were generally considered

[37]The Yuan dynasty had more than 1400 km^2 in its territories.

as "administrative accidents".

II.III Other Pubic Goods Providing Local Institutions

In this paper, I focus on clans as the public good providing local institutions. Of course, there were other local institutions that provided public goods during Imperial China. Here, I would briefly discuss their roles and why they are less suitable for this study.

Buddhist Temples

Like many western countries, religious groups played a role in providing public goods, particularly relief for impoverished people. When Buddhism was introduced into China around 67 A.D., the Buddhist temples were not popular and did not take any social roles in public goods provision. It was until the end of the fifth century when Kings, aristocrats, landowners became adherents of Buddhism. Buddhist temples started to own assets and gradually began to take a role in public goods provision and disaster relief (Gernet, 1956). In the sixth and the seventh centuries, many Buddhist temples divided their land into three categories: one is used to support parents (*En Tian*); one is dedicated to generating funding for worship the Buddhas (*Jing Tian*), and one is used for disaster relief and helping the improvised people (*Bei Tian*). During this time, the Buddist temple was actively involved in many public goods provisions, including local roads, bridges, dams, and irrigation systems. Buddhist Temples also established philanthropic organizations (*Bei Tian Yuan*) using the funding generated from the land.

The influence of Buddhist temples spread fast and started to pose an alert to the state. In 717 A.D., Song Jing, the Grand Chancellor, suggested to the emperor Xuan Zong that the state should regulate these Buddhist temples and restrict their charitable roles. In 734 A.D., the emperor nationalized all the existing philanthropic organizations, making local government fund these philanthropic organizations. In 845 A.D., the emperor Wu Zong enacted a mandate to demolish more than 40,000 Buddhist temples and forced monks to resume secular life.

In late 900, when a new regime, the Song dynasty, came into power, Buddhist temples were rebuilt. The dynasty steadily regained its influence and participated in public goods provision such as building local roads and dams. However, most cases were coerced by local governments. The Buddhist temples never got back to their glory during the sixth and seventh centuries (Liang, 2001).

Most of the peak time of Buddhist temples was warring when the society was less stable and central state administration was hard to measure, making it unsuitable for this study.

After the massive demolish in 845, Buddhist temples had limited influence in public good provisions.

Charities

Since philanthropic organizations were nationalized, the state started to take active roles in charitable activities. This peaked in the Song dynasty when the government opened many different types of charities. However, this also caused a significant fiscal burden on the state. When the Yuan dynasty overthrew the Song dynasty, the new regime did not continue to fund these charities. In the Yuan dynasty, the government only kept medical-related charities (*Hui Min Yao Ju*).

In the Ming dynasty, even medical-related charities lost their vitality. However, during the end of the Ming dynasty, local elites gradually took the role of the state and established charities. The first known charity established by local people was founded in 1590. Since then, many charities local elites have established many charities. Some were focused on raising orphans, while some were focused on giving medicines for the sick and the poor. These charities groups were usually organised by a small number of people who would appeal to donations from the kind.

In 1724, during the Qing dynasty, Emperor Yong Zheng announced to encourage more charities. Since then, the state has provided grants and subsidies to these charity groups. For example, from 1736 to 1799, the central government issued yearly subsidies to 16 charities, which included a grant of 30,000 *liang* (a unit for weight 1 *liang*=50 grams) silver to a charity for the orphan (*Yu Yin Tang*) in Hubei province.

Charities can only be considered local institutions since the end of the Ming dynasty, as it was a part of the state institutions in the Song and Ming dynasties. Hence, it essentially only played a role in Chinese history for one dynasty (the Qing dynasty). This made it less suitable for this study, as its distribution might be confounded by many factors, and hard to isolate the effect of central administrative from other factors such as culture.

However, one concern might be that charities and clans coexisted during the Qing dynasty. If charities were prevalent in places where clans were weak, then using clans alone to measure local institutions might bias my results. To assess this, I combine geo-coded charities data in the Qing dynasty provided by Havard World Map with the clan data. I first check the correlation between the two clan measures and charities, and they are positively correlated. Further, Table A5 also shows that similar to the patterns of clans, there were more charities when it is closer to the provincial capitals.

Table A5: Clan Land Data and Charity Data

Dependent Variable:	Clan Prefecture (Dummy)			Clan Coverage (Percentage)			ln(# of Charities +1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(# of Charities +1)	0.124***	0.124***	0.075**	0.117***	0.123***	0.082***		
	(0.016)	(0.025)	(0.030)	(0.013)	(0.020)	(0.023)		
Proximity (-ln(dist))							0.341***	0.127**
							(0.056)	(0.061)
Observations	267	267	267	267	267	267	776	776
R-squared	0.154	0.203	0.261	0.196	0.250	0.309	0.550	0.619
Province FE	N	Y	Y	N	Y	Y	Y	Y
Controls	N	N	Y	N	N	Y	N	Y

Notes: Robust standard errors are shown in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. This table uses a cross-sectional sample for the Qing dynasty. The dependent variable for columns (1)-(3) use a dummy measure which takes value of 1 if *historical prefectures with powerful clans* cover more than 50% of the prefecture's territory; while columns (4)-(6) use a continuous measure which equals to the percentage of the prefecture's territory is covered by *historical prefectures with powerful clans*. ln(# of Charities +1) is the number of charities in each prefecture during the Qing dynasty (in natural logarithm). Considering some prefectures might have zero charity, I add 1 to the number of charities before taking the natural logarithm.

