

The Making of Bad Gentry: The Abolition of an Exam, Local Governance and Anti-gentry Protests, 1902–1911

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Abstract

The decay of non-government local elites, or the lower gentry, was an important driving force of the Chinese revolution. This paper argues that this decay was an unintended consequence of the abolition of the civil service exam in 1905. Before the abolition, local elites could lose their candidacy to higher degrees and higher status if they corrupted in collecting surtaxes that financed local public goods, and stirred commoner's protests. This prospect of upward mobility (POUM) gave them incentive to behave well, which was removed by the abolition of exam. Using a DID strategy, we find that a prefecture with a higher POUM before the abolition experienced more incidents of anti-gentry protests after the abolition. This impact is driven by an increase in corrupt behaviours of the lower gentry such as excessive collection of surcharges. The effect is larger when the state is more capable to monitor local elites and when the costs of collective actions are lower for commoners. We also find that the abolition triggered an adverse selection process, resulting in an outflow of young talents from rural areas and a deterioration of the pool of local elites remaining in rural areas.

Key words: Prospect of upward mobility, political selection, political incentives, local governance, civil service exam

JEL Classification: D73, D74, N45

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1. Introduction

China's first half of the 20th century witnessed a rapid deterioration of rural governance and an emergence of "bad gentry". There is ample documentation on how local elites imposed excessive surcharges, embezzled public funds, and preyed upon poor peasants (Duara, 1991; Skocpol, 1979). The "grabbing hand" of local elites stirred up widespread complaints and protests, which enabled the Chinese Communist Party (CCP) to mobilize furious peasants from village to village to fight against local elites and finally overthrow the old regime ruled by the Chinese Nationalist Party. However, the labelling of local elites as "bad gentry" is in stark contrast with the benevolent image of local gentry presented in late imperial China, who typically held exam degrees but no official positions. They traditionally served as leaders of local communities, as intermediaries between governments and local communities, and as providers or managers of local public goods, such as schools, charities, granaries, and waterworks (Fei, 1946; Kuhn, 2002; Rowe, 2010). An interesting question thus arises – what made the traditionally benevolent local gentry decay into the target of a social revolution?

In this paper, we argue that the abolition of the imperial civil service exam (*keju*) in 1905 was an important contributing factor to the decay of local gentry in rural areas. Before the abolition, most local elites were "lower gentry" who had passed the county exams and held the title of *Shengyuan*. They anticipate the prospect of upward mobility (henceforth POUM) if they could pass the provincial exam and obtain the title of *Juren*. As "upper gentries", *Juren* were eligible to hold official positions and obtain much greater wealth and prestige (Chang, 1962). However, before moving to the higher level, lower gentries were subject to the supervision and evaluation of local governments in their jurisdictions, and their lower titles could be removed for misconduct and corruption (Hsiao, 1967). The prospect of upward mobility and the critical role of local government supervision motivated lower gentries to behave well in the provision of local public goods in the late imperial era.

The abolition of the exam system disrupted the traditional career path of local elites and the incentive structure that they faced. The educated individuals could not obtain higher status unless they pursued modern education in urban areas (Bai, 2019; Yuchtman, 2017). Yet, for those still engaged in local public services in rural area, there was no performance evaluation enforced by local officials as there was before the abolition (Wang, 2008). Therefore, there was a negative impact of abolition on the incentives of the lower gentry not to corrupt, and the impact was greater in areas where they had anticipated a greater POUM before the abolition. This is because before the abolition, a greater chance of moving up for lower gentry is associated with a greater potential loss from misbehaviour in public service so the less likely he would choose to corrupt in public service. Hence, after the abolition, with no such career concerns, there would be a greater rise in corruption of

lower gentry who have a greater POUM, stirring more protests by the commoners against them.¹

Using a unique prefecture-level dataset from 1902 to 1911, this paper empirically tests the linkage between the abolition of civil service exam and the deterioration of local governance in rural areas, and explore the potential mechanisms underlying the relationship. We measure the deterioration of rural local governance by the incidence of anti-gentry protests (excluding protests led by gentries) during this period. The POUM for lower gentry is measured by the ratio of the number of *Juren* admitted from 1870–1905 in a prefecture over the number of *Shengyuan* admitted from the same period.² Using a DID estimation strategy, we find that a greater POUM for lower gentry is associated with a greater increase in frequency of anti-gentry protests following the abolition in 1905. One standard deviation increase in the logged POUM is associated with 0.114 more incidents of anti-gentry protests, which is nearly one-half of the sample mean of the dependent variable. The dynamics of the impact show that the assumption of a parallel pre-trend is satisfied, indicating that the POUM is not associated with anti-gentry protests before the abolition.

We perform a series of tests to address several concerns threatening our empirical analysis. First, we rule out several alternative explanations for our findings, such as state fiscal extraction, the strength of human capital, or the authority of local elites. Second, we examine the effects of the exam abolition on other types of violent activities unrelated to local gentry, such as anti-Christianity protests, but find no significant results. This exercise helps to refute the view that the effect on anti-gentry protests might simply capture the worsening of local social stability in that chaotic period, rather than the misbehaviour of lower gentry per se. Finally, we find that neither the changes in the POUM for upper gentry, nor that for commoners caused by the exam abolition, account for the variations in anti-gentry protests, suggesting that the effects were not driven by the effects of the exam abolition on other social groups.

To best explain our empirical results, we set up a simple model with an incomplete information game between a lower gentry and the commoners. The gentry is responsible of providing local public goods when needed. However, even when the public goods are not needed, the gentry may still ask the commoners to pay surcharges without providing any public goods. The gentry privately knows her private benefit from corruption, but the commoners can only tell whether the surcharges are really needed based on a private signal. If the signal reveals a sufficiently high probability that the public goods are not needed, the

¹ The abolition also has a selection effect: those who nevertheless aspired to become government officials had to obtain a modern education in urban areas (Esherick, 1976). As they move out, quality of local public servants worsens. We present a theoretical model that derives the main hypothesis in section 5.

² On average, 5 percent of *Shengyuan* could become *Juren* throughout their lifetimes, but the odds varied greatly across regions. Hence, these odds capture the lower gentry's conceived probability of moving up the social ladder, and such perceptions could last for a long time. Similarly, Bai and Jia (2016) measured POUM for commoners by the *Shengyuan* quota per capita. Chen, Kung and Ma (2018) find that *Jinshi* density shaped attitudes toward education in contemporary China. Table A2 shows that the probability to become upper gentry remains stable over time.

commoners will protest the surcharges with some chance of success. In this situation, upward mobility gained from the civil service exam provides a deterrence mechanism for corruption: a more corrupted gentry is more likely to fail the performance evaluation due to successful protest and hence lose the opportunity of obtaining higher status. As a result, the impact of abolition on the incentives of lower gentry is greater in areas where they anticipate a greater POUM before the abolition because this means a greater deterrence effect of triggering commoners' protest over surcharges. Our model also shows that the exam abolition triggers a process of adverse selection in lower gentry such that those who remain serving the public in the rural areas are likely those who pursue private gain from public service provision.

Then we take the model to the data and test its empirical implications. Firstly, we find evidence that the areas with higher POUM before the abolition witness a significant increase in protests particularly induced by surcharges and protests targeting on local public services explicitly financed by surcharges (e.g., local granaries or modern schools) after the abolition. Secondly, we find evidence that the impact of POUM is greater in a prefecture subject to stricter government monitoring where the deterrence effect of protests is larger, measured by proximity to Beijing and access to telegraph network. We also find a larger effect of POUM in regions with a stronger presence of clan organisations and more temples which facilitate the collective actions of commoners. Finally, we find some preliminary evidence supporting the selection effect of the *keju* abolition on lower gentry: for those prefectures with a greater POUM, there is a larger outflow of rural talents into modern institutions in urban areas, reflected in an increase of per capita enrolment in modern military colleges, secondary schools, and merchant assemblies. These results imply a worsened pool of public service candidates in rural areas.

Our paper contributes to the recent literature on the political economy of the *keju*. This exam traditionally provided commoners from a humble background with a "ladder of upward mobility" (Ho, 1962). Bai and Jia (2016) find that following the abolition of the exam in 1905, commoners in areas with higher prospects of moving up into lower gentry were more likely to participate in revolution as it was too costly for them to switch to modern education. Cantoni and Yuchtman (2013) argue that although a modern education provides higher social returns than a traditional one, the state hesitated to abolish the exam because doing so would be detrimental to elites' interests due to prior heavy investment in traditional human capital. This argument suggests that gentry members should display discontent with the state once the exam was abolished. By focusing on how abolition affects the lower gentry in rural areas and the commoners, our paper complements the work of Bai and Jia (2016), broadening our perspective of how the exam abolition laid the seeds for the collapse of Qing dynasty. Our study also complements Cantoni and Yuchtman (2013) by showing evidence that the exam abolition encouraged elites to invest in modern education, which is consistent with the implication of their model about the critical role of government policies. However, our study additionally highlights the costs of the abolition, as reflected

in the worsening incentives of lower gentry in local public goods provision, alongside the diluted pool of local elites in rural areas. Overall, our study provides a new perspective as to why the exam was critical for social stability in imperial China and a new channel of how the exam abolition led to social unrest.

Furthermore, this paper adds to a large existing literature on the failure of political modernisation in late Imperial China and the institutional origins of the Chinese revolution (Moore, 1966; Skocpol, 1979; Jin and Liu, 2001). Many studies have paid attention to upper elites in the urban areas who dominated various bodies of representation and prompted the political turnover from the Qing dynasty to the Republic regime (Chang, 1982; Esherick, 1976). Some historical studies discuss the existence and consequences of the deterioration of lower elites in rural areas from the early 20th century (Fairbank, 1987; Wang, 2008), but fail to offer systematic evidence. We are among the first to provide the causal linkage between the exam abolition and the decay of lower gentry after 1905. This finding also sheds light on the roots of the Chinese communist revolution, since as argued by Jin and Liu (2001), the rise of bad gentry in rural areas set the stage for the Chinese Communist Party to fuel a social revolution.

Lastly, our findings contribute to a growing literature on the role of incentivising political agents to improve governance performance (Besley, 2005).³ Besley (2004) offers a theoretical prediction that an increase in wage increases the performance of politicians, which was subsequently tested by several empirical studies (Ferraz and Finan, 2011; Fisman et al. 2015; Gagliarducci and Nannicini, 2013). Niehaus and Sukhtankar (2013) find that prospective rents in the future deter corruption today. Bertrand et al. (2019) show that the career incentive of reaching the top of a public organization is a powerful determinant of bureaucrat performance. In a historical context, our study provides evidence that a loss of career prospects (hence future payoff) damages the incentives of semi-public agents and leads to a deterioration in local governance.

The rest of the paper is organized as follows: Section 2 briefly describes the historical background. Section 3 describes the data sources. Section 4 introduces the empirical strategy, reports the main results, and provides robustness checks. Section 5 presents a theoretical model. Section 6 explores heterogeneity of impacts and selection effects. Finally, Section 7 concludes.

2. Historical background

2.1 Career prospects and constraint of lower Gentry under the exam system

In late imperial China, the majority of formal taxes were submitted to the central government to finance national defence, government salaries, imperial roads and major river works (Wang, 1973). Thus, the county magistrates had very limited funds at their

³ Finan, Olken and Pande (2015) provide a survey on field experiments studying the selection, incentives and monitoring of civil servants. For more recent review on political selection, see Dal Bo and Finan (2018).

discretion and had to cede the provision of local public goods to the hands of local gentry (Brandt et al. 2014). These public goods included roads, waterworks, local granaries, small-scale famine relief, charities, private academies, community schools, and hosting rituals or sacrifices (Ch'u, 1962). During the devastating Taiping Rebellion (1851–1865), local gentry stepped up and took the responsibility of organising local self-defence against domestic rebels (Kuhn, 1970).

These activities were financed by private donations and quasi-taxes collected by the local elites from commoners, yet the local gentry retained a portion of these funds as personal income (Rankin, 1986).⁴ The POUM for lower gentry (*Shengyuan*) to become upper gentry (*Juren*) is critical for constraining behaviour in rural areas. This is because, (1) it was a large increase in social and economic status for a *Shengyuan* to get promoted to a *Juren*, and (2) a *Shengyuan's* behaviour in local public service was crucial to maintaining their candidacy towards higher degrees. First, while *Shengyuan* consisted of only 3% of the male population, fewer than 5% of *Shengyuan* could pass the very competitive provincial exam to be promoted to upper gentry (*Juren*) within their lifetime. While a *Shengyuan* had a set of legal privileges including exemption from corvée service, a *Juren* was eligible to hold official positions, with the ability to speak about public affairs directly to county magistrates, or even provincial governors (Ho, 1962). While a *Shengyuan* made his living on providing public services and teaching as a private tutor, *Juren* obtained lucrative economic returns from holding positions and taking shares in business, notwithstanding earning great social prestige. It is estimated that the average income of a *Juren* was 30 times that of a *Shengyuan*, and the average income of a *Shengyuan* 6 times that of a commoner (Chang, 1962). Table 1 summarizes the social and economic status of commoners, lower gentry and upper gentry.⁵

Secondly, a *Shengyuan* had to pass a performance evaluation by county magistrates and education supervisors to keep their current status and candidacy to take higher exams. If a *Shengyuan* failed this evaluation through an accusation of corruption, the supervisors could strip him of his titles so that he would lose all the privileges and candidacy for higher exams (Hsiao, 1967). More importantly, the county magistrates were incentivised to enforce the supervision. Suppose a *Shengyuan* over-collected quasi-tax, then dissatisfied commoners would organise a protest. A protest incurred real costs not only to the *Shengyuan* who was responsible, but also to the county magistrate who need to expend effort to dampen the protest in order to avoid punishment from the upper government (Ch'u, 1962).

