The Short- and Long-Run Effects of Affirmative Action: Evidence from Imperial China*

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Abstract

We examine the short- and long-run effects of affirmative action in the setting of China. Imperial China used a centrally-governed, multi-stage examination system to allocate high-status government jobs. The average performance of exam candidates varied so much across the country that a reform was launched in 1712 to reduce the disparities in access to these jobs. The reform equalized acceptance rates across the provinces, which led to increasingly more individuals being selected from underrepresented provinces. Using a novel dataset on the exam performance and career outcome of successful candidates, we show in addition that there was no decline in the quality and outcome of candidates selected from underrepresented provinces following the reform. However, a divergent trend emerged between sub-provincial units, indicating rising inequality within underrepresented provinces, but this divergence was mitigated by the presence of funding agencies that subsidized the cost of traveling to attend the exam. When the reform was phased out in 1905, despite a reversal in educational attainment in formerly underrepresented provinces, we show that part of the gains from the reform remained. We also find significant spillover effects from the reform and the imperial examination system itself: imperial exams were not just relevant for the educational elite but also for the ordinary people.

Keywords: Affirmative Action, Education, Inequality, China

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I Introduction

Affirmative action policies are designed to improve the position of groups that have been underrepresented or disadvantaged. Affirmative action has been a subject of debate since its inception.[1] Researchers who have examined the effects of affirmative action on both equity and efficiency have come to drastically different conclusions.[2]

The imperial examination system in China was a program to recruit individuals for scarce, high-status government jobs through competitive exams. Ordinary individuals from all over China competed. To reach the final round, they had to take a series of exams over nearly two decades. The average performance of exam candidates varied greatly across the provinces.[3] Due to linguistic barriers, fewer educational resources, and less convenient locations, candidates from certain provinces found examination preparation more difficult.[4] In 1712, a reform was enacted to improve the chance of candidates from underrepresented provinces and to diversify provincial origins of successful candidates. This policy stayed in effect until imperial exams were abolished in 1905.

A central piece of the reform was to make the number of successful candidates per province proportional to the *total* number of candidates from that province who sat in the exam. Prior to the reform, individuals competed with both those from the same province as well as those from other provinces. The new policy made the selection criteria based on provincial origins, restricting competition to within the province. Conditional on passing lower-level exams, the same percentage of candidates from each province would pass the final round, irrespective of their actual score. This allowed candidates from less competitive provinces to pass the final round and obtain a government position with lower scores. This reform is a similar intervention to affirmative action policies elsewhere in that members of disadvantaged groups receive preferential treatment.

The 1712 reform provides an opportunity to estimate the long-term effects of large-scale affirmative action policies. We begin by analyzing the contemporaneous effects of the 1712 reform on the academic and career outcomes of intended beneficiaries, using a novel dataset on the 16,073 successful candidates who received their jinshi degree between 1650 and 1840. Using two sources of variation — the intensity of the reform and the timing of the reform — we estimate the impact of the reform in a continuous difference-in-differences framework. To understand the distributional consequences of the reform, we estimate the heterogeneous impact of the policy and investigate factors that shaped the distribution of the gains and losses from the reform within the provinces.

[1] Affirmative action began in the United States with Lyndon Johnson's 1965 executive order preceded by a commencement address he delivered at Howard University on the same subject matter.

[2] see Peter Arcidiacono and Lovenheim (2016) and H. Holzer and Neumark (2000) for a review.

[3] A broad pattern is that candidates from North China performed less well than those from South China. This particular source of regional disparity had already been corrected through explicit quota systems imposed in 1454.

[4] In Schotter and Weigelt (1992), affirmative action programs are a solution to uneven tournaments, in which one group of agents have a higher cost of effort than another group does.

Our last line of analysis probes into the long-run impact of the reform, as well as its spillover effects on lower educational levels.

To examine the impact of the reform, we first construct a measure of reform intensity. Specifically, we take the difference between a province's share of successful candidates without the reform and its share immediately after the reform. To ensure comparability over time, we create artificial provinces with boundaries well contained within exam regions.[5] Change in a province's share in its exam region ranged from -47% to 24%. As expected, there is an inverse relationship between a province's initial share and the change in its share. Or, a province with a lower share of successful candidates without the reform were more likely to see a positive change under the reform. The observed relationship shows the reform expanded opportunities for individuals from underrepresented provinces.

For robustness, we measure the intensity of the reform in a number of other ways: a.) instead of using a province's share in its exam region between 1426–1650 as its share in the absence of the reform, we use its share in the entire country between 1371 and 1425. This is to exploit the fact that competition at the imperial exam was nationwide before 1425, which allows us to measure the competitiveness of a province's candidates in the absence of any regulation. b.) instead of using a province's share in 1713–1730 as its share with the reform, we use a province's share over a longer period (i.e. 1713–1840). c.) instead of computing the raw difference in a province's with and without the reform, we adjust for population growth between two periods. Intuitively, if a province's share of successful candidates increased — so did a province's population size — the role of the reform will be confounded if we do not adjust for population growth.

As the reform expanded opportunities for individuals from underrepresented provinces, return to education increased for these individuals. We ask: did an increase in return to education stimulate the demand for education following the reform? Using panel data on exam scores and bureaucratic ranks, we investigate how the reform affected the academic achievement and professional outcome of successful candidates. Because the final-round exam occurred at the end of a candidate's academic journey, exam scores would reflect cumulative investments in education made by him.[6] We estimate the interaction between reform intensity and the post-reform indicator and find the interaction term to be positive, indicating that there was a larger improvement in the exam performance of successful candidates from provinces that benefited more from the reform. Taken together, there were both more successful candidates from underrepresented provinces and the achievement gap between these candidates and other successful candidates shrank over time. We thus conclude that more educational investments were made in beneficiary provinces after the

[5]Exam regions were instituted in 1454. Starting in 1454, quotas were assigned to exam regions (North, South and Central) following the rule below: 35% to North, 55% to South, and 10% to Central. The boundaries of these exam regions did not perfectly overlap with provincial boundaries. These exam regions became irrelevant after 1712.

[6]Imperial exams were open to all adult men, but not to women.

reform.

Having shown that the reform expanded opportunities for individuals in underrepresented provinces and incentivized education there, we go on to explore the distribution of gains within the provinces. We estimate the heterogeneous impact of the reform varying by the amount of pre-existing human capital. Pre-existing human capital is measured by the density of jinshi degree holders before 1650.

Using a panel of 267 prefectures and 19 periods, we estimate the triple interaction term between pre-existing human capital, reform intensity and post-reform dummy and find the coefficient estimate to be positive. After the reform, in beneficiary provinces, the density of successful candidates increased more in sub-provincial units where the level of pre-existing human capital was higher. In other words, places with more pre-existing human capital captured most of the gains from the reform. The advantage held by prefectures with greater pre-existing human capital also prevailed in reform-negative provinces. The reform raised the standard for individuals from reform-negative provinces, making it less likely for them to pass the exam, but the negative impact was not equally absorbed by all sub-provincial units. Compared to other prefectures in the province, prefectures with greater pre-existing human capital were negatively impacted but to a much less extent.

Using a more flexible estimation strategy, we show that the differential impact of the reform lasted throughout the period under study, suggesting limited positive spillover across sub-provincial units. This intraprovincial analysis is conducted at a county-decade level and similar results are obtained.

Having witnessed a widening gap between sub-provincial units, we investigate what can reduce the gap. We begin by assessing the role of funding agencies. Since the final round was held in the capital city, candidates from remote areas often had to travel a long way to attend the exam. Sometimes the trip would take several months and be extremely costly. Funding agencies provided resources to prospective examinees in the form of a travel grant. Our results suggest that the gap that emerged after 1712, between prefectures with greater pre-existing human capital and other prefectures, is almost entirely driven by prefectures without funding agencies. Prefectures with at least one funding agency by 1840 derived benefits (or endured losses) from the reform in a similar fashion, irrespective of their level of pre-existing human capital.

We have shown in the 1650–1840 panel results that the reform had a positive impact on beneficiary provinces. Below we investigate whether the effects were permanent. We compare the periods right after the affirmative action policies were withdrawn and the periods just before then. In 1905, affirmative action policies were ended after the abolition of imperial examination system. Using outcomes from competitive exams held by top universities, we show there was a relative decline in the aggregate academic performance after 1905 in provinces that benefited from the reform. This indicates a weakened effect of the 1712 reform after its withdrawal.

While the reform was targeted at the final round of the imperial exams and so only directly affected individuals who competed at a very high level, we find evidence for significant spillovers of the reform onto lower educational levels. Using the first modern census with detailed information on education attainment, we show that both tertiary and secondary education attainment in 1982 are highly correlated with the intensity of the 1712 reform. These results also suggest that despite the reversal after 1905, some of the gains from the reform remained.

Related Literature Our study contributes to the growing literature on the effects of affirmative action. Several studies provide theoretical support for the incentivizing effect of affirmative action on human capital accumulation. Lundberg and Startz (1983) demonstrate that equal opportunity laws encourage human capital investments, as human capital investment decisions are affected by the presence of labor market discrimination. Schotter and Weigelt (1992) find that affirmative action programs always benefit the intended beneficiaries by alleviating the dropout behavior of disadvantaged subjects. Chung (2000) and Fang and Moro (2011) provide theoretical mechanisms for affirmative action to improve group outcomes through role model effects. Other works, however, point to mismatch effects (Sander, 2004; P. Arcidiacono et al., 2011; Peter Arcidiacono and Lovenheim, 2016).

Our study is most related to the research estimating the effects of affirmative action on intended beneficiaries using natural experiments (Bertrand, Hanna, and Mullainathan, 2010; Kapor, 2015; Bagde, Epple, and Taylor, 2016; Bleemer, 2022). Bleemer (2022) shows that ending affirmative action caused underrepresented minority freshman applicants to cascade into lower-quality colleges. Kapor (2015) finds that under the "Top Ten Percent" policy in Texas, more students from high-poverty schools enrolled, and students who enrolled under the policy achieved higher GPAs. Bagde, Epple, and Taylor (2016) show that the affirmative action program in India increased college attendance for targeted students and there is no evidence for the "mismatch" effect. Bertrand, Hanna, and Mullainathan (2010) find a positive return to admission for intended beneficiaries, but lower-caste individuals from stronger socioeconomic backgrounds benefited the most.

Our results suggest that affirmative action policies could have a large positive impact on beneficiaries' academic achievement, with more ambiguous effects on their professional outcome. The long-term effects of these policies could be substantial, with positive spillovers onto members of the beneficiary group that were not directly affected by the policy.

The finding that the reform led to a great academic achievement for the beneficiaries, is related to the larger literature on how returns to education shape educational investments [7]. In our setting, both the number of and the performance of successful candidates in beneficiary provinces increased, following an exogenous increase in returns to education. As long as the

[7] See Card (2001) for a review

relationship between educational investments and academic achievement is generally positive, our findings suggest that more educational investments were made in those provinces.

A central question in the affirmative action literature is how efficient these policies are and whether these policies are needed in perpetuity. [8] Our findings suggest that the academic performance of successful candidates from beneficiary provinces increased over time, even though their performance might not be fully on par with other successful candidates yet. When the policies were withdrawn in 1905, we document a reversal in the effect of the reform, which suggests that the policies would still be needed to keep the beneficiaries on the same path as before.

A smaller number of studies within the affirmative action literature have examined the distributional consequences of the reform (Bertrand, Hanna, and Mullainathan, 2010). We find that prefectures with a high level of pre-existing human capital derived the most benefits from the reform. The gap that emerged after 1712 between prefectures with varying levels of pre-existing human capital remained large throughout the period we study. A silver lining is that this gap closed when certain public goods, such as travel grants, were provisioned to prospective examinees.

A separate literature examines the political determinants of affirmative action and redistribution, focusing on voter preferences (Austen-Smith and Wallerstein, 2006; Chan and Eyster, 2009). In our context, these policies were externally determined and imposed by the central government and not a direct response to local preferences.

In addition, our study contributes to the growing literature on the quantitative analysis of economic and social history of China (Shiue, 2002; Shiue and Keller, 2007; Jacks, Yan, and Zhao, 2017; Gao and Lei, 2020). Historians and Economists have investigated the relationship between the imperial examination system, human capital and social mobility both in imperial and modern China (Ho, 1962; Campbell and Lee, 2008; Elman, 2013; Bai and Jia, 2016; Shiue, 2017; Yuchtman, 2017; Shiue, 2019; Chen, Kung, and Ma, 2020). Ho (1962) suggests there was a considerate amount of mobility in Ming China; Elman (1991) and Elman (2013), on the other hand, conclude that there was "a healthy circulation between upper and lower elites" but nowhere near social mobility. This study complements previous research. By showing that the 1712 reform incentivized educational investments in underrepresented provinces and had significant spillover effects onto lower educational levels, we provide evidence that the influence of imperial exams was not limited to an unchanging elite.

To our knowledge, this study is the first to examine affirmative action policies in a historical context using a long-run perspective.[9] The period at which the new policy was implemented allows

[8] See H. J. Holzer and Neumark (2006) and Peter Arcidiacono, Lovenheim, and M. Zhu (2015) for a review of the literature. At the heart of this literature is how affirmative action policies affect both equity and efficiency.

[9] One exception might be (Martin et al., 2001), which descriptively studies the Soviet Uníon as the world's first

us to estimate the effects of the policy over a long period and to track beneficiaries throughout their life. The policy under study spanned 193 years—from 1712 to 1905—before abruptly ended. This provides an ideal setting for analyzing the long-run dynamics of human capital responses to affirmative action policies, both within and over the generations. Rather than looking into a particular set of schools and students, our study analyzes the universe of successful candidates from the entire country who passed the metropolitan exam between 1650 and 1840.

Our setting is characterized by a straightforward admission process and a single uniform labor market for successful candidates. Conditional on provincial origins, exam scores were the sole criteria for determining the success (or failure) of examinees. This feature ruled out potential adjustments along other dimensions in response to the affirmative action policy.[10]

Moreover, conditional on passing the final round, exam candidates were guaranteed to obtain important government jobs. The appointment process was centralized by the Ministry of Personnel, a branch of the central government, and the test score was the most crucial factor in determining the first assignment. This unusual feature mitigated the confounding role of further preferences and discrimination in the labor market faced by affirmative action beneficiaries which are prevalent in other studies. The above features of the setup help to pin down specific mechanisms underlying the short- and long-run effects of the 1712 reform.

The remainder of the paper is organized as follows. Section III discusses data sources and variable constructions. Section V links the 1712 reform to academic and career outcomes of successful candidates. Section VI examines the distributional consequences of the reform and analyzes the heterogeneous impact of the reform on prefectures varying by pre-existing human capital. Section VII documents the effects of the 1712 reform after the withdrawal of the policy. Section VIII gauge the spillover effects of the 1712 reform on the broader population. Section IX concludes.

II Historical Background

In 1712, a major reform was introduced to the long-standing imperial examination system, the backbone of China's economic and political institutions from 1000 AD onwards. The reform equalized acceptance rates at the final round of imperial exams across the provinces. Under the new policy, candidates from less developed parts of the country would have a chance to pass the exam even when they received lower scores than those of candidates from other provinces.

The imperial examination system originated in 587 AD and was further institutionalized during the Song Dynasty (960–1279 AD). The system was structured as a tournament and had three tiers: the prefectural exam (*yuankao*), the provincial exam (*xiangshi*) and the metropolitan exam

Affirmative Action Empire.

[10]In the US, affirmative action and weights assigned to non-test-score items substitute for each other (Chan and Eyster, 2003).

(*huishi*). Academic degrees were conferred to candidates selected at each stage: *shengyuan*, *juren* and *jinshi*. The metropolitan exam was held every three years. After passing the metropolitan exam, candidates became eligible to important government positions. This system is described in Figure I.[11]

This system provided individuals with an incentive to learn to read and write. In the premodern world, such incentives were usually absent, as returns to education were typically low. Passing imperial exams required considerable cognitive skills. Successful candidates were rewarded with high-status jobs and social prestige (Ho, 1962). Candidates who failed to advance to the next tier routinely pursued a teaching career in local communities, a source of human capital externalities for the rest of the population. Whilst used as an instrument to select government officials, the imperial examination system produced a literate population that was many times larger than the bureaucracy itself.[12] According to Evelyn Rawski's (likely too optimistic) estimates, 30-45% of adult males in the Yangtze Delta in late imperial China were literate (Rawski, 1979).

The exams at all three tiers were open to all adult males.[13] There were no additional requirements such as income and wealth. Candidates received education at home or attended clan schools. Conditional on passing lower-level exams, they also received training in government-sponsored academies. In late 19th century, it is estimated that about 3 million, i.e., 1 in 50 males (or 1 in 20 boys), took the first-tier exam every year (Elman, 2013).

For operating on the basis of merit and being open to all, the system provided political legitimation to the state. Despite incidents of corruption and scandals. the system had a great deal of transparency. Each time, exam questions were drawn from the same list of classics. Exam answers were transcribed by a third party before they were graded. Punishment close to or at the same level of death penalty, was imposed on those who violated the rules at any stage, be the organizers, the candidates, or the graders.[14]

The prerequisite for taking the exam was being registered in a locality where the candidate held residency. At the time, an individual was only permitted to attend the exam in his locality if his extended family had resided there for at least three generations (*ji guan*). This made it difficult to take exams in locations different from an individual's place of origin.

The average exam performance varied greatly across China. From the examination curriculum to local educational infrastructure, many factors caused this unevenness.[15] Some provinces were

[11] See Appendix Section C.3 and Appendix Section C.3.3 for a detailed discussion of job opportunities available to successful and failed candidates.

[12] The elimination tournament design had an additional effect on the level of effort (see Kracke (1957)).

[13] An exception is the Tanka people (or Boat People). They were considered as inferior and were not eligible to imperial exams for much of history. Even after they were permitted to attend imperial exams in the 1700s, the barrier remained substantial for them.

[14] See Appendix Section C.2.2 for details on measures put in place to deter cheating.

[15] See Appendix Section C.1.1 for more details.

remote, poor, and previously unexposed to the examination system.[16] Candidates coming from these provinces had little chance to pass the final-round exam and to become jinshi. After 1650, as the Qing state expanded its territory, the striking deficit of successful candidates in frontier provinces became more noticeable. Despite the traditional appeal of this meritocratic system, growing inequalities induced by the same system began to threaten the legitimacy of the state.

Finally, Emperor Kangxi and the officials introduced a reform to the imperial examination system in 1712. In his Imperial Edict of 1712 Kangxi remarked:

> Participation in imperial exams has increased nationwide. This includes candidates coming from a humble background and traveling from far away. Few of these candidates ever passed the exam. I am deeply unsettled by this situation. Going forward, we should take into account where the candidates come from. To do this, we should wait for all candidates to arrive first, and then decide how many from each province will pass on the basis of how many from each province sit in the exam.

This was not the first reform implemented in the imperial examination system to address equity-related concerns.[17] The earliest debate on this issue occurred in 1066 between Sima Guang and Ouyang Xiu. Ouyang Xiu believed in unconditional meritocracy whereas Sima Guang advocated for preferential admissions for candidates from underrepresented regions. After 1400, a number of changes were made to the system (Kracke, 1957): in 1425, regional quotas were imposed on South China (60%) and North China (40%). In 1455, the quota system became more refined and three exam regions were established: South (55%), North (35%) and Central (10%). These interventions were not sufficient to diminish the gap in exam success and access to government jobs between provinces.

