The Monopoly over Violence in a Late Modernizer

Evidence from Imperial China*

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Abstract

This study analyzes how the state may establish or lose a monopoly over violence in the context of late modernizers, taking imperial China as a laboratory. We provide a new conceptual framework in which elites and the state interact over the provision of internal security. Exploiting new micro-level data that span hundreds of years, we show evidence that, traditionally, there was greater state development – at the expense of private security provision via the clan – in response to mass rebellion, because the cost of public security was relatively low. After 1850, however, there was a dramatic increase in this cost due to China's military loss to the West. In turn, we find evidence for greater private security provision – now at the expense of public provision – in response to internal conflict. This change reduced the imperial state's monopoly over violence and eventually promoted state failure. Our study provides new perspectives on both the long-run political dynamics of the Great Divergence, and the relationship between internal conflict and state development.

Keywords: State Development, Internal Conflict, Elite Action, Great Divergence, China

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1 Introduction

In his classic work on politics, Weber (1946 [1918], 78) defines the state in terms of its ability to secure a monopoly over violence within its territory. This ability, however, cannot be taken for granted. The extant literature indicates that the state's monopoly over violence was the outcome of a hard-fought historical process (Hoffman 2015*a*, 307). Much of this literature centers on long-run political development in Western Europe (Tilly 1975; North and Weingast 1989; Stasavage 2011; Cox 2016; Ziblatt 2017). Yet we know relatively less about this process across other, late-modernizing parts of Eurasia (Kuran 2018, 1353).

To make progress on this front, this study analyzes the long-run dynamics of state development in imperial China. To the best of our knowledge, it is the first such study of its kind. This case provides two major advantages. First, imperial China is at the center of the "Great Divergence" debate, by which Western Europe took off economically from the mid-eighteenth century onward, while the rest of Eurasia fell behind (Pomeranz 2000). By the start of the twentieth century, modern nation-states had become prevalent across Western Europe (Dincecco 2017, 37-58). In contrast, the imperial state in China failed (Rosenthal and Wong 2011, 222). Systematic analysis of state development in imperial China helps resolve this puzzle of East-West political divergence. Given that the state plays an important role in economic development (Besley and Persson 2011), greater understanding of this phenomenon will improve our knowledge of the Great Divergence. Second, imperial China has particularly well-documented historical records, enabling us to analyze the long-run dynamics of state development in a non-European context. Elite-state security interactions in imperial China resemble those in other non-European parts of Eurasia such as the Ottoman Empire (Rubin 2017, 184-99). Thus, we will improve our general understanding of the state's ability (or lack thereof) to establish a monopoly over violence within late modernizers.[1]

Drawing on historical narrative evidence, we develop a simple conceptual framework that analyzes the interactions between traditional land-owning elites (i.e., the gentry) and the state (i.e., the emperor) over the provision of internal security in response to mass rebellion. Elites may prefer the public provision of security through the state, due to its relatively low cost. This choice, however, means that they will suffer some loss of political autonomy.

[1] In a related manner, Blaydes and Chaney (2013) document a historical divergence in political stability between Western Europe and the Muslim world.

Meanwhile, the state will improve its monopoly over violence, even if it must undertake costly new public investments in defense. We refer to this outcome as "state development." If the costs of new defense investments are high enough, however, then the state may prefer to delegate back partial responsibility for internal security to elites via a public-private security partnership. In turn, the state will suffer some loss of its monopoly over violence, while elites will regain some political autonomy. We refer to this outcome as "state devolution." Depending on the severity of the state's loss over the monopoly of violence, then state failure may become more likely.

This framework produces several empirical predictions. First, in the "traditional" benchmark context, the public provision of security is cost-effective enough to be attractive to elites. Thus, we expect to observe greater state development in response to mass rebellion, at the expense of the private provision of security. In imperial China, the clan was the main way in which elites organized collective private defense. We should therefore observe a reduction in clan development in the traditional context. Second, if there is a negative critical juncture such as a new external threat that significantly increases the costs of public investments in defense, then the state may prefer to rely more heavily on the public-private security partnership. Thus, in this new context, we expect to observe state devolution (i.e., greater clan development) in response to mass rebellion.

To evaluate these predictions, we construct novel data from a variety of archival and contemporary documents. Our main database exploits original panel data on internal conflict and clan activity (and thus the extent of private security provision) at the local level (i.e., 25x25 km grid cells) in imperial China that span several hundred years, from the (approximate) start of the Ming Dynasty to the downfall of the Qing. To proxy for the local extent of internal conflict, we identify the geographical locations of all major recorded mass rebellion battles over this period. These data include nearly 900 such battles. Similarly, to proxy for the local extent of clan activity, we identify the geographical locations of all recorded genealogy books, of which there were more than 13,000. Given historical data limitations, this approach is both feasible and systematic. We complement this panel database with two cross-sectional databases for which historical data on state development outcomes – always rare – are in fact available. The first of these includes new geocoded data on both military garrisons and courier routes during the Ming Dynasty, while the second includes land tax data during the Qing Dynasty. Finally, to proxy for state failure, we employ data on local

independence declarations from the imperial Qing state.

Our empirical analysis proceeds in several parts. First, we perform a panel regression analysis of mass rebellion and clan activity in the traditional context in imperial China (i.e., pre-1850). To help control for unobservable features that may bias our results, this analysis includes grid cell and period fixed effects and county-specific time trends. We find a negative, highly significant, and robust relationship between mass rebellion and clan activity. This result is consistent with our empirical prediction that, traditionally, elites moved away from the private provision of security in response to internal conflict.

We next provide evidence that mass rebellion traditionally promoted state development. Our cross-sectional regression analysis reveals a positive and highly significant relationship between internal conflict and the Ming-era construction of military garrisons and courier routes, respectively, even after controlling for local fixed effects. Similarly, we find a significant positive correlation between internal conflict and total land taxation during the Qing era. These results are consistent with our empirical prediction that, traditionally, state development took place in response to mass rebellion.

Defeat by Britain in the First Opium War (1839-42) and the resulting Treaty of Nanking (1842) marked a critical juncture in the history of imperial China (Rosenthal and Wong 2011, 221). In the new post-juncture context, the imperial government's costs of providing security rose greatly for both foreign and domestic reasons. Thus, according to our conceptual framework, mass rebellion will no longer induce movement away from the private provision of security and toward the public provision of it, as was traditionally the case. Rather, our framework predicts that we should now observe greater reliance on the public-private security partnership, and thus greater clan development, in response to mass rebellion.

While imperial China's military loss to the West may have been inevitable, the specific timing of this critical juncture was unpredictable and subject to chance. The historical development of superior military technology in Western Europe was an idiosyncratic process in which four factors – frequent warfare, high military spending, heavy use of gunpowder technology, and ease of adoption – co-evolved over hundreds of years (Hoffman 2015*b*, 19-66). A priori, it was not obvious at which specific point in time this indigenous process would bear fruit and enable the West to truly threaten imperial China's sovereignty. We exploit this "plausibly exogenous" timing to study the relationship between internal conflict

and security provision in the new post-juncture context.

We first extend the panel regression analysis described above to include the 1850-1900 period. Now, the relationship between mass rebellion and clan activity turns positive in sign (it remains highly significant). This evidence is consistent with our empirical prediction that, once the state delegated back partial responsibility for internal security to elites, then we should observe greater clan development in response to mass rebellion.

We complement this result with two further types of evidence. The first of these zooms in on the Taiping Rebellion (1850-64), an internal conflict of unprecedented magnitude. We find that locales that were more highly exposed to Taiping-era conflict experienced larger increases in subsequent clan activity. This evidence provides additional support for our empirical prediction that elites will turn back toward the private provision of security via the clan in the face of internal conflict, if the state demonstrates that it can no longer adequately protect them. We next evaluate the extent to which greater clan activity following the Taiping Rebellion influenced subsequent decisions to declare independence from the imperial Qing state. Here we find a positive correlation between increased local clan activity and independence declarations. This evidence is consistent with our empirical prediction that the renewed emphasis on privately-provided security – facilitated by the state's decision to rely more heavily on the public-private security partnership – may eventually promote state failure.

In summary, our study shows how elite-state security interactions in response to internal conflict can promote state development or devolution. As described at the outset, it thereby improves our understanding of the political dynamics of the Great Divergence. Similarly, by analyzing long-run state development within the "Rest" context of imperial China (i.e., versus the "West"), it improves our general knowledge of the state's capacity to secure a monopoly over violence within late modernizers.

In addition, our study offers a new perspective on the different ways in which internal conflict can influence long-run state development outcomes. External warfare is a common explanation for state-making (Tilly 1975; Besley and Persson 2011; Scheve and Stasavage 2016). However, there is relatively less consensus over the role of internal conflict. One strand of the literature argues that internal conflict may promote state development by inducing collective elite action (Weinstein 2005; Slater 2010; Rodríguez-Franco 2016), while

another strand claims that it may promote state failure by encouraging the formation of private militias (Centeno 1997; Bates 2008; Acemoglu, Robinson and Santos 2013; Garfias and Sellars 2018; Ch et al. 2018). We contribute to this debate in both theoretical and empirical terms, by showing how the relationship between internal conflict and state development outcomes depends on the underlying macro-political context.

Finally, our study contributes to the growing literature on historical state development in China (Hui 2005; Sng 2014; Sng and Moriguchi 2014; Ang 2016; Bai and Jia 2016; Ma and Rubin 2017). Much of this literature focuses on a particular dynasty or historical time period. Our study complements this literature by taking a long time span, enabling us to analyze both the rise and fall of the imperial Chinese state in terms of a single conceptual and empirical framework.

We proceed as follows. Section 2 provides the historical background, which Section 3 draws on to develop our conceptual framework. Section 4 describes the data that we will employ in our empirical analysis. Section 5 presents the empirical strategy, main results, and robustness checks for the traditional context (i.e., pre-1850), and Section 6 for the post-critical juncture context (i.e., post-1850). Section 7 provides concluding remarks.

2 Historical Background

We now provide a brief historical overview of violent conflict, elite security actions, and state development outcomes in imperial China.

2.1 Mass Rebellion

Perry (2002, ix) writes: "No country boasts a more enduring or more colorful history of rebellion and revolution than China." While the majority of historical military conflicts fought in medieval and early modern Western Europe were between rival states, more than 65 percent of those fought in China were internal (Dincecco and Wang 2018, 343). Exogenous weather shocks, including droughts and floods, were the main catalysts for peasant rebellions (Perry 1980, 3; Kung and Ma 2014, 136).

Typically, revolts began when peasant groups plundered their affluent neighbors (Perry 1980, 4). If such plundering was significant enough, then the local arm of the imperial government would likely intervene. Most local revolts were put down in this manner. However, they sometimes erupted into major internal conflicts, compelling the central government to

take action. What had begun as local revolt, therefore, could eventually turn into mass rebellion, with the peasantry now battling against the imperial state itself (Kuhn 1970, 52).[2]

According to Moore (1966, 201-27), China was traditionally prone to mass rebellion, because the peasantry did not fully trust the imperial government to resolve their basic concerns vis-à-vis land-owning elites. As we will describe ahead, major mass rebellion battles between imperial forces and mass rebel groups (and not local revolts, which generally went unrecorded at the national level) form the basis of our empirical measure of internal conflict.

2.2 Elite Action

Even if mass rebellions ultimately pitted the peasantry against the imperial state, they nonetheless posed serious threats to the property and lives of traditional land-owning elites, known collectively as the gentry.[3] Radical redistributive demands were a prominent theme of peasant uprisings, as a song popular among the Taiping rebels attests (Spence 1996, 160):

> Those with millions owe us their money,
> Those who are half poor-half rich can till their fields.
> Those with ambitions but no cash should go with us:
> Broke or hungry, Heaven will keep you well.

When nearby peasants took up arms, the gentry had two basic options. The first was to seek state protection. Skocpol (1979, 49) writes that, traditionally, the gentry "could not defend against peasant rebellions entirely on a local basis; they had all come to depend, albeit in varying degrees, upon the centralized monarchical states to back up their class positions and prerogatives." The imperial government had an "urban bias" when it came to military defense, whereby the "governing regime defended its walled cities and ceded the countryside to its foes…" (Rowe 2007, 28-9).[4] From the Song Dynasty (960-1279) onward,

[2]Battlefield success by the peasantry, however, was very unlikely. Between 1350 and 1900, only one mass rebellion ultimately succeeded: the Zhu Yuanzhang Rebellion of the mid-1300s, which led to the overthrew of the Yuan Dynasty.

[3]The gentry were an educated status group comprising the majority of elites in imperial China. Chang (1955, 3) defines the gentry as all holders of academic degrees under the imperial civil service exam system. Although such a degree made an individual qualified for office, most degree holders were not office-holders, and dwelled in their home districts. There were more than a million members of the gentry during the first half of the 1800s (Chang 1955, 139). Including all kin members, this total amounted to approximately 5.5 million, or just more than 1 percent of China's entire population at the time.

[4]This urban bias was due in part to high military transportation costs. For example, the Mongolian horse – the fastest of all – could only cover 90 km per day (Zhabu 1992, 240).

most imperial governments placed their military garrisons at or near major urban centers. Originally, such garrisons were intended to defend border regions, but eventually were established "throughout the heartland of the empire and served less for external defense than for internal repression" (Kuhn 1970, 21). The imperial Ming state (1368-1644) constructed hundreds of military garrisons across their territory. In times of peasant revolt, the gentry could flock to these "walled safe havens" for temporary refuge. Fleeing to an imperial walled city during the revolt itself, and then returning to the countryside once the imperial state had eventually put it down, was a common traditional response by the gentry to mass rebellion (Rowe 2007, 29).

The gentry's traditional reliance on the state for protection, however, reduced their political autonomy. During mass rebellion, the gentry often gave greater "tribute" (e.g., donations, taxes) to the state in order to help it build up the military (Chang 1955, 83). In this manner, internal conflict (and threats thereof) transferred valuable resources from local land-owning elites to the imperial government, strengthening the state's monopoly over violence.

The second option in the face of mass rebellion was to organize self-defense among kin members, either by constructing fortress protections in the mountains or directly taking on the rebels with private militias. If the imperial government found it too costly to provide security on its own, then the emperor might partially delegate security provision to local elites. A public-private security partnership was generally quite effective in putting down mass rebellions, such as during the Taiping Rebellion (1850-64) (Kuhn 1970, 135-51). Delegating the legitimate use of physical force to local land-owning elites, however, threatened the state's monopoly over violence. Thus, the imperial government was very reluctant to do so, only allowing elites to form private militias when it could no longer afford the costs of heightened security (Kuhn 1970, 145). If the emperor agreed to partially delegate security provision, then the gentry could keep more of its resources for themselves, rather than transfer them to the imperial government, thereby undermining the state's power. This public-private security partnership became a more common response by local land-owning elites and the state to mass rebellion from the mid-nineteenth century onward (Rowe 2007, 199-203).

The clan was the primary means through which the gentry organized private collective

defense (Rowe 2007, 65-6). Freedman (1958, 3-4) defines a clan as a lineage organization that includes all male descendants within five generations of a common male ancestor, along with any unmarried female agnates and wives of the aforementioned males. During mass rebellion, the gentry could "conscript" their clan and establish a private militia, if the central government was unable to provide sufficient protection. Indeed, many fortresses were lineage-specific, such as the Yu clan's Cloud Dragon Fortress and the Xia clan's Stonewall Fortress (Rowe 2007, 205).