In sum, a *Shengyuan's* behaviour in providing public goods was tied to his career prospect. More importantly, a greater chance of moving up was associated with a greater potential loss from misbehaviour as a lower gentry in public service, so the less likely he would choose to corrupt.

⁴ Contemporary policy-makers held the view that outsourcing public services to local elites was crucial to improving local governance and maintaining social stability (Feng, 1883).

⁵ Candidates within a county competed for a fixed *Shengyuan* quota. For the provincial exam, 10,000 to 50,000 *shengyuan* within a province gathered at the provincial capital to compete for 30-150 higher degrees (*Juren*) every two or three years.

[Table 1 here]

2.2 The impact of abolition on career prospects of various social groups

After China's defeat against the West in the Boxer Rebellion, the Qing state was determined to reform the elite recruiting system. Along with the abolition in 1905, the dynasty attempted to switch to a Western-style education system and recruit government officials holding modern degrees. Although the abolition directed talents towards modern knowledge and skills, and facilitated the spread of modern industry (Bai, 2019), it shackled social mobility in many other aspects. For most commoners from humble backgrounds, modern education was much more expensive than under the traditional system. Hence, their upward mobility was blocked. Bai and Jia (2016) find that a greater upward prospect of commoners (to become *Shengyuan*) was associated with greater revolutionary participation.

The effect of abolition on existing elites was more complicated. The upper gentry was unaffected until the demise of Qing in 1911. They continued to hold government positions or were elected as provincial congress members until. Those *Jinshi* and *Juren* who obtained college degrees, particularly from overseas universities, were exceptionally popular for new governmental recruits (Wang, 1960).

By contrast, most traditionally educated people (including *Shengyuan*), comprising 5-20% of male population in the rural area, did not have the financial resources or social networks to obtain a modern tertiary education. Indeed, throughout the 1910s, fewer than 20,000 individuals graduated from domestic and overseas colleges. Instead, modern secondary schools were a major outlet for those trying to move up the social ladder. More than 300,000 people graduated from such schools from 1900-1910.⁶ Military schools which trained military officers acted as another alternative. In an era when China was building its modern army, military talents were highly demanded.

Nonetheless, while graduates of modern schools remained in urban areas and never returned to their rural homes (Luo, 2006), the majority of the lower gentry stayed in their hometowns and continued to provide public services.⁷

2.3 Worsening of local governance in rural areas

In 1902, the Qing court launched a 'New Deal' Campaign, instigating general elections to form representative bodies all over China. Although the upper gentry presented at provincial congresses in provincial capitals, the lower gentry staffed county-level and sub-county-level councils. More importantly, the state authorised local elites to establish four bureaus of county self-government: (1) education, (2) police, (3) finance and (4) enterprises,

⁶ Such a degree was much cheaper than a college degree to obtain, and equipped a graduate with necessary skills to work in banking, law, social media, and other modern industries.

⁷ In addition, a large portion of lower gentries who were either too poor or too old, in terms of age and knowledge, chose to stay in rural areas for private tutoring. In 1908, there were only 300,000 modern primary schools in China, over two-thirds of which were in rural areas. There were many private tutors in rural areas, at least five times the number of primary school teachers, who taught traditional content, such as basic writing and calculation.

requiring branches in towns and villages. In addition, local elites could confiscate public properties and levy surtaxes to establish modern primary schools (Hao and Xue, 2017). At this time, the lower gentries were empowered with the ability to tax, and thus provided with more opportunities to embezzle and predate.

Even worse, the exam abolition in 1905 removed the previously imposed constraint on lower gentry, rendering the link between upward mobility and performance in public goods provision inactive. No matter what they did and how the county magistrates evaluated them, the only way to improve career prospects was through obtaining modern education. As more and more local elites left to cities to pursue modern education, the agents who remained engaged in rural public services were those most attracted to the chances of rent extraction. As a commentator observed (Liu, 1920):

“When the county magistrate entrusted local gentry to handle ‘local autonomy’, the man of virtue stayed away, whereas despicable ones, such as former clerks, stole the position by bribing the magistrate or voters ... As agents or councilmen, they colluded to divert and embezzle public funds in favour of their own interests.”

Consequently, after 1905, there emerged furious actions on the part of commoners, such as protests over quasi-taxes, burning down the gentry’s houses, demolishing the buildings of government bureaus, destroying modern schools or police stations, and robbing local grain granaries or stores. Before the exam abolition, protests towards the gentry were relatively rare; what was much more common to observe was tax protests led by the gentry against predatory state officers and their voracious agents (Wu, 2011). In summary, it was not elite discontent that drove social turmoil after 1905 but instead, the newly empowered and predatory local elites stirred the commoners’ protests against the gentries in rural areas.

Based upon the above historical observations, we propose our major hypothesis about the effects of the exam abolition as follows. The disruption of a traditional career path worsens the incentives of the lower gentry, who remained in the countryside to serve their communities. An empirical implication of this hypothesis is that in the areas more greatly affected by the exam abolition, as measured by the interaction between a higher POUM and the post-abolition dummy, we should observe a larger increase in the frequency of anti-gentry protests after 1905. We will test this major hypothesis in Section 4, subsequently presenting a theoretical model to rationalize these mechanisms.

3. Data and motivating evidence

In this section, we introduce the data from a variety of sources required for empirical tests and outline the construction of the gentry’s upward prospect. Table A1 reports the summary statistics for main variables. Before conducting formal empirical analysis, we offer descriptive graphs demonstrating the correlation between the exam abolition and anti-gentry protests.

3.1 Data

Anti-gentry protests: Our main source of information on protests is ‘*The Chronology of Civil Protests in the Late Qing Dynasty*’, edited by two historians Zhang and Ding (1982). This dataset records 1,511 incidents of revolts in the last ten years of the Qing empire (1902–1911), including information on the time, location, cause and participants of each protest. We carefully classify these incidents into different types according to their main targets and triggers. In total, 619 incidents can be classified as anti-gentry protests.⁸ They were usually induced by the over-extraction of new surcharges, and by the encroachment on local public assets by the lower gentry in the local autonomy campaign (Prazniak, 1999; Wang, 2008). Apart from these incidents, anti-Christian protests, anti-government revolts, and strikes are classified for placebo tests. In addition, data on gang rebellion as another type of conflict is taken from Cheng-yun Liu (1992). We then calculate the yearly frequency of protests at the prefecture level, which is our main dependent variable in the empirical test. The average yearly frequency of anti-gentry protests per prefecture is 0.236. Figure 2 maps the spatial distribution of anti-gentry protests, showing a significant difference in spatial variations before and after the exam abolition.

[Figure 2 here]

During China’s first decade of twentieth century, the destruction of modern schools was a special action to express dissatisfaction against the local gentries, who frequently taxed the commoners to finance the construction of these schools. Information of this action is collected from Tian and Chen (2009).⁹

The prospect of upward mobility (POUM) for lower gentry: To measure the cross-regional prospect of upward mobility for the lower gentry, we construct a passers-candidates ratio, which comprises the total number of *Juren* from 1875 to 1905 who successfully passed the provincial-level exam, divided by the total number of candidates for provincial exam in this same period.¹⁰ In China’s imperial civil exam system, the numbers of eligible candidates and successful passers at each exam level were controlled by a quota system. The number of candidates (*Shengyuan*) becoming the lower gentry was assigned at the county-level, whereas the number of exam passers (*Juren*) becoming the upper gentry was allocated at the provincial-level. In the provincial exam, candidates from all prefectures and counties within a province competed freely because no quota of *Juren* was assigned to each county. This passers-candidates ratio hence directly measures the relative performance of the lower gentry on the provincial-level exam.¹¹

⁸ Focusing on the effect of the exam abolition on local governance in rural area, we drop any anti-gentry riots in cities. We also record whether there are attacks on tax-collection agencies and whether there is killing violence in a riot.

⁹ Although our sample period ranges from 1902 to 1911, the data on the occurrence of school destruction covers the period of 1904–1911.

¹⁰ We calculate the total number of candidates by the candidate quota multiplied by the frequency of exams. From 1875 to 1905, the province-level exams were held 13 times across the country. The quota of *Shengyuan* candidates varied before and after the 1870s due to the Taiping Rebellion. For consistency, we use the number after the 1870s to construct the JQ (what is JQ) ratio.

¹¹ An individual candidate’s perceived probability of moving to the upper gentry is closely related to

The *Juren* data is collected from provincial and county gazetteers. The data on candidate quotas, provided by Bai and Jia (2016), is collected from ‘*The Imperially Established Institutes and Laws of the Great Qing Dynasty*’ (Kun et al. (1899)). Figure 3 maps the spatial distribution of the passers-candidates ratio across 262 prefectures in 18 provinces, demonstrating the great variation across regions.¹² The mean and standard deviation of the ratio are 0.042 and 0.038, respectively. We use the logged passers-candidates ratio in our empirical analysis. In addition, using information on the upper gentry, who succeeded in the highest-level exams (i.e., *Jingshi*) and became high-rank officials, we construct analogous measures of POUM for the upper gentry: *Jinshi/Juren* and government officials/*Jinshi*. These variables come from the data appendix of Bai and Jia (2016)¹³

[Figure 3 here]

Prefecture characteristics. From a variety of sources, we collect a rich dataset on regional characteristics for robustness checks and heterogeneity analysis. In our baseline estimation, we include several control variables for the following reasons (see Table A1 for the data sources and summary statistics). First, the exam abolition also affects POUM for commoners so, following Bai and Jia (2016), we use the *Shengyuan* quota-to-population ratio to control for the potential influence. Second, to control for the potential influence of geographical features, we include two dummy variables for whether a prefecture is situated on the coast or covers one or more major rivers. Third, we use treaty port indicators to control for the possible influence of western institutions and religion. Fourth, because the incidence of protests might also be correlated with economic conditions, we control for the urbanisation rate at the prefecture level, using Gilbert Rozman’s (1973) three-type classification of Chinese cities.

We further use a series of additional prefecture characteristics in robustness checks: the number of revolutionaries who were also a consequence of the abolition (Bai and Jia, 2016), linguistic fragmentation and polarization index based on dialect data (Wurm et al., 1987)¹⁴, disaster weather and weather volatility (State Meteorological Society, 1981)¹⁵, and the number of high-rank officials in 1905 from each prefecture to proxy for the strength of political connections. We also measure the political importance of a prefecture using the

the observed performance by his fellow lower gentry, provided that relative performance across regions remained stable for long periods. Figure A1 plots the share of exam passers, *Juren*, from a prefecture within province in 1851-1905, against that in 1801-1850. The correlation is nearly one, implying that the relative exam performance in late Qing period changed little in 100 years. In Table A2, we further show that the share of *Juren* in the late Qing period (1851-1905) was almost the same as that in different earlier periods, confirming the stability of relative exam performance.

¹² The passers-candidates ratio varies from 0.29 in the most successful region (Fuzhou) to zero (where?)

¹³ Originally obtained from Zhu and Xie (1980), and Qian (2005), who listed the name and county of origin of all presented scholars and all key officials).

¹⁴ Hao and Xue (2017) find that during this period, diversity played a negative role in local public good provision (e.g., modern primary schools).

¹⁵ As argued by Scott (1976), risk-averse peasants are more vulnerable and more likely to revolt in an environment with high climate risk.

designations by the Qing government indicating the characteristics of a prefecture: *chong* (important in transportation), *fan* (important in business), *pi* (difficult to tax), and *nan* (high crime rate) (Liu, 1993). Finally, we use the yearly grain price index (based on the Qing grain price digital dataset constructed by Yeh-Chien Wang, 2014) to control for the effect of living costs.

In addition, to address the concern of several alternative explanations (see section 4.3), we use proxy variables for the extent of state extraction, including province-level fiscal income and expenditure data in 1908 (Zhou, 2000), and the number of commercial tax (*lijin*) bureaus and commercial tax stations (Luo, 1936). As proxies for human capital, we use the number of Confucian Academies built in the Qing period from Xiaofeng Ji (1996) and the number of notable book authors from Qingbai Jiang (2005). Both variables are normalised by population size. For the gentry's authority against commoners in relation to their connection with incumbent officials, we use the data on the hometown of officials from the *China Government Employee Database-Qing* constructed by Campbell et al. (2019).