The 1712 reform took a step further towards the goal of equity. The reform made the number of successful candidates proportional to the number of examinees. Equalizing acceptance rates across the provinces confined academic competition to within the provinces. Criteria for passing the exam became tied to a candidate's province of origin and would be lower for individuals from provinces of which the candidate pool was weaker.

A natural question is how prospective examinees would react to overtly different standards across the provinces. How likely were they to migrate to provinces with a weaker candidate pool in order to arbitrage? Due to aforementioned rules on the difficulty of establishing residency, opportunistic migration to a new province for a higher likelihood of passing the exam would not be a very cost effective strategy.[18]

[16] Recent literature has shown that place-based inequalities are widespread even in a modern context (Ludwig et al., 2013; Chetty and Hendren, 2018a; Chetty and Hendren, 2018b).

[17] See Appendix Section C.1.2 for the intellectual background on the equity doctrine in China.

[18] **cullen2013jockeying** documents strategic high school choice under Texas's top ten percent plan. They show that among the subset of students with both motive and opportunity for strategic high school choice, at least 5%

III Data

Below we introduce the main data sources used in this paper. Information on additional variables can be found in Appendix A. Table A.1 presents the summary statistics of the variables used in this paper.

III.A Information on Successful Candidates

In this study, we put together a comprehensive and systematic dataset on the successful candidates of imperial exams over the period 1371–1840. The dataset includes the universe of successful candidates with information on their exam performance and professional outcome. To our knowledge, this is the most comprehensive dataset on successful candidates for this period.

Throughout the Ming and Qing dynasty, about 51,000 candidates passed the final round of imperial exams and obtained the jinshi degree. After each exam, the government made public the list of successful candidates, with information on their name, rank, and place of origin. This information has been made available in B. Zhu and Xie (1980) in the *Official Records of Jinshi in the Ming-Qing Imperial Exams*.

Using this data source, we generate the following variables:

The Density of jinshi The variable is defined as the number of jinshi in a decade per 10,000 people. We use the population of 1776 as the denominator as 1776 is the only year for which population data are available and is in the middle of the period of 1650 to 1840. To ensure this choice does not drive our results, we use population size in 1820 and estimated population size (by decade) as our denominator. These alternative methods do not alter our results in any meaningful way.

Exam Rank Exam rank in the metropolitan exam is our measure the academic achievement of successful candidates. The candidates took the metropolitan exam, which was held in the capital city. Although quotas dictated the number of successful candidates from different provinces, the rank of successful candidates was only determined by their performance in the exam.

Because the total number of successful candidates changed in every exam, we use standardized exam rank to ensure comparability. Standardized rank is computed as one minus the ratio of the raw rank to the total number of successful candidates. The value of the standardized rank ranges from 0 to 1. A lower value corresponds with a lower rank in the exam.

In alternative specifications, we aggregate individual-level standardized ranks into province-decade standardized ranks. For provinces with successful candidates in that decade, we average standardized ranks over all successful candidates from that province during that decade. If a province did not have any successful candidate in a decade, the average standardized rank will

enroll in a different high school to improve the chances of being in the top 10%.

be set to 0. We generate prefecture-decade and county-decade standardized ranks following the same approach.

Bureaucratic Rank We glean information on successful candidates' professional outcome from Gong (2019). The database contains the biographical information of jinshi degree holders from various historical archives and local gazetteers. The career outcome of 4,314 jinshi (27% of all jinshi) between 1650 and 1840 can be identified.

These candidates obtained a variety of positions within the government. The Qing Government classified bureaucratic posts into nine ranks, each rank further classified into standard and secondary ranks. These ranks matched the importance of the position. We have information on the rank of the initial position held by the successful candidate, and the rank of the highest position ever attained.

We transform this nine-rank system (with standard and secondary ranks) into a scale of 18 levels. The value of the variable ranges from 0.5 to 9 and increases by 0.5 per level. A lower value corresponds with a lower rank (less important position). Higher values represent positions such as the Prime Minister (level 8.5-9), the Minister (level 7.5-8.5), and the Governor of a province (level 7.5-8). Lower values represent positions such as Governor of a county (level 3) and the Deputy Governor of a county (level 2-2.5). For successful candidates in our sample, the average rank of highest positions is 5.5, which is the rank of a position similar to the Governor of a prefecture.

We average individual ranks over all successful candidates coming from the same province and passed the exam during the same decade. If a province had no successful candidate over a decade, the average standardized position is set to be 0.5, which is the lowest possible value. We obtain the average bureaucratic rank of successful candidates at the prefecture-level and county-level in the same way.

III.B Pre-Existing Human Capital

We use the density of jinshi before 1650 to proxy for pre-existing human capital. The variable is computed as the total number of jinshi between 1371 and 1650 per 10,000 people. In our baseline measure, we use the population of 1600 as the denominator. When population size in 1400 or 1500 is used as the denominator, results are unchanged.

III.C Lower-Tier Exams and Quotas

Unlike the final round, lower-tier imperial exams were governed by pre-determined quotas. We control for these quotas as they determined the size of the candidate pool for higher-tier exams.

For prefectural examinations, the number of successful candidates was capped for each prefecture. Prefectural exam quota had two components: the first component is the number of slots assigned to the county; in addition to these slots, a few slot were aside to be competed for by

all counties within a prefecture. We collect data on quota from the *Imperially Established Institutes and Laws of the Great Qing Dynasty* for the period of 1724 and 1851 and normalize it by population.

For provincial examinations, the number of successful candidates was capped for each province. Provincial exam quota were adjusted in 1645, 1660, 1696, 1711, and 1744.

In Appendix C.2, we discuss further details of lower-level exams in the imperial examination system.

IV Reform Intensity: Gains and Losses from the 1712 Reform

The 1712 reform was to equalize the access to jinshi degrees and important government positions. To accomplish this, a policy was implemented to make the number of jinshi proportional to the number of examinees from each province.

In a motivating figure (Figure II), we present trends in the density of jinshi after the reform varying by initial differences in exam success rates. Provinces in the upper panel had a higher share of successful candidates from lower-tier exams eventually passing the highest-level exam. This group saw little change in the density of jinshi after 1712. In contrast, provinces in the lower panel, most of which had a relatively low share of successful candidates at lower-tier exams eventually passing the highest-level exam, saw an increasing trend in the density of jinshi. This is broadly consistent with the objective of the reform.[19]

How do we quantify the magnitude of the reform for each province? A possible measure is to compare a province's share of jinshi under the reform with its share during a period. We would ideally examine a period that was close to the period of interest (1650–1840) and for which no intervention existed. Such periods did not exist. As a compromise, we examine the period of 1454–1650 when competition for the jinshi degree occurred at the level of exam region (South, North, and Central Region) and there were no further interventions within the exam region. Taking the difference between a province's share of jinshi within a region during this period and its share right after the reform yields a measure of the intensity of the reform.

To construct this measure, we first compute each province's share of jinshi within the region ($Share_{prov(region),1454-1650}$). We then compute each province's share of jinshi within the region for the period of 1713–1740, $Share_{prov(region),1713-1740}$, even though these regions were no longer relevant. A province's share of jinshi within the region ($Share_{prov(region),1454-1650}$) reflects a province's position relative to other provinces in the same region.

[19] We compute the ratio of the number of successful candidates at the final-round exam (jinshi) to successful candidates at lower level exams (*juren*) for each province. We then divide the provinces into two groups based on the jinshi-to-*juren* ratio before the reform (1644–1711). The upper panel comprises provinces whose jinshi-to-*juren* ratio was above the median in 1644–1711; the lower panel comprises provinces whose jinshi-to-*juren* ratio was below the median. To note, only those who passed lower-level exams could sit in the final-round exam.

Because provincial boundaries evolved over time from the Ming period (1368–1644) to the post-1712 period (1712-1840), the boundaries of the three exam regions established during the Ming dynasty (South/North/Central) did not overlap with post-1712 provincial boundaries. To deal with this problem, provinces are reconstructed so that each "province" is continuously contained within the same exam region [20]

In equation 1, the share of jinshi without the reform ($Share_{prov(region),1454-1650}$) is subtracted from the share under the reform ($Share_{prov(region),1713-1740}$). When the change in the share of jinshi is positive, G_{prov}^{1712} takes the value of the change in the share of jinshi, denoting gains for provinces seeing an increasing share of jinshi, and L_{prov}^{1712} is set to be zero. When the change in the share of jinshi is negative L_{prov}^{1712} is the absolute value of the change in the share of jinshi, denoting the losses for provinces that saw a decreasing share of jinshi, and G_{prov}^{1712} is set to be zero.

$$\begin{aligned} \Delta Share_{prov} &= Share_{prov(region),1713-1740} - Share_{prov(region),1454-1650} \\ G_{prov}^{1712} &= |\Delta Share_{prov}| \cdot 1(\Delta Share_{prov} > 0) \\ L_{prov}^{1712} &= |\Delta Share_{prov}| \cdot 1(\Delta Share_{prov} < 0) \end{aligned} \tag{1}$$

This yields a measure of effective reform intensity. Figure III depicts effective reform intensity in different provinces. The red, green, and blue color represent the provinces in the South, North, and Central exam region. A lighter shade represents a negative change in the share of jinshi. A province with a lighter shade suffered losses from the reform. A darker shade represents a positive change in the share of jinshi. A province with a darker shade benefited from the reform. Compared with provinces that suffered losses from the reform, provinces that benefited from the reform were farther from the capital city and had a lower level of ruggedness.[21].

By design, the 1712 reform improved the position of formerly underrepresented provinces. In Figure IV, we plot the relationship between a province's share of jinshi without the reform and the change in its share under the reform ($\Delta Share_{prov}$ and $Share_{prov(region),1454-1650}$). As expected, the direction of the change is inversely correlated with the no-reform share. Provinces with a lower share of jinshi when there was no reform had a larger increase in the share of jinshi under the reform; provinces with a higher share of jinshi when there was no reform had a more modest increase or even a decrease in the share of jinshi.

[20] We reconstruct 16 provinces based on the 18 provinces in 1712-1840, including *Fujian*, *Guangdong*, *Guangxi*, *Guizhou*, *Henan*, *Huguang* (*Hubei* and *Hunan* province in 1712–1840), *Jiangbei* (northern *Anhui* province and northern *Jiangsu* province in 1712–1840), *Jiangnan* (southern *Anhui* province and southern *Jiangsu* province in 1712–1840), *Jiangxi*, *Shanxi*, *Shaanxi* (*Gansu* and *Shaanxi* province in 1712–1840), *Shandong*, *Sichuan*, *Yunnan*, *Zhejiang*, *Zhili* (*Hebei* province).

[21] We compare the average distances to *Beijing* for the prefectures in provinces with gains or losses. The average distance to *Beijing* for the prefectures in provinces with gains is 1260 km, whereas the average distance to *Beijing* for the prefectures in provinces with losses is 1098 km. We compute the terrain ruggedness index based on the elevation map with the cells 225 by 225 meters. The ruggedness for the provinces with a gain is 402, while the ruggedness for the provinces with a loss is 416.

One limitation to this measure is that it is only comparable between provinces within the same exam region. In Appendix B.3, we explore different formulations of measures of reform intensity, including a measure that is comparable between the exam regions.

V The Impact of the Reform on Exam Performance and Professional Outcome

V.A The Reform and Exam Performance

The 1712 reform produced more successful candidates in underrepresented provinces (Figure IV). Was there also an improvement in their exam performance? Next we examine how the reform affected the exam performance of successful candidates.

We estimate the impact of the 1712 reform on the exam performances of successful candidates in the following equation:

$$Exam\ Rank_{i(p),t} = \alpha_0 + \alpha_1 G_p^{1712} \cdot Post_t + \alpha_2 L_p^{1712} \cdot Post_t + \gamma X_p \cdot \eta_t + \delta_p + \eta_t + \varepsilon_{i(p),t} \tag{2}$$

Our dependent variable $Exam\ Rank_{i(p),t}$ denotes the standardized exam rank of successful candidate (jinshi) i from province p in period t. As we introduced in Section IV, G_p^{1712} is the size of the gain for province p, and L_p^{1712} is the size of the loss for province p. In our alternative specification, we combine G_p^{1712} and L_p^{1712} into a single measure, $\Delta Share_p$. $\Delta Share_p$ denotes the change in the share of jinshi of province p after the 1712 reform. $Post_t$ is equal to 0 in the periods before the 1712 reform, and equal to 1 in the periods after the 1712 reform. X_p is a set of province-level control variables. δ_p is the time-invariant effect unique to province p, and η_t is a decade fixed effect. $\varepsilon_{i(p),t}$ is the error term.

Table I summarizes the results. In columns 1 and 2, we use our baseline measure of the reform intensity, G_{prov}^{1712} and L_{prov}^{1712}. In columns 3, 4, and 5, gains and losses are combined into a single measure, $\Delta Share_p$. Column 3 includes only successful candidates from provinces that benefited from the reform. Column 4 includes only successful candidates from provinces hurt by the reform. In column 5, we again include all the provinces with $\Delta Share_p$ as the treatment.

We control for the interactions of various time-invariant characteristics and decade fixed effects to account for trends related to the province's initial conditions, including population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. We include time and province fixed effects in all columns. Decade fixed effects will absorb common shocks that affected exams in certain years but not others, as well as overall trends in exam participation. We also include the interaction of decade fixed effects and exam region fixed effects. This is because even before the reform, exam candidates faced varying levels of competition which was determined by the exam region they were from. Moreover, this

particular source of variation in the intensity of competition collapsed after 1712. By allowing the effects of exam regions to vary over time, we account for the changing role of the exam region before and after the reform.

Column 2 is our preferred specification. With all the controls included, the interaction between the post dummy and the gain from the reform is positive and significant. After the reform, the exam rank of successful candidates from provinces that benefited more from the reform improved, relative to successful candidates from elsewhere. If a province saw a change in its share of jinshi that was 0.1 larger, its successful candidates would a 3% larger increase in (standardized) exam rank. In column 5, the coefficient of the interaction of the post dummy and the change in the share is significant and positive as well. The results similarly suggest that provinces with greater gains (or smaller losses) from the reform saw improvements (relative to other provinces) in the exam performance of their successful candidates.

This suggests that post-reform successful candidates from beneficiary provinces rapidly converged with other successful candidates in their exam performance. A very likely explanation for this pattern of convergence is that the 1712 reform incentivized effort in younger generations who were still in the preparation stage for imperial exams. At a province level, this "increase in effort" could include two dimensions: both that children and young adults spent more time and energy studying the materials than their predecessors and that more children and young adults were educated than before.

Lastly, we demonstrate the impact of the 1712 reform on exam performances over time. We re-estimate the equation 2 by including the interactions between decade dummies and change in the share of jinshi. In Figure VI, we plot the point estimates of the coefficients of the interaction terms. Figure VI shows that a larger gain (or smaller loss) from the reform led to an improvement in exam performance among successful candidates for many decades after 1712.

V.B The Reform and Professional Outcome

Next, we investigate the impact of the 1712 reform on the professional outcome of successful candidates. Note that the reform included no separate measure targeted at the professional success of successful candidates. The effects we find should be considered as the effects of the same reform as examined in Section V.A.

After passing the final round, successful candidates were recruited into different positions in the bureaucracy based on their exam rank, personality, and manners (see Figure A.7 for more details on official recruitment). This is confirmed by Figure V and results in Table A.2. Both suggest that there was a positive relationship between exam rank and professional outcome: if a successful candidate had a higher rank in the final-round exam, he would more likely attain a higher bureaucratic rank. This positive relationship holds both for the first placement and for the highest-ranked position obtained.

Given the relationship between exam and bureaucratic rank, and the link between the reform and the exam rank as established in Section V.A, there should be a positive relationship between the intensity of the reform and an improvement in professional outcome. However, this does not have to be true if there are unobserved characteristics of the successful candidates that are both correlated with the intensity of the reform and determinants of professional success.

To shed light on this question, we estimate the impact of the 1712 reform on professional outcomes of successful candidates as follows:

$$Bureaucratic\ Rank_{i(p),t} = \alpha_0 + \alpha_1 G_p^{1712} \cdot Post_t + \alpha_2 L_p^{1712} \cdot Post_t + \gamma X_p \cdot \eta_t + \delta_p + \eta_t + \varepsilon_{i(p),t} \tag{3}$$

In equation 3, we estimate the relationship between bureaucratic rank and the 1712 reform at an individual level. Our unit of analysis is a successful candidate i from province p who passed the imperial exam in decade t. The dependent variable $Bureaucratic\ Rank_{i(p),t}$ denotes the standardized rank of the position a successful candidate held. G_p^{1712} is the size of the gain from the 1712 reform for province p, and L_p^{1712} is the size of the loss from the 1712 reform for province p. $\Delta Share_p$ is the change in the share of jinshi of province p from the 1712 reform. $Post_t$ is equal to 0 in the periods preceding the 1712 reform, and equal to 1 in the periods following the reform. X_p is a set of province-level control variables. δ_p is the time-invariant effect unique to province p, and η_t denotes decade fixed effects. $\varepsilon_{i(p),t}$ is the error term.

Table II summarizes the results. In columns 1 and 2, we use our baseline measure of the reform intensity, G_{prov}^{1712} and L_{prov}^{1712}. In columns 3, 4, and 5, we combine gains and losses into a single measure, $\Delta Share_p$. In column 3, we only include successful candidates in provinces that benefited from the reform. In column 4, we only include successful candidates in provinces hurt by the reform. In column 5, we include all the provinces.

Column 2 is our preferred specification. With all the controls included, the coefficient estimate of the interaction of the post dummy and the gain from the reform is insignificant. Relative to other successful candidates, successful candidates from beneficiary provinces did not obtain higher rank in the bureaucracy after the 1712 reform. The 1712 reform was not directly associated with improved professional outcome for successful candidates from beneficiary provinces.

Based on the findings from Section V.A and Section V.B, we conclude that the 1712 reform not only increased the number of candidates but also improved the exam performance of successful candidates from beneficiary provinces, but this positive relationship did not translate into a positive relationship between the reform and professional success. Given the positive relationship between exam performance and professional outcome, as shown in Table A.2, we can conclude that there were still missing links between academic success and professional success for reform beneficiaries.

By bringing a different mix of people into the bureaucracy, the reform could have affected

the quality of the bureaucracy through the channel of bureaucratic selection. While not a focus of this study, we acknowledge that this is an important aspect of the reform.[22] Reassuringly, the impact on the bureaucracy is unlikely to confound our findings — we focus on the effect of the reform on successful candidates' hometown, whereas the bureaucrats were explicitly forbidden from working in their hometown.[23]

Our results are robust to using province-level measures of exam rank or bureaucratic rank, as well as to using an indicator variable as our treatment. Results are available in Section B.2.1 and Section B.2.2, respectively.

VI The Distributional Consequences of The 1712 Reform

One key question in the affirmative action literature is the distributional consequences of the affirmative policy for the beneficiaries. A small number of studies have shown that inequalities increased within intended beneficiaries (Bertrand, Hanna, and Mullainathan, 2010). While it is relatively obvious that inequalities should increase at the time of the policy, the long-run dynamics are much less clear.