Given the social importance of kin groups in imperial China, the clan was a common way to enforce cooperation (Greif and Tabellini 2017). Here, the compilation of genealogy records was a key method to delineate clan membership. Since the maintenance of such books called for both "the scholar's pen and landowner's purse," they were most commonly kept by powerful clans (Hsiao 1960, 333-4). These books followed a standard template, starting with an account of the clan's origin and history, the growth of its membership over time, and clan settlement and migration patterns (Hsiao 1960, 334). By documenting the achievements and contributions of individual clan members, these books provided "selective incentives" (Olson 1965, 51) for members to contribute to the clan's collective goods (Hsiao 1960, 334).

By helping the clan to overcome collective action problems, the formalization of lineage organizations was an important action that the gentry could take to reduce material risks and secure personal safety. Rowe's study of four lineage groups in central China finds that lineage formalization – in terms of the compilation of genealogy records – served two main goals: internal discipline and kin solidarity in non-member interactions. Furthermore, he argues that the construction and maintenance of genealogy records by the gentry was often a response to "the plebeian mass around them" and typically occurred "in the wake of social crisis" (Rowe 2007, 71-2).

2.3 Western Influence

Prior to the mid-nineteenth century, a traditional equilibrium in which the imperial government and the gentry partnered toward the exploitation of the peasantry characterized state-society relations in China (Skocpol 1979, 48-9). Even during dynastic transitions, when the imperial government's administrative structures became weak, "the gentry grew all the more aware of its dependence on central authority and military protection" (Wakeman 1975, 64).

Furthermore, the imperial government was generally able to maintain its viability in the face of external threats, which primarily came from the nomads of the Asian land frontiers (Bai and Kung 2011, 975; Hoffman 2015*b*, 70-2). Skocpol (1979, 67) writes: "Alien groups might seize the command posts of dynastic rule, but the Chinese imperial system continued to operate." In the two cases where the Mongols or Manchus actually conquered imperial China, both groups were eventually "Sinicized" and kept the imperial system intact (Wakeman 1975, 85; Skocpol 1979, 67). In 1651, just seven years after the Manchu conquest, for example, the Qing government successfully repressed a peasant rebellion, and land-owning elites were "decisively convinced" that "they could and should work as partners with the alien dynasty" (Rowe 2007, 157).

Britain's victory over China in the First Opium War (1839-42), along with the resulting Treaty of Nanking (1842), served as a negative critical juncture that fundamentally changed traditional Chinese state-society relations (Rosenthal and Wong 2011, 221). As part of this treaty, the Qing government was forced to pay 21 million silver dollars to Britain and concede control of five ports (Wakeman 1975, 137). This large reparation payment put great strain on Qing public finances, prompting an "unprecedented financial crisis" (Shi and Xu 2008, 55).

2.4 Taiping Rebellion

The new globalizing Western influence also sparked a fresh wave of mass disturbance, the biggest of which was the Taiping Rebellion. Historians have called the Taiping Rebellion "the largest popular revolt anywhere in the world throughout the nineteenth century" (Anderson 1974, 537), "the bloodiest civil war of all time" (Platt 2012, xxiii), and even the "greatest civil war in world history" (Ho 1959, 238). Led by Hong Xiuquan, a schoolteacher who had failed the imperial civil service exam, the Taiping rebels banded together in 1850. In 1853, they captured the city of Nanjing in Jiangsu Province, declaring it the capital of the Taiping Heavenly Kingdom. At the height of its power, the Taiping controlled nearly 200 counties across five provinces along the lower Yangtze River. With help from the gentry leader Zeng Guofan and his private militia (i.e., the Hunan Army), the imperial Qing state finally put down the Taiping Rebellion in 1864.[5] The combined Qing-Zeng military force

[5]Meanwhile, several other mass rebellions broke out across Qing territory, including the Nian and Small Swords Society Rebellions. Most such rebellions were put down in 1869. For this reason, we code the Taiping Rebellion period for our empirical analysis ahead as 1850-69.

henceforth became a model for public-private security partnerships in the post-Taiping era (Kuhn 1970, 135-52).

The property and lives of the gentry were severely threatened by the Taiping rebels, many of whom were peasants that had lost their land due to subsistence risks (Platt 2012, 18). When the Taiping captured the city of Yongan in Guangxi Province in 1851, for example, they "sent out sizable groups of troops to raid the fugitives' homes and seize their grain stores, livestock, salt and cooking oil, and even their clothing" (Spence 1996, 141). During one raid, approximately 2,000 rebels expropriated two wealthy families, taking "five days and nights to list and carry away the families' accumulated stores" (Spence 1996, 141). Upon the establishment of the Taiping Heavenly Kingdom in 1853, its leadership attempted to implement radical land redistribution (Luo 2009, 753-4). Although this land reform ultimately failed, peasants within Taiping-controlled zones refused to pay rents to their landlords, burned their tenancy contracts, and sometimes beat their landlords to death (Luo 2009, 787-810). Outside of Taiping-controlled territory, there was widespread fear of rebel attack (Spence 1996, 193).

2.5 State Failure

The imperial Qing state was "fiscally broken" by the mid-nineteenth century due to a combination of external and internal turmoil (Platt 2012, 150). Qing military forces were not typically paid on time and were in poor fighting shape (Kuhn 1970, 10; Shi and Xu 2008, 58-60; Platt 2012, 118). Furthermore, corruption was rampant (Platt 2012, 119).

In despair, the Xianfeng Emperor (1850-61) reluctantly agreed to allow the gentry to raise private local militias for protection. Traditional clans played a key role in overcoming collective action problems and organizing such militias, both in terms of finance and leadership. In a Hunan county, for example, gentry contributions made up nearly 90 percent of militia expenditures (Kuhn 1970, 89-92). The gentry also managed the militia's finances without imperial government oversight. Militia leaders were, moreover, almost always clan leaders (Yang 2012, 335). To mobilize clan members to join a militia, the clan leader would rely on his lineage ties, and militias were often named after the leading clan (Yang 2012, 335).

The combined military forces of the Qing state and local militias retook the city of Nanjing from the Taiping rebels in 1864, and were able to put down other mass rebellions by 1869. This victory brought a period of stability and reform to the Qing government, enabling

it to survive another four decades (Wright 1962). Indeed, state revenue grew dramatically after 1850, both to put down mass rebellion and to improve military defenses against new external threats. While greater revenue enabled the imperial Qing state to begin to respond to new foreign and domestic challenges, it was still not enough (Rosenthal and Wong 2011, 200-2). Furthermore, the state was forced to reduce its traditional provision of non-military public goods (e.g., irrigation, grain reserves).

By granting the gentry an official governmental role, moreover, the Qing's endorsement of private militias during the Taiping Rebellion may have eventually tipped the balance of power (Kuhn 1970, 211-25). The gentry were now formally involved in both military defense and public administration. Thus, local political power moved from the hands of state officials into those of local elites, which according to Kuhn (1970, 211) led to the "breakdown of the traditional state."

After defeat in the First Sino-Japanese War (1894-5), the imperial Qing state established the New Army in the hope of producing a modern Westernized military force. Gradually, however, "New Army officers and weaponry were absorbed into the framework of the regionally based armies surviving from the time of the rebellions" (Skocpol 1979, 78), and the gentry leaders, many of whom had been elected to the new provincial legislatures, became local strongmen with control over both taxation and military matters (Wakeman 1975, 228-32, 235-7).

The Wuchang Uprising, followed by declarations of independence by local military forces throughout China, prompted the downfall of the imperial Qing state in 1911. According to Wakeman (1975, 225), the "Revolution of 1911 can be seen as a series of provincial secessions from the empire, led in every major province but one by officers of the New Army units or by gentry leaders of the new provincial assemblies." With respect to the deeper roots of Qing state failure, Wakeman (1975, 228) highlights the longer-term shift in the power balance toward the local gentry and away from the central government that had began more than a half-century before.

3 Conceptual Framework

Drawing on the historical background described in the previous section, we now develop a simple conceptual framework about elite-state security interactions in response to mass rebellion. We leave the technical details to Appendix A.

Say that the gentry elite must decide how to best provide security against mass rebellion, the provision of which delivers a positive benefit. There are two ways to ensure such security: privately through the clan, or publicly through the state (i.e., the central government under the emperor's rule).[6] We assume that the gentry's security cost is lower under public provision, since the bulk of such costs can be jointly shared across clans, rather than be paid separately – and thus redundantly – by each.[7] The public provision of security, however, entails an additional cost to the gentry. Namely, by handing over security provision to the emperor, the gentry suffer some loss of political autonomy. Finally, we assume that, since security provision enables the gentry to maintain their elite status in society, the benefit of security provision to the gentry always outweighs its cost, regardless of whether it is privately or publicly provided.

The emperor may respond to the gentry's security choice in two ways. He may decide to strengthen the state's ability to provide internal security through new public investments in defense. Alternatively, he may decide to delegate back some responsibility for internal security to the gentry in the form of a public-private security partnership. We assume that the emperor's material cost of new public investments in defense are lower under the public-private option, since the emperor is only partially responsible for internal security provision. The public-private option, however, entails an additional cost for the emperor. Namely, by delegating back some political autonomy to the gentry via the public-private security partnership, the emperor suffers some loss of the state's monopoly over violence. From the point of view of the gentry, however, the public-private security partnership enables them to somewhat reduce their loss of political autonomy to the emperor. We assume that the benefit of security provision to the emperor, whether via new public investments in defense or the public-private security partnership, always outweighs its cost, as both options enable the emperor to maintain his social status as ruler. Finally, if the gentry initially opt for the private provision of security, then the emperor will lose his incumbent status, resulting in a loss.

[6] Here we abstract away from intra-clan conflict, in part because there is no obvious reason why such conflict should systematically bias the gentry's security choice in one direction or another.

[7] For simplicity, we assume that both the private and public options are equally effective at putting down mass rebellion. However, the state may have a comparative advantage in putting down large-scale rebellions. We may characterize this advantage in terms of a further reduction in the gentry's cost of public security provision relative to the private option. Thus, this advantage should only reinforce any preference by the gentry for public security.

Our simple framework suggests that mass rebellion may have different implications depending on the specific context. Say first that the gentry prefer the public provision of security due to the lower cost, even in the face of some loss of political autonomy. Similarly, say that the emperor prefers to pay the cost of new public investments in defense rather than face some loss of the state's monopoly over violence. In this context, the gentry will opt for public security provision and the emperor will opt for state-strengthening. We think of this outcome as "state development."

Now say that the cost of new public investments in defense is high enough that the emperor prefers to delegate back partial responsibility for internal security to the gentry even in the face of some loss of the state's monopoly over violence. Here the emperor will opt for the public-private security partnership, and the gentry will agree to this choice, as the public-private partnership enables them to reduce their loss of political autonomy. We think of this outcome as "state devolution." From the point of view of the emperor, the danger is that, if the emperor delegates back too much security provision to the gentry, then the state's loss of the monopoly over violence may become severe. If in this manner the gentry gain the upper hand politically, then state failure may follow.

We now interpret this simple framework in imperial China, taking the first context above as the "traditional" benchmark case. Here the cost of new public investments in defense was low enough for the emperor to undertake them, and the public provision of security was cost-effective enough to be attractive to the gentry. Thus, we may expect to observe greater state development over time in response to mass rebellion as the "standard" historical outcome in imperial China.

Say, however, that there was a negative critical juncture such as the nineteenth-century defeat by Britain in the First Opium War and the resulting Treaty of Nanking. In this new macro-political context, the cost of public investments in defense may greatly increase for two reasons. First, it may be expensive to compete with the West's superior military power. Second, even greater public investments in defense may be required to counter new threats of mass rebellion sparked in part by the new external environment.[8] In terms of our framework, we may think of such a juncture as a change from the former traditional context above

[8] As Skocpol (1979, 23) writes: "Developments within the international states system as such – especially defeats in wars or threats of invasion... have helped to undermine existing political authorities and state controls, thus opening the way for basic conflicts and structural transformations."

to the latter one. Given high enough investment costs in defense, the emperor may now prefer to delegate back partial responsibility for internal security to the gentry. This choice, however, will entail some loss of the state's monopoly over violence. If this loss is severe enough, then state failure may eventually occur.

Summarizing, our simple framework produces two main predictions and one ancillary prediction, which we will use to help guide our empirical analysis.

1. As the traditional benchmark case, we may expect to observe greater state development over time in response to mass rebellion, at the expense of greater clan development.

2. If there is a negative critical juncture, then we may expect to observe greater reliance on a public-private security partnership, and thus greater clan development, at the expense of further state development.

A. If the state's loss of the monopoly over violence is severe enough due to greater clan development, then state failure may occur.

4 Data

4.1 Internal Conflict

To construct the historical conflict data, we rely on the *Catalog of Historical Wars* produced by the Nanjing Military Academy (2003). This catalog contains detailed information including dates, locations of individual battles, and leaders for each major internal and external conflict that took place in China from approximately 1000 BCE to the downfall of the Qing Dynasty in 1911. The *Catalog* derives this information from China's official historical books, known as the "twenty-four histories." Traditionally, each dynasty in China compiled a standardized history of its predecessor, typically based on official court records. The official historical books produced as a result of this process are among the most important sources of systematic data on Chinese history (Wilkinson 2000, 501).

Given the historical nature of these data, there may be measurement error. In our view, selection bias is unlikely to be severe, since each official book was written by (relatively) contemporaneous historians whose main task was to provide the available facts and draw

lessons for the incoming dynasty. For this reason, we are confident that the main historical conflicts in imperial China are well-represented in the *Catalog*. The official history books did not record casualty totals, limiting our ability to distinguish between the magnitudes of different conflicts. Presumably, however, all recorded conflicts were judged by historians to be above a certain threshold of significance, thereby justifying their inclusion in the official history books. Thus, we are confident that recorded data enable us to make "apples-to-apples" comparisons between conflicts. Nevertheless, the quality of the conflict data coverage may differ by place and time. To account for this possibility, our regression analysis ahead will employ grid cell and period fixed effects and county-specific time trends, along with a variety of robustness checks.

For the purposes of this study, we focus on mass rebellion, defined as a violent conflict between an imperial government force and a mass rebel group (e.g., peasants, artisans). Here we identify a rebel group as a mass organization so long as its leadership did not hold any official government positions according to the *Catalog*. The Li Zicheng Rebellion in the late Ming era and the Taiping Rebellion in the late Qing era (which we will analyze in Section 6) are two examples of mass rebellion included in the *Catalog*.

Our sample data consist of 887 individual battles linked to 453 recorded mass rebellions between 1350 and 1900. This period approximately spans the start of the Ming Dynasty to the downfall of the Qing. We focus on this period for several reasons. First, the imperial state did not establish a political equilibrium of internal spatial integration until the late thirteenth century (Rosenthal and Wong 2011, 12-13, 23-4). Second, as we will describe ahead, historical data for local state development outcomes that we can partner with the clan activity data are not widely available prior to the Ming era. Third, we have an accurate shapefile of the external borders in place during the Ming Dynasty, but not for its predecessor (i.e., the short-lived Yuan Dynasty). Figure 1 maps the mass rebellion battle locations, which took place all throughout China.

The above definition excludes rebellions led by local governing elites (e.g., the Revolt of the Three Feudatories led by Wu Sangui in the early Qing era), since such rebellions did not typically pose significant redistributive threats. Rather, the goal of such elite rebels was generally to gain regional independence. Nonetheless, we control for elite rebellions as a robustness check in our regression analysis ahead (Appendix Table D-3). Our main results

remain unchanged, and there is a significantly positive relationship between elite rebellion and clan activity. Appendix Figure B-1 maps the elite rebellion locations, which were far less common than mass rebellions.

Following the seminal work by Chen (2007 [1940], 3), we define external warfare as a violent conflict between a China-based dynasty and a non-Han state or state-like power.[9] There were 541 individual battles linked to 334 recorded external wars during our sample period. Appendix Figure B-2 provides a map of these external battles. Consistent with the evidence cited in Section 2, the geographical pattern suggests that many external conflicts were fought against nomads from the Eurasian Steppe.