Modern career choices for lower gentry: After the exam abolition, there was a variety of modern career paths typically for those in the lower gentry with strong motivation for public service, including overseas study, modern secondary school, military college, and merchant chambers. We collect data on these career choices from a variety of data sources: the list of overseas students arriving to Japan and Peking University from Zhaoying Fang (2006), the list of Baoding Military College students from Yuhuan Chen (2006), and the members in merchant chambers compiled from *Agriculture and Business Statistics of the Republic of China*. We also include the number of modern secondary students in the period 1907–1909 from the first, second, and third reports on modern education by the *Ministry of Education of the Republic of China*. We calculate enrolment or membership of these educational and political institutions in each prefecture as proxies for the strength of selection by the lower gentry triggered by the exam abolition.

3.2 Descriptive correlation between upward prospect and protests

Before conducting the formal empirical analysis, we now present some suggestive evidence linking the prospect of upward mobility (POUM) for the lower gentry with anti-gentry protests before and after 1905. Figure 2 shows the regional distribution of protests and Figure 3 the regional distribution of POUM. The intensity of colour represents the frequency of protests. As illustrated in Panel A of Figure 2, the anti-gentry protests were not popular before the exam abolition. A comparison of the maps of protest incidents in the pre-abolition period (Panel A) and post-abolition period (Panel B), reveals that the pattern of spatial distribution changed dramatically after the year of the abolition in 1905. Both Figure 2 and 3 demonstrate a striking finding: the prefectures with a higher frequency of anti-gentry protests in the post-abolition period coincide with those prefectures that had better career prospects (as measured by POUM) for the lower gentry before 1905. The correlation is particularly strong in the eastern area of China. This finding suggests that the increase in

anti-gentry protests is associated with the reduction in upward mobility induced by the sudden exam abolition.

Furthermore, Figure 4 presents the plot of aggregate trends in incidences of anti-gentry protests over time. To capture the effect of POUM, we divide into two all the sample prefectures to create a high-prospect group (prefectures with POUM above the median) and a low-prospect group (prefectures with POUM below the median). This figure shows that there was no obvious gap between the two groups before the exam abolition. However, after the abolition, a divergence emerges. Despite a short decrease in 1908, the number of anti-gentry protests in the high-prospect group remarkably started to climb after 1905, which coincides with the exam abolition. This finding is consistent with the spatial coincidence of POUM and protests in the post-abolition period. In support, Figure 3 suggests that parallel trends appear to be in place before the abolition.

[Figure 4 here]

Taken together, Figures 2, 3 and 4 provide suggestive evidence that the variation of anti-gentry protests after the abolition is positively correlated with POUM for the lower gentry.

4. Empirical results

In this section, we introduce the empirical strategy, report the main results, and provide robustness checks.

4.1 Empirical strategy

We exploit cross-prefecture variation in the prospect of upward mobility for the lower gentry and over-time variation in the exam abolition to identify whether anti-gentry protests were affected by the exam abolition. We use a standard Differences-in-Differences (DID) strategy to examine the effect of POUM for the lower gentry before and after the abolition. Our baseline specification is the following:

$$y_{it} = \alpha + \beta \ln POUM_i \times Post_t + \gamma X_i \times Post_t + \delta_i + \theta_t + \lambda_{prov} \times \theta_t + \epsilon_{it} \quad (1)$$

where y_{it} is the number of anti-gentry protests in prefecture i in year t . $Post_t$ is a dummy variable indicating the year after the exam abolition, which equals one after 1905, and $\ln POUM_i$ is the logged POUM as a proxy for the career incentive of local elites. δ_i are prefecture fixed effects, controlling for all time-invariant differences between prefectures. θ_t are year fixed effects capturing the common shocks in a particular year that affect all prefectures. In addition, we control for flexible provincial-specific time fixed effects by using the interactions of province dummies and year dummies ($\lambda_{prov} \times \theta_t$), helping us address potential confounding factors at the provincial level. X_i includes the series of prefecture-level control variables discussed in Section 3.4. These variables include: (1) logged population and (2) logged quota/pop ratio, both as controls for POUM for commoners. Additionally, we include (3) the number of provincial senators, (4) dummies for whether

the prefecture is located on the coast or major river, (5) a treaty port dummy controlling for the potential influence of western institutions, and (6) dummies for urbanisation levels as proxies for economic prosperity.¹⁶ β is the coefficient of interest, capturing the effect of a disruption in career paths on anti-gentry protests. To address the potential serial correlation of the error term, we cluster the standard errors at the prefecture level for all specifications.

4.2 Baseline results and dynamic of impacts

The baseline results are presented in Table 2. Column (1) reports the simple DID estimation including only year and prefecture fixed effects. Column (2) adds the logged quota/pop ratio to control for the possible effect of upward prospect for commoners.¹⁷ The results show that those prefectures with a higher POUM for the lower gentry did experience a higher increase in anti-gentry protests after the exam abolition. In column (3), we include the interaction of the post-1905 dummy with the set of control variables in X_i . The effect of POUM remains significant, although the magnitude of the coefficient decreases from 0.165 to 0.122 (See column (1) vs column (3)). Column (4) presents our preferred specification which includes a full set of control variables and provincial-year fixed effects, showing the estimated β as 0.134. In terms of magnitude, an increase of one standard deviation in logged POUM (0.838) is associated with 0.112 more incidents of anti-gentry protests. This effect accounts for nearly half (48%) of the overall anti-gentry protests, of which the mean frequency is 0.236 during the period 1902–1911.

[Table 2 here]

The main identification assumption in equation (1) is that there is no systematic difference in the trends of the outcome variable among prefectures with different POUMs before the treatment (i.e., the exam abolition in 1905). The overall temporal pattern of anti-gentry protests from Figure 4 exhibits a parallel trend before the treatment. To formally test the parallel trend assumption of the DID approach, we examine whether there are any different trends in prefectures with different POUMs before the abolition. We estimate the dynamic effects using the following specification:

$$y_{it} = \alpha + \sum_{\tau=1903}^{1912} \beta_{\tau} \ln POUM_i \times Year_{\tau} + \sum_{\tau=1903}^{1912} \gamma_{\tau} X_i \times Year_{\tau} + \delta_i + \theta_t + \lambda_{prov} \times \theta_t + \epsilon_{it} \quad (2)$$

where the year 1902 is omitted as the reference year. The coefficient β_{τ} identifies the effect of the POUM in year τ , compared with t. We also include interaction terms between the

¹⁶ From the mid-18th century, treaty ports were forced to open because of treaties between China and Western countries after the Opium Wars, in which Western countries had great extraterritoriality. Jia (2014) finds that the treaty ports system has had long-term effects on development. Urbanisation rate is often used to proxy for economic prosperity prior to the industrial era (e.g., Acemoglu, Johnson and Robinson (2002, 2005); Nunn and Qian (2011)).

¹⁷ Bai and Jia (2016) find the effect of upward mobility for commoners on revolution participation. The effect might also impact anti-gentry protests, because these local gentry usually support and benefit from the imperial court.

controls and a set of time dummies, $Year_{\tau}$. If β_{τ} is not significantly different from zero for any year prior to the abolition ($\tau \leq 1905$), then the parallel trend assumption is satisfied.

The results on β_{τ} are displayed in Figure 5. All pre-treatment coefficients are approximately zero, and none are statistically significant, confirming that there is no systematic difference before the abolition among prefectures with different POUMs for the lower gentry. Therefore, the parallel trend assumption is indeed satisfied. Furthermore, right after the abolition, the coefficients become significantly positive and show a slightly increasing trend in magnitude. Only the effect in 1908 is insignificant, but it remains positive. The average magnitude of the effects from 1906–1911 is 0.139, similar to the baseline results.

[Figure 5 here]

4.3 Alternative explanations

In this subsection, we address several alternative explanations for our key findings above presented.

State extraction. In 1902, the Qing court launched a ‘New Deal’ Campaign. The state centralised commercial taxes, previously collected and spent at local level, into the hands of provinces. There was also a transfer to Beijing to finance modern armies and pay war indemnity. As a result, the county governments had to levy greater taxes on commoners to maintain their offices, in which the lower gentry were also highly involved (Chen, 2009). This observation raises an important question concerning the interpretation of our previous key results. Commoners might protest against the gentry to simply express their dissatisfaction over excessive state extraction, even though the incentive and selection of public agents remained intact. To check whether our results are driven by state extraction, we include the interaction of four measures of state extraction and the post-treatment dummy in our baseline regression. The results are shown in columns (1)-(2) of Table 3. In column (1), we use provincial level fiscal revenue in 1908 to measure the level of state extraction. In column (2), we use the number of commercial tax (*lijin*) stations to measure the level of state extraction. In both regressions, the estimated coefficients on state extraction are significantly positive, which means that state extraction does fuel rural protests against the local gentry. Nonetheless, the main effect of the POUM remains significant, although a bit smaller, implying that state extraction does not entirely drive the effect of the POUM we observed in the baseline regressions.

[Table 3 here]

Human capital stock. Another major concern is that our key explanatory variable, the POUM, might correlate with the level of local human capital stock,¹⁸ which could also affect riot occurrence. Therefore, the effects of the POUM might merely capture the role of human capital, rather than the disruption in career prospects. To address this threat, we construct two proxy measures of the level of human capital. First, given the important role of

¹⁸ Conceptually, the POUM reflects the success rate of the provincial exam for *Juren* qualification. Regions with better overall performance on the exam are very likely to have higher levels of human capital.

education infrastructure in determining human capital (e.g., Duflo, 2001), we use the number of Confucian Academies per capita. Second, we use the number of contemporary authors of notable books per capita. Indeed, a cross-section regression shows that the second measure is significantly higher in prefectures with a higher POUM.¹⁹ We include the interaction of these two human capital proxies and the post-treatment dummy in our baseline regression. The results are shown in columns (3) and (4) of Table 3. Column (3) shows the inclusion of logged academy per capita reduces the main effect of the POUM. In column (4), the logged number of authors shows a strong and positive effect on anti-gentry protests. Although we observe a decrease in the main effect of the POUM, it remains significant, implying that human capital does not drive the effect of the POUM we observed in the baseline regressions.

The authority of gentry. The last concern is that our key explanatory variable, the POUM, might also positively correlate with the extent to which commoners respect the gentries and treat them with obedience. Before the abolition of civil exam, the local gentries had the authority and capacity to impose quasi-taxes because they built connections with and gained political influence from incumbent officials sharing the same hometowns. Losing the exam titles and the possibility to enter the upper gentry, they no longer benefited from such connections. Subsequently, they lost the respect from the commoners, who were more likely to initiate anti-gentry protests. We explore this alternative explanation by adding the number of incumbent officials from a prefecture, interacted with post-dummy. In Table 3, column (5) uses the origin of central government officials and column (6) that of local government officials.²⁰ While the magnitude of the POUM main effect decreases, it remains significant implying that a decline in the gentry's authority does not entirely drive the result.

4.4 More robustness checks

To further check the validity of our results, we use this section to introduce more control variables for robustness checks, to provide falsification and to conduct placebo tests.

More Control Variables. To ensure that our results are not driven by confounding factors, we further expand our analysis in Table A3 to include a series of additional control variables. In column (1), we add the total number of revolutionary party members, which is also a consequence of the abolition (Bai and Jia, 2016). In column (2), we control for the potential effect of identity diversity and polarisation (Alesina and Ferrara, 2005), measured by a linguistic fragmentation and polarisation index. Column (3) includes a disaster weather index and weather volatility, column (4) adds dummies of political importance classified by

¹⁹ Specifically, a one-percentage-point increase in the POUM is associated with 0.56 percentage point increase in the number of authors of notable books per capita, conditional on a series of control variables and province fixed effects. The regression results are available upon request.

²⁰ We exclude the officials whose rank was lower than that of county magistrates (7th rank). These lower-rank officials were junior auxiliary bureaucrats and had little political power.

the government,²¹ and column (5) the grain price. From column (1) to column (5), the effect of the POUM for the lower gentry varies little from the baseline results in Table 2. Column (6) shows that the effect of the POUM remains highly significant after adding the full set of control variables described above. Robustness to the inclusion of a large set of controls alleviates specific concerns about omitted variable bias.

Falsification Tests. We have assumed that anti-gentry protest reflects the worsening of the lower gentry's behaviour, which relates to their upward prospect before the exam. If this is the case, the prospect of upward mobility for other segments of society also affected by the abolition, should have no impact on anti-gentry protests.²² The falsification test results are presented in panel A of Table 4. In column (1), we measure the POUM for commoners by $\ln(\frac{Quota}{pop})$. In columns (2) and (3), we measure the POUM for *Juren* by $\ln(\frac{Jinshi}{Juren})$, and that for *Jinshi* by $\ln(\frac{Official}{Jinshi})$. Panel A of Table 6 shows that neither the POUM for commoners nor that for the upper gentry has significant impact on protests, suggesting that the effects are only driven by the change in POUM for the lower gentry, and hence the change in their incentive and selection.