Below we estimate the heterogeneous impact of the reform on jinshi density within provinces, varying by a prefecture's pre-existing human capital. As shown in Figure VII, there was a lot of variation in pre-existing human capital across the prefectures. Pre-existing human capital is measured by the total number of successful candidates (jinshi) per 10,000 before 1650. We proceed to estimate the reform's heterogeneous impact with the following equation:

$$\begin{aligned} Jinshi_{p,prov,t} =& \beta_0 + \beta_1 PHC_p \cdot Post_t + \beta_2 G^{1712}_{prov} \cdot PHC_p \cdot Post_t + \beta_3 L^{1712}_{prov} \cdot PHC_p \cdot Post_t + \\ & \gamma X_p \cdot \eta_t + \delta_{prov} \cdot \eta_t + \theta_p + \eta_t + \varepsilon_{p,prov,t} \end{aligned} \tag{4}$$

In equation 4, the dependent variable $Jinshi_{p,prov,t}$ is defined as the number of successful candidates (jinshi) from prefecture p in province $prov$ who passed the imperial exam in decade t, divided by the population. G^{1712}_{prov} is a province's gain from the 1712 reform, and L^{1712}_{prov} is a province's loss from the 1712 reform. PHC_p is a proxy for pre-existing human capital, which is measured by the jinshi density in prefecture p before 1650. $Post_t$ is equal to 0 in the periods preceding the 1712 reform and equal to 1 in the periods following the reform. X_p is a set of prefecture-level control variables. δ_{prov} is the time-invariant effect specific to each province. θ_p is the time-invariant effect unique to prefecture p, and η_t denotes decade fixed effects. $\varepsilon_{p,prov,t}$ is the error term.

Table III shows the regression results from estimating equation 4. In all columns, we use our baseline measure of the reform intensity, G^{1712}_{prov} and L^{1712}_{prov}. Decade fixed effects and prefecture

[22] Unfortunately, few data on the performance of these bureaucrats have survived, so it will be difficult to assess the impact of the reform on bureaucratic quality.

[23] We have information on the location of the position they held for 3,655 successful candidates. Only 14 of them worked in the same province they were from.

fixed effect are included in every specification. We further control for the interaction of decade fixed effect and province fixed effect for provincial heterogeneous time trends[24]. In columns 2, 3, and 4, we control for the interactions of different historical variables and decade fixed effects. We allow the trends to be related to the prefecture's initial conditions, including population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a prefecture had access to any main navigable river. Column 3 includes only the prefectures in the provinces that gained from the reform. Column 4 includes only the prefectures in the provinces with losses from the reform.

In column 2, with all the controls included, the coefficients of triple interactions $G^{1712} \times PHC_p \times Post$ and $L^{1712} \times PHC_p \times Post$ are positive and significant. Within a province that gained from the reform, prefectures with greater pre-existing human capital had more successful candidates after the reform. In other words, the gain from the reform was concentrated in the prefectures with greater pre-existing human capital. On the other side, within a province hurt by the reform, prefectures with greater pre-existing human capital also had more successful candidates after the reform. The loss from the reform was greatest in the prefectures with least human capital before, and the prefectures with greater pre-existing human capital continued to have relatively more successful candidates.

In column 3, we only include the prefectures in the provinces that benefited from the reform. In column 4, we only include the prefectures in provinces hurt by the reform. The coefficient of the triple interaction $G^{1712} \times PHC_p \times Post$ in column 3 and that of $L^{1712} \times PHC_p \times Post$ in column 4 are positive and significant. This further indicates that there was greater within-province inequality both in the provinces that benefited from the reform and those that suffered from it.

The distributional consequences are large. We focus on column 2 when interpreting the magnitude of the distributional consequences. As a measure of pre-existing human capital, the average jinshi density before 1650 is 1.33. In a province that benefited from the reform, if the increase in the jinshi share is 0.1, prefectures with greater pre-existing human capital (1.33 higher in jinshi density before 1650) had 0.006 more successful candidates per 10,000 in every period after the reform. Since a prefecture had an average of 0.024 successful candidates per 10,000 in a period, the distributional impact of the reform is equivalent to an increase of 24% of successful candidates in prefectures with greater pre-existing human capital. [25]

To understand the dynamics, we estimate the equation 5. $Period_t$ is a group of dummies for 20-year periods[26] In the following scenario, it is possible for intraprovincial inequalities to grow

[24]By controlling for the interaction of decade fixed effect and province fixed effect, we only focus on the difference between prefectures within the same province. We control for the confounding changes due to the different province-level conditions. For example, the changes in the quotas of the province-level exam.

[25]$1.33 \times 0.1 \times 0.0419/0.024 = 24.3\%$

[26]$Period_t$ is equal to 1 for the period from year t to $t+19$. For instance, $Period_{1650}$ is equal to 1 for the years

over time: individuals growing up in prefectures with lower pre-existing human capital invested less in education than those growing up in prefectures with higher pre-existing human capital, after observing the subpar performance of the first few post-reform cohorts of examinees.[27]

$$Jinshi_{p,prov,t} = \beta_0 + \sum_{t=1650}^{1830} \beta_{1,t} PHC_p \cdot Period_t + \sum_{t=1650}^{1830} \beta_{2,t} G_{prov}^{1712} \cdot PHC_p \cdot Period_t + \sum_{t=1650}^{1830} \beta_{3,t} L_{prov}^{1712} \cdot PHC_p \cdot Period_t + \gamma X_p \cdot \eta_t + \delta_{prov} \cdot \eta_t + \theta_p + \eta_t + \varepsilon_{p,prov,t} \quad (5)$$

In Figure VIII, we plot the point estimates of the coefficients $\beta_{2,t}$ and $\beta_{3,t}$. These coefficients suggest that the divergent trend following the reform grew steadily over time, especially in provinces hurt by the reform. There is no evidence for convergence during this period.

VI.A Replicating the Analysis at the County Level

Next, we replicate the above analysis at the county level. Table IV summarizes the results.

In all columns, we use our baseline measure for the gains or losses of provinces (G_{prov}^{1712} and L_{prov}^{1712}) and include time and county fixed effects. We further control for the interaction of decade fixed effects and province fixed effects to account for provincial heterogeneous time trends. In columns 2, 3 and 4, we control for the interactions of different historical variables and decade fixed effects. We allow the trends to be related to the county's initial conditions, including population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a county had access to any main navigable river. In column 3, we only include the counties in the provinces with gains from the reform. In column 4, we only include the counties in the provinces with losses from the reform. With all the controls included, the coefficients of triple interactions are positive and significant (column 2). The results parallel those in column 2 of Table III. The distributional pattern present at the county level is in line with results found using prefecture-level data, confirming our conclusion that the reform created greater within-province inequality.

VI.B The Great Equalizer — The Role of Funding Agencies

Next, we estimate the distributional consequences of the 1712 reform in prefectures with or without funding agencies. As the metropolitan exam was held in the capital city, *Beijing*, the cost of attending the exam was high for many. In some prefectures, the wealthy set up funding agencies to subsidize travel, lowering the cost of attending the exam. For a marginal candidate, access to travel funding could be pivotal for their decision to attend the exam. While the effect of travel funding at an aggregated level is ambiguous, it is safe to say travel funding made continued

of 1650-1669.

[27] Jensen (2010) shows that *perceived* returns affect schooling decisions. Youths often observe the earnings of workers who live in their neighborhoods to make schooling decisions.

participation in the exam more likely for prefectures that saw little exam success. We ask: did this change the long-run trajectory in human capital for these prefectures?

Table A.12 shows the regression results from estimating equation 4. In all columns, we use our baseline measure of the reform intensity, G_{prov}^{1712} and L_{prov}^{1712}. We include time and prefecture fixed effects. We include the interaction of time and province fixed effects to allow for provincial heterogeneous time trends. Column 1 only includes the prefectures with a funding agency in 1840, while we focus on the prefectures without a funding agency in 1840 in column 2. We then divided the prefectures into two samples, the prefecture with and without a funding agency in 1840. In Appendix B.4, we discuss the full details of using the propensity score method to match the two samples. In columns 3 and 4, we use the matched sample by including the prefectures with or without a funding agency in 1840.

The coefficient of triple interactions are positive and significant in columns 2 and 4. The results show that the reform led to increasing inequality in the sample of prefectures without any funding agency, but not in those with at least one funding agency. Without any intervention, the widening gap between prefectures in exam performance would lead to differential participation levels, which could further widen the gap between them. Travel funding mitigated the polarizing effect of the reform within the provinces.

VII After 1905: The Long-term Consequences of The 1712 Reform

In this section, we examine the long-term consequences of the 1712 reform in the first half of 20th century. We ask whether the reform still had effects after the policy was phased out along with the imperial exams in 1905?

Because there was no direct equivalent to the imperial exam system after 1905, we focus on individuals who attained a high level of academic achievement in the new era. We begin our analysis with individuals who acquired any sort of social prominence in 1912–1949. These individuals include politicians, military officers, scientists, professors, educators, journalists, writers, and entrepreneurs. We then focus narrowly on the individuals who succeeded in competitive exams before they enrolled in elite universities: graduates from China's best universities, i.e. Tsinghua University and Peking University, and individuals who received government funding to study oversea.

First, we investigate the impact of the 1712 reform on the density of jinshi in the last few imperial exams immediately before 1905, and the density of individuals in one of the above groups after 1905.

We expect the effects of the 1712 reform to be reversed after 1905. Specifically, places that produced a lot of successful candidates partly as a result of the reform during the imperial era might face tougher competition once that examination system was eliminated.

To test this conjecture, we construct panel data around the point of 1905. The dependent variable in the first, second, and third period is the density of jinshi in the last few imperial exams in the periods of 1870–1880, 1880–1890, and 1890–1905. The fourth, fifth, sixth, and seventh periods include the density of highly educated individuals in the periods of 1910–1920, 1920–1930, 1930–1940, and 1940–1950. To account for differences in the unit, we standardized the outcome variable across time periods. Specifically we estimate:

$$Educational\ Elite_{p,prov,t} = \beta_0 + \beta_1 \Delta Share_{prov} \cdot Post_t + \gamma X_p \cdot \eta_t + \delta_p + \eta_t + \varepsilon_{p,prov,t} \quad (6)$$

The dependent variable $Educational\ Elite_{p,prov,t}$ is the density of highly educated individuals from prefecture p in province $prov$ in period t. In the first period, the variable is the standardized density of jinshi in 1890–1905. In the second, third, fourth, and fifth periods, the variable records the standardized density of highly qualified individuals in the years 1910–1920, 1920–1930, 1930–1940, and 1940–1950. $\Delta Share_{prov}$ is the change in the share of jinshi of province $prov$ from the 1712 reform. $Post_t$ is equal to 0 in the first period and equal to 1 after the second period. X_p is a set of prefecture-level control variables. δ_p is the time-invariant effect unique to prefecture p, and η_t is a decade fixed effect. $\varepsilon_{p,prov,t}$ is the error term.

Table V reports regression results from estimating equation 6. In all columns, confirming our prior, the gains from the 1712 reform were partly reversed after 1905. After 1905, prefectures in provinces that benefited more from the reform, produced fewer notable figures and fewer students in selective universities than prefectures in provinces that benefited less.

Below we explore the dynamic impact of the 1712 reform on the density of educational elite. We re-estimate the equation 6 with the interactions of the period dummies and the change in the share of jinshi and plots the point estimates of the interaction terms in Figure IX. Figure IX shows that a greater gain (or smaller loss) from the reform is associated with a decline in the size of educational and social elite for several decades after 1905.

In a nutshell, the impact of the 1712 reform partly remained after the withdrawal of the policy in 1905. After 1905, individuals in beneficiary provinces lost some of the advantages conferred by the reform, as indicated in Table V, but they were still better off compared to their ancestors who lived before the reform.

VIII Spillover Effects from the Imperial Examination System and the 1712 Reform

Recall that the 1712 reform was targeted at the final round of imperial exams. Does that mean the reform affected only a handful of social and educational elites, and was irrelevant to the broader population?

Contemporaneous data on education besides those who acquired degrees through imperial

exams are unavailable. Moreover, the number of candidates who passed lower-level exams was tightly regulated by a fixed quota.

To overcome data limitations, we gauge the effects of the reform on the wider population using 20th century census data. 1982 census is the first modern census with disaggregated information on educational attainment. We use the 1982 census to estimate the long-term impact of the 1712 reform on educational attainment. Using the share of the population that completed primary and secondary school, and college, we estimate the long-term effect of the reform on different educational levels.

Table VI shows the results. In all columns, we control for the same historical characteristics as in the previous tables as well as age structure in 1982. We find suggestive evidence that the impact of the reform trickled down to lower educational levels. The 1712 reform is positively correlated with educational attainment at a secondary and tertiary level in 1982, after controlling for pre-existing human capital.

A possible mechanism behind this is that a higher chance to succeed in the exam attracted more individuals to study and prepare for imperial exams. The vast majority would not advance to the final round but nonetheless, they acquired basic literacy;if they at least passed the lowest level exam, they would be financially rewarded for the successful outcome. Failed candidates took on occupations such as teaching or positions of leadership in own villages. The amount of education they received served to increase the educational attainment of future generations.

Combining this result with findings in Section VII, we conclude that despite the reversal after the policy was withdrawal, part of the positive effect of the 1712 reform remained. The reform had a long-lasting impact on the educational attainment of a sizable share of the population, up to the level of secondary education.

IX Conclusion

Imperial China selected government officials via a competitive examination system. We examine the consequences of the introduction in 1712 of a large-scale affirmative action policy that favored candidates from previously underperforming regions. Specifically, this policy equalized acceptance rates across the provinces at the final round.

Using a novel dataset, we show that the 1712 reform improved the academic outcomes of individuals from previously underrepresented provinces. In provinces positively affected by the reform, successful candidates from provinces with a greater reform intensity obtained higher exam ranks than before. Tracking the career outcomes of successful candidates, we find less clear evidence as to whether these candidates also became more successful professionally.

By performing a policy that favored formerly underrepresented provinces, the reform reduced inequality across the provinces. Our analysis of the distributional consequences of the reform,

however, suggests that benefits from the reform were concentrated in sub-provincial units that had been abundant in human capital prior to the reform. After 1712, a gap began to emerge between prefectures or counties with greater pre-existing human capital and those with less human capital. Funding agencies were able to mitigate this post-reform divergent trend between sub-provincial units with different pre-existing conditions, by handing out travel subsidies to exam candidates.

We find the effects of the reform to be long-lasting. When the policy was withdrawn in 1905, there continued to be a positive relationship between academic excellence and post-reform density of jinshi. However, compared to the period immediately before 1905, the effects of the reform were much weakened.

The connection between imperial exams and human capital accumulation was not limited to a small segment of society. We show that this relationship holds for lower educational levels, indicating significant positive spillovers of participation and success in imperial exams.

Figures and Tables

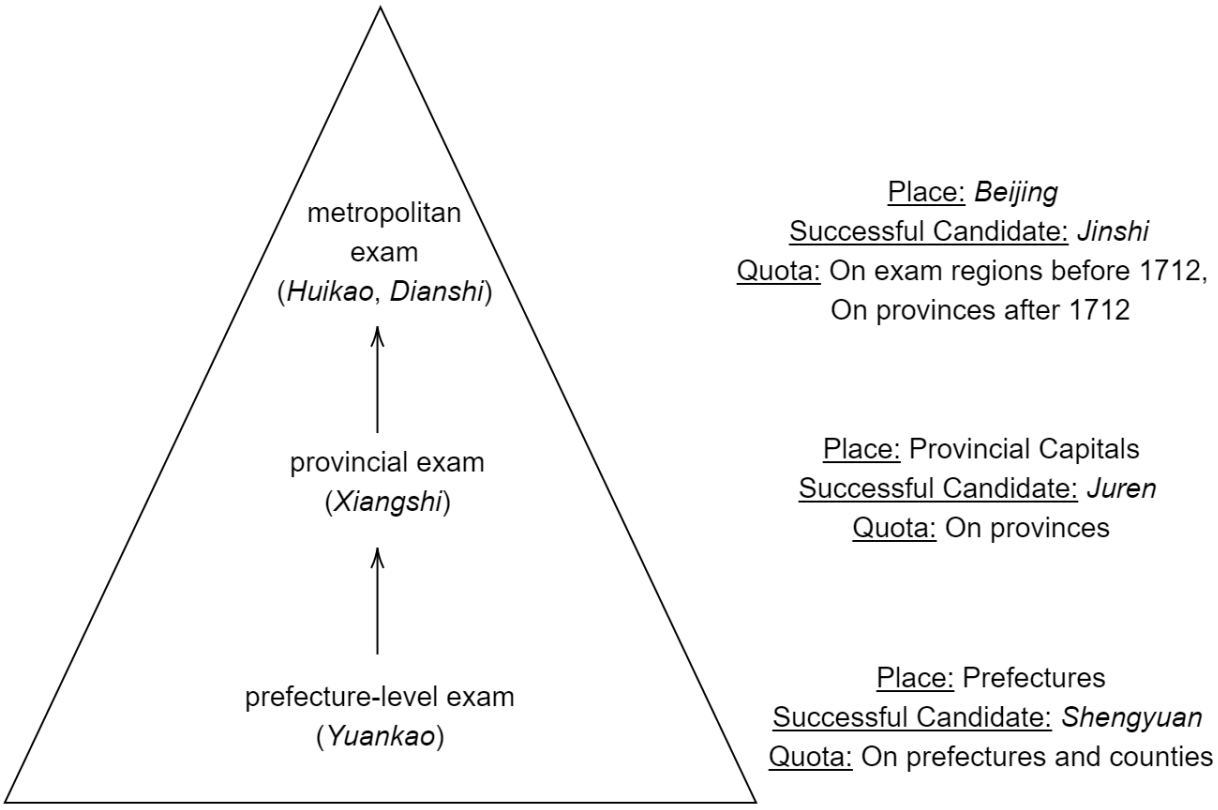


Figure I: The Three-Tier Imperial Examination System

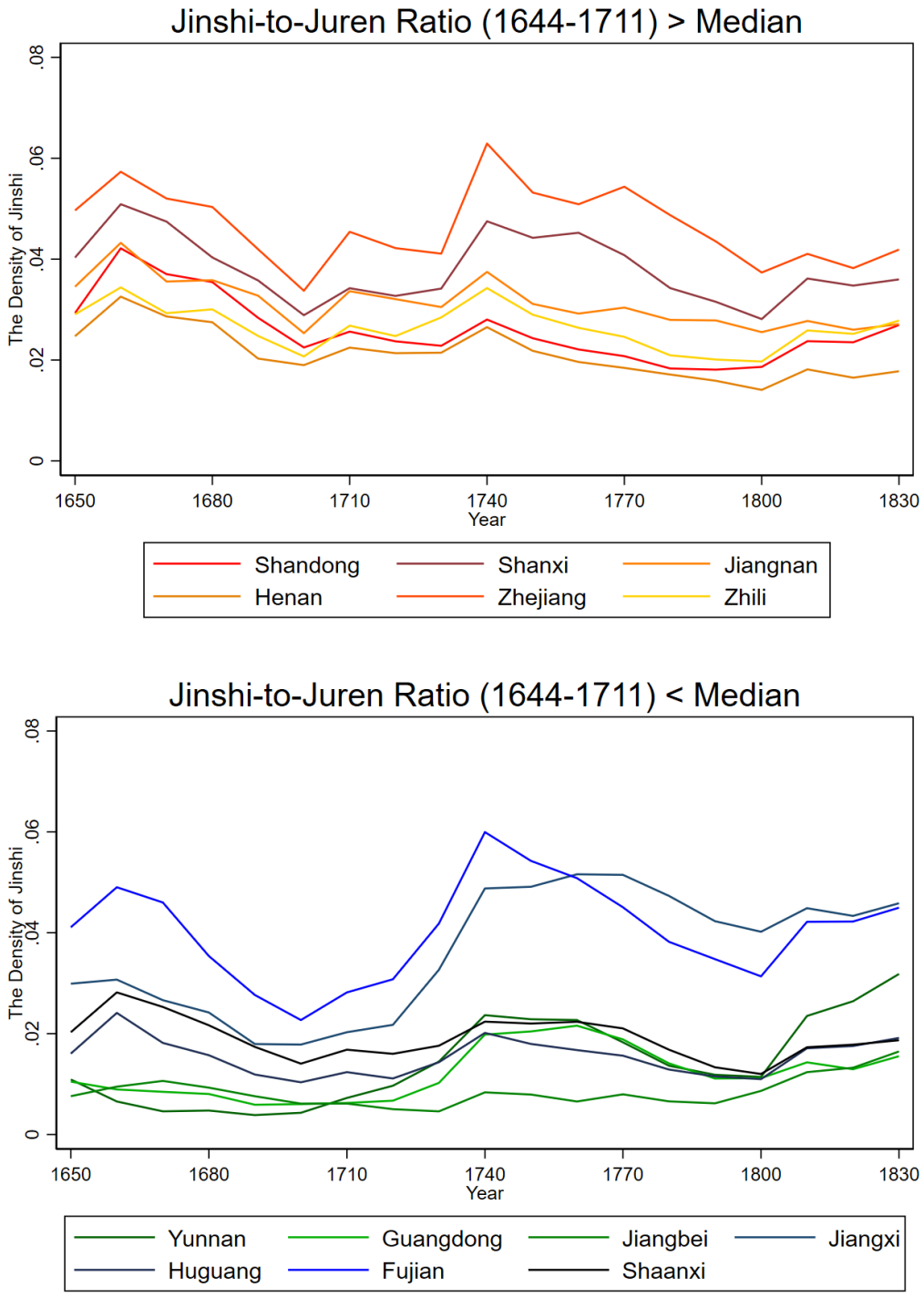


Figure II: The Density of *jinshi*

Notes: This figure shows the change in the density of jinshi in the subsample of provinces with a below-median jinshi-to-juren ratio and in the subsample of provinces with an above-median jinshi-to-juren ratio.