Appendix III: Model

To formulate the trade-off states face in co-opting local elites, I develop a simple riot model, where peasants can choose to riot, and the state could either delegate the task of suppressing conflict to the local elites or suppress the conflict directly when it happens. Here, I focus on one specific role that the state often delegates to the local elites–peacekeeping–just as an example. Many other roles, such as tax collection, would have very similar features and therefore share the same trade-offs.

The Set-up:

The local region is endowed with some wealth (W). The state would have to decide whether to let the local elites administer local affairs ($L = 1$ if co-opting local elites or $L = 0$ if not). The state's strength in administration (which was empirically approximated by proximity to the provincial capital in the paper) is denoted as S. If the state employs local elites (i.e., $L = 1$), they have to incur monitoring costs $C(S)$ to ensure that the empowered elite will not defeat his role as an agent. This cost increases as state administrative capacity decreases (i.e., $C'(S) < 0$). Once the decision has been made, an idiosyncratic shock (δ) would hit the local wealth. For simplicity, I assume that it follows a uniform distribution ($\delta \sim [-\frac{1}{2}\Delta, \frac{1}{2}\Delta]$). Local wealth will thus become $W^p = W + \delta$.

Peasants can choose to riot ($v = 1$) or not ($v = 0$). Rioting would give them a chance to get tax exempted if peasants win. However, if they lose, they will be punished. The state would take all of their wealth except a bare minimum $\underline{w}$ for them. Also, a fraction of the wealth β will be destroyed if a riot happens (assume $\beta < \tau$ so peasants will not always prefer peace). I assume $\underline{w} < (1 - \beta)(W - \frac{1}{2}\Delta)$; that is, peasants always have a lower payoff when they lose the conflict. If they choose not to riot ($v = 0$), they will pay τ proportion of tax to the state, and the game ends.

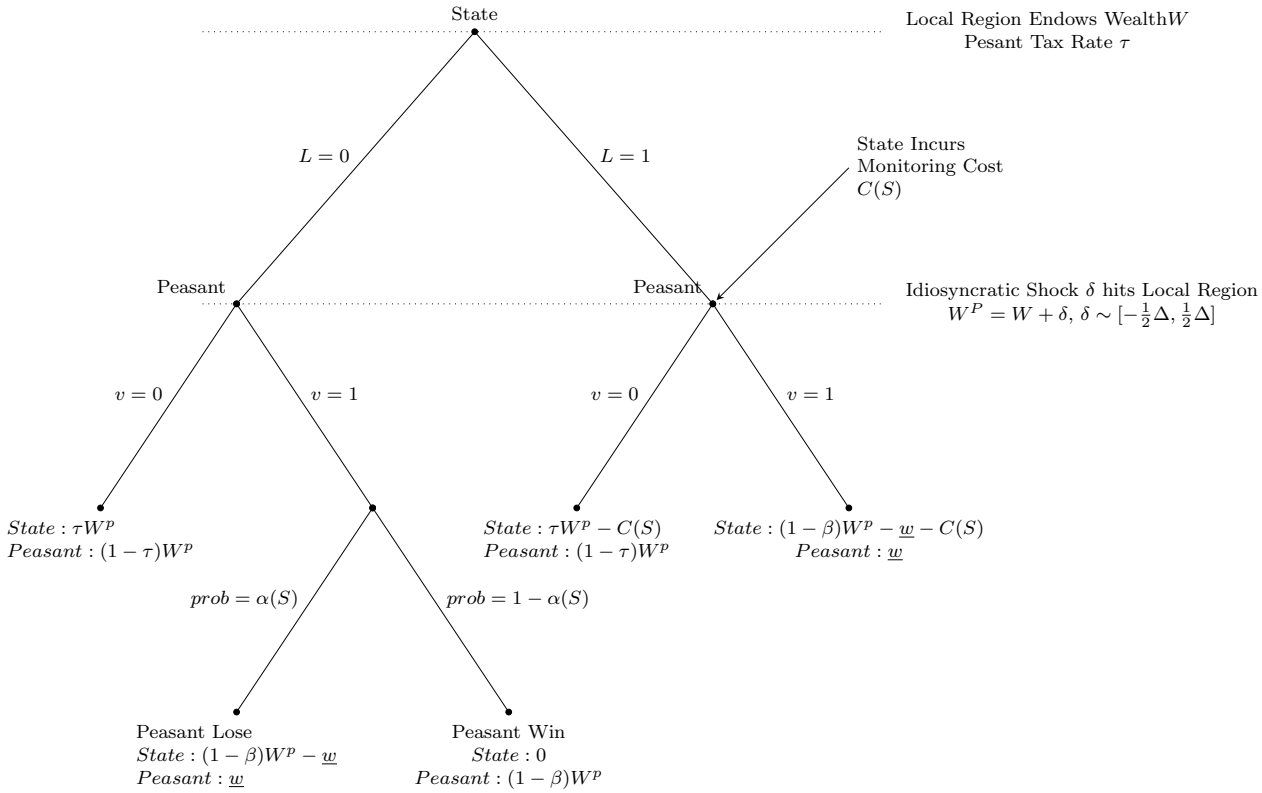
If peasants riot and the state has co-opted local elites $L = 1$, then local elites would be the ones who manage the conflict. Due to the state monitoring, elites will always put effort into suppressing the conflict. In addition, I assume elites could always successfully suppress the conflict as they have more local information and are better connected with the peasants. However, the state would need to suppress the conflict directly if it has chosen not to co-opt local elites (i.e., $L = 0$). In this case, the state has a probability of $\alpha(S)$ to successfully suppress the conflict. I assume when the state has a higher administrative capacity, it will have a higher chance of winning (i.e., $\alpha'(S) > 0$).