Placebo Tests. There are also concerns that the effects on anti-gentry protests might simply reflect the general environment of political instability rather than the outcome of the lower gentry's bad behaviour. If this is the case, we might find POUM has a negative impact on other types of protests and riots, such as anti-Christianity protests, strikes by workers and traders, urban petition to convene national congress, or rebellion organized by gangs. To address this concern, we implement several tests using these activities as dependent variables. Panel B of Table 4 reports the results of placebo tests. We find that none of these activities are correlated to the POUM for the lower gentry given all coefficients in columns (4)-(7) are insignificant and small in magnitude.

[Table 4 here]

5. A theoretical model

In this section, we develop a simple model to explain our empirical findings in the previous section. Consider a model with two players: a lower gentry who has already passed the lowest level exams (she) and a representative commoner (he). An allocation $a \in \{0,1\}$ must be made. The utility of the commoner u depends on the state of the world, $\omega \in \{0,1\}$, and the allocation a . The prior is that both states occur with equal probability $\frac{1}{2}$. We

²¹ The four indicators are whether a prefecture is important in transportation network, important in business, has difficulty in collecting tax, or suffered from high crime

²² Commoners might participate in revolutionary activities because their upward mobility was mostly blocked, since modern education was too costly (Bai and Jia, 2006). On the other hand, the upper gentry lived mostly in cities. If they are dissatisfied with the state, they might mobilise protests and petitions in the cities; but this will not trigger anti-gentry protests by commoners in rural areas (Zhang, 2013).

assume that $u = 1$ if $a = \omega$ and $=0$ otherwise. The utility of the gentry v is the same as u except $v = x > 0$ when $a = 1$ and $\omega = 0$.

The above model setup can be interpreted as follows. The allocation a involves the provision of local public goods through a surcharge, where $a = 1$ implies the surcharge is imposed and $a = 0$ the opposite. The commoner is willing to pay the surcharge if and only if the public goods are really needed. So, we use $\omega = 1$ to represent the state in which the public goods are needed, and $\omega = 0$ to represent the opposite state. The commoner's ideal allocation is to match a with ω as reflected by the specification of u . However, the gentry can obtain an additional utility, $x > 0$ from the surcharge even if the public goods are not needed ($\omega = 0$). We assume that x is privately observed by the gentry, and the commoner believes that x is uniformly distributed on the interval $[0,1]$.

Time proceeds as follows. The gentry first privately observes x and message $m \in \{0,1\}$ about the state ω . We assume that $\Pr(m = \omega|\omega) = \pi > \frac{1}{2}$, so the message m is an informative but imperfect signal about the state ω . Based on x and m , the gentry recommends an allocation \hat{a} to the commoner. The commoner observes \hat{a} and another message s about the state ω . We assume that conditional on the state ω , the message s is normally distributed with mean ω and standard deviation σ . So the density function

$f^\omega(s) = \frac{e^{-\frac{(s-\omega)^2}{2\sigma^2}}}{\sqrt{2\pi\sigma^2}}$ satisfies the monotone likelihood ratio property because $l(s) = \frac{f^1(s)}{f^0(s)} = e^{\frac{2s-1}{2\sigma^2}}$ is strictly increasing in s . Based on \hat{a} and s , the commoner decides whether to protest or not. Making a protest is costly for the commoner: it is assumed he has to pay cost $c > 0$, and probability of success is $\theta > c$. If the protest is successful, allocation $1 - \hat{a}$ is taken and the gentry suffers a disutility y . Otherwise, allocation \hat{a} is taken. Finally, under the civil exam system, the lower gentry also has probability β to obtain the upper gentry title via taking provincial exams, which brings value $Z > 0$ to her. But if the protest succeeds, the gentry will lose this opportunity as a punishment. Obviously, β measures POUM in our model.

We focus on characterizing the following perfect Bayesian equilibrium of the above game. The gentry will recommend $\hat{a} = 1$ when observing message $m = 1$, or message $m = 0$, but the additional utility x exceeds a threshold \bar{x} . Intuitively, when observing message $m = 1$, the gentry believes that the state is more likely to equal 1. Since $v(a = 1, \omega = 1) = 1 > v(a = 0, \omega = 1) = 0$, $\hat{a} = 1$ is recommended. In contrast, when observing message $m = 0$, although the gentry believes that the state is more likely to equal 0, she still recommends $\hat{a} = 1$ so long as the additional utility from surcharge is high enough. Fully anticipating the gentry's strategy, the commoner adopts the following strategy: when the gentry recommends $\hat{a} = 1$, the commoner will make a protest if he observes a sufficiently low signal $s < s_1$ and hence believes that state $\omega = 0$ is very likely; when the gentry recommends $\hat{a} = 0$, the commoner will make a protest if he observes a sufficiently high signal $s > s_0$ and hence believes that state $\omega = 1$ is very likely. So, the characterisation of the equilibrium involves solving the three cut-offs: \bar{x} , s_0 , and s_1 .

We follow the standard procedure to solve the equilibrium cut-offs. First of all, given the gentry's strategy, we can calculate the commoner's posterior belief about $\omega = 1$ when observing message s and recommended action \hat{a} using Bayes rule:

$$(1) \quad \rho(s, \hat{a} = 0) \triangleq \Pr(\omega = 1 | s, \hat{a} = 0) = \frac{(1-\pi)l(s)}{(1-\pi)l(s)+\pi};$$

$$(2) \quad \rho(s, \hat{a} = 1) \triangleq \Pr(\omega = 1 | s, \hat{a} = 1) = \frac{[(1-\pi)(1-\bar{x})+\pi]l(s)}{[(1-\pi)(1-\bar{x})+\pi]l(s)+1-\pi+\pi(1-\bar{x})}.$$

Based on the gentry's strategy, the commoner knows $m = 0$ for sure when the gentry recommends $\hat{a} = 0$, and hence the belief about $\omega = 1$ is $1 - \pi$. This belief together with the message s observed by the commoner will induce posterior belief $\rho(s, \hat{a} = 0)$ defined by Equation (1). When the gentry recommends $\hat{a} = 1$, the commoner believes that $\omega = 1$ occurs with probability $\frac{(1-\pi)(1-\bar{x})+\pi}{2-\bar{x}} < \pi$ because the gentry may recommend $\hat{a} = 1$ when $m = 0$ and $x > \bar{x}$. We can immediately derive Equation (2) using this updated belief.

When the gentry recommends $\hat{a} = 0$, the commoner decides to make a protest if and only if:

$$\theta\rho(s, \hat{a} = 0) + (1 - \theta)(1 - \rho(s, \hat{a} = 0)) - c \geq 1 - \rho(s, \hat{a} = 0).$$

Without a protest, $\hat{a} = 0$ is the final action and the commoner's expected utility is the probability of $\omega = 0$, $1 - \rho(s, \hat{a} = 0)$. If the commoner pays a cost c to make a protest and the protest succeeds with probability θ , the expected net utility is $\theta\rho(s, \hat{a} = 0) + (1 - \theta)(1 - \rho(s, \hat{a} = 0)) - c$. Therefore, the commoner will make a protest if and only if $\rho(s, \hat{a} = 0) \geq \frac{\theta-c}{2\theta} > 0$. Using Equation (1), we can derive the cutoff s_0 to satisfy:

$$(3) \quad l(s_0) = \frac{\pi}{1-\pi} \times \frac{\theta+c}{\theta-c}.$$

Similarly, we can solve s_1 to satisfy:

$$(4) \quad l(s_1) = \frac{1-\pi+\pi(1-\bar{x})}{(1-\pi)(1-\bar{x})+\pi} \times \frac{\theta+c}{\theta-c}.$$

Finally, at \bar{x} , the gentry is indifferent between recommending $\hat{a} = 0$ and $\hat{a} = 1$. This implies:

$$(5) \quad \Xi_1(\bar{x}, s_0) = \Xi_2(\bar{x}, s_1),$$

where

$$\begin{aligned} \Xi_1(\bar{x}, s_0) = & \pi F_0(s_0) + \pi(1 - \theta)(1 - F_0(s_0)) + \theta(1 - \pi)(1 - F_1(s_0)) + \theta\pi(1 - F_0(s_0))\bar{x} - \\ & \theta[\pi(1 - F_0(s_0)) + (1 - \pi)(1 - F_1(s_0))](y + \beta Z) \end{aligned}$$

and

$$\begin{aligned} \Xi_2(\bar{x}, s_1) = & (1 - \pi)F_1(s_1) + (1 - \pi)(1 - \theta)(1 - F_1(s_1)) + \theta\pi F_0(s_1) + [\pi F_0(s_1) + \\ & \pi(1 - \theta)(1 - F_0(s_1))]\bar{x} - \theta[\pi F_0(s_1) + (1 - \pi)F_1(s_1)](y + \beta Z). \end{aligned}$$

Equations (3)-(5) constitute a system of equations about three unknowns: \bar{x} , s_0 , and s_1 . After plugging Equation (3) and (4) into Equation (5), we obtain an equation about \bar{x} . We can numerically solve this equation and Figure 7.1 plots how POUM β affects \bar{x} . It is not surprising to see that \bar{x} is positively associated with β . This reflects the deterrence effect of future career concerns. A higher β implies a higher loss to the gentry when there is a successful protest. As a result, the gentry will avoid protest by increasing \bar{x} , which implies that the gentry is less likely to recommend $\hat{a} = 1$ when receiving message $m = 0$.

Figure 7.2 plots the changes in the probability of protest after the abolition of the civil service exam as a function of β . The abolition of the civil exam reduces β to zero and hence affects both \bar{x} and the probability of protest. This figure plots the difference of protest probability before and after the civil exam abolition. We differentiate two different protests: the first is the protest when the gentry recommends $\hat{a} = 0$ (i.e., protest over doing nothing); while the second is the protest when the gentry recommends $\hat{a} = 1$ (i.e., protest over surcharge). We use ΔPr_1 (resp. ΔPr_2) to denote the change in the probability of the first (resp. second) protest. It is interesting to note that changes in POUM β have opposite effects on ΔPr_1 and ΔPr_2 .

First of all, Figure 7.2 shows that $\Delta Pr_1 < 0$ is decreasing in β while $\Delta Pr_2 > 0$ is increasing in β . Intuitively, as seen from Figure 7.1, the civil exam abolition will lead to a lower \bar{x} : when receiving message $m = 0$, the gentry is less likely to recommend $\hat{a} = 0$ and more likely to recommend $\hat{a} = 1$. As a result, the probability of the first protest decreases after the abolition and is decreasing in β (as a higher β leads to a larger reduction of \bar{x}), while the probability of the second protest increases after the abolition and is increasing in β .

Secondly, the magnitudes of ΔPr_1 and ΔPr_2 are also very different. This is because the commoner's cutoff for the first protest, s_0 , does not change with \bar{x} , as seen from Equation (3). So, the change in ΔPr_1 is purely driven by the fact that the gentry is less likely to recommend $\hat{a} = 0$. In contrast, the commoner's cutoff for the second protest, s_1 , changes with \bar{x} . As \bar{x} decreases, the commoners are also more likely to make a protest when observing $\hat{a} = 1$. This makes ΔPr_2 much more significant in magnitude than ΔPr_1 . This also justifies our empirical investigation of the second protest.

In the following figures, we focus on the second protest and plot how ΔPr_2 changes with β under different parameter values. Figure 7.3 shows that as the probability of having a successful protest θ increases, the effect of the civil exam abolition on the increase of surcharge protest probability becomes larger. Figure 7.4 shows that as the cost of protest c decreases, the effect of the civil exam abolition on the increase of surcharge protest probability becomes larger. We relate the parameter θ to state monitory capacity. With greater state monitory capacity, the state becomes more likely to conceive and punish the lower gentry's corruption when a protest occurred, which means a protest is more likely to be successful. We relate the parameter c to costs of collective actions. With lower costs of collective actions, the commoner is more likely to protest when the gentry recommends $\hat{a} = 1$.

We have demonstrated that under exam system the expected loss for the lower gentry to corrupt (i.e., to collect surtax when it was not needed) is a product of the likelihood of protest, the likelihood of protest being successful, the prospect upward mobility for the lower gentry (POUM), and the future rents from being an upper gentry. Three things follow:

Corollary 1: *The exam abolition made the lower gentry more likely to over-collect surcharge when it was not needed (higher \bar{x}) and hence the commoners were more likely to make a protest to*

surcharges. Since the opportunity cost of over-collecting surcharges was greater with a higher POUM before the exam, the abolition led to a greater increase in such behaviours and a greater increase in protests with greater POUM.