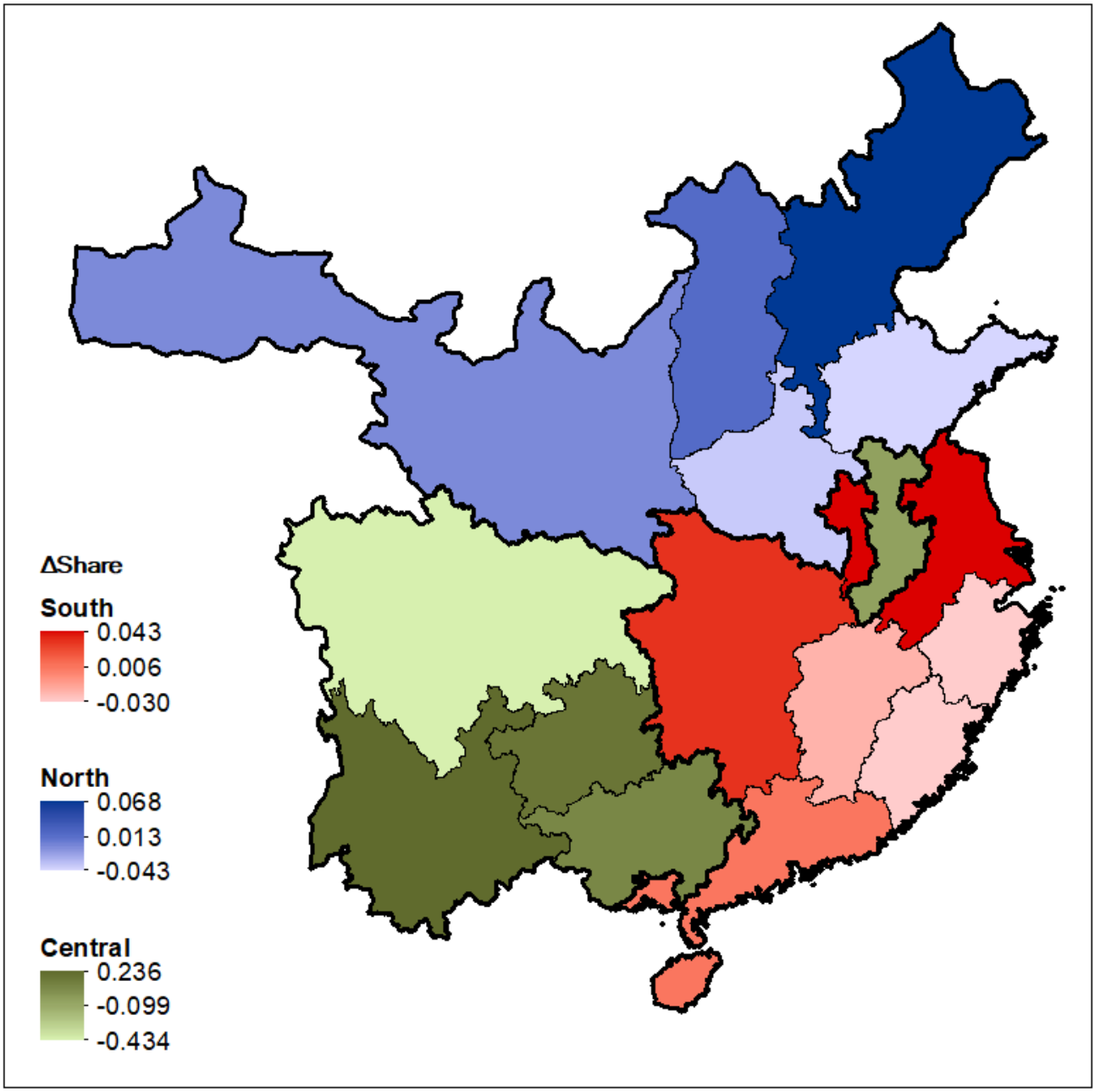


Figure III: The Intensity of the 1712 Reform

Notes: This map shows the difference in a province's share of jinshi in its region with and without the reform.

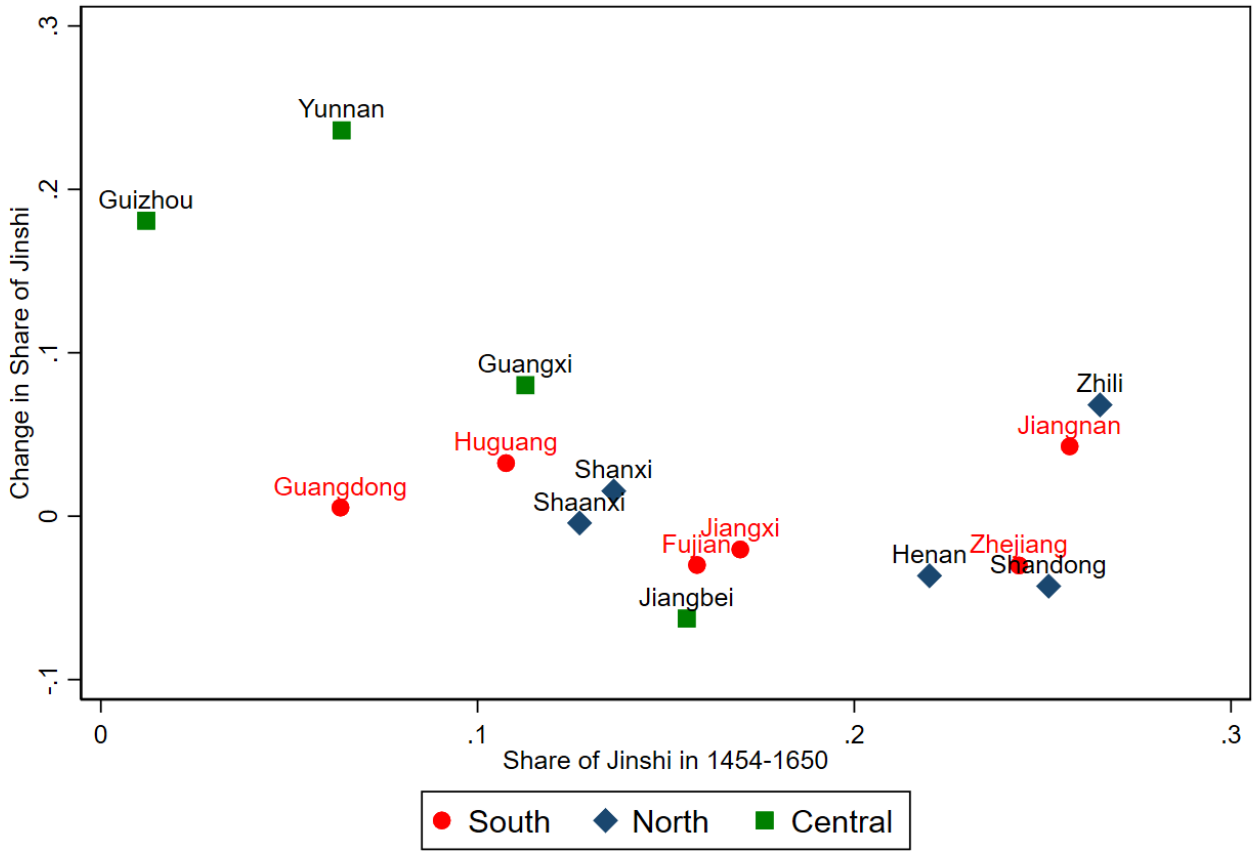


Figure IV: Who Benefited from the 1712 Reform?

Notes: The variable on the Y-axis is the difference between the share of jinshi within the region in 1713–1730 and the share of jinshi within the region in 1454–1650. The change in the share of jinshi under the reform is inversely correlated with the share of jinshi without the reform.

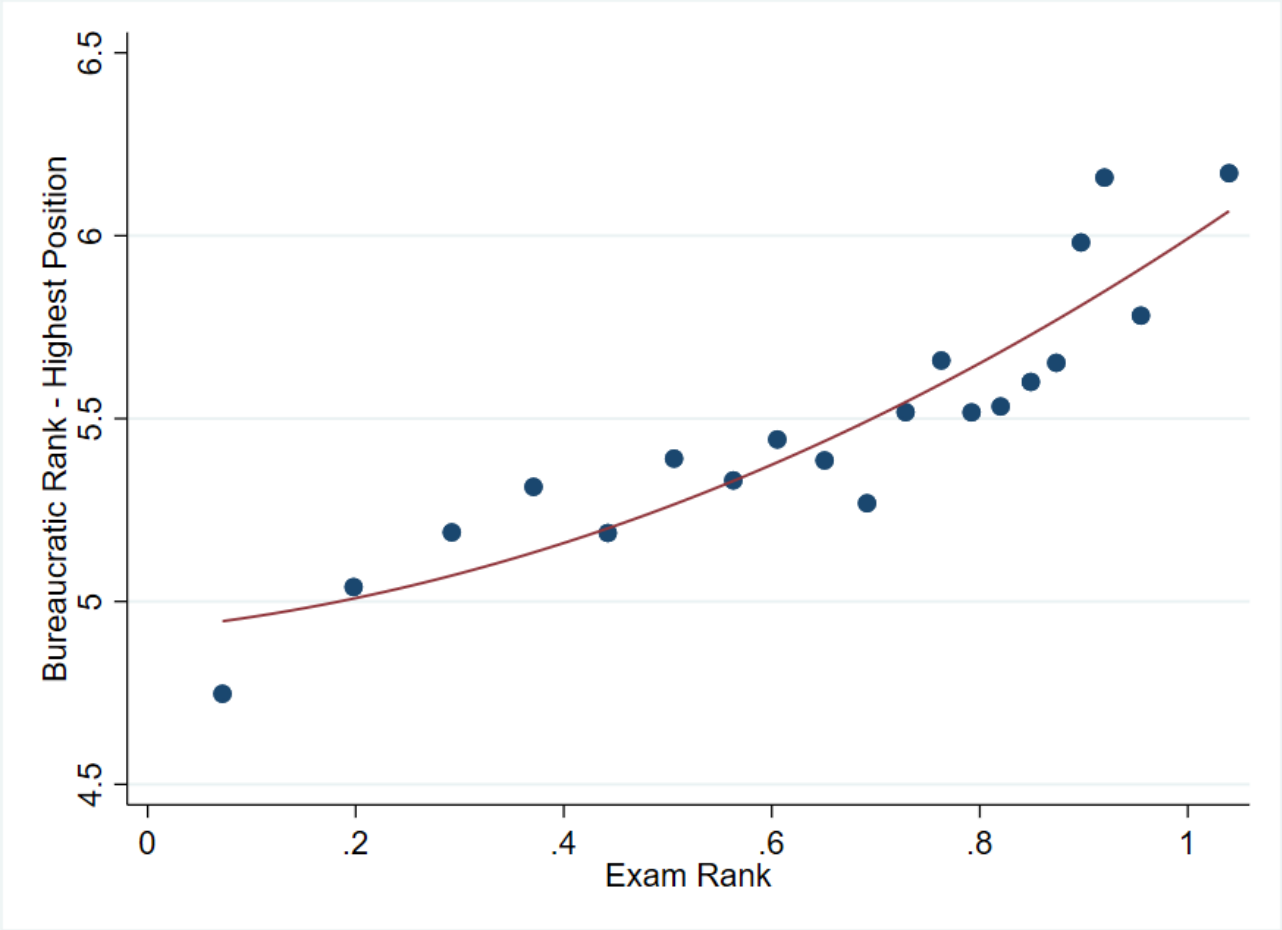


Figure V: The Relationship Between Exam Performance and Professional Outcome

Notes: This figure is a binscatter plot of exam rank and bucreatic rank at an individual level.

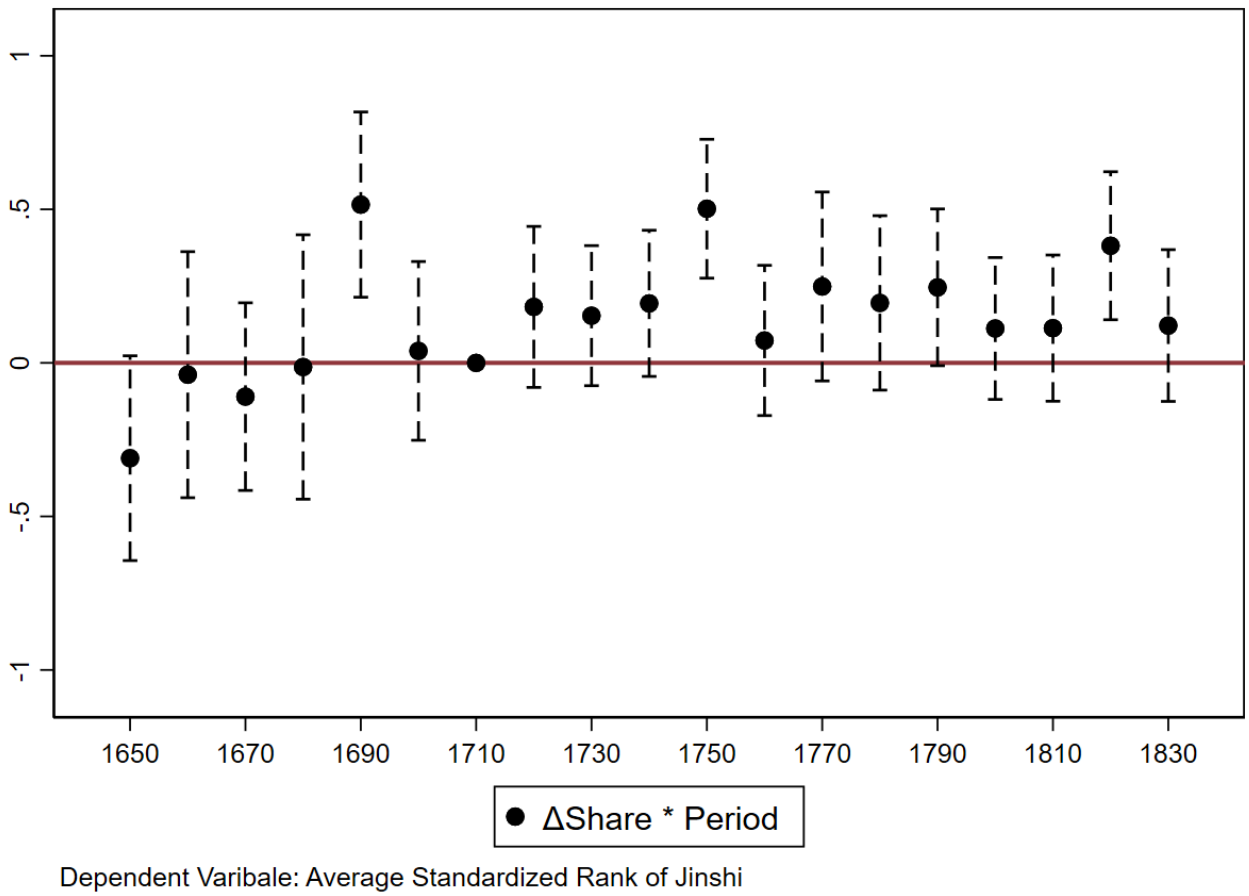


Figure VI: The Dynamic Impact of The 1712 Reform

Notes: This figure plots the estimation results of equation 2 by decade. The points represent the coefficients, and the dash lines are confidence intervals (90%).

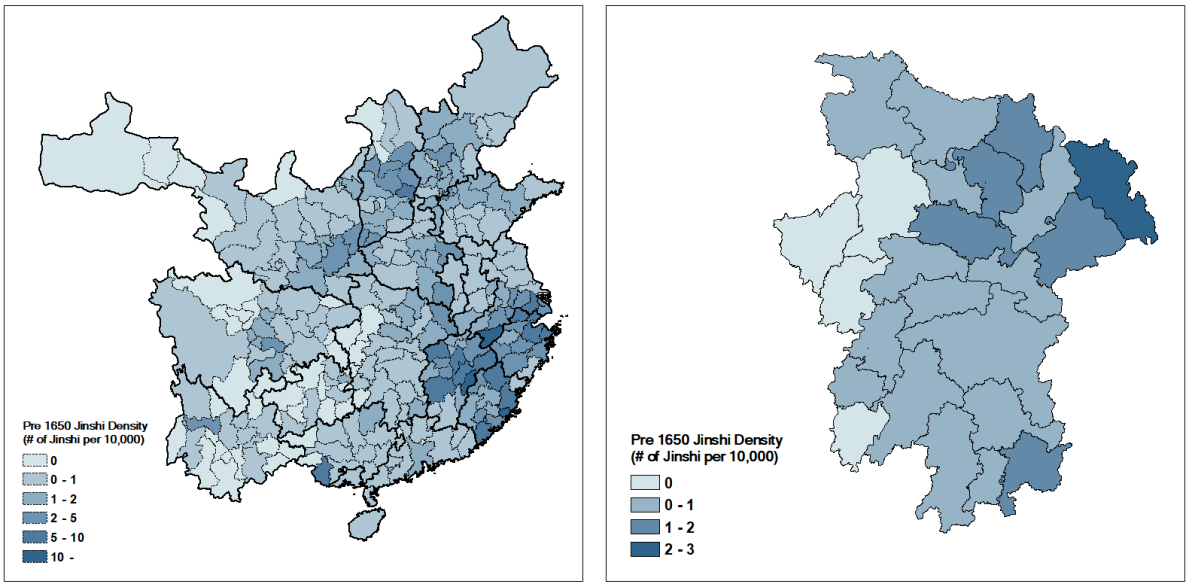


Figure VII: Pre-Existing Human Capital

Notes: The left map depicts the spatial variation in pre-existing human capital in the entire country. The right map depicts spatial variation in pre-existing human capital within Hunan Province.