Appendix Table C-1 breaks down the distribution of conflict types in our sample.

4.2 Clan Activity

Genealogy records are a rich, yet under-analyzed, source of demographic information in Ming-Qing China, a historical period for which alternative data sources are not widely available (Shiue 2016, 459). Our genealogy data draw on Wang (2008), who has cataloged roughly 51,200 genealogy books from the end of the first millennium to the present day in a print registry. This effort represents the most comprehensive registry of known Chinese clan genealogies to date (Greif and Tabellini 2017, 2). Wang's team spent eight years gathering genealogy records from all known sources, including local and national archives and libraries, private holdings, and overseas collections (Wang 2008, 8-9).[10]

Each entry in Wang's registry reports a record of a clan's genealogy book, including the year in which it was compiled. A clan may have had multiple registry entries. For example, the Li clan based in the city of Taiyuan compiled its first genealogy book in 1701 (entry 1), which it then updated in 1754 (entry 2) and 1802 (entry 3), for a total of three genealogy books. Each entry also includes information on the clan's surname and current (at the time) location.

We digitized this entire print registry, and geocoded each genealogy book based on its reported location. To the best of our knowledge, this geocoding is the first such effort of its

[9]Thus, for example, battles between the Manchu invaders and the imperial Ming state were categorized as "external," while those between the subsequent imperial Qing (i.e., Manchu) state and mass rebel groups were categorized as "internal."

[10]Indeed, Wang's registry includes all 10,000 microfilmed genealogy records archived by the Genealogical Society of Utah – the largest overseas collection of Chinese genealogy.

kind. We first used optical character recognition software to read the entire registry into a Microsoft Excel file. Next, with the help of research assistants, we manually checked each entry in order to ensure accuracy. Finally, we relied on the *China Historical Geographic Information System* (2018) for latitudes and longitudes for the purposes of geocoding. Figure 2 maps the locations of recorded genealogy books written down for our sample period. Consistent with previous qualitative evidence (e.g., Freedman 1958, 129), the geographical pattern suggests that historical clan activity was more prevalent in the South than in other parts of China.

In our view, the genealogy book data provide the most systematic and best available proxy – even if imperfect – for documenting long-run trends in clan activity in imperial China. By delineating clan membership and documenting the achievements of clan members, these books helped clans overcome the collection action problem of organizing themselves. As described in Section 2, the process of compiling the genealogy books reflected the capacity of the clan to act together. Thus, we are confident that locales that produced more genealogy books did in fact experience greater clan activity.

Still, data concerns including measurement error remain. The compilation of genealogy books may have been sensitive to the availability of printing materials, changing economic conditions, and migration patterns. Our regression analysis ahead will account for such potential confounders through grid cell and period fixed effects and county-specific time trends. Furthermore, elites may have found it difficult to compile genealogy books during internal conflicts, and these books may have been less likely to survive and be cataloged. If true, then we should observe fewer genealogy books in locales that experienced "too many" rebellions. To address this concern, we include a quadratic term for mass rebellion as a robustness check in our analysis ahead (Appendix Table D-4). This check reveals that the quadratic term is positive and highly significant, which suggests that locales that experienced greater rebellions did not in fact witness a major decline in the compilation of genealogy books.[11]

[11]Similarly, to account for the fact that the influence of mass rebellion on clan activity may not be contemporaneous, we repeat the main analysis ahead for the lagged variable of interest $Rebellion_{i,t-1}$. The results remain similar to the main ones (Appendix Table D-5).

4.3 State Development

There is a lack of systematic historical data available on the imperial government's local strength. Given this limitation, we are still able to unearth several measures of imperial state power.

We assess the imperial state's infrastructural reach (Mann 1984) in two ways. Upon taking power, the imperial Ming state embarked on an ambitious garrison construction plan, in great part to help suppress mass revolt (Downing 1992, 50). To connect the capital of Beijing with the military garrisons, as well as to link the garrisons themselves, the Ming constructed a network of courier routes. Both the military garrisons and the courier routes were built primarily during the Ming's first century of rule (1368-1467). We thus geocode data on the location of each new military garrison and courier route over the 1368-1467 period according to Yang (2006) and the *China Historical Geographic Information System* (2018). Appendix Figures B-4 and B-5 map the garrison and courier route locations, respectively.

Second, to assess the imperial state's fiscal reach (Besley and Persson 2011), we employ data on the extent of local land taxation in 1820 under the imperial Qing state from Sng (2014). The land tax, collected by local bureaucrats and remitted to the central government, was the most important source of tax revenue in imperial China. The year 1820, moreover, is the cross-section of these data that historians regard to be the most systematic and accurate (Liang 2008, 555-71). Appendix Figure B-6 displays total land taxation across Qing prefectures in this year.

Due to the dearth of historical data, the state development outcomes above are all cross-sectional in nature. Nevertheless, since the infrastructural power data are from the Ming era, while the fiscal capacity data are from the Qing era, our empirical analysis ahead can still provide insights into whether the relationship between internal conflict and state development held across different time periods of traditional imperial rule.

Finally, to proxy for state failure at the start of the twentieth century, we geocode the location of each local military group that declared independence from the imperial Qing state in 1911 according to Guo (2015). Appendix Figure B-7 shows the locations of these military groups.

4.4 Database Construction

4.4.1 Main Database

We use the data gathered above to construct several novel databases. Our main database is a panel database that conjoins the geocoded data on mass rebellions and genealogy books at the grid cell level between 1350 and 1900. We first divide mainland China's territory into several thousand grid cells. The virtue of this approach is that we can "exogenously" impose grid cells on imperial China's territory, unlike internal political borders (e.g., 1990 county borders), which may have been endogenously determined. We choose 25 km x 25 km grid cells as the benchmark because this size is relatively close to the average size of the township, the smallest administrative unit in China. Appendix Figure B-3 maps these grid cells. For robustness, we employ an alternative grid size of 50 km x 50 km. As a further alternative, we employ 1990 county borders. The main results remain similar across both alternative demarcations (Appendix Tables D-6 and D-7).

For the panel analysis, we restrict the grid cells to those which fall within Ming-era external borders for three reasons. First, given that the start year of this analysis (i.e., 1350) corresponds with the approximate establishment of the Ming Dynasty, these are the "initial" borders. Furthermore, an accurate shapefile of the Ming-era external borders is in fact available (*China Historical Geographic Information System* 2018). Finally, the imperial Ming state was small relative to its successor (i.e., the Qing Dynasty), and thus serves as an "Inner China" that forms a continuous spatial core across the Ming and Qing eras. Still, we show that our main results are robust to other border configurations, including the use of all grid cells within the Qing-era external borders (Appendix Table D-8).

We then divide the 1350-1900 period into 50-year periods. This interval length makes sense since genealogy books were typically revised roughly every half-century, all else constant. Traditionally, there was the expectation that a clan should update its genealogy book every three generations (Feng 2006, 67). Given that males typically married and had their first child in their late teens (Chaffee 1989, 345), three generations translates into $3 \times 18 = 54$ years, or roughly one half-century. Furthermore, this interval length provides a good deal of variation in both the number of mass rebellion battles and genealogy books written down.

Overall, the unit of analysis in our main database is grid cell-period, with $N = 5,803$ (25 km x 25 km grid cells) and $T = 11$ (50-year periods).

4.4.2 Other Databases

As described above, the next two databases are cross-sectional in nature. The second database conjoins the geocoded data on mass rebellions with the infrastructural power data (i.e., military garrisons and courier routes) at the grid cell level during the first century of Ming rule. Once more, $N = 5,803$ (25 km x 25 km grid cells). The third database conjoins the geocoded conflict data with the fiscal capacity data (i.e., land taxation) in 1820 at the prefectural level under Qing rule. Here we take Qing-era prefectures as the unit of analysis rather than grid cells, since the land tax data are available at this level ($N = 318$).

Finally, we conjoin the geocoded data on clan activity in the two decades prior to the fall of the imperial Qing state with the data on independence declarations from the Qing in 1911 at the grid cell level. For this part of the analysis, it makes sense to use the Qing-era external borders (which were significantly larger than during the Ming era), increasing the sample size to $N = 15,103$ (25 km x 25 km grid cells). However, we show that these results remain robust if we restrict the sample to the Ming-era borders (Appendix Table G-2).

5 Mass Rebellion and State Development Before 1850

To systematically analyze the relationship between mass rebellion and state development in imperial China, we now undertake a regression analysis. In this section, we focus on the traditional context prior to the nineteenth-century critical juncture. Here our conceptual framework predicts that we should observe greater state development in response to mass rebellion, at the expense of greater clan development. We now provide two main types of evidence in support of this empirical prediction. First, we show evidence for a negative relationship between mass rebellion and clan activity over time. Second, we show evidence for a positive relationship between mass rebellion and state development outcomes. Taken together, we view this evidence as consistent with the argument that, traditionally, internal conflict in China was associated with movement away from the private provision of security and toward the public provision of it.

5.1 Clan Activity

5.1.1 Methodology

We estimate the following benchmark OLS specification:

$$ClanActivity_{i,t} = \alpha + \beta Rebellion_{i,t} + \mu_i + \lambda_t + \epsilon_{i,t}. \quad (1)$$

The dependent variable $ClanActivity_{i,t}$ reflects clan activity in each 25 km x 25 km grid cell i over 50-year period t as proxied by the number of genealogy books written down there. The variable of interest $Rebellion_{i,t}$ measures the number of mass rebellions in each grid cell per 50-year period. μ_i and λ_t are grid cell and period fixed effects, respectively. $\epsilon_{i,t}$ is a random error term. All standard errors are robust, clustered at the cell level to account for any within-cell serial correlation in the error term. Appendix Table C-2 displays the summary statistics for all of the regression variables used in our analysis.

The genealogy data increase in mean and variance across time, particularly before and after 1850. We thus take the inverse hyperbolic sine (IHS) of the number of genealogy books as the dependent variable.[12] This transformation reduces the range of the mean and variance of $ClanActivity_{i,t}$, and allows us to make use of all observations, since it is defined at zero (Burbidge, Magee and Robb 1988). However, the main results remain robust if we take $\ln(1 + GenealogyBooks_{i,t})$ rather than the IHS, or keep the dependent variable in its original linear form (Appendix Table D-1). Beyond this transformation, we exclude the post-1850 period from our current analysis (we will include it in Section 6). Finally, given that the mean and variance of $Rebellion_{i,t}$ does not display any obvious increase over time, we keep this variable in its original linear form.

Unobserved local and/or temporal features may have affected both mass rebellions and clan activity alike. For example, rough terrain may have promoted internal conflict by enabling peasant rebels to hide from state forces, and by allowing the gentry to evade the rebels themselves (Fearon and Laitin 2003, 84). To help account for such features, our analysis always include grid cell and period fixed effects. Grid cell fixed effects help control for local initial conditions (e.g., demographic, economic) and local features that are time-invariant including local geography (e.g., soil quality, terrain ruggedness, natural resources), while

[12] Namely, $ClanActivity_{i,t} \equiv \ln(GenealogyBooks_{i,t} + (GenealogyBooks_{i,t}^2 + 1)^{1/2})$.

period fixed effects help control for widespread shocks (e.g., cultural, economic) specific to each 50-year interval.

Nonetheless, unobserved time-varying features may still affect the results. To address this possibility, we add county-specific linear time trends, which help account for unobservable features (e.g., cultural, demographic, economic, urbanization) specific to each county that may have changed over time. The counties are larger than the 25 km x 25 km grid cells. On average, there are roughly 3 grid cells per county, and thus 1,547 counties overall (i.e., 1,547 county-specific trends).[13] We further test the robustness of the results in a variety of ways, which we will describe below.

5.1.2 Main Results

Table 1 shows the main estimation results for the relationship between mass rebellion and clan activity in China from 1350 to 1850. The benchmark specification in column 1 controls for time-invariant local features and widespread time-specific shocks through fixed effects. The coefficient estimate for $Rebellion_{i,t}$ is negative in sign and highly significant, with value -0.068. To help account for unobserved changes over time in local features (e.g., demographic patterns), column 2 adds county-specific trends to the benchmark specification. The coefficient estimate for $Rebellion_{i,t}$ remains highly significant, with value -0.046.

Overall, the Table 1 results indicate that, traditionally, there was a negative and significant relationship between mass rebellion and clan activity. According to the coefficient estimate in column 2, each additional mass rebellion battle was associated with a 5 percent average *decrease* in clan activity (as proxied by the number of genealogy books written down) per 50-year period between 1350 and 1850.

5.1.3 Robustness Checks

The main analysis controls for unobserved regional patterns over time by including county-specific trends. Nonetheless, clan activity in period t may still influence the chance of mass rebellion in period $t+1$. To explicitly account for the role of previous clan activity, Appendix Table D-2 includes the lagged dependent variable $ClanActivity_{i,t-1}$ as an independent regressor.[14] The coefficient estimates for $ClanActivity_{i,t-1}$ are positive and highly significant,

[13] Given data limitations, we rely on the Qing-era county shapefile from *China Historical Geographic Information System* (2018) to identify historical county borders.

[14] Including the lagged dependent variable induces asymptotic bias of order $1/T$ (Nickell 1981). Given that $T = 10$ in our pre-1850 panel, however, Nickell bias should be relatively small.

indicating that clan strength in period t was partly a function of previous clan activity. While the coefficient estimates for $Rebellion_{i,t}$ fall slightly in magnitude relative to the main results, they remain negative in sign and highly significant across both specifications.

To further account for unobserved heterogeneity across place and time, we exclude provinces and periods one by one (Appendix Figures D-1 and D-2). No single province or period drives our results. Similarly, to control for other time-varying observable features, we include elite rebellion and external warfare battles in a given grid cell (Appendix Table D-3, columns 1-2, 4). To account for potential spillovers, we control for mass rebellions in neighboring grid cells (Appendix Table D-3, columns 3-4). The main results remain robust.

The main analysis accounts for widespread shocks by including period fixed effects. Still, the dynastic change from the Ming to the Qing during the mid-1600s may have been a critical shock to the viability of the imperial system. Appendix Figure B-8 depicts the relationship between mass rebellion and the Ming-Qing dynastic change. It indicates that mass rebellions were highest in the late Ming era between 1620 and 1649 (top panel). Most of these battles pitted the imperial Ming state against the Li Zicheng rebels. However, there was no enduring increase in clan activity either during or after the 1620-49 period of rebellions. As we will describe in Section 6, this result stands in contrast to the consequences of the mid-nineteenth century Taiping Rebellion, in which there was large and persistent increase in clan activity (Figure 3). Thus, this evidence further suggests that, in line with the historical account in Section 2, the Ming-Qing dynastic change did not fundamentally alter the viability of the imperial system.[15]

Finally, as described previously, we also test: two alternative specifications of the dependent variable (Appendix Table D-1); the inclusion of a quadratic term for mass rebellion (Appendix Table D-4); the use of the lagged variable of interest (Appendix Table D-5); the alternative grid cell size of 50 km x 50 km (Appendix Table D-6), as well as 1990 county borders (Appendix Table D-7); and the inclusion of all 25 km x 25 km grid cells within Qing-era external borders (Appendix Table D-8).[16] The results are robust across all of the above

[15]To systematically analyze clan activity before and after the Ming-Qing dynastic change, we perform a difference-in-difference-style regression analysis. This analysis shows that grid cells that experienced more mass rebellion battles during 1620-49 (i.e., during this dynastic change) saw a small, but insignificant, decline in clan activity during 1650-79 (i.e., early Qing rule) relative to 1590-1619 (i.e., late Ming rule). Results not shown to save space; they are available upon request.

[16]For the tests for the 50 km x 50 km grid cells and 1990 county borders, we replace the county-specific trends with province-specific trends (i.e., a higher-level administrative unit), given the larger sizes of these zones

checks.