Corollary 2: *The marginal effect of POUM on the expected loss was increasing in the likelihood of protest being successful. With greater state monitory capacity, the state was more likely to conceive and punish the lower gentry's corruption once a protest occurred, which means a protest is more likely to be successful. After abolition, this 'deterrence' mechanism was deactivated. Therefore, the impact of POUM on anti-gentry protest post-1905 should be larger with greater state monitory capacity.*

Corollary 3: *The marginal effect of POUM on the expected loss was increasing in the likelihood of protests. With lower costs of collective action, commoners were more likely to protest, all else equal. After the abolition, this 'deterrence' mechanism was deactivated. Therefore, the impact of POUM on anti-gentry protest post-1905 should be larger with lower costs of collective action.*

A straightforward extension of our model is to include an outside option yielding utility \bar{V} , which could be interpreted as utility gained from taking other professions other than being a gentry. A gentry will participate in local public goods provision only when the resulting expected utility is higher than \bar{V} , or equivalently when the additional utility x exceeds another threshold \underline{x} . This participation constraint implies that the support of x changes from the interval $[0,1]$ to the interval $[\underline{x}, 1]$. As a result, Equation (4) changes to:

$$(6) \quad l(s_1) = \frac{1-\pi+\pi\frac{1-\bar{x}}{1-\underline{x}}}{(1-\pi)\frac{1-\bar{x}}{1-\underline{x}}+\pi} \times \frac{\theta+c}{\theta-c}.$$

Due to the civil service exam abolition, the expected utility from being a gentry decreases by βZ , and hence the cut-off \underline{x} has to increase to satisfy the participation constraint. Since the right-hand-side of Equation (6) is increasing in \underline{x} , this ultimately implies that s_1 will increase after the civil service exam abolition. Hence, the commoners were more likely to protest against surcharges. The above discussions ultimately imply another selection effect of POUM:

Corollary 4: *With the gentry's participation constraint, greater POUM led to a more severe exit of the lower gentries, which made the impacts on protest against surcharges even stronger.*

6. Further tests motivated by the model

In section 5, we developed a theoretical model to rationalise the linkage between the exam abolition and anti-gentry protests. We cannot claim that the story described by our model is the only interpretation for the observed fact about the effect of abolition on anti-gentry protests. Nevertheless, we can use our data to test the validity of the four testable corollaries derived from the model to increase our confidence on the proposed story. We provide evidence on these four corollaries respectively.

6.1 Evidence on surcharges

According to corollary 1, in areas with greater POUM, the abolition led to a greater increase in collection of surcharges and higher frequency of anti-gentry protests. To test this corollary, we choose the number of various surcharge-related protests or angry actions from commoners as alternative dependent variables. In column (1) of Table 5, we identify those protests that are explicitly documented as “excess collection of surcharges” as the direct trigger of the protests. In column (2), we use the number of those protests with explicit target of surcharge agencies as the dependent variable. Column (3) reports the result on protests at local grain granaries which were managed by the local gentry and financed by surcharges (Hsiao, 1967). In column (4), using another data source, we test the incidents of destroying modern schools which were financed by the surcharges on commoners.²³ In all these specifications, we find positive and sizable effects of POUM after the abolition, suggesting that the abolition triggered a worsening of incentives of the lower gentry on surcharge collection, which in turn led to protests against them.

6.2 The impact of state’s monitoring

As shown in corollary 2, our theoretical model predicts that the impact of POUM for the lower gentry on anti-gentry protest was greater where the state had greater capacity to monitor a gentry’s misbehaviour. We use two proxies to measure *state monitory capacity*. First, we use distance from a prefecture (km) to Beijing. The costs of travel, transportation, and information transmission were large, especially in the premodern world (Sng, 2014). Hence, it was difficult for the central ruler to monitor a far-away county official who might collude with the lower gentry in collecting excessive taxes. Second, we use a dummy variable indicating a prefecture’s access to the telegraph network. In 1876, telegraphs were introduced to China, and by 1906, 60% of all prefectures had been connected to telegraph networks (Hao, et al. 2019).²⁴ The telegraph network was widely used to transmit information on grain price, domestic conflicts, and military actions. As a result, the cost of information transmission was greatly reduced. We argue that it becomes easier for the central ruler to monitor a prefecture with access to telegraph network than without.

By introducing the two proxies for state monitoring capacity, corollary 2 implies that the impact of POUM for the lower gentry on anti-gentry protest was greater in areas closer to Beijing, or in areas connected to the telegraph network. Table 6 presents the empirical results testing corollary 2. In column (1), we add a triple-interaction term: $\text{distance from Beijing} \times \ln(\text{POUM})_i \times \text{Post}_t$ which captures the heterogeneous effect of state monitoring capacity on our treatment effect. We find that the coefficient of this triple-interaction term is negative and significant at the one percent level, displaying consistency with our prediction. In column (2), we add the triple-interaction term: the dummy for telegraph $\times \ln(\text{POUM})_i \times \text{Post}_t$. The estimated coefficient on this triple interaction is positive and significant, which is similarly consistent with our prediction. With the inclusion of a triple-

²³ The data on destroying modern school across 1904-1911 is from Tian and Chen (2009).

²⁴ The data on telegraph construction are provided by Hao, Li, and Nye (2019), who collect the original data from *Traffic History: Telecommunications*, edited by the Ministry of Communications in 1936.

interaction term, the impact of POUM on anti-gentry protests remains significant in both specifications. Taking these results together, we find evidence consistent with corollary 2.

[Table 6 here]

6.3 The impact of commoners' collective action

Corollary 3 of our theoretical model predicts that the impact of POUM for the lower gentry on anti-gentry protest was greater where commoners had lower costs of collective action. With lower costs of collective action, commoners are more likely to protest, which implies a larger effect of abolition, all else equal.

We use two proxies to measure *costs of collective action*. First, we propose that the strength of clans in an area, measured by the number of clan genealogies during Qing dynasty, is negatively associated with the costs of collective action. In premodern China, clans were the basic units of cooperation and trust in pursuing collective action (Greif and Tabellini, 2017; Wong and Rosenthal, 2011). The presence of strong clans implies a lower cost of organising protests among commoners possessing kinship ties. Second, religion could play an important role in coordination and mobilisation of collective action (Iyer, 2016). Affiliation to the same religious identity promotes mutual trust (Chuah et al., 2016), helps to screening out free riders and stabilises in-group cooperation (Akerlof and Kranton, 2010; Carvalho, 2013). These effects work to reduce the costs of collective action. We use the number of Buddhism temples to proxy for religion influence.²⁵ A greater number of temples within a prefecture indicates a greater proportion of villagers shared the same religious attitude fostering greater mutual trust and facilitating cooperation for collective actions.

We hence propose that the impact of POUM for lower gentry on anti-gentry protest is greater in areas where clans were stronger and temples more numerous. Table 7 presents the empirical results. In column (3), we add a triple-interaction term: number of genealogies $\times \ln(POUM)_i \times Post_t$. In column (4), we add another triple-interaction term: the number of temples $\times \ln(POUM)_i \times Post_t$. We find that both the coefficients of these two triple interactions are positive and significant, indicating that the impact of POUM is stronger in areas with presence of clans or shared Buddhism religion. These results provide supportive evidence for corollary 3.

6.4 Evidence on selection

As previously described, the lower gentry's career profiles diverged greatly after the exam abolition. Some individuals moved to cities and attended modern schools to move up the social ladder. A small group of the lower and upper gentry obtained college degrees from domestic and oversea universities. Modern secondary schools and military schools were major outlets for the lower gentry with average social and economic status who desired better career prospects.

²⁵ Wang and Zhang (2018) collect the information on temple from the Imperial Encyclopedia of the Qing Empire (*Daqing Yitong Zhi*). We thank Shaoda Wang and Boxiao Zhang for sharing the temple data.

First, we explore how the exam abolition affects military school enrolment. We collect information (prefecture hometowns and year of enrollment) on newly enrolled students of Baoding Military College from 1903 to 1907, the largest national military college in the late Qing period. In Table 8, we apply a similar DID setting as equation (1) and use the number of military college students as the dependent variable. Columns (1) and (2) report the results. We find that a one standard deviation increase in the logged POUM (0.838) is associated with 0.5 more military school enrolments per million citizens from a prefecture after 1905. The coefficient is significant at the 1 percent level. This effect accounts for 54% of the sample mean of military school enrolment. Figure 6 presents the dynamic effects on military school enrolment. We find no significant difference in military school enrolment among prefectures with different POUM before the abolition, but a dramatic increase after the exam abolition for those with higher POUM.

[Table 8 here]

[Figure 6 here]

Second, we examine the effect of exam abolition on modern school enrolment and merchant group membership. Since we do not have data prior to 1905, we only use a cross-sectional dataset for empirical analysis. In column (2) of Table 9, we find that there were more modern secondary students per capita in 1907–1909 in areas with a higher POUM. A one standard deviation increase in the logged POUM (0.838) is associated with 0.3 more students per capita enrolled in secondary schools, nearly 50% of the mean of secondary students per capita. In column (4), we find a similar effect on merchant group membership in 1909. While these results are very preliminary due to data limitations, we find some evidence that after the abolition, those prefectures with a higher POUM are associated with higher modern school enrolment and merchant group membership, suggesting an outflow of talented youth from rural areas.

[Table 9 here]

Appendix A exploits a hand-collected dataset of electors (who were eligible to vote for local assembly) in rural areas around Suzhou in 1909 to look at their family background. A cross-sectional analysis shows that those lower gentries who remained in rural areas were more likely to come from below-average families, and more likely endowed with a relatively low-level of human capital. This indicates that after the abolition, among local elites, those who desired to serve as a public agent in rural areas had lower social and economic status.

Taken together, we find solid evidence on the selection effect of the exam abolition on military school enrolment, and some suggestive evidence about the outflow of young talents (the potential pool of lower gentry) from rural areas to modern schools and merchant groups in urban areas. Additionally, we show the remaining lower gentries had low social and economic status. These empirical findings appear to be consistent with our hypothesis that the exam abolition triggered an adverse selection process whereby higher quality gentries gradually moved out of the villages, whereas the worst remained.

7. Conclusion

The *keju* system was so deeply imbedded into China's traditional political system that its sudden abolition generated career disruption and social instability via many channels. This paper focuses on one important aspect—local governance in rural areas. The abolition of the exam system disrupted the traditional career path of local elites, which previously provided a modern career path for them. As a result, it triggered both a moral hazard and adverse selection problem on the part of the lower gentry. On one hand, the abolition removed the traditional constraint on the lower gentry in local public goods provision, which prompted them to predate commoners who in turn, induced protests. On the other hand, the disappearance of civil exams incentivised some lower gentries, typically those of higher talent and/or from advantaged families, to pursue new careers in urban areas. Resultantly, those who had no good outside options remained in rural areas and delivered public services for private gain. Both the moral hazard and adverse selection triggered by the abolition of exams lead to the increase of protests against lower gentry in rural areas.

We apply a DID approach to empirically test the linkage between the abolition of civil exam and anti-gentry protests. Using a prefecture-level dataset from 1902-1911, we find that those prefectures with a higher POUM before the abolition witness a higher incidence of anti-gentry protests after the abolition. This key finding survives a series of validity checks, including a parallel trend test, robustness checks controlling for a multitude of confounding covariates, falsification tests and placebo tests.

We then build a simple model to pin down the mechanisms linking the abolition of the exam and anti-gentry protests. The model highlights the role of moral hazard and adverse selection in triggering anti-gentry protests. To show the relevance of this theoretical model in explaining our empirical findings, we test the implications of the model which are summarised in four corollaries. The evidence provided is consistent with the predications of the model. These findings highlight the role of POUM in shaping the selection effects and behaviour of public agents.

Our study sheds new light on the role of civil exam abolition in causing the collapse of the Qing dynasty and in premediating the subsequent Chinese revolution. Jin and Liu (2001) view the exam abolition as the cause of the collapse of the once highly integrated ruling class. The upper gentry in urban areas became rebels against the state, leading to the demise of Qing in 1911. The lower gentry in rural areas either switched to modern education or stayed in rural areas and decayed into 'bad gentry'. We provide a causal link between the exam abolition and the deterioration of local governance, as manifested in the significant increase in anti-gentry protests. Indeed, in the following period 1924-27, both the Communist and Nationalist parties tried to mobilise peasants to bring down the bad gentry (Tsou, 1994). By presenting empirical evidence, our study helps to lend support to the notion that the decay of the gentry triggered by the abolition of the exam paved the road to radical revolution in modern China.