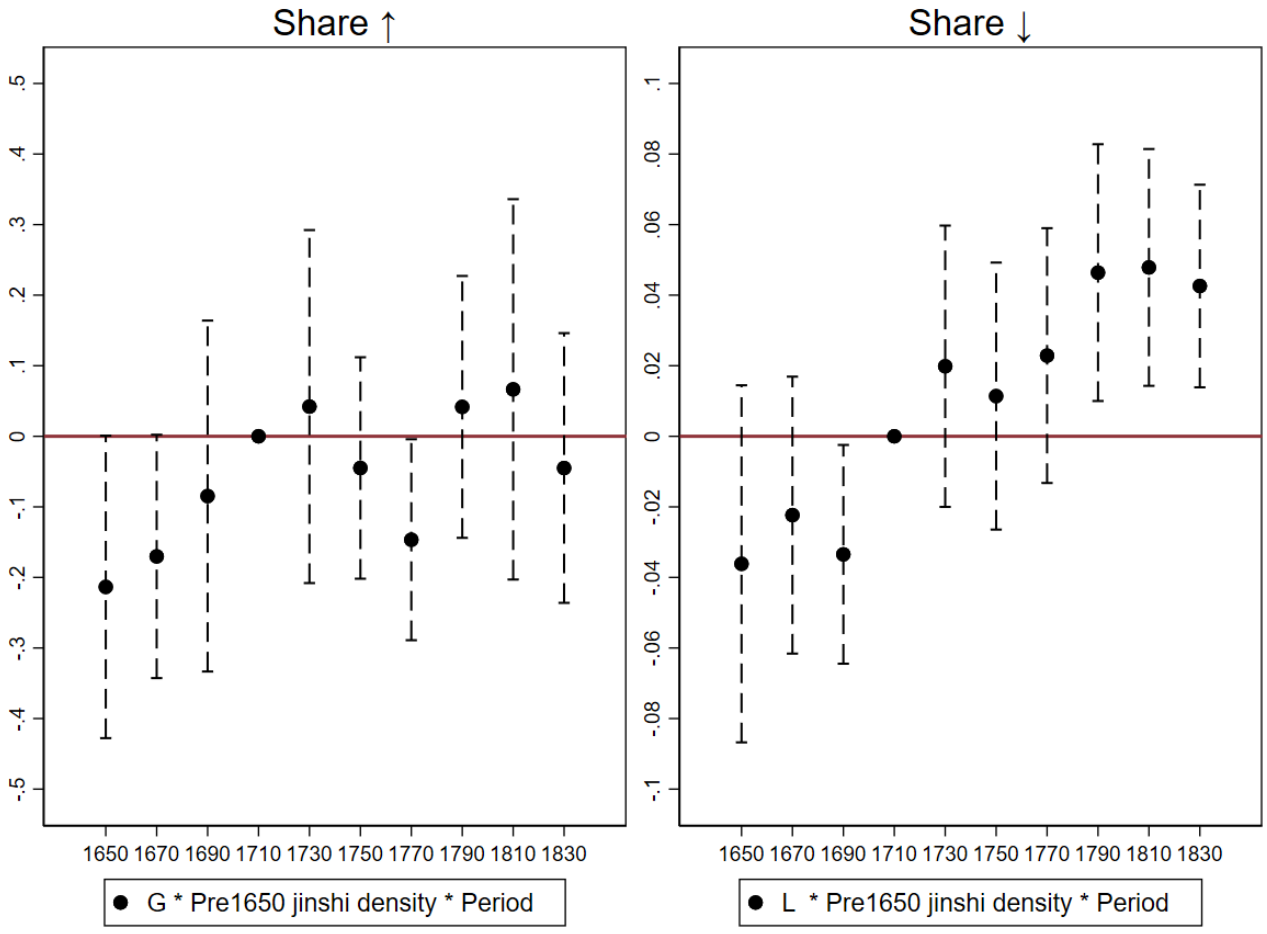


Figure VIII: The Distributional Impact of The 1712 Reform

Notes: This figure plots the estimation results of equation 5. The dash lines are confidence intervals (90%).

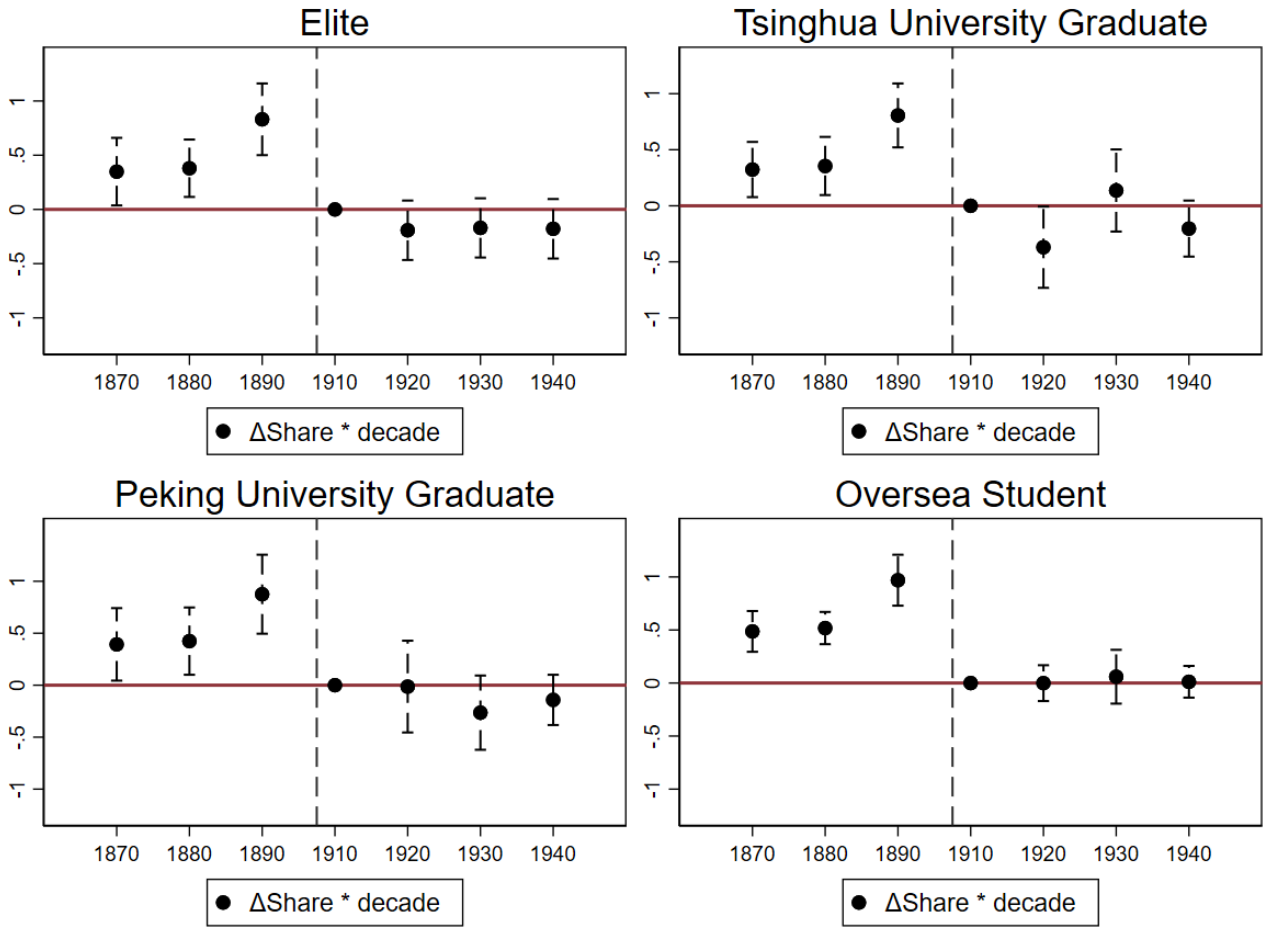


Figure IX: The Impact of The 1712 Reform a Poilcy Reversal in 1905

Notes: This figure plots the estimation results of equation 6. The points represent the coefficients, and the dash lines are confidence intervals (90%).

Table I: The 1712 Reform and Exam Performance

	Exam Rank				
	(1) All	(2) All	(3) $Share_{prov} \uparrow$	(4) $Share_{prov} \downarrow$	(5) All
$G^{1712} \times$ Post	0.312*	0.323*			
	(0.182)	(0.191)			
$L^{1712} \times$ Post	-0.0244	-0.0806			
	(0.127)	(0.127)			
$\Delta Share_{prov} \times$ Post			0.714**	0.152	0.171**
			(0.356)	(0.145)	(0.073)
Controls × Decade FE	No	Yes	Yes	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes	Yes
Observations	16073	16073	7950	8122	16073
Adjusted R^2	0.123	0.133	0.151	0.122	0.133

Each observation is a successful candidate (jinshi) from province p in period t. Exam Rank is the ordinal rank of a successful candidate based on his raw score, standardized to 0 (lowest) to 1 (highest). In columns 1 and 2, we use our baseline measure of reform intensity, G^{1712}_{prov} and L^{1712}_{prov}, interacted with the post dummy. In columns 3, 4, and 5, gains and losses are combined into a single measure, $\Delta Share_p$. In columns 2, 3, 4, and 5, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and exam region fixed effects are included in all columns. Coefficients are reported with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table II: The 1712 Reform and Professional Outcome

	Bureaucratic Rank				
	(1) All	(2) All	(3) $Share_{prov} \uparrow$	(4) $Share_{prov} \downarrow$	(5) All
$G^{1712} \times$ Post	2.715	2.335			
	(1.929)	(2.124)			
$L^{1712} \times$ Post	1.465	1.863			
	(1.582)	(1.706)			
$\Delta Share_{prov} \times$ Post			-2.111	-2.147	-0.118
			(4.109)	(1.988)	(0.841)
Controls × Decade FE	No	Yes	Yes	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes	Yes
Observations	4314	4314	2206	2107	4314
Adjusted R^2	0.013	0.006	0.008	0.003	0.006

Each observation is a successful candidate (jinshi) from province p in period t. Bureaucratic Rank is the rank of the position held by successful candidates in the bureaucracy, standardized to 0.5 (lowest) to 9 (highest). In columns 1 and 2, we use our baseline measure of reform intensity, G^{1712}_{prov} and L^{1712}_{prov}, interacted with the post dummy. In columns 3, 4, and 5, gains and losses are combined into a single measure, $\Delta Share_p$. In columns 2, 3, 4, and 5, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and exam region fixed effects are included in all columns. Coefficients are reported with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table III: Between Prefectures: The Distributional Consequences of the 1712 Reform

	The Density of jinshi			
	(1)	(2)	(3)	(4)
	All	All	$Share_{prov} \uparrow$	$Share_{prov} \downarrow$
$G^{1712} \times$ PHC $\times$ Post	0.0631***	0.0429*	0.0761**	
	(0.023)	(0.022)	(0.032)	
$L^{1712} \times$ PHC $\times$ Post	0.0167***	0.0304***		0.0296***
	(0.005)	(0.005)		(0.005)
Controls $\times$ Decade FE	No	Yes	Yes	Yes
Province FE $\times$ Decade FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	5073	5073	2831	2242
Adjusted R^2	0.574	0.609	0.526	0.690

Each observation is a prefecture in period t. PHC_p is the density of jinshi in prefecture p before 1650. In all columns, we use our baseline measure of reform intensity, G^{1712}_{prov} and L^{1712}_{prov}. In columns 2, 3, and 4, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. Column 3 only includes prefectures in provinces benefiting from the reform. Column 4 only includes prefectures in provinces hurt by the reform. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and province fixed effects are included in all columns. Coefficients are reported, with standard errors clustered at the province-period-level in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table IV: Between Counties: The Distributional Consequences of the 1712 Reform

	The Density of jinshi			
	(1)	(2)	(3)	(4)
	All	All	$Share_{prov} \uparrow$	$Share_{prov} \downarrow$
$G^{1712} \times$ PHC $\times$ Post	0.0638***	0.0538***	0.0870***	
	(0.019)	(0.018)	(0.021)	
$L^{1712} \times$ PHC $\times$ Post	0.0206***	0.0229***		0.0161***
	(0.005)	(0.006)		(0.006)
Controls $\times$ Decade FE	No	Yes	Yes	Yes
Province FE $\times$ Decade FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	31293	31293	16682	14611
Adjusted R^2	0.437	0.463	0.419	0.535

Each observation is a county in decade t. PHC_j is the density of jinshi in county p before 1650. In all columns, we use our baseline measure of reform intensity, G^{1712}_{prov} and L^{1712}_{prov}. In columns 2, 3, and 4, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a county had access to any main navigable river. Column 3 only includes counties in provinces benefiting from the reform. Column 4 only includes counties in provinces hurt by the reform. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and province fixed effects are included in all columns. Coefficients are reported with standard errors clustered at the province-period-level in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table V: Policy Reversal in 1905

	(1) Notable Figures	(2) Tsinghua	(3) Peking	(4) Oversea
$\Delta Share_{prov} \times$ Post	-0.675***	-0.612***	-0.674***	-0.651***
	(0.128)	(0.164)	(0.168)	(0.127)
Controls × Decade FE	Yes	Yes	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	1869	1869	1869	1869
Adjusted R^2	0.396	0.538	0.591	0.505

Each observation is a prefecture in period t. We regress educational elite (normalized by population) on the interaction between reform intensity and the post-1905 dummy. The educational elite refers to jinshi before 1905. After 1905, the educational elite is loosely defined as notable figures, elite university students or students going abroad. In all columns, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, whether a prefecture had access to any main navigable river, and the density of jinshi in 1650–1712, interacted with decade fixed effects. Decade fixed effects, province fixed effects, and exam region fixed effects interacted with decade fixed effects. Coefficients are reported with standard errors clustered at the province-period-level in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table VI: The Long-Term Impact of the 1712 Reform: Persistence and Spillovers

	(1) Primary	(2) Secondary	(3) Tertiary
$Jinshi_{1650-1712}$	0.115***	0.0202*	0.00377***
	(0.039)	(0.010)	(0.001)
$\Delta Share_{prov}$	-0.123***	0.0208	0.00362***
	(0.039)	(0.013)	(0.001)
Controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Observations	266	266	266
Adjusted R^2	0.416	0.432	0.532

Each observation is a prefecture. $Jinshi_{1650-1712}$ is the number of successful candidates (jinshi) from prefecture p in province $prov$ who passed the imperial exam in 1650–1712 before the reform, normalized by population. In all columns, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a prefecture had access to any main navigable river. Coefficients are reported with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

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For Online Appendix

A Data Appendix

A.1 Additional Variables

We include historical variables such as population, land area, agricultural suitability, ruggedness, access to navigable river, and funding agencies as our controls.

a.) For population, we use prefecture-level population data from the Population History of China by Cao (2005). This source is known to be the best available population estimates for 200 BC – 1953 AD and has been widely used by economic historians. Cao's estimates are available for 1776, 1820, and 1910 during the period under study. To complement Cao (2005), we incorporate population estimates from the History Database of the Global Environment (HYDE) (Klein Goldewijk et al., 2017). Klein Goldewijk et al. (2017) model population and land use over time. The data are available at a 5 arc-minute resolution.

b.) We measure the agricultural suitability by the Caloric Suitability Indices (CSI) constructed by Galor and Özak (Galor and Özak, 2016). The CSI data provides the maximum potential caloric yield attainable in each cell of 5 longitude arc-minutes by 5 latitude arc-minutes. We compute the average value of the maximum potential caloric yield attainable in the post-1500 period for each province, prefecture, and county.

c.) We compute the terrain ruggedness index for each province, prefecture, and county to control for the ruggedness. We obtain the terrain elevation map from the Global Multi-resolution Terrain Elevation Data 2010 (GMTED 2010), which is a raster map providing elevation in each cell of 7.5 longitude arc-seconds by 7.5 latitude arc-seconds (Danielson and Gesch, 2011). For each point on the elevation grid, we calculate the difference in elevation values from a center cell and the eight cells immediately surrounding it. Then we square each of the eight elevation difference values to make them all positive, sums them, and takes the square root. We compute the average value of terrain ruggedness index across all grid cells in a province, a prefecture, and a county.

d.) We define a dummy of whether a province, a prefecture, and a county had access to main navigable river tributaries. The GIS map on the rivers is obtained from the China Historical Geographic Information System (CHGIS, 2016b), which identifies the main navigable river tributaries. The dummy is equal to 1 if a province, a prefecture, and a county had a main navigable river tributary.

e.) we collect the data on the funding agencies to subsidize travel for the imperial exam. As the the metropolitan exam was held in the capital city, Beijing, the local wealthy from some prefectures set up funding agencies named *Binxing Ju* to fund and lower the travel cost for examinees in their hometown. Mao (2014) records the funding agencies in 1644–1905, and their

locations and the founding years. We aggregate our data to the prefecture level, and define a dummy of whether a prefecture had a funding agency before 1840.

f.) we assemble data on the social elite in the first half of the 20th century. Xu (2007) records more than 17,000 notable figures active in 1912–1949, including politicians, military officers, scientists, professors, educators, journalists, writers, and entrepreneurs. From the official alumni books of the top two universities in China (Peking University and Tsinghua University), we can identify about 16,000 students who graduated from these two institutions between 1910 and 1950. We also obtain the number of oversea students from each prefecture. We geocode these individuals according to their place of origin. We then aggregate the data to the prefecture level, and by the year they were born, entered college or went overseas.

g.) We obtain the 1% population census data in 1982 from the "Third National Population Census" (King et al., 2017). We focus on the population who were born before and after 1942. We match each person's place of origin to the prefecture-level administration, and compute the percentage of the population who had finished primary school, secondary school, and college in each prefecture.

Table A.1: Summary Statistics

	Obs.	Mean	S.D.
Individual-level Data			
Exam Rank	16073	0.499	0.288
Bureaucratic Rank	4314	5.493	1.598
Prefecture-level Data			
The Density of jinshi	5073	0.024	0.041
The Density of *Juren*	4256	0.125	0.180
The Density of jinshi Before 1650	267	1.330	2.097
Population Density in 1776	267	132.014	146.462
Population Density in 1820	267	130.220	136.512
Quota for *Shengyuan*	267	1.052	0.983
Caloric Suitability Index	267	3631.617	949.024
Ruggedness	267	408.323	306.756
Access to Any Main Navigable River	267	0.345	0.476

1: **Exam Rank** is the ordinal rank received by a successful candidate based on his raw score, normalized to 0 (lowest) to 1 (highest). 2: **Bureaucratic Rank** is the rank of the position held by successful candidates in the bureaucracy, ranging from 0.5 (lowest) to 9 (highest). 3: **The Density of jinshi** is defined as the number of successful candidates (jinshi) per 10,000 in a period. 4: **The Density of *Juren*** is defined as the number of successful candidates at lower level exams (*juren*) per 10,000 in a period. 5: **The Density of jinshi Before 1650** is defined as the total number of successful candidates (jinshi) per 10,000 in 1371–1650. 6: **Population Density in 1776** is defined as the number of population per squared kilometer in 1776. 7: **Population Density in 1820** is defined as the number of population per squared kilometer in 1820. 8: **Quota for *Shengyuan*** is defined as the number of quota for *Shengyuan* per 10,000. 9: **Caloric Suitability Index** is defined as the average value of the maximum potential caloric yield attainable within a prefecture. 10: **Ruggedness** is defined as the average value of terrain ruggedness index within a prefecture. 11: **Access to Any Main Navigable River** is defined as a dummy of whether a prefecture had access to main navigable river tributaries.