5.2 State Development

The results above support the empirical prediction that, traditionally, elites moved away from the private provision of security via the clan in response to mass rebellion. To complement this evidence, we now analyze the relationship between mass rebellion and state development in the traditional (i.e., pre-1850) context.

5.2.1 Military Garrisons and Courier Routes

We first evaluate the relationship between mass rebellion and the imperial state's infrastructural power, as proxied by the construction of military garrisons and courier routes during the first century of Ming rule. We use OLS to estimate:

$$Infrastructure_i = \alpha + \beta Rebellion_{i,1368-1467} + \gamma_j + \epsilon_j. \quad (2)$$

The dependent variable $Infrastructure_i$ measures one of two outcomes. For reasons similar to those described above, the first takes the inverse hyperbolic sine of the number of garrisons built in each 25 km x 25 km grid cell i between 1368-1467.[17] The second is a binary indicator that equals 1 for the presence of a courier route in a grid cell over the same time period. Our variable of interest $Rebellion_{i,1368-1467}$ is the number of mass rebellions in grid cell i over the 1368-1467 period.

Given that Equation 2 uses cross-sectional data, we address the possibility of omitted variable bias by including county fixed effects γ_j. This helps control for institutional features common to each administrative unit in which sub-groups of grid cells fall into. To address the potential interdependence of grid cells within the same county, we cluster standard errors at the county level.

Columns 1 and 2 of Table 2 display the results of this analysis when the infrastructural power outcome is military garrisons. Column 1 shows the bivariate correlation between mass rebellion and the establishment of Ming-era garrisons, while column 2 adds county fixed effects. The coefficient estimate for $Rebellion_{i,1368-1467}$ is positive in sign and highly

relative to the benchmark 25 km x 25 km grid cells.

[17] The results remain robust, however, if we take $\ln(1 + Garrisons_{i,1368-1467})$, or keep this dependent variable in its original linear form (Appendix Table E-1).

significant across both specifications, with values between 0.161 and 0.152. These magnitudes suggest that each additional mass rebellion battle during the first century of Ming rule was associated with an increase in the likelihood of having a military garrison of 16-17 percent.

Similarly, columns 3 and 4 show the results for Ming-era courier routes. There is a positive and highly significant relationship between mass rebellion and the presence of Ming-era courier routes across both specifications. The coefficient value for $Rebellion_{i,1368-1467}$ in column 2 suggests that each additional mass rebellion battle during the Ming era was associated with an increase in the likelihood of having a courier route of 11 percent.

Overall, the results for the Ming-era measures of infrastructural power are consistent with our empirical prediction that, traditionally, there was a positive and significant relationship between mass rebellion and state development.

5.2.2 Land Taxation

We next evaluate the relationship between mass rebellion and the imperial state's fiscal capacity, as proxied by Qing-era land taxation. We again use OLS to estimate:

$$Taxation_i = \alpha + \beta Rebellion_{i,1644-1819} + \omega PopDensity_i + \zeta_z + \epsilon_z. \quad (3)$$

The dependent variable $Taxation_i$ takes the inverse hyperbolic sine of the land tax (in silver kg) in prefecture i in 1820, enabling us to incorporate a few null observations.[18] We measure the land tax in both total and per capita terms. Our variable of interest $Rebellion_{i,1644-1819}$ is the number of mass rebellions in prefecture i over the 1644-1819 period.

To help control for common institutional features among sub-groups of prefectures, we include provincial fixed effects ζ_z.[19] Similarly, to help account for local demographic features, we control for the population density of each prefecture. We cluster standard errors at the provincial level to address the potential interdependence of prefectures within the same province. Here, we exclude all provinces located in peripheral zones of Qing China for which land tax data were not available (Appendix Figure B-6).

[18] Following Sng (2014, 115), we exclude seven prefectures near Beijing (i.e., Baoding, Chengde, Shuntian, Tianjin, Yongping, Xuanhua, and Zunhua), since many farmers there directly paid rents to the imperial state rather than taxes.

[19] To identify Qing-era administrative units, we use the shapefile from *China Historical Geographic Information System* (2018).

Columns 1 to 3 of Table 3 displays the results for total land taxation. Column 1 shows the bivariate correlation, column 2 adds provincial fixed effects, and column 3 adds population density. Across all three specifications the coefficient estimate for $Rebellion_{i,1644-1819}$ remains positive in sign and highly significant, with values between 0.187 and 0.248. The magnitude of the estimate in column 3 suggests that each additional mass rebellion battle during early nineteenth-century Qing rule was associated with 0.21 silver kg increase (≈$124) in total land taxation.[20] Columns 4 to 6 repeat the previous three specifications for land taxation per capita. Here the coefficient estimate for $Rebellion_{i,1644-1819}$ are small in magnitude and not significant.

Taken together, these results suggest that there was an increase in the imperial Qing state's overall fiscal capacity in response to mass rebellion (although no such increase in its fiscal extraction per capita).

6 Mass Rebellion and State Development After 1850

The results in the previous section support our first empirical prediction that, traditionally, mass rebellion was associated with less clan activity and greater state development in imperial China. We now turn to our second empirical prediction of our conceptual framework, namely that in the aftermath of the negative nineteenth-century critical juncture (i.e., defeat by Britain in the First Opium War and the resulting Treaty of Nanking), we should observe greater reliance on a public-private security partnership, and thus greater clan development, in response to mass rebellion, at the expense of further state development.

There are several phenomena specific to the nineteenth century that we must account for. Traditionally, woodblock printing was standard, with printing centers located near raw materials (e.g., bamboo, pine) (Brokaw and Chow 2005, 10, 79). The introduction of modern printing technology in the 1870s, however, led to the establishment of new printing centers (e.g., Shanghai, Tianjin), potentially reducing the costs of publishing genealogy books (Brokaw and Reed 2010, 6-7). Similarly, the nineteenth century saw the arrival of Protestant missionaries, who helped spread mass printing, newspapers, and mass education, each of which could affect mass rebellion and clan activity alike (Woodberry 2012). Finally, Jia (2014)

[20] To make the conversion from Qing-era silver kg to US dollars, we first convert from silver kg to yuan following Shao (2011), who takes the grain price as the intermediate unit, with 1 silver kg ≈ 4,000 yuan. We then convert from yuan to dollars based on an exchange rate of 6.80.

shows that numerous treaty ports conceded by the Qing to the West over the nineteenth century experienced faster subsequent growth. In the main analysis below, period fixed effects and county-specific linear time trends help control for such nineteenth-century phenomena.

In Table 4, we repeat the regression analysis based on Equation 1 after *including* the 1850-1900 period. The coefficient estimates for $Rebellion_{i,t}$ now switch signs: the relationship between mass rebellion and clan activity is significantly *positive* across both specifications. The magnitude of the column 2 estimate suggests that, once we take into account the nineteenth-century critical juncture, each additional mass rebellion battle was associated with a 9 percent *increase* in clan activity.

Figure 3 helps illustrate the above results. It indicates that mass rebellions peaked between 1850 and 1869 (top panel). There were 230 mass rebellion battles over this period, of which nearly 60 percent involved the Taiping.[21] Similarly, there was a level-step increase in clan activity in the aftermath of the Taiping Rebellion (bottom panel). The number of genealogy books rose from less than 100 per year before 1850 to nearly 200 by 1870. This descriptive evidence provides further support for our empirical prediction that renewed clan development took place in response to mass rebellion in the post-critical juncture context.

To systematically analyze pre- and post-Taiping clan activity, we perform a difference-in-difference-style regression analysis. To save space, we relegate the technical details to Appendix F. This analysis shows that grid cells that experienced more mass rebellion battles during 1850-69 (i.e., the Taiping Rebellion) saw a positive and highly significant change in clan activity during 1870-89 (i.e., post-Taiping) relative to 1830-49 (i.e., pre-Taiping). The results suggest that each additional Taiping Rebellion battle was associated with a 31 percent increase in local clan activity in the two decades following this rebellion.

A final (i.e., ancillary) empirical prediction of our conceptual framework is that greater clan development in the aftermath of the negative nineteenth-century critical juncture could eventually prompt state failure. As described in Section 2, greater reliance on a public-private security partnership, coupled with renewed clan activity, altered the traditional security balance that favored the state, since now the gentry began to mobilize greater resources and increase their political autonomy.

To systematically analyze the extent to which local independence declarations were a

[21] The remainder involved other peasant rebel groups including the Nian.

function of renewed post-Taiping clan activity, we perform a cross-sectional regression analysis, the technical details of which we relegate to Appendix G in order to save space. We find a positive and highly significant relationship between the two variables, providing further support for our framework's final prediction.

Overall, the results in this section are consistent with our empirical prediction that, following the negative nineteenth-century critical juncture, mass rebellion was associated with greater clan activity, at the expense of further state development.

7 Conclusion

In this paper, we have analyzed the long-run dynamics of internal conflict, elite action, and state development outcomes in China. We have argued that whether internal conflict promotes state development or state devolution depends on the macro-political context, contingent on the cost of state-provided security. Traditionally, the public provision of security was cost-effectiveness enough to be attractive to the gentry, and the cost of new public investments in defense was low enough for the imperial state to make them. Thus, state development was likely to occur in response to mass rebellion. In the aftermath of the nineteenth-century critical juncture (i.e., defeat by Britain in the First Opium War and the resulting Treaty of Nanking), however, the cost of new defense investments greatly increased, making a public-private security partnership more attractive to the imperial state. Clan development therefore became more likely in response to mass rebellion. The imperial state's loss of the monopoly over violence, however, could eventually promote state failure.

To evaluate the predictions of our argument, we have exploited a set of novel databases for imperial China at the micro level. We have shown evidence that, traditionally, mass rebellion was associated with movement away from the private provision of security via the clan and toward the public provision of it via the imperial state. This dynamic changed, however, after the negative nineteenth-century critical juncture. We have found that, in the post-critical juncture context, mass rebellion was associated with movement back toward the private provision of security via the clan. Finally, we have shown evidence for a positive relationship between renewed clan activity in the post-Taiping era and eventual state failure.

To the best of our knowledge, this study is among the first to provide both a theoretical logic and systematic evidence that, depending on the nature of elite-state security interactions, internal conflict can promote either state development or devolution. Our study

suggests that the trajectory of state development in imperial China proceeded in the same direction as that of Western Europe – with national governments in both parts of Eurasia gaining a greater monopoly over violence – into the nineteenth century. Only over the second half of the nineteenth century did the imperial Chinese state began to lose control over its monopoly over violence, while nation-states in Western Europe steamed ahead. Neither renewed clan strength nor state weakness is likely to be conducive to modern economic development (Greif 2006, 310-11; Besley and Persson 2011, 27-31). Thus, our study also provides a new perspective on the long-run dynamics of the Great Divergence, by which China fell economically and politically behind the West.

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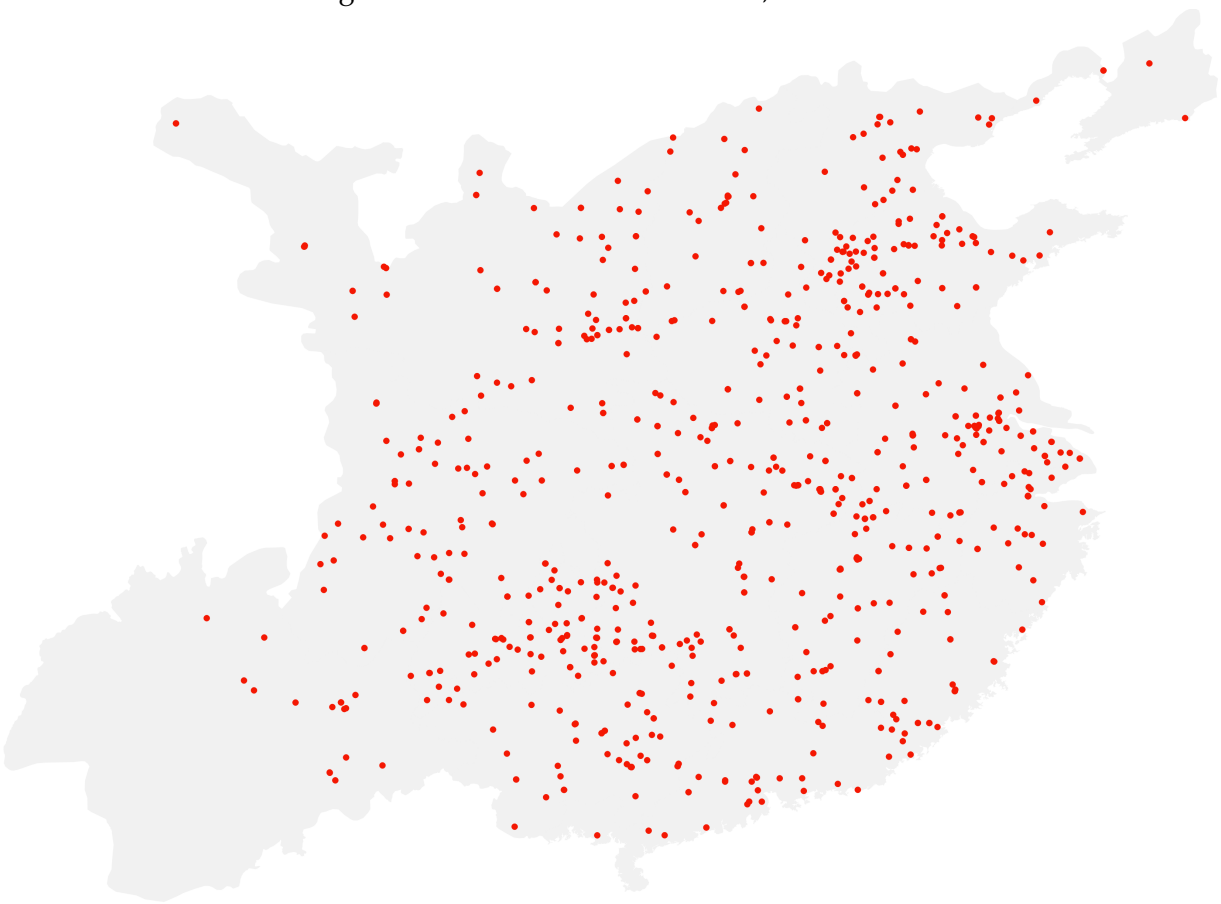
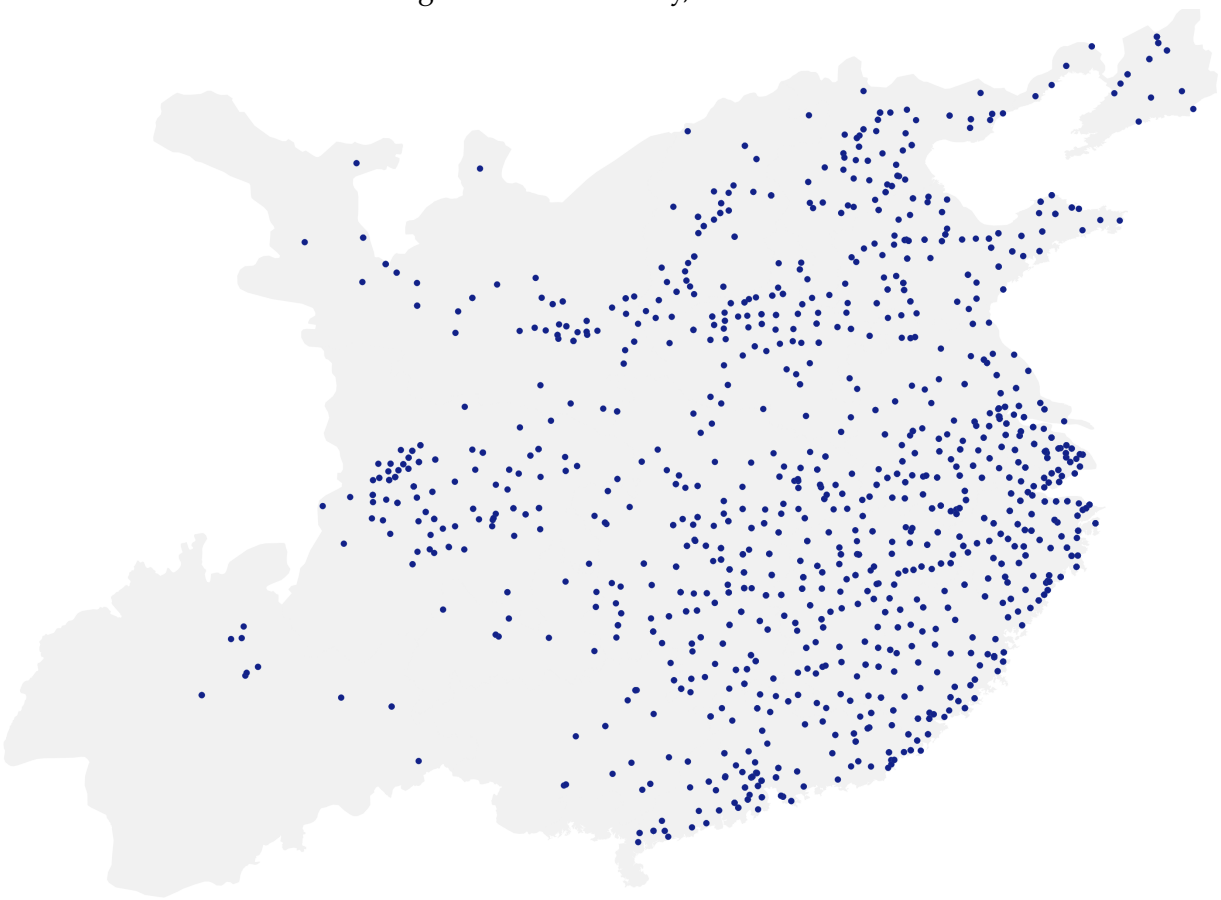
Figure 1: Mass Rebellion Locations, 1350-1900