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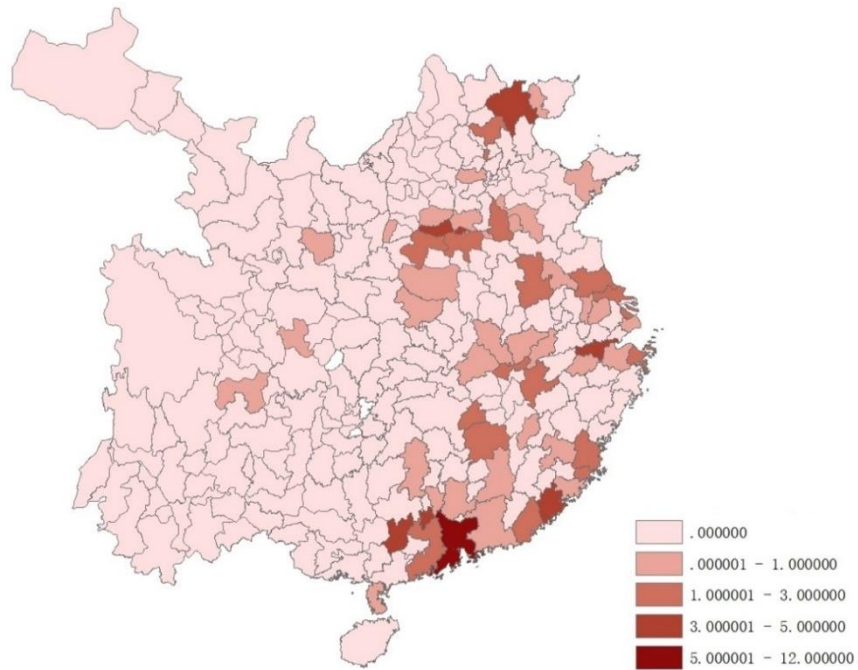
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Figures and tables

Panel A: Anti-gentry protests before the abolition (1902–1905)



Panel B: Anti-gentry protests after the abolition (1906–1911)

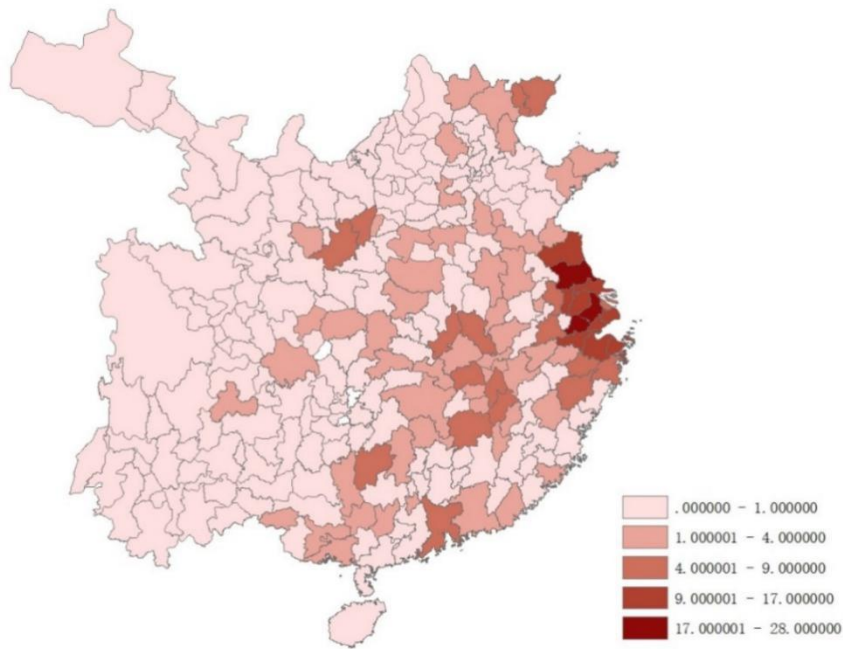


Figure 1. Spatial distribution of anti-gentry protests

Notes: This figure shows that there was regional variation in anti-gentry protests before and after the exam abolition in 1905. Data on anti-gentry protests is from Zhang and Ding (1982)

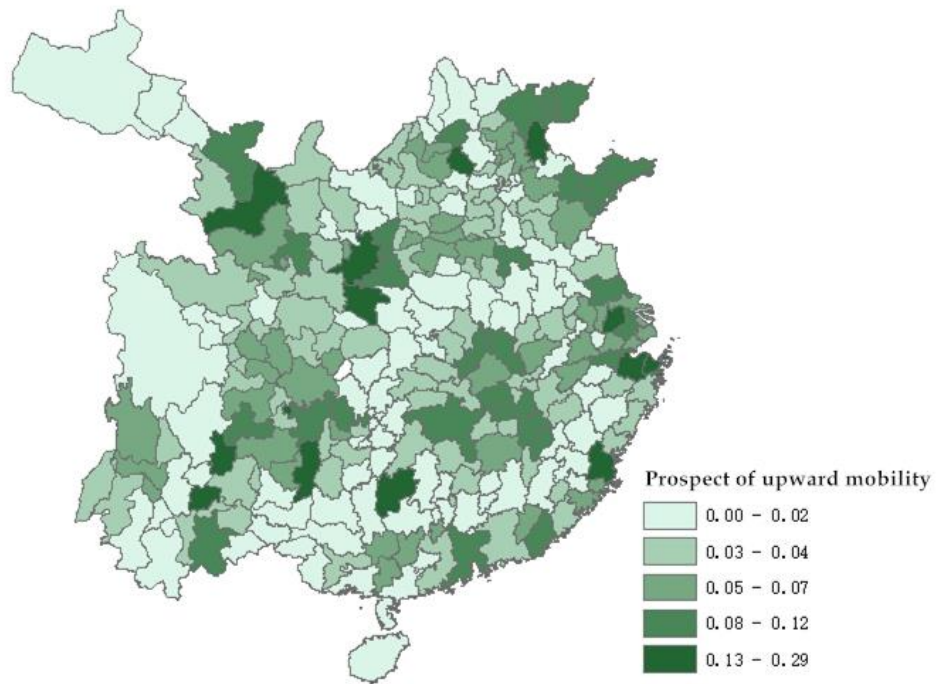


Figure 2. Spatial distribution of POUM

Notes: This figure shows that there was large variation in the prospect of upward mobility across regions. Refer to section “Data and Motivating Evidence” for the definition of POUM.

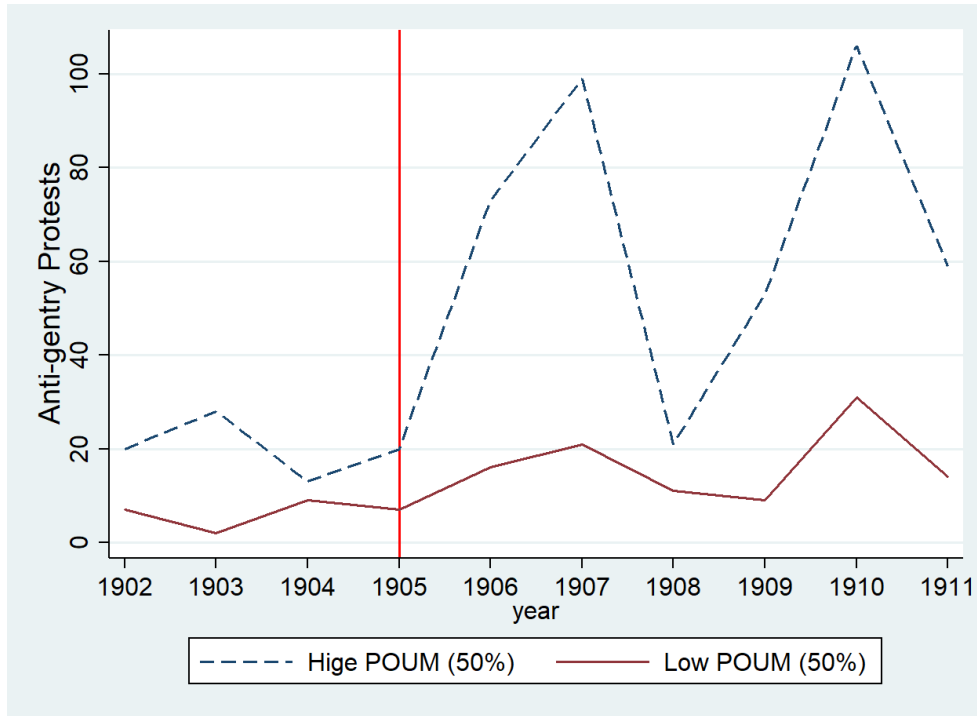


Figure 3. Trends of anti-gentry protests over time

Notes: This figure shows how the aggregate frequency of anti-gentry protests in two groups of prefectures changed during the entire sample period (1902-1911). The two groups of prefectures are divided by the prefectural median of the POUM. The high (low) prospect group is composed of prefectures above (below) the median (0.424). The red vertical line marks the year of the exam abolition.

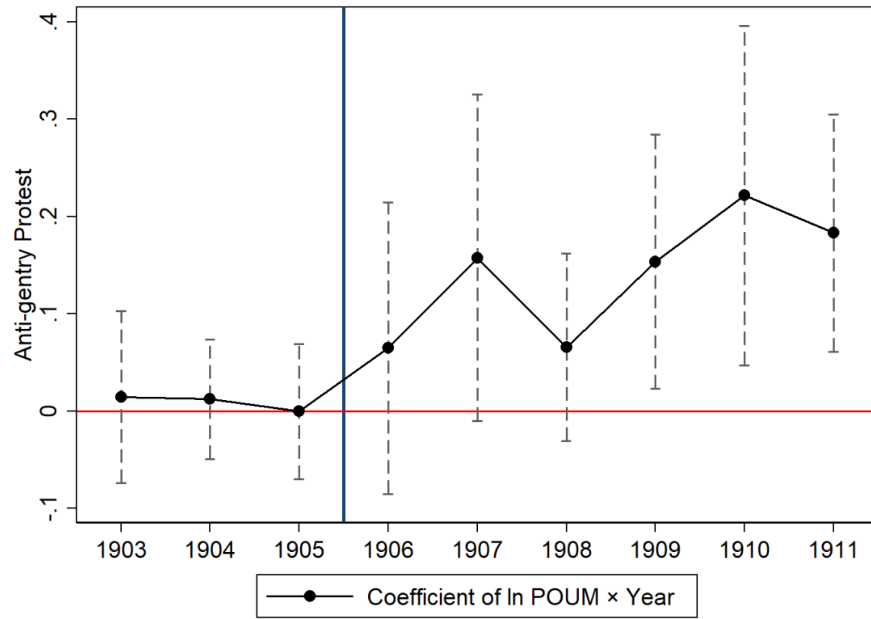


Figure 4. Dynamic effects of the POUM on anti-gentry protests before and after the abolition of the exam

Notes: This figure shows the estimated coefficient by year from equation (2). Standard errors are clustered at the prefecture level. The points connected by the solid line indicate the estimated coefficients of the POUM interacted with $Year_t$. Year 1902 is omitted as the reference year. The dashed line indicates the 95% confidence intervals. The red vertical line marks the timing of the abolition of the exam

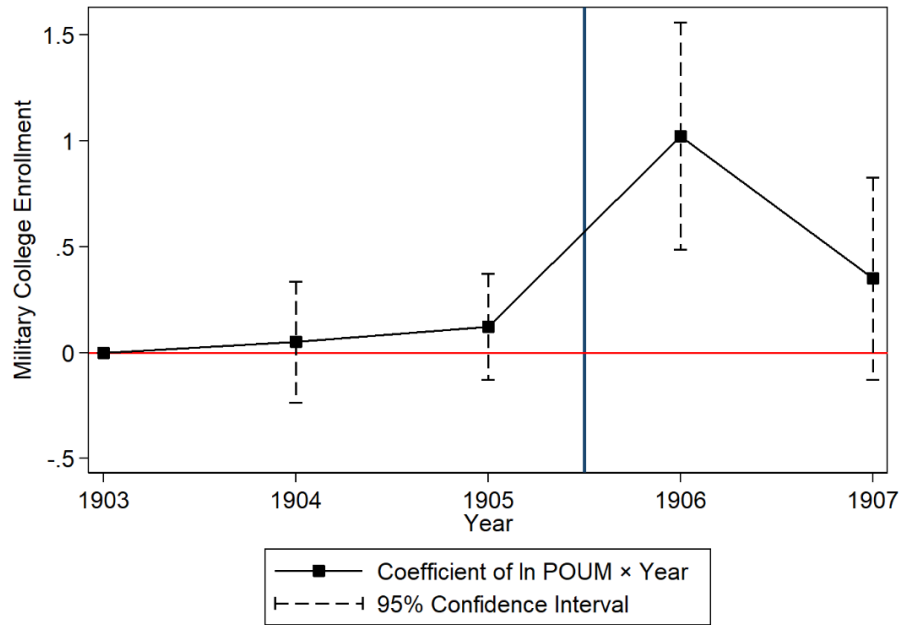


Figure 5. Dynamic effects of the POUM on military college enrollment origins

Notes: This figure shows the dynamic effects extended from Table 6. Standard errors are clustered at the prefecture-level. The points connected by the solid line indicate the estimated coefficients of the POUM interacted with $Year_t$. Year 1903 is omitted as the reference year. The dashed line indicates the 95% confidence intervals. The blue vertical line marks the timing of the abolition of the exam.