B Empirical Appendix

B.1 The Relationship Between Exam Performance and Professional Outcome

Table A.2: Exam Performance and Professional Outcome

	Bureaucratic Rank			
	(1)	(2)	(3)	(4)
	Initial Position		Highest Position	
Exam Rank	0.113***	0.118***	1.233***	1.277***
	(0.032)	(0.033)	(0.092)	(0.095)
Controls × Decade FE	No	Yes	No	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	4704	4704	4314	4314
Adjusted R^2	0.040	0.038	0.053	0.051

Each observation is a successful candidate (jinshi) from province p in period t. Exam Rank is the ordinal rank of a successful candidate based on his raw score, standardized to 0 (lowest) to 1 (highest). Bureaucratic Rank is the standardized rank of the position held by successful candidates in the bureaucracy, ranging from 0.5 (lowest) to 9 (highest). In columns 2 and 4, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and exam region fixed effects are included in all columns. Coefficients are reported with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

B.2 The Impact of the 1712 Reform on Exam Performance and Professional Outcome: Additional Results

B.2.1 Province-Level Measures

Columns 1-3 of Table A.3 shows the regression results from estimating equation 2 with province-level data.[28] The results are similar to Table I. In column 2, the interaction of the post dummy and the gain from the reform is significant and positive. In column 3, the interaction of the post dummy and the change in the share is also significant and positive. Compared with other provinces, the provinces with larger gains saw a greater improvement in the exam performance of its successful candidates. Columns 4-6 of Table A.3 shows the regression results from estimating equation 3 with provincial aggregates.[29] The results are similar to Table II. In column 2, the interaction of the post dummy and the gain from the reform is insignificant.

[28]The dependent variable is defined as the average standardized exam rank of successful candidates (jinshi) from province p in period t.

[29]The dependent variable is defined as the average standardized rank of government position of successful candidates from province p who passed the imperial exam in period t.

Table A.3: The 1712 Reform: Province-Level Measures

	Exam Rank			Bureaucratic Rank		
	(1)	(2)	(3)	(4)	(5)	6)
G^{1712} × Post	0.473**	0.535**		8.466	7.496	
	(0.215)	(0.210)		(6.787)	(6.869)	
L^{1712} × Post	-0.0528	-0.200***		-0.477	-1.855	
	(0.052)	(0.066)		(3.324)	(4.160)	
$\Delta Share_{prov}$ × Post			0.307***			3.660*
			(0.068)			(1.775)
Controls × Decade FE	No	Yes	Yes	No	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	304	304	304	304	304	304
Adjusted R^2	0.696	0.692	0.692	0.392	0.353	0.351

Each observation is a province in period t. Exam Rank is the average exam rank of successful candidates (jinshi) in province *prov* in period t, ranging from 0 (lowest) to 1 (highest). Bureaucratic Rank is the average bureaucratic rank of the positions taken by successful candidates (jinshi) in a province in period t, ranging from 0.5 (lowest) to 9 (highest).In columns 1, 2, 4 and 5, we use the baseline measure of reform intensity, G^{1712}_{prov} and L^{1712}_{prov}, interacted with the post dummy. In columns 3 and 6, gains and losses are combined into a single measure, $\Delta Share_p$. In columns 2, 3, 5 and 6, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and exam region fixed effects are included in all columns. Coefficients are reported, with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

B.2.2 Indicator Variable as the Treatment

Below we experiment with using an indicator variable as our treatment. If a province benefited from the reform, it receives a value of 1; if a province endured losses from the reform, it receives a value of 0. Despite losing some valuable variation by using this treatment, we continue to find a positive relationship between the reform and the exam performance of successful candidates. In column 4, we lose statistical significance in using province-level measures of exam ranks, in conjunction with using an indicator variable as our treatment.

B.3 Alternative Measures for Reform Intensity

B.3.1 The Construction of Alternative Measures

We construct alternative measures for reform intensity for robustness. First, we measure a province's aggregate performance in imperial exams differently, exploiting the fact that competition at the imperial exam was unrestricted during this period and no quota were assigned to individual provinces or regions ("laissez faire"). To measure a province's aggregate performance in imperial exams without the reform, we compute a province's share of jinshi in the entire country during 1371 and 1425. To measure measure a province's performance under the reform, we compute a province's share of jinshi in the entire country between 1713 and 1740. We then compute the difference in the share of jinshi with and without the reform to obtain reform intensity

Table A.4: The 1712 Reform and Exam Performance: Indicator Variable

	Exam Rank			
	(1)	(2)	(3)	(4)
G/L^{1712}× Post	0.0184*	0.0197**	0.0423*	0.0505
	(0.010)	(0.010)	(0.024)	(0.034)
Controls × Decade FE	Yes	Yes	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	16073	16073	304	304
Adjusted R^2	0.123	0.133	0.689	0.678

In columns 1 and 2, each observation is a successful candidate (jinshi) from province p in period t, and Exam Rank is the ordinal rank received by a successful candidate based on his raw score, standardized to 0 (lowest) to 1 (highest). In columns 3 and 4, each observation is a province in period t, and Exam Rank is the average exam rank of successful candidates (jinshi). In all columns, we use G/L^{1712} as the treatment, which is a indicator variable for the gain/loss status of a province. decade fixed effects, province fixed effects, the interaction between decade fixed effects and exam region fixed effects, and population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river, interacted with decade fixed effects, are included in all columns. Coefficients are reported, with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

(equation 7). This method yields a second measure of reform intensity.

$$\begin{aligned} \Delta Share_{prov,2} &= Share_{prov(nation),1713-1740} - Share_{prov(nation),1371-1425} \\ G^{1712}_{prov,2} &= |\Delta Share_{prov,2}| \cdot 1(\Delta Share_{prov,2} > 0) \\ L^{1712}_{prov,2} &= |\Delta Share_{prov,2}| \cdot 1(\Delta Share_{prov,2} < 0) \end{aligned} \tag{7}$$

Next, we incorporate population growth into our measure of reform intensity. Between the periods with and without the reform, provinces could have undergone different trajectories of population growth. We consider a measure of the change in the share of jinshi, adjusted by population growth. We compute a province's share of population within the exam region in 1600 ($Share_{prov(region),1600}$) and in 1740 ($Share_{prov(region),1740}$), respectively. We then take the difference between these two shares to obtain the change in the share of the population. As shown in equation 8, the change in the share of population is subtracted from the change in the share of jinshi. Thus, we create a third measure of reform intensity.

$$\begin{aligned} \Delta Share_{prov,3} = &\left[Share_{prov(region),1713-1740} - Share_{prov(region),1454-1650}\right] - \\ &\left[PopShare_{prov(region),1740} - PopShare_{prov(region),1600}\right] \\ G^{1712}_{prov,3} &= |\Delta Share_{prov,3}| \cdot 1(\Delta Share_{prov,3} > 0) \\ L^{1712}_{prov,3} &= |\Delta Share_{prov,3}| \cdot 1(\Delta Share_{prov,3} < 0) \end{aligned} \tag{8}$$

In Figure A.1 and Figure A.2, we plot the relationship between a province's initial share of

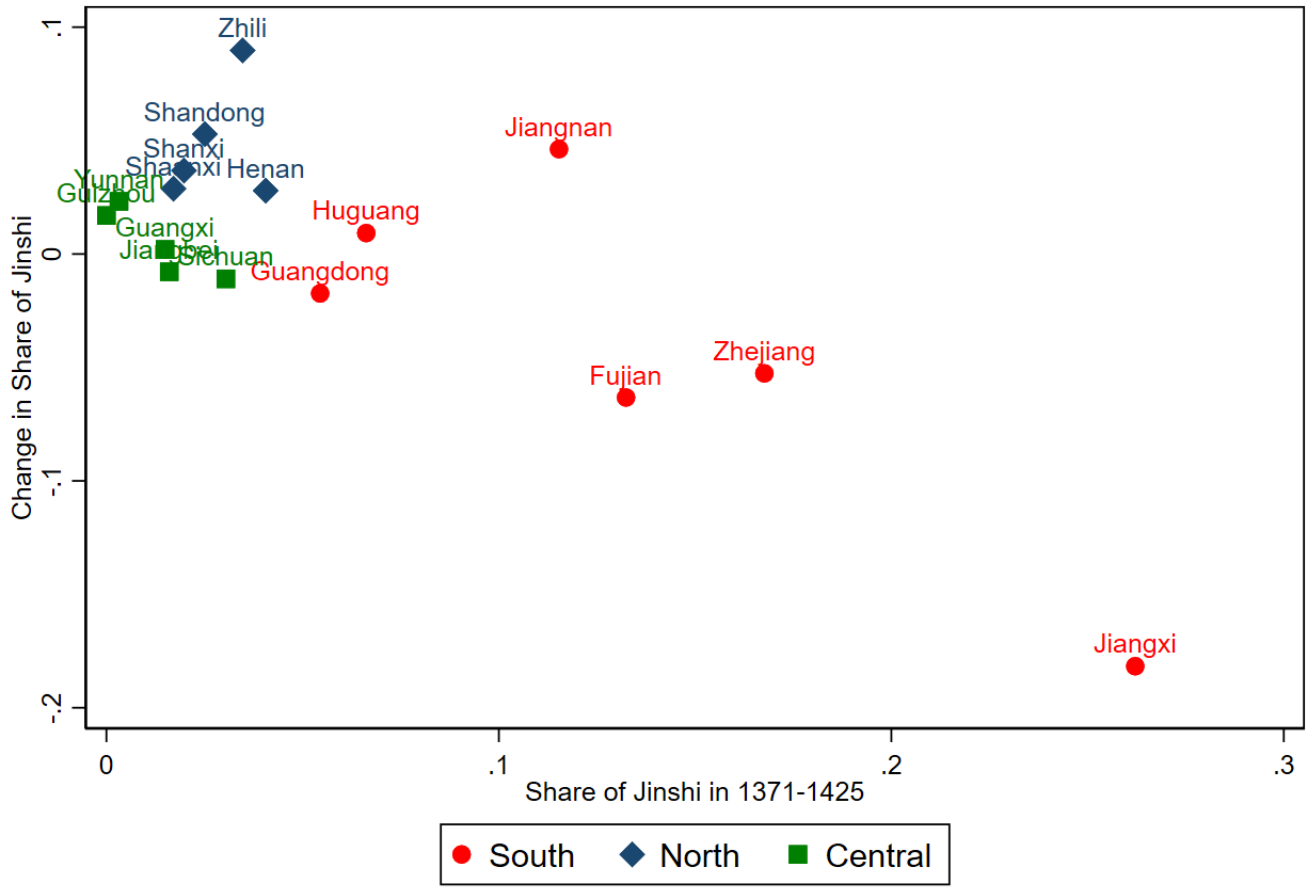


Figure A.1: Who Benefited from the 1712 Reform? (Measure II)

Notes: The variable on the Y-axis is the difference between the share of jinshi in the entire country in 1713–1730 and the share of jinshi in the entire country in 1371–1425. As in Figure IV, the difference in the share of jinshi with and without the reform is inversely correlated with the share of jinshi without the reform.

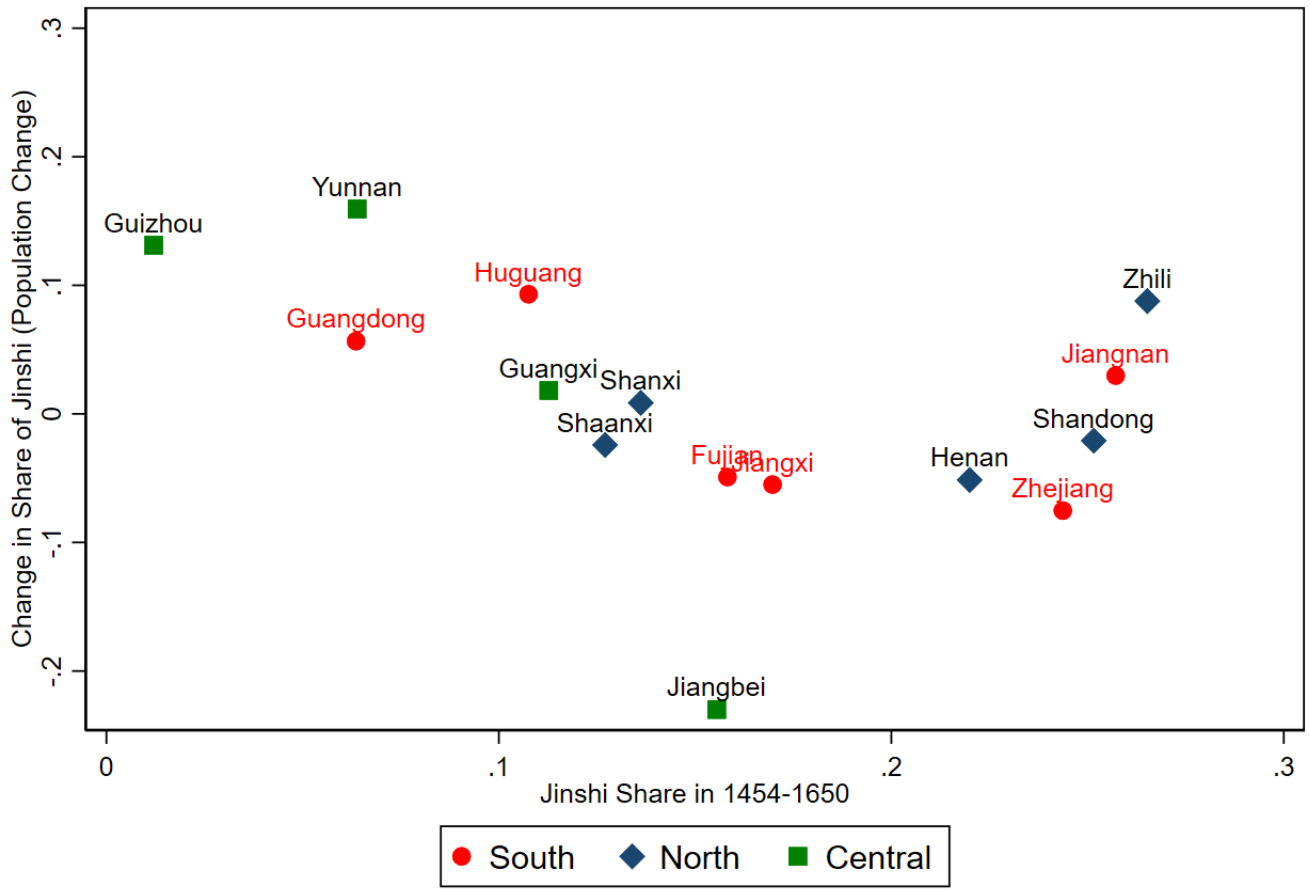


Figure A.2: Who Benefited from the 1712 Reform? (Measure III)

Notes: The change in the share of jinshi in y-axis is defined as the share of jinshi within the region in 1713–1740 minus the share of jinshi within the region in 1454–1650, then minus the change in the share of the population.

jinshi and the change in its share of jinshi after the reform and find a robust inverse relationship between the two.

B.3.2 Results

We first use alternative measures for the gains or losses of provinces from the reform, to investigate the impact on the exam performances of successful candidates (jinshi). In Table A.5, we use the second measure for the gains or losses of provinces ($G^{1712}_{prov,2}$ and $L^{1712}_{prov,2}$), and the change in the share of jinshi ($\Delta Share_{prov,2}$). For the period before the reform, we focus on the exams and jinshi between 1371 and 1425, when there were no quotas assigned to provinces or regions. Column 1 and 2 focuses on the individual-level data of successful candidates and shows the regression results from estimating equation 2. Columns 3 and 4 focus on the province-level data of successful candidates.

In Table A.6, we use the third measure for the gains or losses of provinces ($G^{1712}_{prov,3}$ and $L^{1712}_{prov,3}$), and the change in the share of jinshi ($\Delta Share_{prov,3}$). We consider the population change in the provinces and use the measure of the change in the share of jinshi, which is adjusted based on the change in the population. The results are robust to using alternative measures for the gains or losses of provinces from the reform.

We also use alternative measures to investigate the impact on the professional outcome of successful candidates. In Table A.7, we use the second measure for the gains or losses of provinces ($G^{1712}_{prov,2}$ and $L^{1712}_{prov,2}$), and the change in the share of jinshi ($\Delta Share_{prov,2}$). For the period before the reform, we focus on the exams and jinshi between 1371 and 1425, when there were no quotas assigned to provinces or regions. Column 1 and 2 focuses on the individual-level data of successful candidates and shows the regression results from estimating equation 3. Columns 3 and 4 focus on the province-level data of successful candidates.

In Table A.8, we use the third measure for the gains or losses of provinces ($G^{1712}_{prov,3}$ and $L^{1712}_{prov,3}$), and the change in the share of jinshi ($\Delta Share_{prov,3}$). We consider the population change in the provinces and use the measure of the change in the share of jinshi, which is adjusted based on the change of population. The results are robust to using alternative measures for the gains or losses of provinces from the reform.

We then use alternative measures for the gains or losses of provinces from the reform, to study the distributional consequences. In Table A.9, we use the second measure for the gains or losses of provinces ($G^{1712}_{prov,2}$ and $L^{1712}_{prov,2}$). For the period before the reform, we focus on the exams and jinshi between 1371 and 1425, when there were no quotas assigned to provinces or regions. In Table A.10, we use the third measure for the gains or losses of provinces ($G^{1712}_{prov,3}$ and $L^{1712}_{prov,3}$). We consider the population change in the provinces and use the measure of the change in the share of jinshi, which is adjusted by the change of population. The results are robust to using the measure accounting for population change.