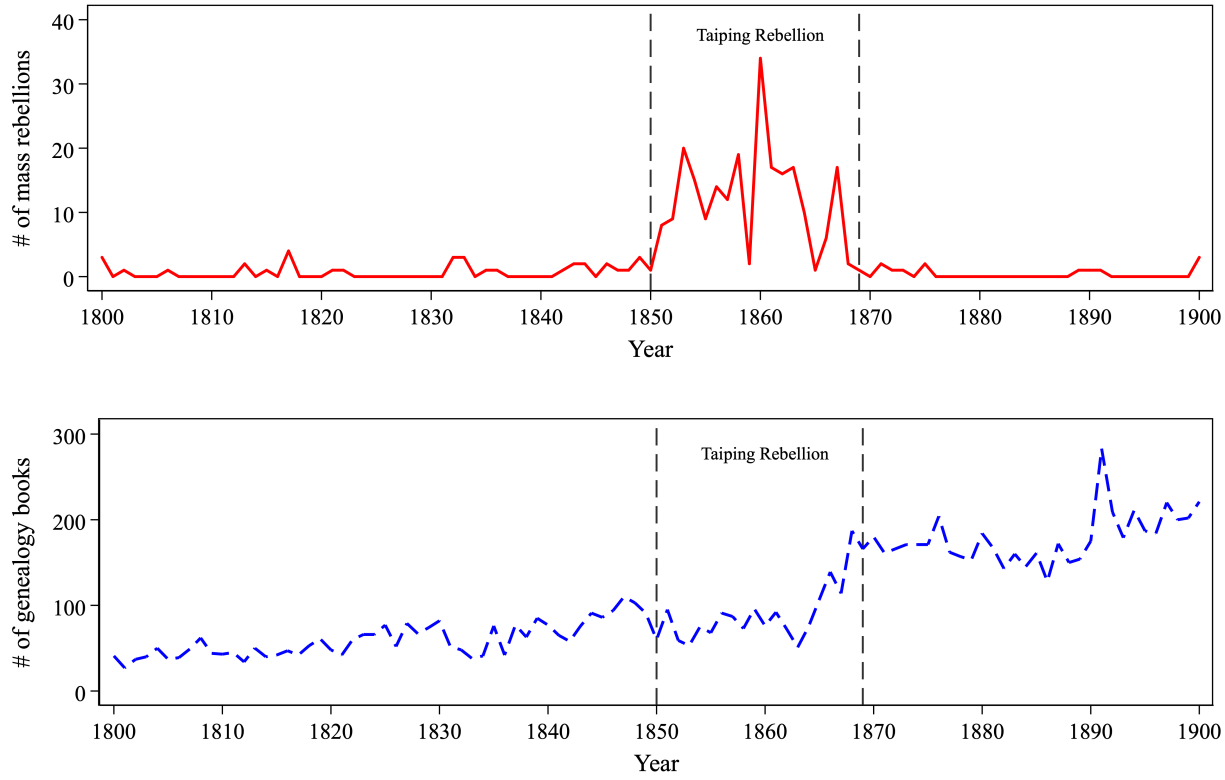
Notes. This figure shows the location of each recorded mass rebellion battle in China between 1350-1900 within Ming-era borders.

Figure 2: Clan Activity, 1350-1900



Notes. This figure shows the location of each recorded genealogy book written down in China between 1350-1900 within Ming-era borders.

Figure 3: Mass Rebellion and Clan Activity, 1800-1900



Notes. This figure shows the annual number of mass rebellion battles (top panel) and genealogy books written down (bottom panel) in China between 1800 and 1900. The (red) solid line indicates the number of mass rebellions per year, and the (blue) dashed line indicates the number of genealogy books.

Table 1: Mass Rebellion and Clan Activity: 1350-1850

Dependent variable:	Genealogy Books (IHS)	
	(1)	(2)
Mass rebellion	-0.068***	-0.046***
	(0.014)	(0.011)
Grid cell FE	Yes	Yes
Period FE	Yes	Yes
County-specific trends	No	Yes
R^2	0.045	0.295
Observations	58030	58030

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 25 km x 25 km. Sample period is 1350-1850. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is number of mass rebellions. All regressions include grid cell and period fixed effects. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table 2: Mass Rebellion and Ming State Development

Dependent variable:	Garrisons (IHS)		Courier Route	
	(1)	(2)	(3)	(4)
Mass rebellion (1368-1467)	0.161***	0.152***	0.148***	0.110**
	(0.039)	(0.044)	(0.035)	(0.044)
County FE	No	Yes	No	Yes
R^2	0.024	0.422	0.006	0.539
Observations	5147	5147	5147	5147

Notes. Estimation method is OLS. Unit of analysis is 25 km x 25 km grid cell. Sample period is first century of Ming Dynasty (1368-1467). Dependent variable in columns 1-2 is early Ming military garrisons as proxied by the inverse hyperbolic sine (IHS) of the number of garrisons. Dependent variable in columns 3-4 is binary indicator of Ming-era courier route. Variable of interest in all columns is number of mass rebellions over 1368-1467. Robust standard errors clustered at county level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table 3: Mass Rebellion and Qing State Development

Dependent variable:	Total Land Tax (IHS)			Per Capita Land Tax (IHS)		
	(1)	(2)	(3)	(4)	(5)	(6)
Mass rebellion (1644-1819)	0.248*	0.234**	0.187**	0.009	0.011	0.001
	(0.122)	(0.086)	(0.070)	(0.051)	(0.037)	(0.034)
Provincial FE	No	Yes	Yes	No	Yes	Yes
Population density	No	No	Yes	No	No	Yes
R^2	0.017	0.487	0.560	0.000	0.597	0.618
Observations	258	258	258	258	258	258

Notes. Estimation method is OLS. Unit of analysis is Qing prefecture. Sample period is Qing Dynasty to 1820. Dependent variable in columns 1-3 is the inverse hyperbolic sine (IHS) of total land tax in silver kg in 1820, and in columns 4-6 it is the IHS of per capita land tax in silver kg in 1820. Variable of interest is number of mass rebellions over 1644-1819. Robust standard errors clustered at provincial level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table 4: Mass Rebellion and Clan Activity: Include 1850-1900

Dependent variable:	Genealogy Books (IHS)	
	(1)	(2)
Mass rebellion	0.107***	0.088***
	(0.029)	(0.022)
Grid cell FE	Yes	Yes
Period FE	Yes	Yes
County-specific trends	No	Yes
R^2	0.064	0.323
Observations	63833	63833

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 25 km x 25 km. Sample period is 1350-1900. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is number of mass rebellions. All regressions include grid cell and period fixed effects. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Online Appendix for
The Monopoly over Violence in a Late Modernizer

A Model

Setup

The gentry elite must decide how to best provide security against mass rebellion, the provision of which delivers benefit $b > 0$. The gentry may provide security privately through the clan, or publicly through the state. Let the gentry's material cost of private security provision be $y > 0$ and that of public provision be $x > 0$, where we assume that $y > x$ (for justification, see Section 3). By handing over security provision to the emperor, however, the gentry suffer some loss of political autonomy. We denote this cost as $a > 0$. Finally, we assume that both $b - y > 0$ and $b - (x + a) > 0$ (for justification, see Section 3).

In response to the gentry's security choice, the emperor may decide to strengthen the state's ability to provide security against mass rebellion through new public investments in defense, or may decide to delegate back some responsibility for internal security to the gentry in the form of a public-private security partnership. As for the gentry, the emperor also receives benefit $b > 0$ from security provision. Let the emperor's material cost of new public investments in defense be $i > 0$ under the state-strengthening option and $l > 0$ under the public-private option. Here we assume that $i > l$, since the emperor is only partially responsible for internal security provision under the public-private partnership. The public-private option, however, entails an additional cost $m > 0$ for the emperor, since, by delegating back some political autonomy to the gentry via the public-private security partnership, the emperor suffers some loss of the state's monopoly over violence. From the point of view of the gentry, the public-private security partnership enables them to somewhat reduce their loss of political autonomy to the emperor by δ, where $0 < \delta < 1$. We assume that both $b - i > 0$ and $b - (l + m) > 0$ (for justification, see Section 3). Finally, if the gentry initially opt for the private provision of security, then the emperor will lose his incumbent status, resulting in loss $t < 0$.

Optimal Decisions

We now analyze the optimal decisions by the gentry and the emperor for two different contexts.

Context 1

Two key assumptions characterize the first context. Here we assume that the gentry prefer the public provision of security due to the lower cost even in the face of some loss of political autonomy: $y > (x + a)$. And, we assume that emperor prefers to pay the cost of new public investments in defense rather than face some loss of the state's monopoly over violence: $l + m > i$.

We solve for the subgame perfect equilibrium in this context by backwards induction. Given the above assumptions, the emperor opts for state-strengthening at the second stage as $b - i > b - (l + m)$, and the gentry opt for public security provision at the first stage as $b - (x + a) > b - y$. The subgame perfect equilibrium is thus (Public, Strengthen).

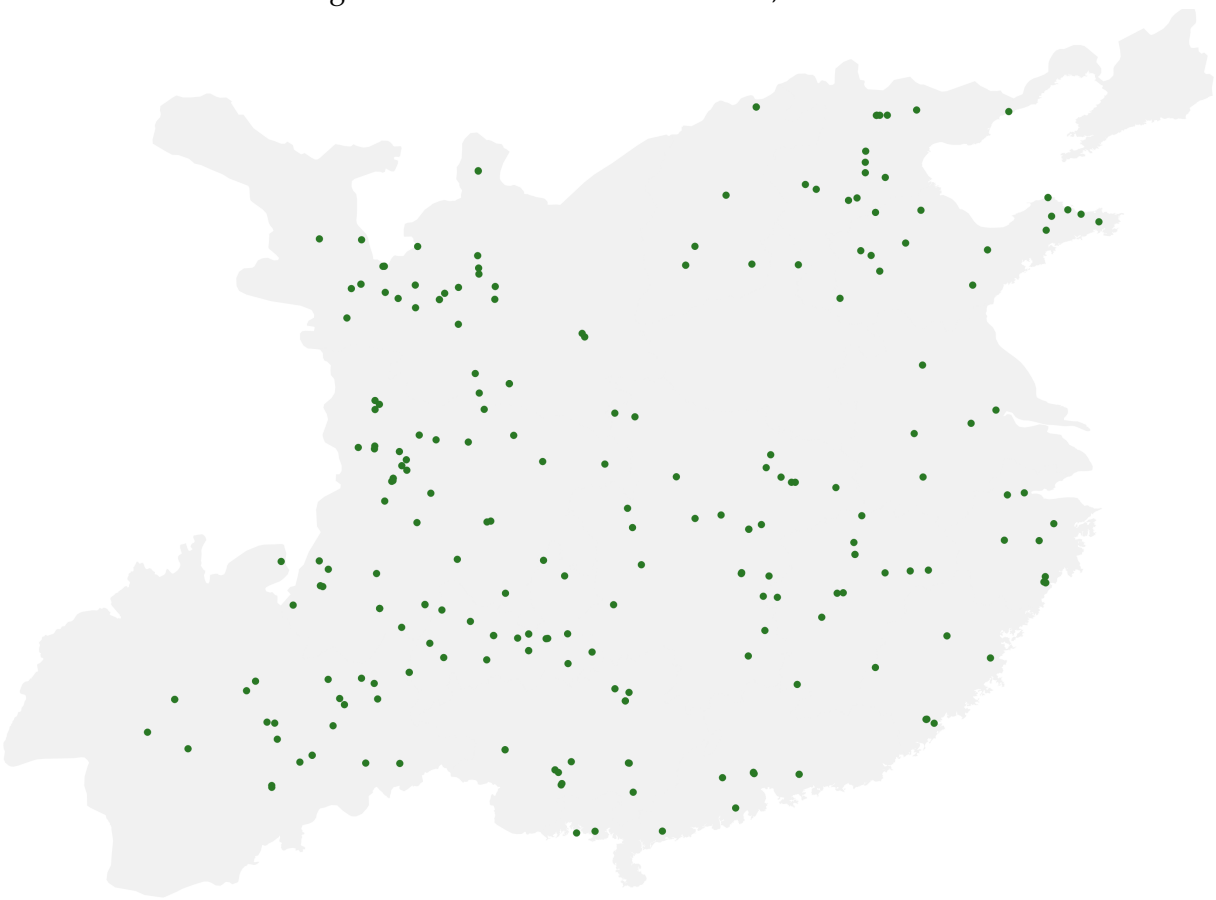
Context 2

We now assume that the cost of new public investments in defense is high enough that the emperor prefers to delegate back partial responsibility for internal security to the gentry even in the face of some loss of the state's monopoly over violence: $i > l + m$.

Given this assumption, the emperor opts for the public-private security partnership at the second stage as $b - (l + m) > b - i$. At the first stage, the gentry agree to this choice, as the public-private partnership enables them to reduce their loss of political autonomy relative to the previous context: $b - (x + \delta a) > b - y$. As δ rises, this choice becomes increasingly attractive to the gentry, since they still receive the cost-saving of the public-private partnership, but with a much smaller autonomy loss. Thus, the subgame perfect equilibrium is (Public, Delegate).