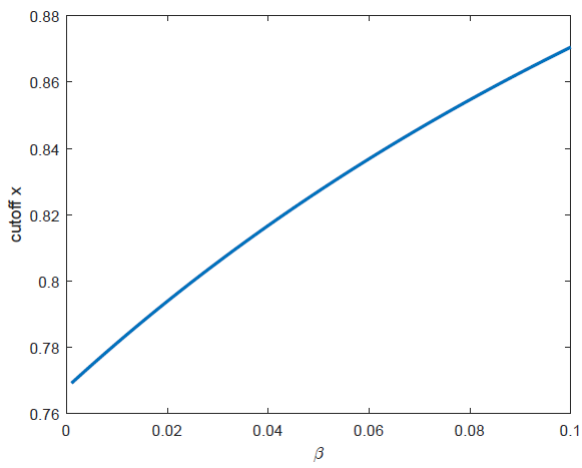


Figure 7.1: Cutoff \bar{x}

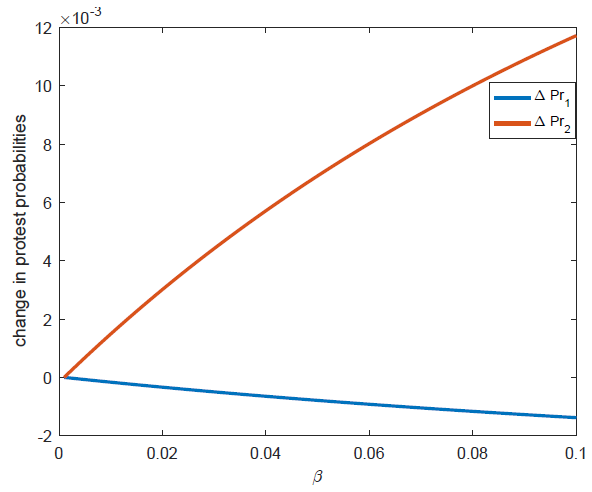


Figure 7.2: Changes in protest probabilities

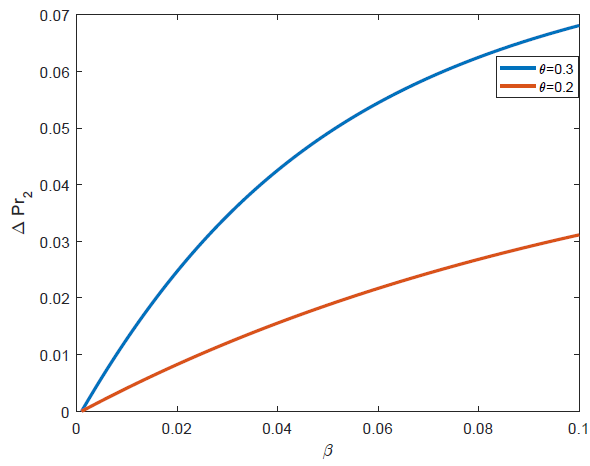


Figure 7.3: Impact of θ

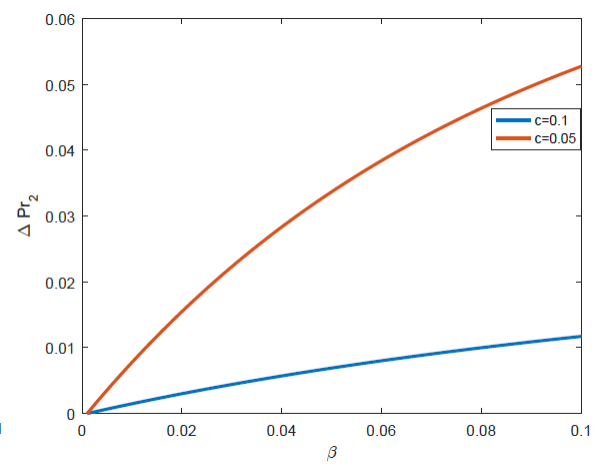


Figure 7.4: Impact of c

Figure 7: Model simulations.

Table 1: Income and Status of Gentry and Commoners

	Upper gentry <i>Jinshi and Juren</i>	Lower gentry <i>Shengyuan and Jiansheng</i>	Clerks	Commoners <i>Excluding clerks</i>
Population (10 thousands)	6	125	100	37000
Average household income (taels of silver)	6936	183	200	31
Major residence	Urban	Rural	Rural	Rural
Privileged in tax payment	Yes	Yes	No	No
Privileged in legal status	Yes	Yes	No	No
Periodic evaluation	No	Yes	No	No
The evaluators with the power of removing titles	Central government	Local education supervisors	NA	NA
Eligibility for office holding	Yes	No, unless buying candidacy	No	No

Source: Calculated and summarized from Chang (1962).

Table 2. The Effect of POUM on Anti-Gentry Protests

<i>Dependent variable:</i>	Anti-gentry protests (mean: 0.236)			
	(1)	(2)	(3)	(4)
POUM \times Post	0.165*** (0.052)	0.136*** (0.046)	0.112*** (0.039)	0.134*** (0.039)
ln (Quota/Pop) \times Post		0.166** (0.065)	0.154** (0.065)	0.142** (0.071)
ln Pop \times Post		0.144*** (0.038)	0.097*** (0.029)	0.034 (0.036)
Treaty port \times Post			0.131 (0.175)	0.145 (0.144)
Coastal \times Post			0.102 (0.206)	-0.204 (0.186)
Main river \times Post			0.061 (0.063)	0.035 (0.060)
Small city \times Post			0.131 (0.108)	0.053 (0.082)
Middle city \times Post			0.165 (0.179)	0.045 (0.112)
Large city \times Post			0.038 (0.466)	-0.254 (0.317)
Prefecture FE	Y	Y	Y	Y
Year FE	Y	Y	Y	
Province FE \times Year FE				Y
Observations	2,620	2,620	2,620	2,620
Prefectures	262	262	262	262
R-squared	0.057	0.065	0.069	0.300

Notes: This table reports the estimation results of equation (1). Robust standard errors in parentheses are clustered at the prefecture-level. ***, **, * represent significance at the 1%, 5%, and 10% levels.

Table 3. Alternative Explanation: State Extraction, Human Capital, and Gentry's Authority

<i>Dependent variable:</i>	Anti-gentry protests					
	(1)	(2)	(3)	(4)	(5)	(6)
POUM \times Post	0.121*** (0.039)	0.079** (0.032)	0.134*** (0.039)	0.091** (0.036)	0.088** (0.034)	0.073** (0.033)
<i>State extraction</i>						
ln (Fiscal revenue per capita) \times Post	0.270*** (0.096)					
Commercial tax checks \times Post		0.015*** (0.005)				
<i>Human capital</i>						
ln (Academy per capita) \times Post			0.011 (0.061)			
ln (Author per capita) \times Post				0.074 (0.047)		
<i>Esteem for gentry</i>						
ln (officials in central government) \times Post					0.085* (0.051)	
ln (officials in local government) \times Post						0.109** (0.046)
Prefecture FE	Y	Y	Y	Y	Y	Y
Year FE	Y					
Province FE \times Year FE		Y	Y	Y	Y	Y
Baseline controls \times Post	Y	Y	Y	Y	Y	Y
Observations	2,620	2,620	2,620	2,620	2,620	2,620
R-squared	0.070	0.315	0.300	0.301	0.304	0.300

Notes: Robust standard errors in parentheses are clustered at the prefecture level. ***, **, and * denote significance at the 1%, 5%, and 10% levels. To rule out the role of state extraction, in Columns (1) we add the provincial-level fiscal revenue per capita in 1908 and its interaction with Post-1905. Columns (2) controls for the number of commercial tax (*lijin*) checks in a prefecture. Columns (3) and (4) control for the logged number of tradition academies and authors of notable books in a prefecture, both normalised by population. In column (5), we control for the logged number of native-originated central government officials from a prefecture, and in column (6), the same for local government officials. We exclude the officials whose rank was lower than 7th. The baseline controls include logged quota / population ratio; logged population in 1880; whether a prefecture is located on the coast and whether it is located on a major river; whether a prefecture has a treaty port; and whether a prefecture was counted as a large city, a middle-size city, or a small city.

Table 4. Falsification and Placebo Tests

<i>Panel A: Falsification tests using prospect of other groups</i>				
<i>Dependent variable:</i>	Anti-gentry protests			
	(1)	(2)	(3)	
POUM \times Post	0.115 (0.069)			
ln (Jinshi/Juren) \times Post		0.055 (0.064)		
ln (Official/Jinshi) \times Post			0.011 (0.035)	
Observations	2,620	2,580	2,540	
R-squared	0.295	0.295	0.295	
<i>Panel B: Placebo tests using other conflicts</i>				
<i>Dependent variable:</i>	Anti-Christian	Urban petition	Strike	Gang rebellion
	(4)	(5)	(6)	(7)
POUM \times Post	-0.001 (0.012)	0.015 (0.010)	0.002 (0.017)	-0.014 (0.017)
Observations	2,620	2,620	2,620	2,620
R-squared	0.104	0.120	0.107	0.123
Prefecture FE	Y	Y	Y	Y
Province FE \times Year FE	Y	Y	Y	Y
Baseline controls \times Post	Y	Y	Y	Y

Notes: Robust standard errors in parentheses are clustered at the prefecture level. ***, **, * represent significance at the 1%, 5%, and 10% levels. The baseline controls include logged quota / population ratio; logged population in 1880; whether a prefecture is located on the coast and whether it is located on a major river; whether a prefecture has a treaty port; and whether a prefecture was counted as a large city, a middle-size city, or a small city.

Table 5. Evidence on surcharge

<i>Dependent variable:</i>	Trigger	Target		
	Excess collection of surcharges (1)	Surcharge agencies (2)	Local granaries (4)	Modern Schools (3)
POUM \times Post	0.062*** (0.023)	0.026** (0.012)	0.072*** (0.025)	0.046*** (0.017)
Prefecture FE	Y	Y	Y	Y
Province FE \times Year FE	Y	Y	Y	Y
Baseline controls \times Post	Y	Y	Y	Y
Observations	2,620	2,620	2,620	2,096
R-squared	0.279	0.177	0.238	0.249

Notes: Robust standard errors in parentheses are clustered at the prefecture level. ***, **, and * represent significance at the 1%, 5%, and 10% levels. The baseline controls include logged quota-population ratio; logged population in 1880; whether a prefecture is located on the coast and whether it is located on a major river; whether a prefecture has a treaty port; and whether a prefecture was counted as a large city, a middle-size city, or a small city.

Table 6. The impact of state's monitoring and commoners' collective action

<i>Dependent variable:</i>	Anti-gentry Protests			
	(1)	(2)	(3)	(4)
POUM × Post	0.359*** (0.110)	0.087** (0.035)	-0.036 (0.039)	-0.140 (0.092)
POUM × Post × Distance to Beijing	-0.165*** (0.060)			
Distance to Beijing × Post	-0.695*** (0.267)			
POUM × Post × Telegraph		0.120* (0.070)		
Telegraph × Post		0.378 (0.258)		
POUM × Post × Clan			0.090*** (0.026)	
Clan × Post			0.334*** (0.091)	
POUM × Post × Religion				0.139*** (0.048)
Religion × Post				0.587*** (0.199)
Baseline controls × Post	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y
Province FE × Year FE	Y	Y	Y	Y
Observations	2,620	2,620	2,620	2,620
R-squared	0.302	0.301	0.308	0.306

Notes: Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at the 1%, 5%, 10% level. In column (1), we use the linear distance in thousand kilometers of a prefecture to Beijing. In column (2), telegraph indicates whether a prefecture was connected to the telegraph network before 1900. The strength of clan is proxied by the logged number of genealogies in column (3). The strength of religion is measured by the logged number of Buddhism temples in column (4). The baseline controls include logged quota / population ratio; logged population in 1880; whether a prefecture is located on the coast and whether it is located on a major river; whether a prefecture has a treaty port; and whether a prefecture was counted as a large city, a middle-size city, or a small city.

Table 7. Evidence on Selection I: Modern Military College

<i>Dependent variable:</i>	Military college enrolment (Mean: 0.98)	
	(1)	(2)
POUM × Post	0.640*** (0.166)	0.640*** (0.183)
Prefecture FE	Y	Y
Province FE × Year FE	Y	Y
Baseline controls × Post		Y
Observations	1,310	1,310
R-squared	0.256	0.274

Notes: Robust standard errors in parentheses are clustered at the prefecture level. ***, **, * represent significance at the 1%, 5%, and 10% levels. Dependent variable is the military college enrolment per million citizens from a prefecture. The sample period is 1903-1907. The baseline controls include logged quota / population ratio; logged population in 1880; whether a prefecture is located on the coast and whether it is located on a major river; whether a prefecture has a treaty port; and whether a prefecture was counted as a large city, a middle-size city, or a small city.