Table A.5: The 1712 Reform and Exam Performance, Measure II

	Exam Rank			
	(1)	(2)	(3)	(4)
G^{1712} × Post	0.721***		1.136**	
	(0.269)		(0.455)	
L^{1712} × Post	0.103		0.0334	
	(0.139)		(0.229)	
$\Delta Share_{prov}$ × Post		0.134		0.200
		(0.101)		(0.249)
Controls × Decade FE	Yes	Yes	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	16073	16073	304	304
Adjusted R^2	0.133	0.132	0.673	0.670

In columns 1 and 2, each observation is a successful candidate (jinshi) from province p in period t, and Exam Rank is the ordinal rank received by a successful candidate based on his raw score, standardized to 0 (lowest) to 1 (highest). In columns 3 and 4, each observation is a province in period t, and Exam Rank is the average exam rank of successful candidates (jinshi). In columns 1 and 3, we use the second measure for the gains or losses of provinces, $G^{1712}_{prov,2}$ and $L^{1712}_{prov,2}$, interacted with the post dummy. In columns 2 and 4, gains and losses are combined into a single measure, $\Delta Share_p$. In all columns, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and exam region fixed effects are included in all columns. Coefficients are reported, with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table A.6: The 1712 Reform and Exam Performance, Measure III

	Exam Rank			
	(1)	(2)	(3)	(4)
G^{1712} × Post	0.464***		0.649**	
	(0.175)		(0.259)	
L^{1712} × Post	0.118		-0.0862	
	(0.176)		(0.182)	
$\Delta Share_{prov}$ × Post		0.176**		0.346**
		(0.077)		(0.155)
Controls × Decade FE	Yes	Yes	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	16073	16073	304	304
Adjusted R^2	0.133	0.133	0.686	0.685

In columns 1 and 2, each observation is a successful candidate (jinshi) from province p in period t, and Exam Rank is the ordinal rank received by a successful candidate based on his raw score, standardized to 0 (lowest) to 1 (highest). In columns 3 and 4, each observation is a province in period t, and Exam Rank is the average exam rank of successful candidates (jinshi). In columns 1 and 3, we use the third measure for the gains or losses of provinces, $G^{1712}_{prov,3}$ and $L^{1712}_{prov,3}$, interacted with the post dummy. In columns 2 and 4, gains and losses are combined into a single measure, $\Delta Share_p$. In all columns, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and exam region fixed effects are included in all columns. Coefficients are reported, with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table A.7: The 1712 Reform and Professional Outcome, Measure II

	Bureaucratic Rank			
	(1)	(2)	(3)	(4)
G^{1712} × Post	-0.752		14.84	
	(3.151)		(12.969)	
L^{1712} × Post	-0.692		-4.280	
	(2.130)		(6.504)	
$\Delta Share_{prov}$ × Post		0.216		6.389
		(1.339)		(4.850)
Controls × Decade FE	Yes	Yes	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	4314	4314	304	304
Adjusted R^2	0.006	0.006	0.334	0.334

In columns 1 and 2, each observation is a successful candidate (jinshi) from province p in period t, and Bureaucratic Rank is the standardized rank of the position held by successful candidates in the bureaucracy, ranging from 0.5 (lowest) to 9 (highest). In columns 3 and 4, each observation is a province in period t, and Bureaucratic Rank is the average bureaucratic rank of the positions taken by successful candidates (jinshi) in a province in period t. In columns 1 and 3, we use the second measure for the gains or losses of provinces, $G^{1712}_{prov,2}$ and $L^{1712}_{prov,2}$, interacted with the post dummy. In columns 2 and 4, gains and losses are combined into a single measure, $\Delta Share_p$. In all columns, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and exam region fixed effects are included in all columns. Coefficients are reported, with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table A.8: The 1712 Reform and Professional Outcome, Measure III

	Bureaucratic Rank			
	(1)	(2)	(3)	(4)
G^{1712} × Post	-3.510*		-3.305	
	(2.031)		(4.454)	
L^{1712} × Post	-3.705*		-15.07***	
	(2.022)		(3.420)	
$\Delta Share_{prov}$ × Post		0.223		6.580***
		(0.874)		(1.931)
Controls × Decade FE	Yes	Yes	Yes	Yes
Region FE × Decade FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	4314	4314	304	304
Adjusted R^2	0.007	0.006	0.427	0.386

In columns 1 and 2, each observation is a successful candidate (jinshi) from province p in period t, and Bureaucratic Rank is the standardized rank of the position held by successful candidates in the bureaucracy, ranging from 0.5 (lowest) to 9 (highest). In columns 3 and 4, each observation is a province in period t, and Bureaucratic Rank is the average bureaucratic rank of the positions taken by successful candidates (jinshi) in a province in period t. In columns 1 and 3, we use the third measure for the gains or losses of provinces, $G^{1712}_{prov,3}$ and $L^{1712}_{prov,3}$, interacted with the post dummy. In columns 2 and 4, gains and losses are combined into a single measure, $\Delta Share_p$. In all columns, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and exam region fixed effects are included in all columns. Coefficients are reported, with robust standard errors in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table A.9: The Distributional Consequences of The 1712 Reform, Measure II

	The Density of jinshi			
	(1)	(2)	(3)	(4)
	All	All	$Share_{prov} \uparrow$	$Share_{prov} \downarrow$
G^{1712} × PHC × Post	0.0428	0.0132	-0.0166	
	(0.046)	(0.044)	(0.051)	
L^{1712} × PHC × Post	0.0172*	0.0138		0.0264*
	(0.009)	(0.009)		(0.014)
Controls × Decade FE	No	Yes	Yes	Yes
Province FE × Decade FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	5073	5073	3496	1577
Adjusted R^2	0.573	0.608	0.606	0.623

Each observation is a prefecture in period t. PHC_p is the density of jinshi in prefecture p before 1650. In all columns, we use the second measure of reform intensity, $G^{1712}_{prov,2}$ and $L^{1712}_{prov,2}$. In columns 2, 3, and 4, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. Column 3 only includes prefectures in provinces benefiting from the reform. Column 4 only includes prefectures in provinces hurt by the reform. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and province fixed effects are included in all columns. Coefficients are reported, with standard errors clustered at the province-period-level in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

Table A.10: The Distributional Consequences of The 1712 Reform, Measure III

	The Density of jinshi			
	(1)	(2)	(3)	(4)
	All	All	$Share_{prov} \uparrow$	$Share_{prov} \downarrow$
$G^{1712} \times$ PHC $\times$ Post	0.103**	0.0811**	0.0832*	
	(0.044)	(0.041)	(0.044)	
$L^{1712} \times$ PHC $\times$ Post	0.0331	0.0407*		0.0742*
	(0.026)	(0.024)		(0.039)
Controls $\times$ Decade FE	No	Yes	Yes	Yes
Province FE $\times$ Decade FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	5073	5073	2831	2242
Adjusted R^2	0.574	0.609	0.526	0.690

Each observation is a prefecture in period t. PHC_p is the density of jinshi in prefecture p before 1650. In all columns, we use the third measure of reform intensity, $G^{1712}_{prov,3}$ and $L^{1712}_{prov,3}$. In columns 2, 3, and 4, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. Column 3 only includes prefectures in provinces benefiting from the reform. Column 4 only includes prefectures in provinces hurt by the reform. decade fixed effects, province fixed effects, and the interaction of decade fixed effects and province fixed effects are included in all columns. Coefficients are reported, with standard errors clustered at the province-period-level in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

B.4 The Role of Funding Agencies

As shown in Figure A.3, whether a prefecture had a funding agency in 1840 was not completely exogenous. There were more prefectures with funding agencies in eastern and southern provinces, which were far from the capital and produced more successful candidates (jinshi). To increase the comparability between the prefectures with and without funding agencies, we use the propensity score method to match the two samples. We use four variables to predict a prefecture's probability of having a funding agency in 1840, including the jinshi density in a prefecture before 1650, population density, agricultural suitability, quota for *Shengyuan*. We use the nearest neighbor matching and select up to 5 nearest neighbors within a caliper of 0.1.

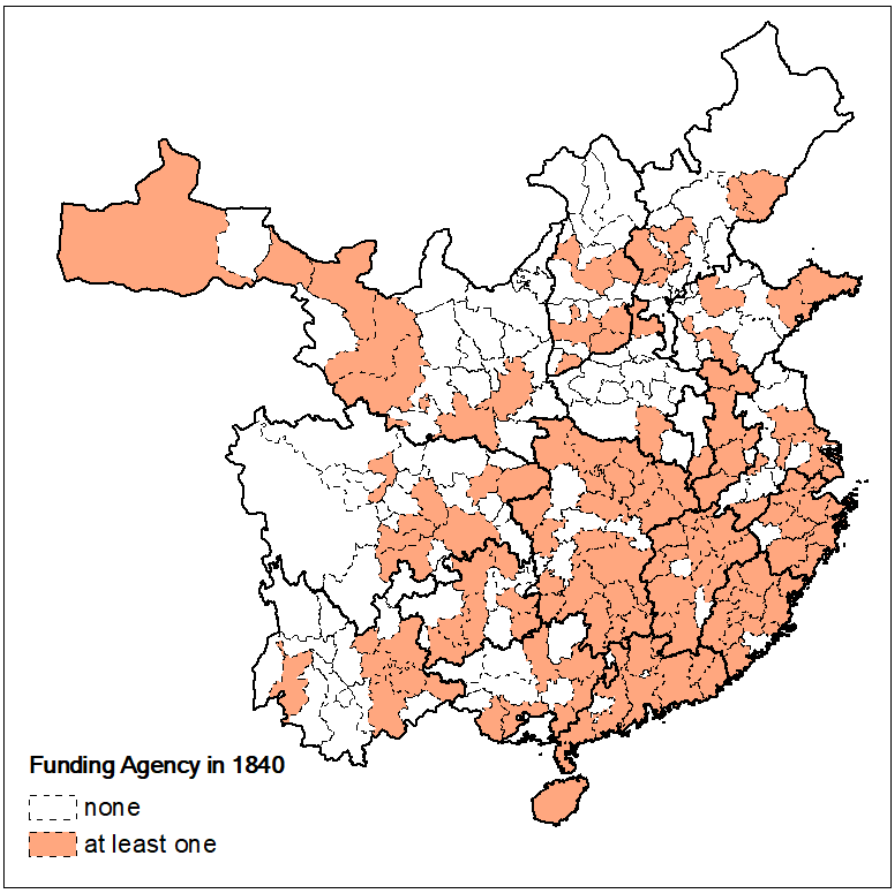


Figure A.3: The Distribution of Funding Agencies

Table A.11 shows results of the balancedness test for prefectures with and without funding agencies. Before the propensity score matching, the prefectures with funding agencies significantly had a higher jinshi density before 1650 and a higher population density. After the matching, the two samples are balanced for all characteristics. Figure A.4 also shows the distribution of propensity score before and after the matching.

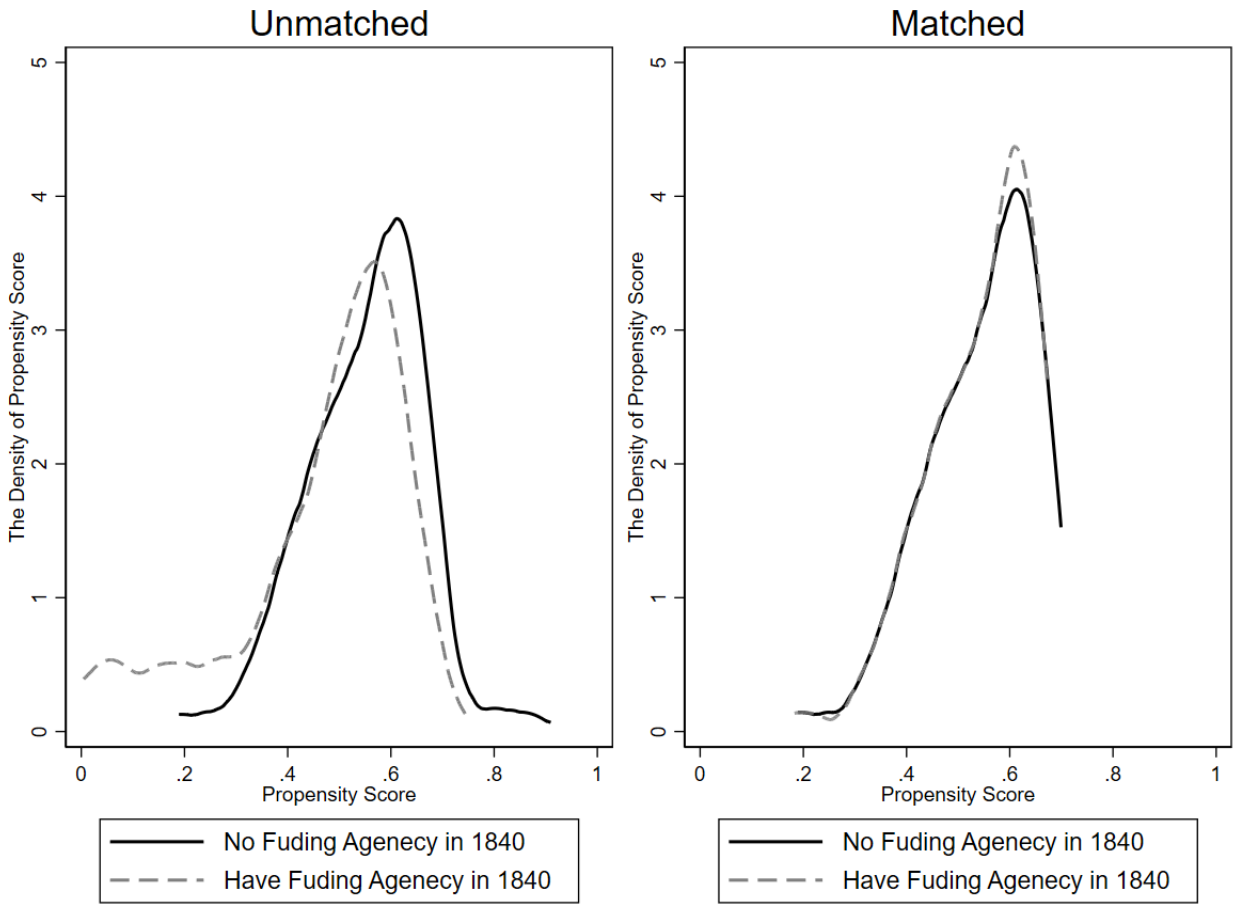


Figure A.4: The Distribution of Funding Agencies

Table A.11: Balancedness Test for Prefectures With and Without Funding Agencies

	Unmatched			
	Have 1840	No 1840	Bias (%)	T-Test
The Density of jinshi Before 1650	1.851	0.828	49.8	4.10***
Population Density in 1776	158.78	106.24	36.3	2.97***
Population Density in 1820	147.67	113.41	25.2	2.06**
Quota for *Shengyuan*	0.948	1.152	-20.9	1.70*
Caloric Suitability Index	3620.3	3642.5	-2.3	-0.19
	Matched			
	Have 1840	No 1840	%Bias	T-Test
The Density of jinshi Before 1650	0.841	0.866	1.2	0.19
Population Density in 1776	111.40	109.22	1.5	0.16
Population Density in 1820	111.67	114.66	-2.2	-0.22
Quota for *Shengyuan*	1.074	0.994	8.3	0.90
Caloric Suitability Index	3575.4	3615.5	-4.2	-0.34

***, **, and * indicate significance at 1%, 5% and 10% levels.

Table A.12: The Distributional Consequences of The 1712 Reform, The Role of Funding Agencies

	The Density of jinshi			
	(1)	(2)	(3)	(4)
	Have 1840	No 1840	Have 1840 (Matched)	No 1840 (Matched)
G^{1712} × PHC × Post	-0.00106	0.117***	-0.169	0.122***
	(0.027)	(0.031)	(0.104)	(0.031)
L^{1712} × PHC × Post	0.0161*	0.0418***	0.0145	0.0431***
	(0.010)	(0.008)	(0.014)	(0.008)
Controls × Decade FE	Yes	Yes	Yes	Yes
Province FE × Decade FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Decade FE	Yes	Yes	Yes	Yes
Observations	2489	2527	2204	2451
Adjusted R^2	0.634	0.585	0.591	0.499

Each observation is a prefecture in period t. PHC_p is the density of jinshi in prefecture p before 1650. In all columns, we use our baseline measure of reform intensity, G^{1712}_{prov} and L^{1712}_{prov}. In all columns, we control for population density, agricultural suitability, quota for *Shengyuan*, ruggedness, and whether a province had access to any main navigable river. Column 1 includes prefectures with funding agencies in 1840. Column 2 includes prefectures without funding agencies in 1840. In columns 3 and 4, we use propensity score matched samples by only including the matched prefectures. Decade fixed effects, province fixed effects, and the interaction of decade fixed effects and province fixed effects are included in all columns. Coefficients are reported, with standard errors clustered at the province-period-level in round brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels.

C Historical Appendix

C.1 The 1712 Reform

C.1.1 Spatial Inequalities in the Exam Performance

Qing provinces had a variety of performances in the Imperial Examinations. In general, Southeastern China had explicit superiority in the exams. As a contemporary noted:

> Since Southern Song Dynasty established its capital at Hangzhou, the center of politics, culture, and economy has also moved into the lower Yangtze region. Qing Empire has far better academic performance than previous dynasties, but its outstanding scholars are mainly from several provinces like Jiangsu and Zhejiang, i.e., the lower Yangtze region.[30]

The main reason why Southeastern China had better exam performance is Southeastern China had a significant economic advantage, which was transformed into an educational advantage over the inner land. A contemporary scholar wrote:

> Now Northern China had two problems: the first is deserted land, and the second is deserted scholars.[31]

Another reason is that the provinces at the border had language disadvantages in the Imperial Examinations, and this problem was particularly severe in the southwestern provinces. Southwestern provinces were relatively newly settled in comparison with other inner provinces, so their ethnic distribution was more complicated than inner land. Figure A.5 demonstrates the years since settlement on the prefecture level based on 1712, and southwestern provinces were among the newest settled territories. The language distribution of Imperial China's 18 inner provinces in 1820 is illustrated in Figure A.6. As the figure shows, non-Han Chinese is mainly spoken in the southwestern provinces. The residents in the southwestern provinces consisted of a variety of ethnic groups, the majority of whom were Miao people. As a local gazetteer noted:

> (Miao people) could not read Chinese at first. But recently, they realized the necessity of going to school. The smart students among them knew the meaning of articles very well, and the students take the Imperial Examinations as registered Miao people.[32]

The gap in exam performances across provinces could not be easily eliminated by migrations. Apart from the government's strict regulations on fake registered origins in exams, residents also

[30] Shengmu Liu (1998). *Five Books of Essays in Changchuzhai (Changchuzhai Suibi, Xubi, Erbi, Sanbi, Sibi, Wubi).* Vol. 5. Zhonghua Book Company, 104

[31] Yanwu Gu (1994). *Compiled Annotations of Rizhilu (Ri Zhi Lu Ji Shi).* Vol. 17. Yuelu Press, 615

[32] *Gazetteers of Longshan County (Longshan Xianzhi)* (1818). Chap. Culture (Fengsu)

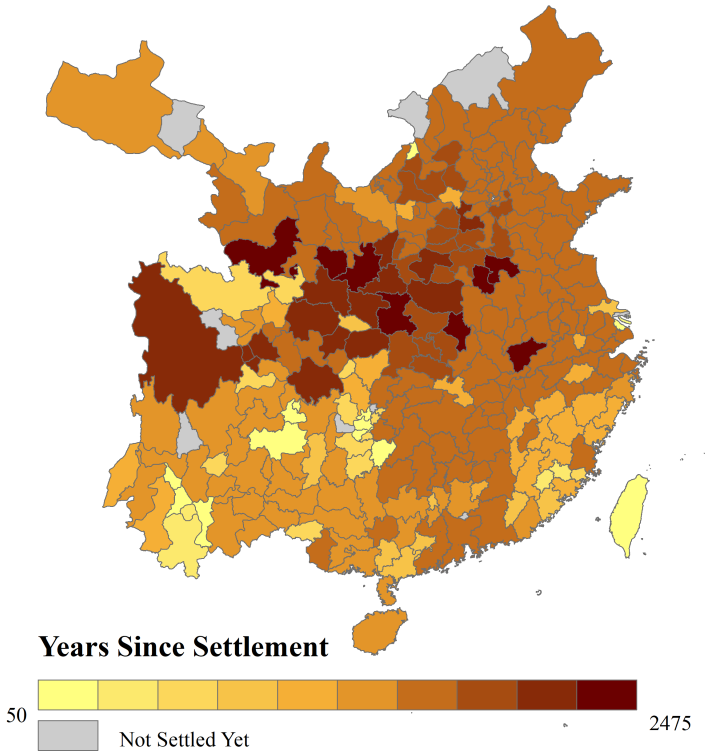


Figure A.5: Years Since Settlement of Imperial China's Prefectures in 18 Inner Provinces at 1712

Note: This figure is based on Imperial China's prefecture map in 1820. A series of counties were established in a prefecture's territory in the history, and the establishment year of the earliest one is used as the settlement year. The years of settlement is defined as 1712 minus the settlement year.
Data Source: Lex Berman (2017). *V6 Time Series County Points*. Version V1. DOI: 10.7910/DVN/Q9VOF5. URL: https://doi.org/10.7910/DVN/Q9VOF5

spontaneously made checks against immigration in exams. For instance, from 1719 to 1804, the aborigines in *Tongdao* county, *Jingzhou* prefecture, had many legal disputes with 18 families who moved in there before 1644, charging the latter of illegally registered residence in the Imperial Examinations.[33] Another instance is that there were more than 2000 immigration families on the coast of *Xinning* county, Guangdong Province, who were hindered from attending the Imperial Examinations as registered residents in *Xinning* county by the aborigines, and then as a result, they had legal disputes for years.[34] Therefore, the performance gap in the Imperial Examination could not be easily narrowed by immigrants.