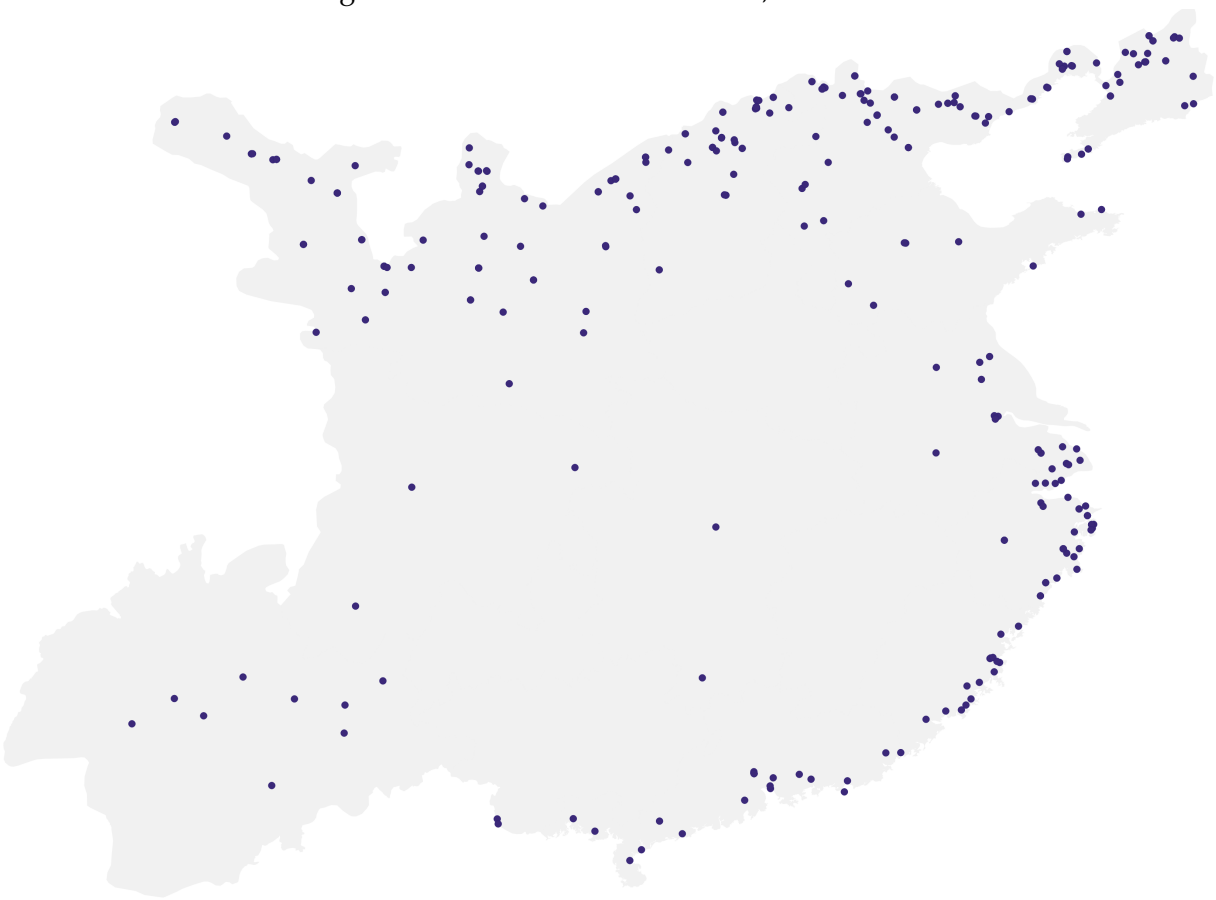
B Extra Figures

Figure B-1: Elite Rebellion Locations, 1350-1900



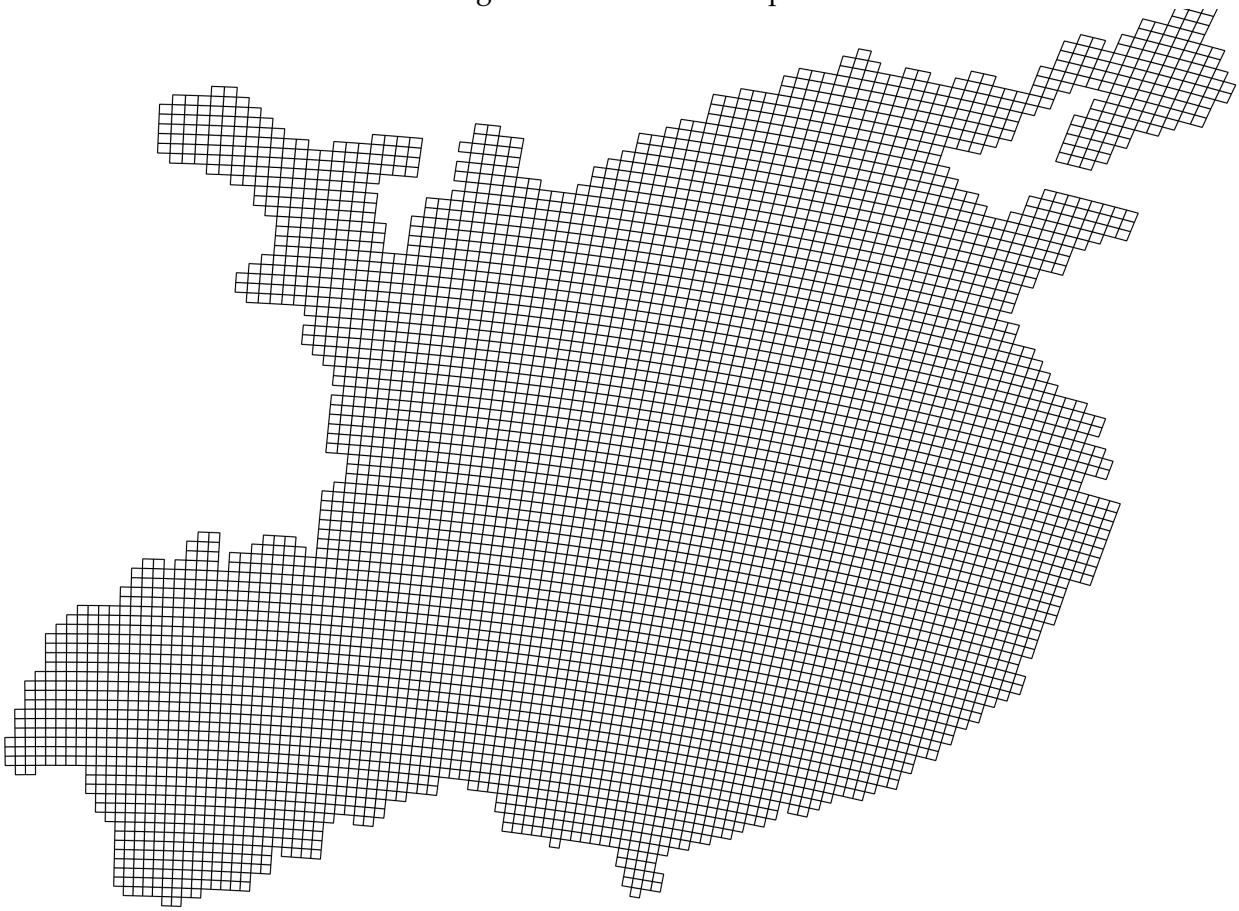
Notes. This figure shows the location of each recorded elite rebellion battle in China between 1350-1900 within Ming-era borders.

Figure B-2: External War Locations, 1350-1900



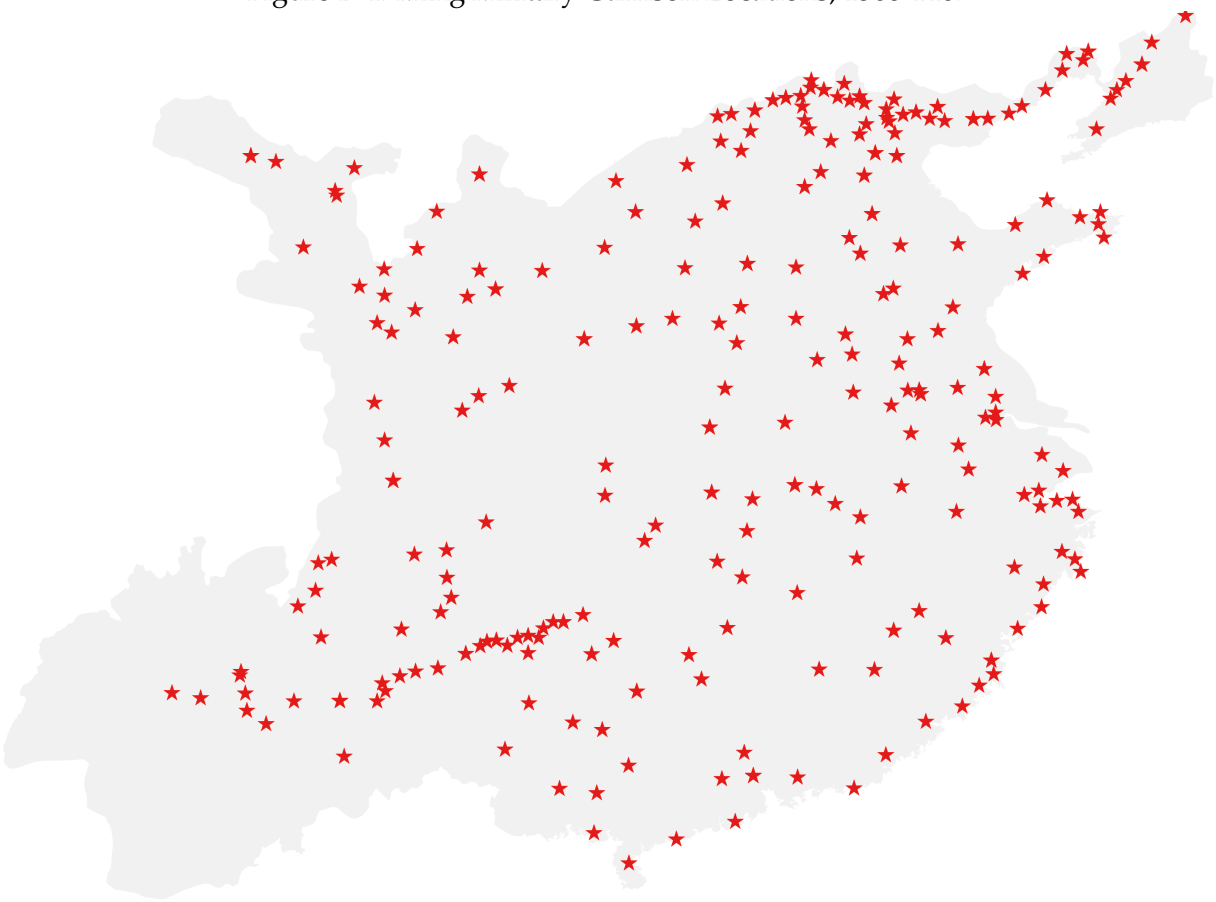
Notes. This figure shows the location of each recorded external war battle in China between 1350-1900 within Ming-era borders.

Figure B-3: Grid Cell Map



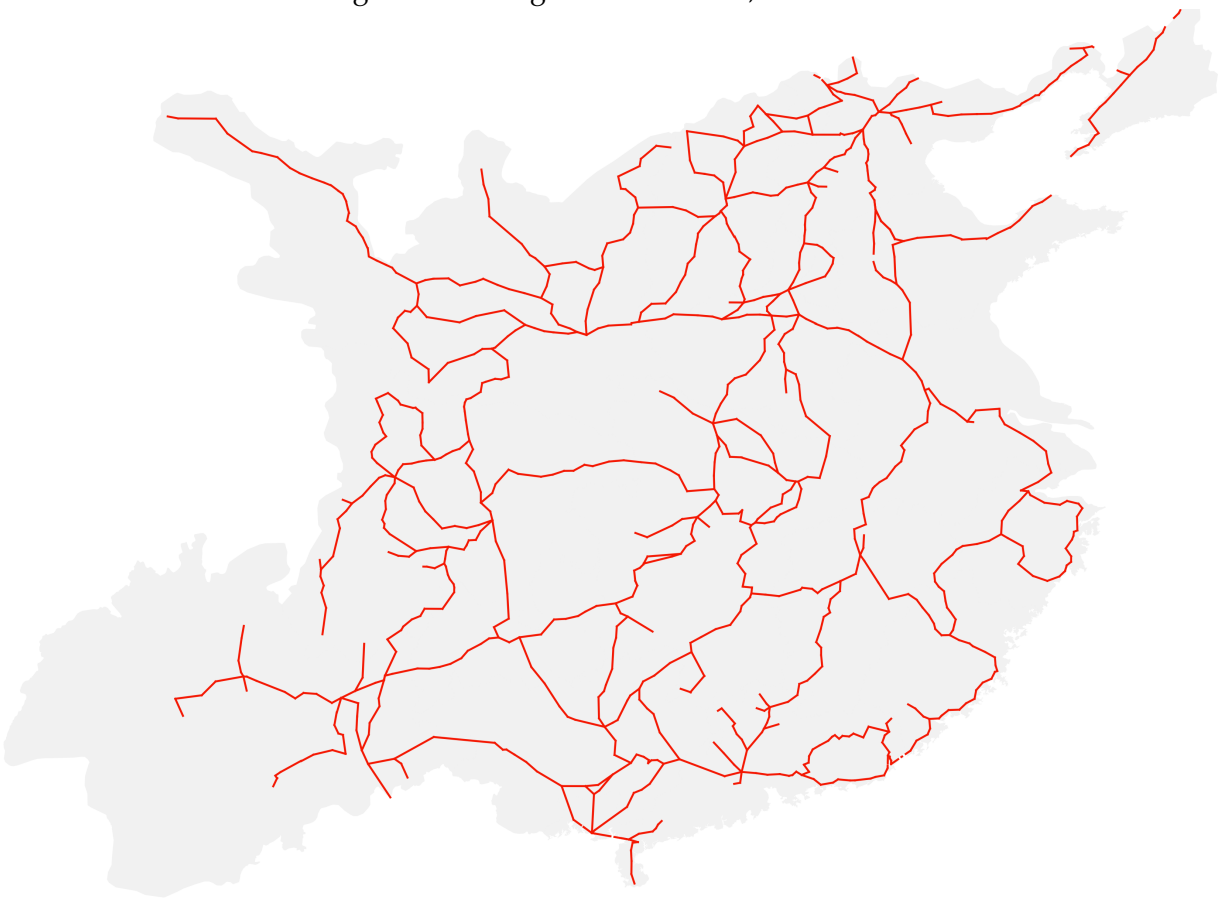
Notes. This figure shows 25 km x 25 km grid cells in China within Ming-era borders.