Table 8. Evidence on Selection II: Modern Secondary School and Merchant

<i>Dependent variable:</i>	Secondary school student			Merchant
	(1)	(2)	(3)	(4)
POUM	23.75** (9.751)	30.06*** (9.736)	29.40** (12.32)	15.86** (7.821)
Province FE		Y	Y	Y
Other controls			Y	Y
Observations	262	262	258	258
R-squared	0.022	0.170	0.204	0.310

Notes: Robust standard errors in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% levels. Dependent variables are normalized by the prefecture population (10,000). The dependent variable in columns (1)-(3) is the total number of secondary school students per million citizens from 1907 to 1909, and the total number of merchant group members per million citizens in 1909 in columns (4). Other controls include logged quota/population ratio; logged jinshi/juren ratio; whether a prefecture is located on the coast and whether it is located on a major river; whether a prefecture has a treaty port and whether a prefecture was counted as a large city, a middle-size city, or a small city.

Appendix

Appendix A: Who remained in rural areas and engaged in public service?

We have established that there was a greater number of modern school students per capita after 1905 in areas with a higher JQ ratio. In this section, using hand-collected micro-data on elected officials from the Suzhou prefecture in 1909, we establish that those elites who stayed in rural areas and engaged themselves in local public services (including new comers) were more likely to come from families with lower social and economic status.

We constructed a micro dataset on the electorate of a prefecture, combined with surname-level data, to determine whether those who stayed in rural areas providing local public service were on average less likely to come from high family backgrounds. The data came from a first-hand document recording 1600 people who were eligible to vote from the Suzhou prefecture in 1909. The Suzhou prefecture was recognized as the most prosperous area of China and the role model of local autonomy. The list reports individual surname, age, residence, and eligibility to vote. One might be eligible to vote if he obtained an exam degree, had wealth greater than 5000 silver dollars, or had participated in gentry service. The list only reports one item as eligibility. 300 people (20%) among all the electors were rural gentry directors. In addition, we construct four kinship/surname-specific variables indicating kinship backgrounds of the voter:

$$\begin{aligned} rr_degree_i &= \frac{\text{share in exam title holders}_i}{\text{population share}_i} \\ rr_rich_i &= \frac{\text{share in people with asset}_i}{\text{population share}_i} \\ rr_chaste_i &= \frac{\text{share in chaste women}_i}{\text{population share}_i} \\ rr_college_i &= \frac{\text{share in college student}_i}{\text{population share}_i} \end{aligned}$$

where the population shares of surnames were derived from a name list of people who died in the Taiping Rebellion in 1851–1865. Records indicate that 8000 people across all social classes died in the Wu county, thereby providing us a good estimate of historical surname distribution. Essentially, these variables measure to what extent a kinship, relative to the average population, was more successfully producing exam degree holders, rich people, chaste women, and college students. This data was calculated from various name lists of notable people of the Wu county in the period 1645–1911.

In Table A4, we conduct a logistic cross-sectional regression exploring what affects the likelihood of local gentry being in public service. The dependent variable is a dummy variable that equals 1 if the elector serves as a gentry director, namely the representative of lowest level councils (a village or town). The repressors include dummies of age, residence,

and four kinship/surname-specific variables indicating kinship background of the elector. In columns (1) and (2), we find that an elector was less likely to serve as a gentry director if he was younger, and if he resided in urban area. More importantly, an elected individual was less likely to serve as a gentry director if he came from a kinship with greater wealth and human capital. In column (3), we only include those elected individuals under the age of 30 and find similar but greater magnitude of results. In column (4), we only include those electors whose surname frequency was less than 100 among the sample of people who died in the Taiping rebellion. Thus, we exclude elected individuals with common surnames, many of whom were immigrants (Hao and Xue, 2017).

[Table A4 here]

Appendix Figures and tables

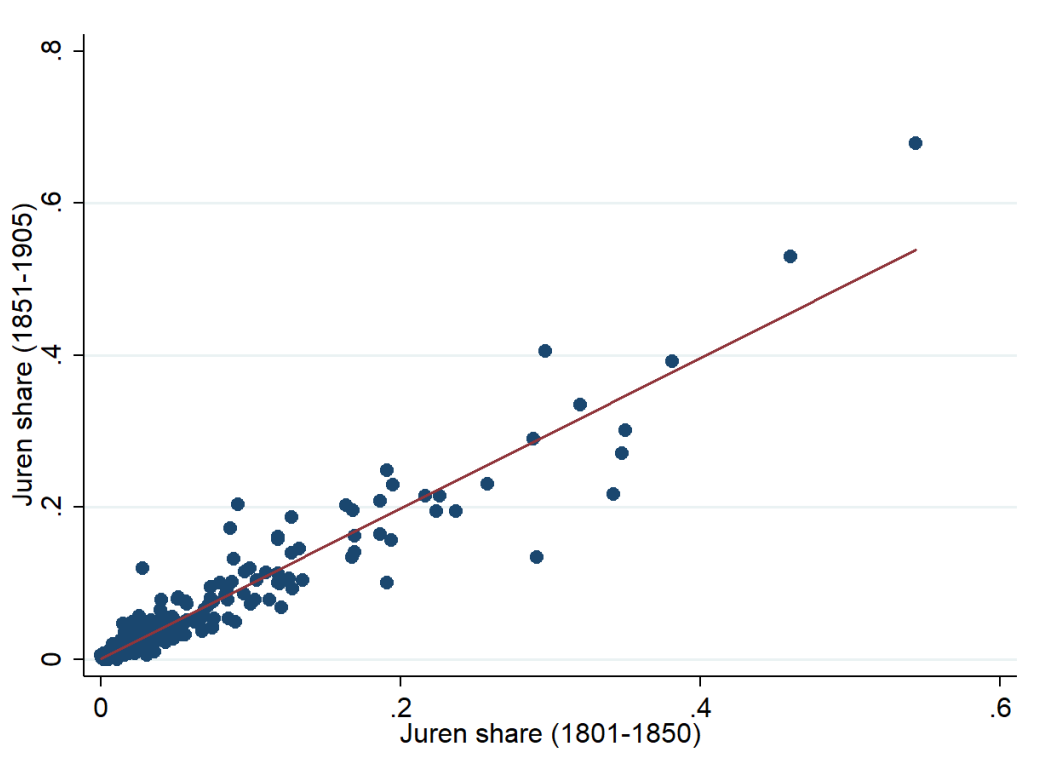


Figure A1. Stability of Relative Exam Performance

Table A1. Summary Statistics and Data Sources

Variable type	Variable definition	Source	Observation	Mean	S.D.
Protest type	Anti-gentry Protest	A	2,620	0.236	0.828
	Tax protest non-city	A	2,620	0.152	0.588
	Price protest non-city	A	2,620	0.0840	0.486
Placebo test	School destroying	B	2,096	0.0802	0.419
	Political protest	A	2,620	0.0355	0.250
	Anti-church protest	A	2,620	0.0347	0.210
	Anti-government rebellion	A	2,620	0.0523	0.292
	Strike	A	2,620	0.0893	0.509
	Gang rebellion	C	2,620	0.0546	0.317
Measures of exam	# Quotas	D	262	113.8	75.73
	# Jurens after 1875	E	262	74.71	105.5
	# Jinshis (Qing period)	D	262	95.98	146.6
	# key officials (Qing period)	D	262	15.13	29.61
	Passers-candidates ratio	D, E	262	0.042	0.038
	POUM (ln Passers-candidates ratio)	D, E	262	-0.879	0.838
Control variables	ln Population	D	262	13.62	1.075
	# provincial senators	F	262	5.832	5.033
	Treaty port	D	262	0.115	0.319
	Coast region	D	262	0.134	0.341
	Small city	G	262	0.198	0.400
	Middle city	G	262	0.122	0.328
	Large city	G	262	0.0382	0.192
	Grain price index	H	1,694	140.1	41.46
	# of Academies (1640–1900)	I	262	10.553	12.223
	# of Authors (1880–1910)	J	262	11.363	26.162
	# revolutionaries	D	262	4.977	13.88
	Language fragmentation index	D	262	0.0864	0.164
	Language polarization index	D	262	0.162	0.299
	Disaster weather index	K	262	0.655	0.251
	Weather volatility	K	262	0.535	0.282
	Important in transportation	D	262	0.615	0.488
	Important in business	D	262	0.760	0.428
	Difficult to tax	D	262	0.267	0.443
	High in crime rates	D	262	0.676	0.469
	# Likin bureaus	P	262	2.595	3.382
	# Likin checks	P	262	10.833	16.618
	Urban rate of gentry	O	262	0.014	0.041
Selection proxies	Military students per capita	L	1,310	0.976	2.668
	Japan students per capita	M	3,406	0.430	1.646
	Merchant group member (per 10,000)	N	262	0.593	0.953
	Secondary school student (per 10,000)	O	262	0.584	1.335
	# Primary school per capita (10,000)	O	262	0.833	1.381
	# Middle school per capita (10,000)	O	262	0.00312	0.0103

Data source: A: Zhang and Ding (1980); B: Tian and Chen (2009); C: Liu (1992); D: Bai and Jia (2016); E: local gazetteers; F: Zhang (2013); G: Rozman (1973); H: Wang (2014); I: Ji (1996); J: Jiang (2005); K: State Meteorological Society (1981); L: Chen (2006); M: Fang (1962); N: *Agriculture and Business Statistics of the Republic of China* from Yin and Li (2010); O: *Ministry of Qing's Education*; and P: Luo (1936)

Table A2. Stability of Relative Exam Performance

<i>Dependent variable:</i>	<i>Juren share (1851–1905)</i>			
	(1)	(2)	(3)	(4)
<i>Juren share (1801–1850)</i>	0.989*** (0.0657)			
<i>Juren share (1751–1800)</i>		0.980*** (0.0974)		
<i>Juren share (1701–1750)</i>			0.902*** (0.111)	
<i>Juren share (1645–1700)</i>				0.906*** (0.107)
Province FE	Y	Y	Y	Y
Observations	197	181	181	181
R-squared	0.892	0.784	0.658	0.608

Notes: Robust standard errors in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% levels. This table shows the share of *Juren* from a prefecture within a province remained stable over a long period.

Table A3. Robustness: Other Controls

<i>Dependent variable:</i>	<i>Anti-gentry protests</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
POUM × Post	0.146*** (0.041)	0.133*** (0.038)	0.136*** (0.039)	0.136*** (0.039)	0.177*** (0.059)	0.183*** (0.064)
Year FE	Y	Y	Y	Y	Y	Y
Prefecture FE	Y	Y	Y	Y	Y	Y
Province FE × Year FE	Y	Y	Y	Y	Y	Y
Baseline controls × Post	Y	Y	Y	Y	Y	Y
Revolutionaries	Y					Y
Fragmentation and Polarization		Y				Y
Climate condition			Y			Y
Political importance indicators				Y		Y
Grain price					Y	Y
Observations	2,620	2,620	2,620	2,620	1,694	1,694
R-squared	0.301	0.300	0.302	0.303	0.339	0.338

Notes: Robust standard errors in parentheses are clustered at the prefecture level. ***, **, and * represent significance at the 1%, 5%, and 10% levels. The climate condition includes disaster weather index and weather volatility measured by the standard deviation of weather indicators during the 19th century. Strength of political connection is measured by the presence of high-rank central government officials. Four dummies of political importance indicate whether the prefecture is important in transportation, important in business, difficult to tax and has high crime. The baseline controls include logged quota-population ratio; logged population in 1880; whether a prefecture is located on the coast and whether it is located on a major river;

whether a prefecture has a treaty port; and whether a prefecture was counted as a large city, a middle-size city, or a small city.

Table A4: Logistic regression on the determinants of doing public service
In Wu County, 1909

<i>Dependent variable:</i>	Whether a voter was a gentry service director			
	(1) Baseline	(2) Robust error	(3) Age<30	(4) Sample population<100
age	0.0212*** (0.00624)	0.0212*** (0.00605)	0.0789 (-0.144)	0.0269*** (0.00791)
urban	-2.961*** (0.231)	-2.961*** (0.229)	-2.913*** (0.817)	-2.865*** (0.287)
rr_degree	-0.278*** (0.104)	-0.278*** (0.102)	-0.460* (0.277)	-0.282*** (0.107)
rr_rich	-0.185** (0.0938)	-0.185* (0.0999)	-1.472*** (0.556)	-0.188* (0.107)
rr_chaste	-0.0317 (0.0848)	-0.0317 (0.0758)	0.121 (0.164)	-0.0428 (0.0771)
rr_college	0.0523 (0.0978)	0.0523 (0.0966)	0.360* (0.205)	0.0654 (0.0994)
Observations	1,604	1,604	261	1,013

Notes: Robust standard errors in parentheses. ***, **, * represent significance at the 1%, 5%, and 10% levels.

we construct four kinship/surname-specific variables indicating kinship backgrounds of the vote:

$rr_degree_i = \frac{\text{share in exam title holders}_i}{\text{population share}_i}$, $rr_rich_i = \frac{\text{share in people with asset}_i}{\text{population share}_i}$, $rr_chaste_i = \frac{\text{share in chaste women}_i}{\text{population share}_i}$, $rr_college_i = \frac{\text{share in college student}_i}{\text{population share}_i}$, where the population share of surnames was derived from a name list of people who died in the Taiping Rebellion from 1851–1865.