To ensure that the state is absolutely conflict-averse, I assume $[\tau - \alpha(S)(1 - \beta)]W + \alpha(S)\underline{w} > 0$, for all S, so that state will not have monetary gains when facing a conflict. Also,

for peasants not always have a preference for violence over peace $\alpha(S) > \tau - (1-\alpha(S))\beta$ for all S (i.e., the probability that the state would win a conflict is above a threshold value) is required.

Finally, I assume $W > \frac{\alpha(S)\underline{w}}{\alpha(S)-\tau+(1-\alpha(S))\beta}$ and $W - \frac{1}{2}\Delta < \frac{\alpha(S)\underline{w}}{\alpha(S)-\tau+(1-\alpha(S))\beta}$ to make sure that neither conflict of peace is not always preferred by the peasant so we could focus on the interior solutions.

The timing of events and the payoff for each party are summarized as follows:



Equilibrium:

Peasant:

As a peasant riot will never succeed when local elites are co-opted ($L = 1$), peasants will only choose $v = 1$, if $L = 0$ and the expected payoff of rioting is greater than peace. That is, when:

$$(1-\alpha(S))(1-\beta)W^p + \alpha(S)\underline{w} \geq (1-\tau)W^p$$
$$W^p = W + \delta \leq \frac{\alpha(S)\underline{w}}{\alpha(S) - \tau + (1-\alpha(S))\beta}$$

This gives probability of conflict $P(W, \underline{w}, \alpha, \tau, \beta) = \frac{1}{\Delta}\frac{\alpha(S)\underline{w}}{\alpha(S)-\tau+(1-\alpha(S))\beta} + \frac{1}{2}$

State:

While the state will have to weigh the trade-off between the cost of monitoring the empowered local elites and the costs of directly mitigating the conflicts and offer $L = 1$ if

$$\tau W - C(S) \geq P\{(1-\alpha(S)) * 0 + \alpha(S)\left[(1-\beta)W - \underline{w}\right]\} + (1-P)\tau W$$
$$C(S) \leq \underbrace{P\{\left[\tau - \alpha(S)(1-\beta)\right]W + \alpha(S)\underline{w}\}}_{\equiv X(W^i, \underline{w}, \alpha, \tau, \beta)}$$

Comparative Statistics:

The right-hand side of the above inequality illustrates the expected cost of attaining tax revenue (τW) absent the involvement of local elites, and it can be shown that:

$$\frac{dX}{dS} = \frac{dX}{d\alpha(S)}\frac{d\alpha(S)}{dS} = \underbrace{\frac{dP}{d\alpha(S)}}_{<0}\underbrace{\frac{d\alpha(S)}{dS}}_{>0}\underbrace{\{\left[\tau - \alpha(S)(1-\beta)\right]W + \alpha(S)\underline{w}\}}_{>0}$$
$$+ P\underbrace{\left[-(1-\beta)W + \underline{w}\right]}_{<0}\underbrace{\frac{d\alpha(S)}{dS}}_{>0} < 0$$

Intuitively, when a state is stronger and thus has better technology to suppress conflict, this would deter peasants from starting the conflict (probability of conflict P would be lower). Moreover, the expected cost of attaining tax revenue (τW) is lower for a strong state because it is more likely to win a conflict and thus faces a smaller expected loss. Therefore, it is less costly for the state to suppress the conflict directly, suggesting less incentive to co-opt local elites.

The left-hand side of this inequality illustrates that a stronger state would have lower monitoring costs and thus prefers co-opting local elites. That is, $\frac{dC(S)}{dS} < 0$

Taking together,

$$\frac{dL}{dS} = \underbrace{\frac{dL}{dC(S)}}_{<0}\underbrace{\frac{dC(S)}{dS}}_{<0} + \underbrace{\frac{dX}{dS}}_{<0}$$

This illustrates the aforementioned trade-offs: a stronger state faces both costs in mitigating conflict directly as well as co-opting local elites to do so. Hence, it is theoretically ambiguous whether the state would co-opt more local elites (and thus have more local institutions) when the state administrative capacity is stronger.