Figure B-4: Ming Military Garrison Locations, 1368-1467



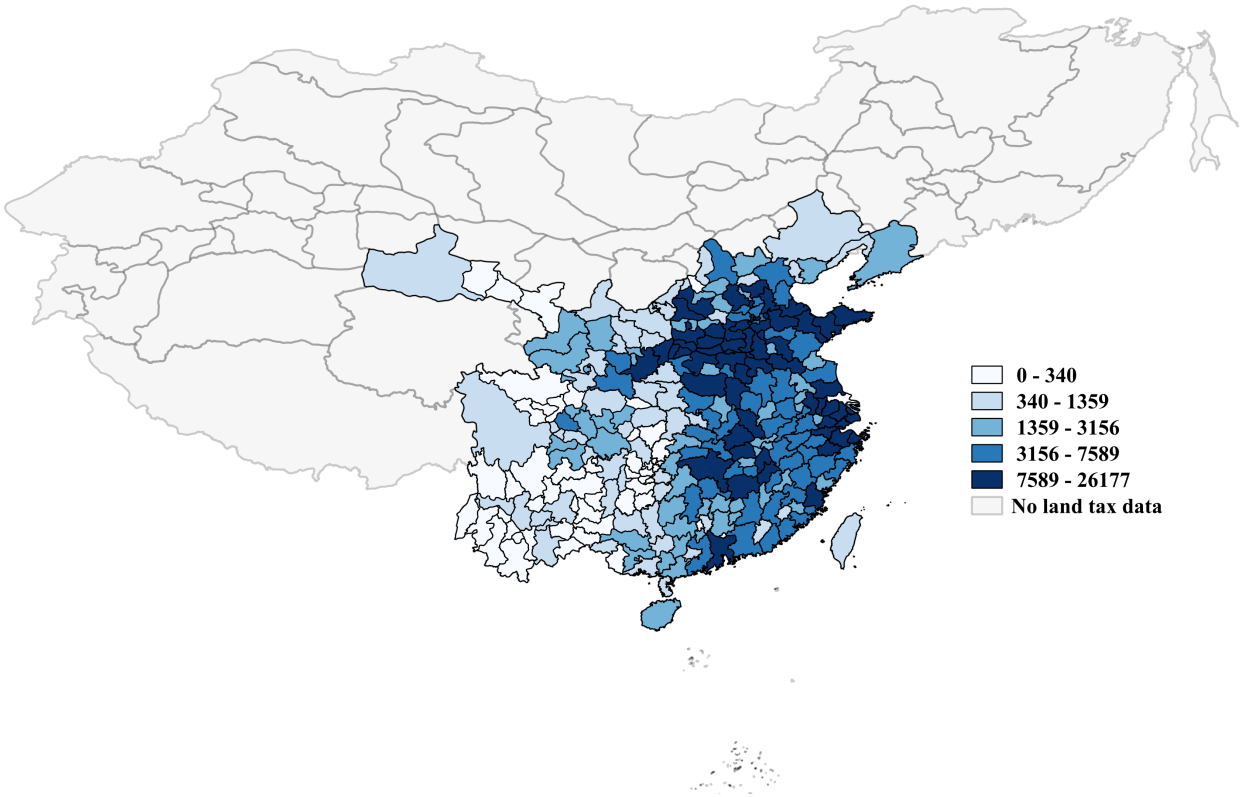
Notes. This figure shows the location of each state military garrison in China established under the first century of Ming rule (1368-1467) within Ming-era borders.

Figure B-5: Ming Courier Routes, 1368-1644



Notes. This figure shows the location of each courier route in China established under Ming rule (1368-1644) within Ming-era borders.

Figure B-6: Qing Land Taxation, 1820

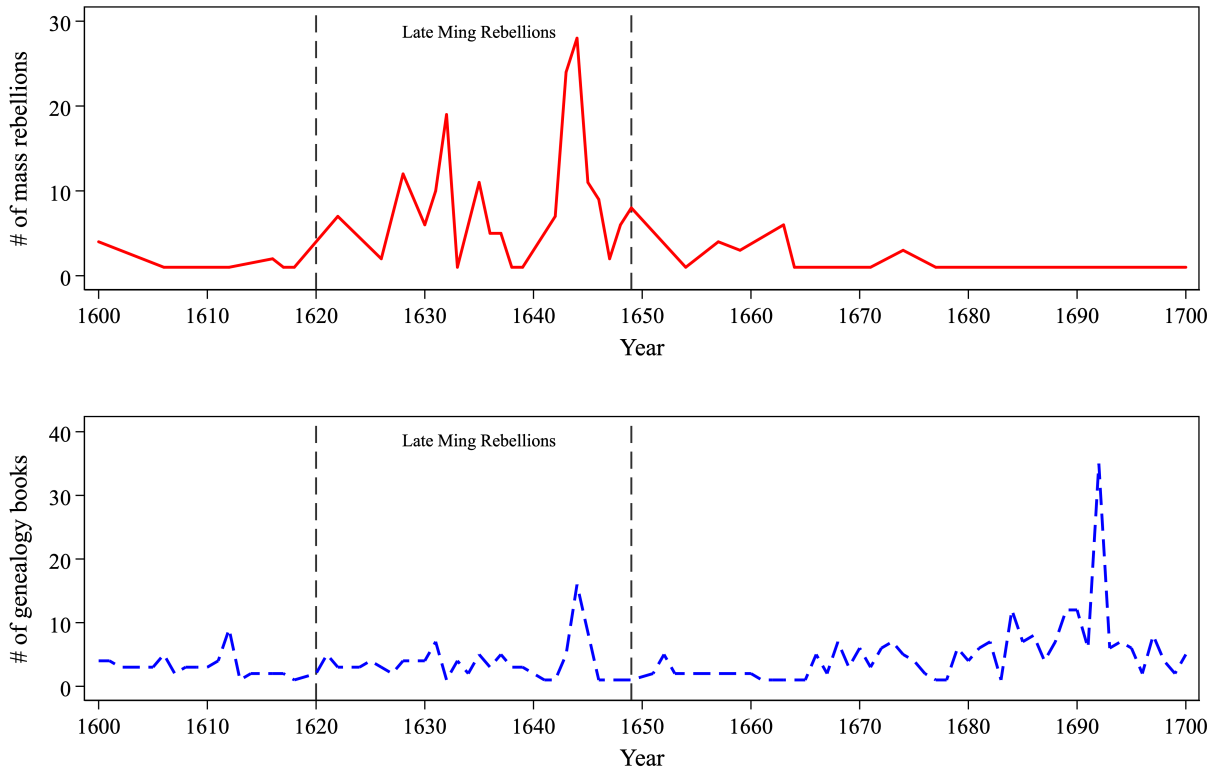


Notes. This figure shows total land taxation (in silver kg) by prefecture in China under Qing rule (1820). Prefectures are shaded by quintile, whereby those in the top quintile receive the darkest shade. Prefectural lines are for Qing-era borders.

Figure B-7: Declarations of Independence, 1911

Notes. This figure shows the locations of military groups that made a formal declaration of independence from the imperial Qing state in China in 1911. Prefectural lines are for Qing-era borders.

Figure B-8: Mass Rebellion and Clan Activity, 1600-1700



Notes. This figure shows the annual number of mass rebellion battles (top panel) and genealogy books written down (bottom panel) in China between 1600 and 1700. The (red) solid line indicates the number of mass rebellions per year, and the (blue) dashed line indicates the number of genealogy books.

C Extra Tables

Table C-1: Conflict Types, 1350-1900

	N	%
Elite rebellion	316	18.016
External war	541	30.844
Mass rebellion	897	51.140
Total	1754	100.000

Notes. See text for variable descriptions and data sources.

Table C-2: Summary Statistics

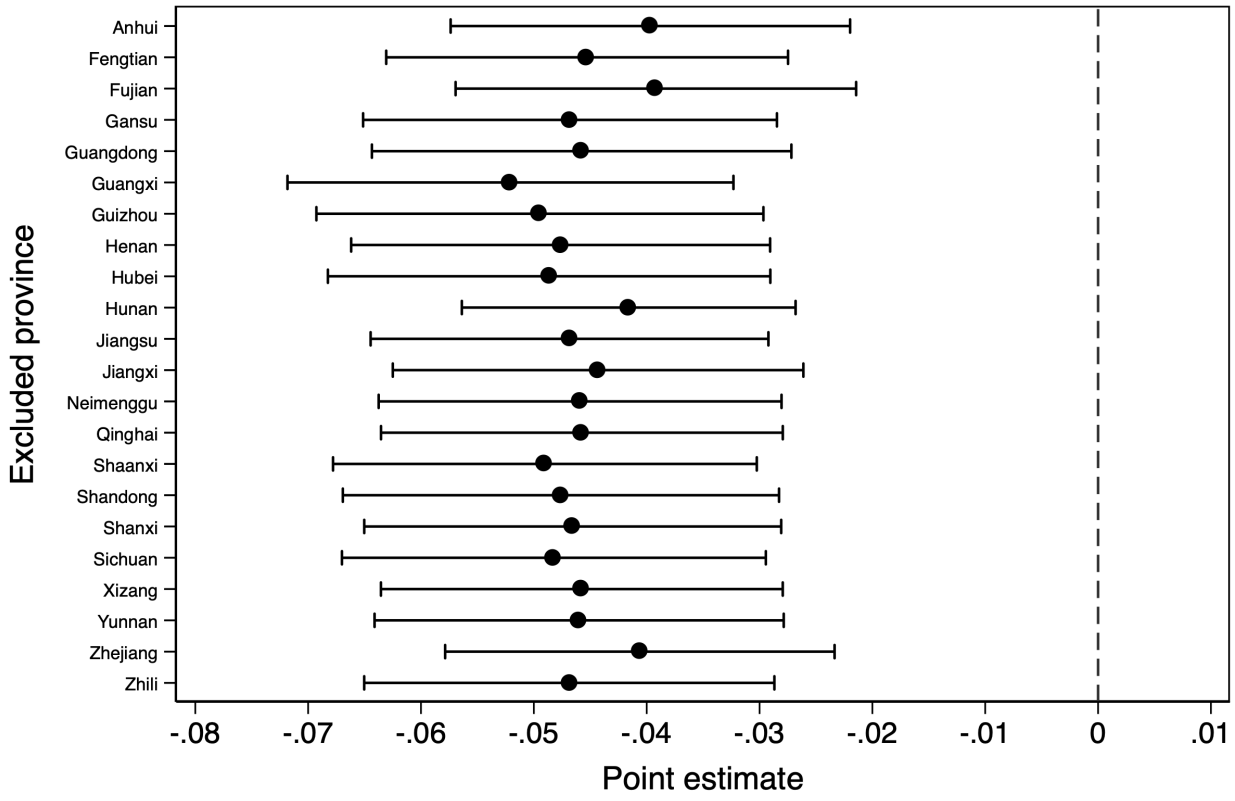
	N	Mean	Std Dev	Min	Max
A: Panel Analysis, 1350-1850					
Genealogy books	58030	0.094	1.660	0.000	190.000
Genealogy books (IHS)	58030	0.032	0.259	0.000	5.940
Mass rebellion	58030	0.011	0.128	0.000	7.000
B: Panel Analysis, 1350-1900					
Genealogy books	63833	0.199	3.621	0.000	371.000
Genealogy books (IHS)	63833	0.049	0.338	0.000	6.609
Mass rebellion	63833	0.014	0.147	0.000	9.000
C: Ming Qing Transition Difference-in-Difference Analysis, 1590-1679					
Genealogy books (1590-1619)	5803	0.016	0.332	0.000	21.000
Genealogy books (1590-1619) (IHS)	5803	0.009	0.116	0.000	3.738
Genealogy books (1650-79)	5803	0.014	0.234	0.000	11.000
Genealogy books (1650-79) (IHS)	5803	0.009	0.110	0.000	3.093
Mass rebellion (1620-49)	5803	0.031	0.215	0.000	4.000
D: Ming Cross-Sectional Analysis, 1368-1467					
Garrisons	5803	0.064	0.370	0.000	7.000
Garrisons (IHS)	5803	0.047	0.236	0.000	2.644
ln(1+Garrisons)	5803	0.037	0.183	0.000	2.079
Passing Ming courier routes	5803	0.230	0.421	0.000	1.000
Mass rebellion (1368-1467)	5803	0.021	0.223	0.000	10.000
E: Qing Cross-Sectional Analysis, 1820					
Land tax 1820 (silver kg)	260	4202.550	4996.500	0.000	26176.699
Land tax 1820 (IHS)	260	7.911	2.086	0.000	10.866
Per capita land tax 1820 (silver kg/person)	260	2.884	2.570	0.000	13.459
Per capita land tax 1820 (IHS)	260	1.491	0.809	0.000	3.294
Mass rebellion (1644-1819)	311	0.444	1.011	0.000	7.000
Population density (person/km2)	260	122.995	126.853	0.435	840.042
F: Taiping Difference-in-Differences Analysis, 1810-89					
Genealogy books (1830-49)	15738	0.069	1.043	0.000	72.000
Genealogy books (1830-49) (IHS)	15738	0.027	0.235	0.000	4.970
Genealogy books (1850-69)	15738	0.092	1.383	0.000	95.000
Genealogy books (1850-69) (IHS)	15738	0.033	0.263	0.000	5.247
Genealogy books (1870-89)	15738	0.206	3.066	0.000	171.000
Genealogy books (1870-89) (IHS)	15738	0.052	0.354	0.000	5.835
Mass rebellion (1850-69)	15738	0.015	0.164	0.000	9.000
G: Qing Cross-Sectional Analysis, 1890-1911					
Declaration of independence in 1911	15738	0.006	0.078	0.000	1.000
Genealogy books	15738	0.283	3.734	0.000	165.000
Genealogy books (IHS)	15738	0.065	0.401	0.000	5.799

Notes. See text for variable descriptions and data sources.

D Robustness Checks for Clan Activity Analysis, 1350-1850

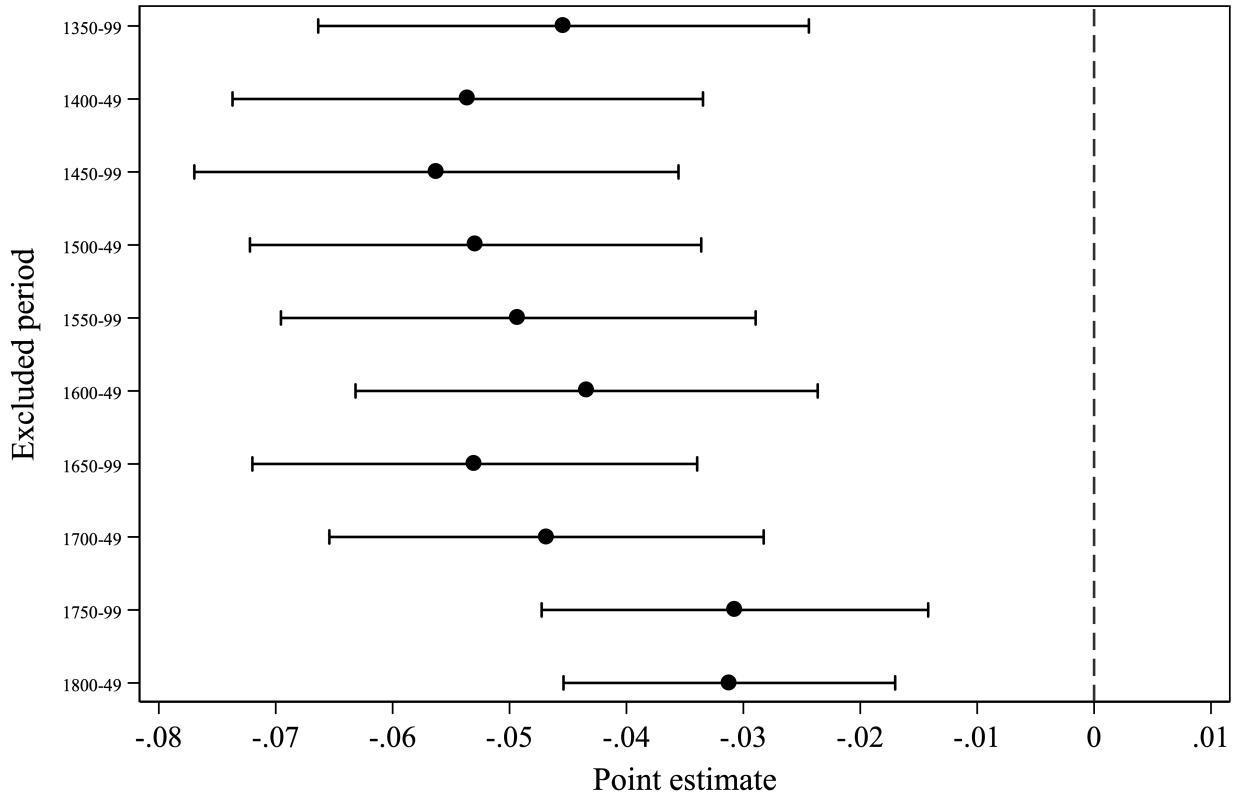
For details, see text.

Figure D-1: Mass Rebellion and Clan Activity: Exclude Provinces One by One



Notes. Sample period is 1350-1850. Each black dot represents point estimate for regression model in column 2 of Table 1 when we exclude each province one by one. Horizontal bars indicate 90 percent confidence intervals.

Figure D-2: Mass Rebellion and Clan Activity: Exclude 50-Year Periods One by One



Notes. Sample period is 1350-1850. Each black dot represents point estimate for regression model in column 2 of Table 1 when we exclude each 50-year period one by one. Horizontal bars indicate 90 percent confidence intervals.

Table D-1: Mass Rebellion and Clan Activity: Alternative Specifications of Dependent Variable

Dependent variable:	ln(1+Genealogy Books)		Genealogy Books	
	(1)	(2)	(3)	(4)
Mass rebellion	-0.055***	-0.037***	-0.345***	-0.237**
	(0.011)	(0.009)	(0.112)	(0.097)
Grid cell FE	Yes	Yes	Yes	Yes
Period FE	Yes	Yes	Yes	Yes
County-specific trends	No	Yes	No	Yes
R^2	0.044	0.297	0.013	0.243
Observations	58030	58030	58030	58030

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 25 km x 25 km. Sample period is 1350-1850. Dependent variable in columns 1-2 is clan activity as proxied by $\ln(1 + GenealogyBooks)$. Dependent variable in columns 3-4 is clan activity as proxied by *GenealogyBooks*. Variable of interest is number of mass rebellions. All regressions include grid cell and period fixed effects. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table D-2: Mass Rebellion and Clan Activity: Lagged Dependent Variable

Dependent variable:	Genealogy Books (IHS)	
	(1)	(2)
Mass rebellion	-0.028***	-0.023***
	(0.008)	(0.008)
L.Genealogy books (IHS)	0.833***	0.674***
	(0.030)	(0.033)
Grid cell FE	Yes	Yes
Period FE	Yes	Yes
County-specific trends	No	Yes
R^2	0.415	0.480
Observations	58030	58030

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 25 km x 25 km. Sample period is 1350-1850. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is number of mass rebellions. All regressions include grid cell and period fixed effects. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table D-3: Mass Rebellion and Clan Activity: Further Controls

Dependent variable:	Genealogy Books (IHS)			
	(1)	(2)	(3)	(4)
Mass rebellion	-0.035***	-0.045***	-0.047***	-0.035***
	(0.011)	(0.011)	(0.011)	(0.011)
Elite rebellion	0.212***			0.211***
	(0.035)			(0.035)
External war		-0.036**		-0.034**
		(0.016)		(0.015)
Mass rebellion (neighbor)			0.004*	0.003
			(0.002)	(0.002)
Grid cell FE	Yes	Yes	Yes	Yes
Period FE	Yes	Yes	Yes	Yes
County-specific trends	Yes	Yes	Yes	Yes
R^2	0.302	0.295	0.295	0.302
Observations	58030	58030	58030	58030

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 25 km x 25 km. Sample period is 1350-1850. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is number of mass rebellions. Regression include cell and period fixed effects and county-specific time trends. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table D-4: Mass Rebellion and Clan Activity: Quadratic Term

Dependent variable:	Genealogy Books (IHS)	
	(1)	(2)
Mass rebellion	-0.107***	-0.067***
	(0.018)	(0.015)
Mass rebellion (squared)	0.018***	0.010**
	(0.005)	(0.004)
Grid cell FE	Yes	Yes
Period FE	Yes	Yes
County-specific trends	No	Yes
R^2	0.045	0.295
Observations	58030	58030

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 25 km x 25 km. Sample period is 1350-1850. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is number of mass rebellions. All regressions include grid cell and period fixed effects. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table D-5: Mass Rebellion and Clan Activity: Lagged Variable of Interest

Dependent variable:	Genealogy Books (IHS)	
	(1)	(2)
L.Mass rebellion	-0.069***	-0.056***
	(0.012)	(0.010)
Grid cell FE	Yes	Yes
Period FE	Yes	Yes
County-specific trends	No	Yes
R^2	0.045	0.295
Observations	58030	58030

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 25 km x 25 km. Sample period is 1350-1850. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is lagged number of mass rebellions. All regressions include grid cell and period fixed effects. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table D-6: Mass Rebellion and Clan Activity: 50 km x 50 km Grid Cells

Dependent variable:	Genealogy Books (IHS)	
	(1)	(2)
Mass rebellion	-0.067***	-0.038***
	(0.017)	(0.012)
Grid cell FE	Yes	Yes
Period FE	Yes	Yes
Province-specific trends	No	Yes
R^2	0.128	0.322
Observations	15310	15310

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 50 km x 50 km. Sample period is 1350-1850. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is number of mass rebellions. All regressions include grid cell and period fixed effects and province-specific time trends. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table D-7: Mass Rebellion and Clan Activity: 1990 County Borders

Dependent variable:	Genealogy Books (IHS)	
	(1)	(2)
Mass rebellion	-0.051***	-0.047***
	(0.013)	(0.013)
County FE	Yes	Yes
Period FE	Yes	Yes
Province-specific trends	No	Yes
R^2	0.113	0.126
Observations	23720	23720

Notes. Estimation method is OLS. Unit of analysis is county-period. County is for 1990 borders. Sample period is 1350-1850. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is number of mass rebellions. Regression include county and period fixed effects and province-specific time trends. Robust standard errors clustered at county level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table D-8: Mass Rebellion and Clan Activity: Include Grid Cells Within Qing Borders

Dependent variable:	Genealogy Books (IHS)	
	(1)	(2)
Mass rebellion	-0.067***	-0.036**
	(0.017)	(0.015)
Grid cell FE	Yes	Yes
Period FE	Yes	Yes
County-specific trends	No	Yes
R^2	0.009	0.274
Observations	359040	359040

Notes. Estimation method is OLS. Unit of analysis is grid cell-period. Grid cell is 25 km x 25 km. Sample period is 1350-1850. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is number of mass rebellions. Regression include cell and period fixed effects and county-specific time trends. Robust standard errors clustered at grid cell level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

E Robustness Checks for Ming State Development Analysis

For details, see text.

Table E-1: Mass Rebellion and Ming Garrisons: Alternative Specifications of Dependent Variable

Dependent variable:	ln(1+Garrisons)		Garrisons	
	(1)	(2)	(3)	(4)
Mass rebellion (1368-1467)	0.125***	0.118***	0.217***	0.199***
	(0.030)	(0.034)	(0.062)	(0.066)
County FE	No	Yes	No	Yes
R^2	0.024	0.419	0.017	0.424
Observations	5147	5147	5147	5147

Notes. Estimation method is OLS. Unit of analysis is 25 km x 25 km grid cell. Sample period is first century of Ming Dynasty (1368-1467). Dependent variable in columns 1-2 is early Ming military garrisons as proxied by $\ln(1 + Garrisons)$. Dependent variable in columns 3-4 is the number of garrisons. Variable of interest is number of mass rebellions over this sample period. Robust standard errors clustered at county level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

F Regression Analysis for Taiping Rebellion

Appendix Figure F-1 plots average clan activity trends for 25 km x 25 km grid cells that experienced at least one mass rebellion battle during the Taiping Rebellion versus those that did not. There is an increase in the slope of the trend line for the former group, but not so for the latter group, during the Taiping Rebellion.

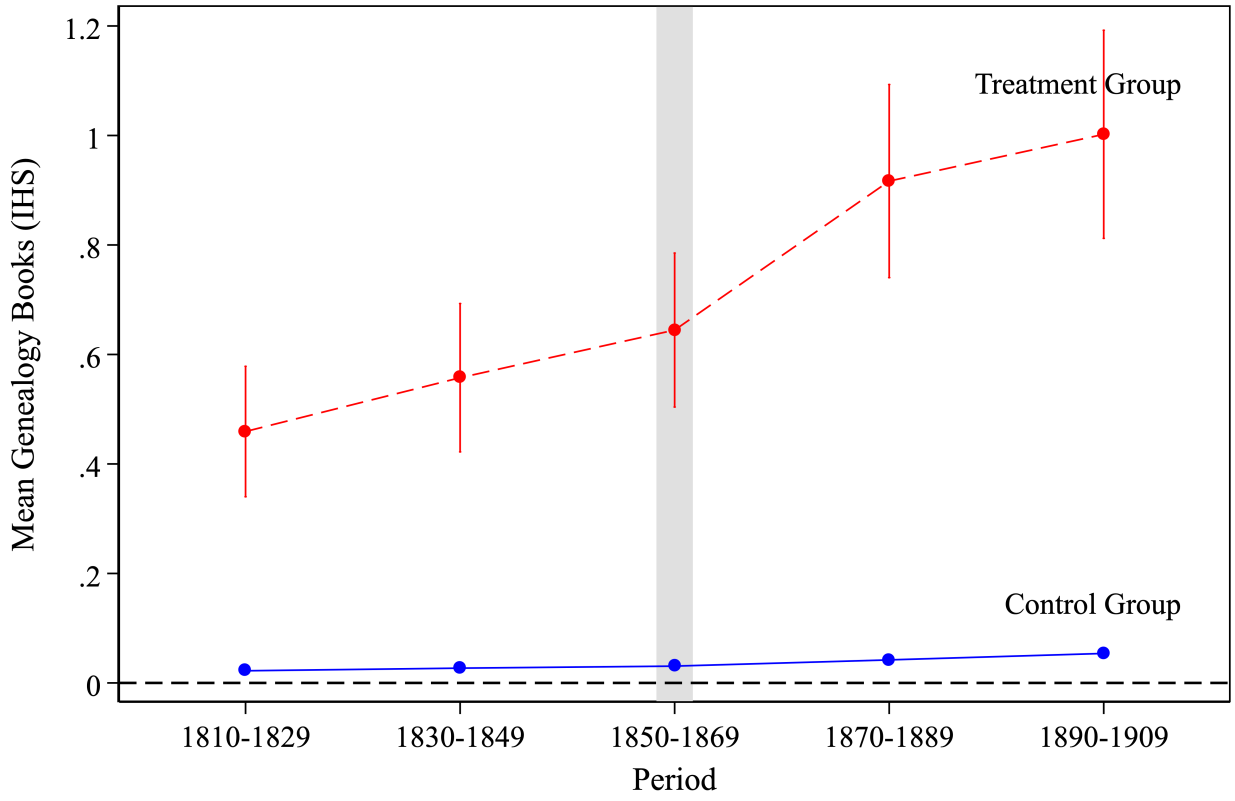
To systematically analyze pre- and post-Taiping clan activity, we estimate the following OLS specification:

$$\begin{aligned} ClanActivity_{i,t} = \alpha + \beta Period_{t,1870-89} \times Rebellion_{i,1850-69} \\ + \gamma Rebellion_{i,1850-69} + \mu_i + \lambda_t + \epsilon_{i,t}. \end{aligned} \tag{F.1}$$

$ClanActivity_{i,t}$ is defined as in Section 5, although it now reflects clan activity in grid cell i over each 20-year period t between 1830 and 1889. The treatment variable is $Rebellion_{i,1850-69}$, which measures the number of mass rebellions in grid cell i during the Taiping Rebellion. $Period_{t,1870-89}$ is a binary indicator variable for the 20-year periods during 1870-89. The quantity of interest is $Period_{t,1870-89} \times Rebellion_{i,1850-69}$. According to the second prediction of our conceptual framework, we expect the coefficient value β on this estimator to be positive in sign and statistically significant. In other words, we expect clan activity to increase during 1870-89 relative to 1830-49 in grid cells that experienced more rebellions during 1850-69. μ_i and λ_t are county and period fixed effects, respectively. $\epsilon_{i,t}$ is a random error term. All standard errors are robust, clustered at the county level.

Table F-1 shows our main coefficient estimate. Grid cells that underwent more mass rebellion battles during 1850-69 experienced a positive and highly significant change in clan activity (as proxied by the number of genealogy books written down) during 1870-89 relative to 1830-49.

Figure F-1: Clan Activity Trends Before and After Taiping Rebellion



Notes. This figure shows the change in average clan activity in China as proxied by Genealogy Books (log), calculated as $ln(GenealogyBooks + (GenealogyBooks^2 + 1)^{1/2})$, for 25 km x 25 km grid cells that experienced at least one mass rebellion battle during the Taiping Rebellion between 1850-69 (treatment group) and those that did not (control group). Shaded vertical line represents start of Taiping Rebellion in 1850. Vertical segments indicate 90 percent confidence intervals.

Table F-1: Clan Activity Before and After Taiping Rebellion

Dependent variable:	Genealogy Books (IHS)
	[1830-49]+[1870-89]
	(1)
Period (1870-89)*Mass rebellion (1850-69)	0.268***
	(0.039)
County FE	Yes
Period FE	Yes
Mass rebellion (1850-69)	Yes
R^2	0.457
Observations	30206

Notes. Estimation method is OLS. Unit of analysis is 25 km x 25 km grid cell. Sample period includes 1830-49 and 1870-89. Dependent variable is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books. Variable of interest is the interaction term between period and number of mass rebellions. Robust standard errors clustered at county level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

G Regression Analysis for Qing State Failure

To proxy for local resistance to Qing rule, we geocode the location of each elite group that declared independence from the Qing state in 1911 according to Guo (2015). We then use this information to create a binary indicator variable $Independence_{i,1911}$ that equals one if there was at least one independence declaration by a local elite group within the borders of (25x25) grid cell i.

We use OLS to estimate:

$$Independence_{i,1911} = \alpha + \beta ClanActivity_{i,1890-1909} + \gamma_j + \epsilon_j. \tag{G.1}$$

Here our variable of interest is post-Taiping clan activity $ClanActivity_{i,1890-1909}$ between 1890-1909. Given that this test uses cross-sectional data, we address the possibility of omitted variable bias by including county fixed effects γ_j.

Table G-1 displays the results of this analysis. Column 1 shows the raw bivariate correlation, and column 2 adds county fixed effects. Bai and Jia (2016) argue that counties that had higher quotas for the imperial civil service exam were more likely to experience revolutionary uprisings once this system was abolished in 1905. Here the county fixed effects control for civil service exam quotas. The coefficient estimate for $ClanActivity_{i,1890-1909}$ is positive in sign and highly significant across both specifications, with values from 0.044 to 0.045. This result is similar if we restrict the sample to Ming-era external borders (Appendix Table G-2).

Table G-1: Clan Activity and Qing State Failure

Dependent variable:	Declaration of Independence in 1911	
	(1)	(2)
Genealogy Books (IHS)	0.045***	0.044***
	(0.007)	(0.009)
County FE	No	Yes
R^2	0.054	0.382
Observations	15103	15103

Notes. Estimation method is OLS. Unit of analysis is 25 km x 25 km grid cell. Dependent variable is binary indicator of formal declaration of independence from imperial Qing state in 1911. Variable of interest is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books, between 1890-1909. Robust standard errors clustered at county level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table G-2: Clan Activity and Qing State Failure: Ming-Era External Borders

Dependent variable:	Declaration of Independence in 1911	
	(1)	(2)
Genealogy Books (IHS)	0.044***	0.045***
	(0.007)	(0.010)
County FE	No	Yes
R^2	0.053	0.398
Observations	5887	5887

Notes. Estimation method is OLS. Unit of analysis is 25 km x 25 km grid cell. Sample is restricted to Ming-era external borders. Dependent variable is binary indicator of formal declaration of independence from imperial Qing state in 1911. Variable of interest is clan activity as proxied by the inverse hyperbolic sine (IHS) of the number of genealogy books, between 1890-1909. Robust standard errors clustered at county level in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.