[33]Xiwei Liu (2012). *On Imperial Examination Migrants in the Qing Dynasty (Qingdai Keju Maoji Yanjiu)*. Central China Normal University Press, 243-246

[34]Xun Zhu (2000). "Shaanxi Governor Zhuxun's Memorial to the Throne on Regulations of Immigrants and Aborigines to Take Exams in Shangzhou (Shaanxi Xunfu Zhuxun Wei Zhuoding Shangzhou Jiji Tuzhu Yingshi Zhangcheng Shi Zouzhe)". In: *Historical Materials on Fake Registered Residence in the Imperial Examinations at Qianlong Emperor and Jiaqing Emperor (Qianjia Shiqi Keju Maoji Shiliao)*. Ed. by Che Wang. The First Historical Archives of China

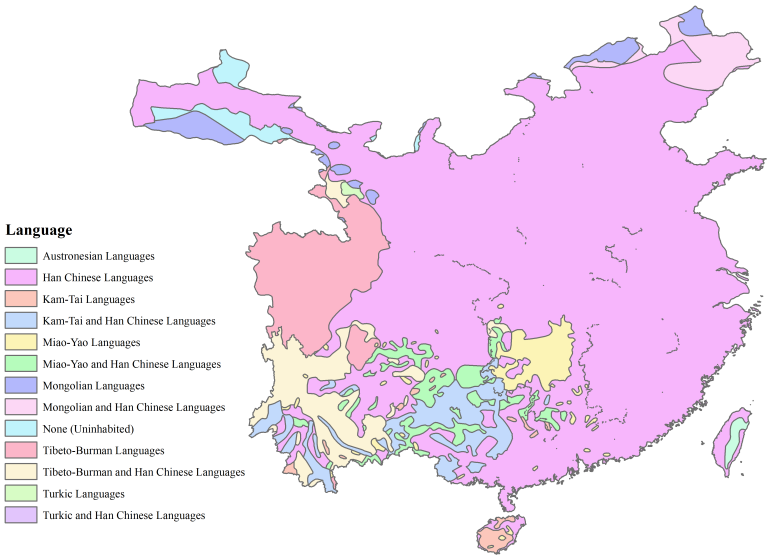


Figure A.6: The Language Distribution of Imperial China's 18 Inner Provinces

Data Source: Lawrence W. Crissman (2012). *Digital Language Atlas of China*. Version V6. DOI: 10.7910/DVN/OHYYXH. URL: https://doi.org/10.7910/DVN/OHYYXH; CHGIS (2016a). *1820 Layers GBK Encoding*. Version V1. DOI: 10.7910/DVN/2K4FHX. URL: https://doi.org/10.7910/DVN/2K4FHX

C.1.2 The Equity Doctrine in the Imperial Examination System

The ideology of equality had a deep root in Imperial China, and it was often reflected in Chinese traditional political philosophy. For Imperial China, equity was no less important than wealth for the whole society's welfare. In the famous analecta which later became the Imperial China textbook in political science, Confucius (551 B.C. – 479 B.C.) claimed rulers should not worry about poverty but the gap between the rich and poor, and they should not worry about insufficient residents but the civil conflicts among them.[35] His emphasis on equality was inherited by his disciples throughout the whole history of Imperial China, and they believed that if the social wealth cannot be equally distributed, even though a country might have wide territory and a large population, the country can be only nominally strong but cannot be wealthy in a real sense.[36]

The equality ideology was also reflected in the Imperial Examination System, which served as both a cultural and a political tool in society. For an individual, a degree was the reward for his hard academic work; while for the whole society, the degree-holders were official candidates who would serve the public interest. Therefore, the Imperial Examination System had a long history

[35]Confucius (2016). "Jishi". In: *The Analecta of Confucius (Lunyu)*. Zhonghua Book Company

[36]Juyi Bai (1994). "On Division of Cultivated (Yi Jingtian Qianmo)". In: *The Compilation of Bai Juyi (Baishi Changqing Ji)*. Shanghai Classics Publishing House

of affirmative action. In 1066, Sima Guang, a senior official in North Song's central government, proposed that the Imperial Examination System should increase jinshi admission quotas in the northwestern provinces:

> The total number of new jinshi degree holders is about two thousand: two hundred from Southern China and around half from the Capital. Each province only has more than one hundred new jinshi degree holders on average. Particularly, in *Shaanxi*, *Hedong*, *Hebei*, *Jinghubei*, and *Guangnandongxi* provinces, only one or two have acquired the degrees in recent years. . . . . Now, in several provinces, even no one has got a degree. . . . . A province-degree-quota system should be implemented. . . ... Every ten examinees should have a new jinshi degree holder in a province.[37]

The role of the Imperial Examination System in politics should not be underestimated: some historians even believed the failure of implementing the province-degree-quota system should be blamed for the military failure of Northern Song vis-à-vis nomads, and the successful province-degree-quota system had contributed to Ming and Qing Empire's territorial integrity.[38]

Attempts to introduction affirmative action in the Imperial Examination System were often backed by emperors. In 1397, all of the jinshi degrees were granted to the examinees from Southern China, and the emperor suspected there was favoritism among officials in charge of the Imperial Exam, as the officials were also from Southern China. As a result, the emperor killed criminal suspects and only granted jinshi degrees to the examinees from Northern China in that year.[39] The attitude of emperors could also be observed in Qianlong Emperor's remarks on affirmative actions in the Imperial Examination System. In 1788, an official named *Qian Feng* suggested Qianlong Emperor abandon the affirmative actions in the Imperial Examination System. The emperor's reply was:

> Qian's suggestion could solve some chronic problems. However, the country should select officials in a wide range, covering not only talented scholars but also a large geographical area. As the provinces have varying degrees of academic performance, if Qian's suggestion was adopted, then *Jiangsu* and *Zhejiang* provinces would occupy more than half of the admission quotas, while the faraway provinces at the border might not even get one admission quota. Qian is from *Yunnan* Province, so he should

[37]Guang Sima (2009). "Proposal for a Province-Degree-Quota System in the Imperial Examinations (Qi Gongyuan Zhulu Quren Zhuang)". In: *Comments on the Compilation of Essays by Sima Guang in Chronological Order (Sima Wengong Ji Biannian Jianzhu)*. Ba Shu Press.

[38]Zheng Jin (1990). *The Imperial Examination System Institution and Chinese Culture (Keju Zhidu Yu Zhongguo Wenhua)*. Shanghai People's Publishing House, 178

[39]Tingyu Zhang (1974). *The History of Ming Dynasty (Ming Shi)*. Zhonghua Book Company, 1697

be innocent. If he was from *Jiangsu* or *Zhejiang* Province, he must have selfish motives.[40]

C.2 An Overview of the Imperial Examination System

The examinees in Qing Empire had to take a series of exams to get a variety of degrees. This section gives a brief introduction of the exams and corresponding degrees in the Imperial Examination System.

C.2.1 Three-Tier System

Shengyuan Degrees The lowest degree in the Imperial Examination System is *Xiucai*. To acquire a Shengyuan/Xiucai degree, an examinee had to pass three exams. The first exam was at the county level (*Xian Shi*), the second exam was at the prefecture level (*Fu Shi*) , and the third exam was also at the prefecture level (*Yuan Shi*). In the most cases, only the survivors of the three exams could be admitted into Confucian Schools set up by prefectures or counties (*Fu Zhou Xian Xue*), and then they were granted *Shengyuan* Degrees. The *Shengyuan* degrees were more often called *Xiucai* Degrees. Before acquiring *Shengyuan/Xiucai* Degrees, the examinees were called Child Students (*Tong Sheng*, also called Government Students), regardless of their real ages. The three exams as a whole were called Child Examinations (*Tong Shi*). Child Examinations were held twice every three years.[41]

Juren Degrees The next exam for *Xiucai* degree holders was at the province level (*Xiang Shi*, Provincial Examination). The Provincial Examinations were held once every three years, and the survivors of the provincial-level exam would be granted *Juren* Degrees. The Provincial Examinations took place at the capital of the provinces.[42]

Juren Degree holders had already got some political power in a sense. Theoretically, they could be directly offered official positions.[43] Zuo Zongtang (1812-1885), one of the most famous politicians in late Qing Empire, only had a Juren degree. However, in the real world, there was little chance for a Juren degree holder to be offered an official position. Nevertheless, Juren degree holders could become local gentry at their hometown, and take up the responsibility of village-level governance. Indeed, Qing Empire heavily relied on local gentry in grass-root governance, and local gentry often enjoyed many privileges in tax and judicial systems.[44]

[40] "Qianlong Wushisan Nian Sanyue Yiyou" (n.d.). In: *Historical Records of Qianlong Emperor in Qing Dynasty (Qing Gaozong Shilu)*. Vol. 1301

[41] Yanliu Shang (2003). *The Memoirs of Qing's Imperial Examination and Other Relevant Books (Qingdai Keju Kaoshi Shulu Ji Youguan Zhuzuo)*, 1-33

[42] Yanliu Shang (2003). *The Memoirs of Qing's Imperial Examination and Other Relevant Books (Qingdai Keju Kaoshi Shulu Ji Youguan Zhuzuo)*, 48-56

[43] Yanliu Shang (2003). *The Memoirs of Qing's Imperial Examination and Other Relevant Books (Qingdai Keju Kaoshi Shulu Ji Youguan Zhuzuo)*, 94-96

[44] Zhongli Zhang (1955). *The Chinese Gentry: Studies on Their Role in Nineteenth-Century Chinese Society*. Seattle: University of Washington Press

Jinshi Degrees *Juren* degree holders could take part in the nation-level exams (*Hui Shi*, National Examination), which were organized in the next year of provincial-level exams at the Imperial capital–Beijing. Therefore, the National Examinations also occurred once every three years. The survivors of the National Examinations were granted jinshi degrees, the highest degrees in the Imperial Examination System.[45]

However, the National Examinations were not the last one for the examinees, and jinshi degree holders could not get an official position at once. Before getting appointed, jinshi degree holders also had to take further exams, which are introduced in details at the next section.

C.2.2 Verification of Residency

Eligibility to imperial exams was linked to residency. Exam candidates needed to have their residency verified before they could attend the exams. Methods of verification are as follows:

Proof Materials for Registered Residence The requirement of complicated proof materials was the basic way to prevent fake registered residence in the Imperial Examination System. In Qing Empire, there were two residence registration systems in parallel: the residence registration system for tax (Li Jia) and the residence registration system for public security (Bao Jia).[46] An examinee's residence was based on his registration in the tax system (Ding Liang Ce), but he must also provide his registration files in the public security system (Yan Hu Ce). Additionally, the examinees had to provide proof files that could confirm the locations of his house and ancestors' tombs.[47] The information on houses and tombs was no less important for verifying an examinee's registered residence, as an imperial edict in 1733 says as below:

> The examinees from *Chongming* and *Zhaowen* in Jiangnan Province cannot take the Imperial Examination in *Tongzhou* until it has been verified that they have resided in *Waisha* with the proof of houses and tombs there. They cannot take the exam only with proof that they have landed there. If they do not have houses or tombs in *Waisha* but take the exam in *Tongzhou*, the examinees' and guarantors' degrees shall be canceled.[48]

Guarantors of Registered Residence To prevent fake registered residence, examinees also had to find guarantors of their residence. The examinee without a Xiucai degree (*Tongsheng*) must find another four examinees to form a group, and every member in the group must guarantee

[45]Yanliu Shang (2003). *The Memoirs of Qing's Imperial Examination and Other Relevant Books (Qingdai Keju Kaoshi Shulu Ji Youguan Zhuzuo)*, 102-107

[46]Gongchuan. Xiao (1960). *Rural China : imperial control in the nineteenth century.* eng. Publications on Asia / University of Washington (State). Seattle: University of Washington Press, 43-144

[47]Xiwei Liu (2012). *On Imperial Examination Migrants in the Qing Dynasty (Qingdai Keju Maoji Yanjiu).* Central China Normal University Press, 257-260

[48]Gang Kun et al. (1995). *Changes in Qing's Political System (Qinding Daqing Huidian Shili).* Shanghai Classics Publishing House, 239

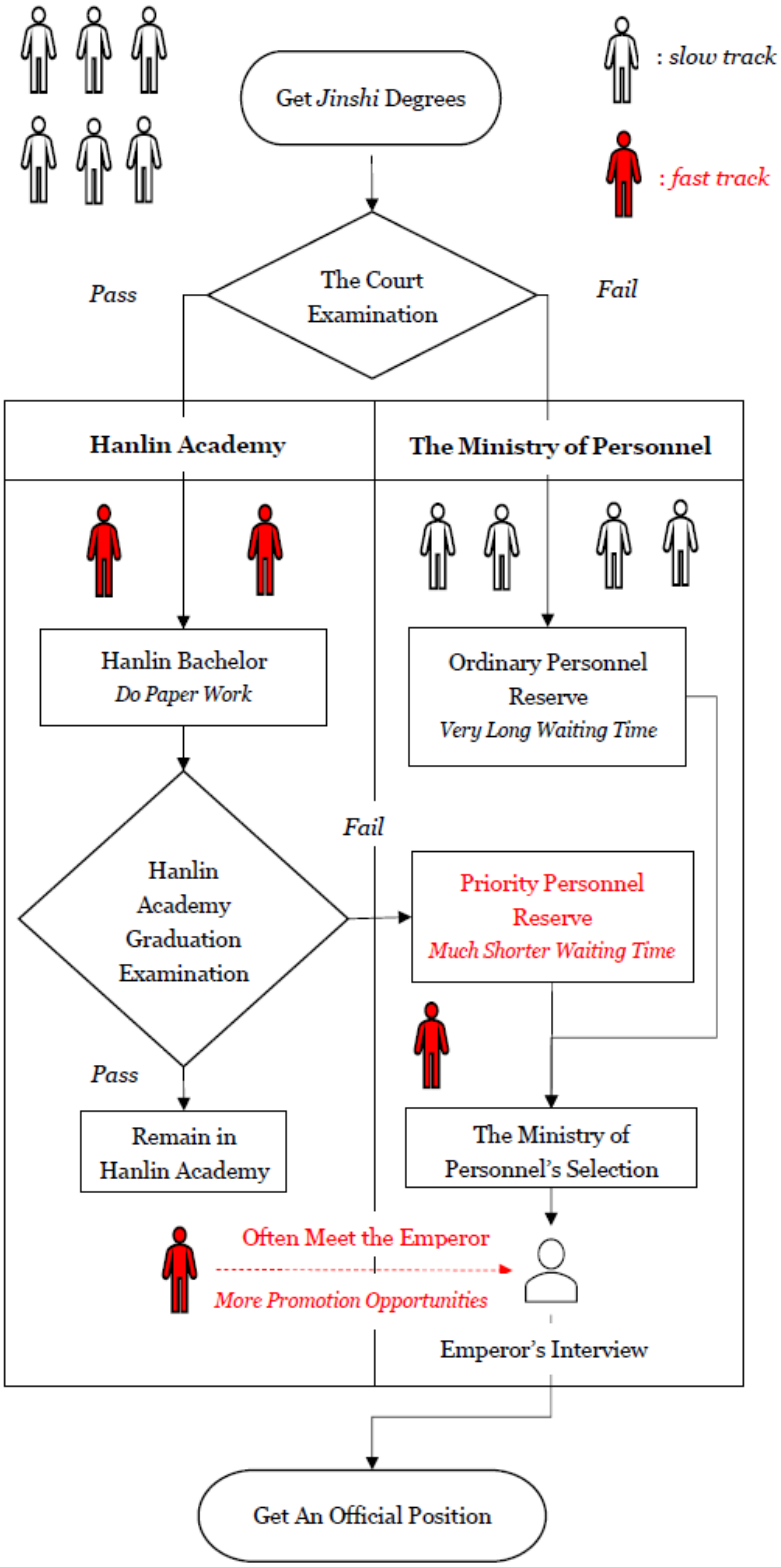


Figure A.7: Procedure for jinshi's Appointment as Officials

the residence of the other four members.[49] Additionally, he must have a distinct *Xiucai* degree holder who enjoyed government grants (*Linsheng*) as another guarantor. An imperial edict in 1652 said as below:

> Five *Tongsheng* shall form a group, and a *Linsheng* with a good behavior record shall sign as a guarantor..... In the roll call, the *Linsheng* guarantor and the five members in the group must check each other, and make a report immediately as long as they find cheats. If they conceal the cheat, the five members shall be punished and the *Linsheng*'s degree shall be canceled.[50]

After 1792, Qing's county officials also designated a second *Linsheng* as an additional guarantor of the examinees' residence, in case that the first *Linsheng* got bribed by the examinees. As a contemporary observer noted:

> In addition to the first *Linsheng* guarantor, another guarantor would also be designated in the prefecture-level Child Examination (*Yuankao*)..... The county education officials would post the name list of designated guarantors in front of their offices, and the examinees would invite them to act as the second guarantors in the Child Examination.[51]

The county and prefecture officials were also responsible for the examinees' real residence. If there were cheats from other guarantors, the officials would also get punished.[52] The contemporary exam regulations read as below:

> The examinees must take the Imperial Examination at their registered residence. If there is a fake registered residence in the exam, the examinee's and his *Linsheng* guarantor's degrees shall be canceled. If the examinee has acquired the *Juren* degree, his degree shall be canceled and he shall be also punished. The local officials responsible for the exam, education, and governance shall go on trial.[53]

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[49]Xiwei Liu (2012). *On Imperial Examination Migrants in the Qing Dynasty (Qingdai Keju Maoji Yanjiu)*. Central China Normal University Press, 262-263

[50]Youming Huo and Haiwen Guo (2009). *Collation and Annotation on the Imperial School Regulations (Qinding Xuezheng Quanshu Jiaozhu)*. Wuhan University Press, 77

[51]Yanliu Shang (2003). *The Memoirs of Qing's Imperial Examination and Other Relevant Books (Qingdai Keju Kaoshi Shulu Ji Youguan Zhuzuo)*, 10

[52]Xiwei Liu (2012). *On Imperial Examination Migrants in the Qing Dynasty (Qingdai Keju Maoji Yanjiu)*. Central China Normal University Press, 271-277

[53]Dingbao Wang, Dong Qichang, et al. (2006). *Compilation of Each Dynasty's Literature on the Imperial Examination System (Lidai Keju Wenxian Jicheng)*, 2672

Accent Verification Sometimes an examinee's accent must be verified before taking the exam. Guangxi Province's exam regulations in 1701 read as below:

> Guangxi local chiefs' descendants willing to take the Imperial Examination shall go to nearby Confucianism schools first, and get enrolled after verifying their accent. If the officials responsible for exams accept them without permission or the local chiefs discourage them from this test, the governors shall report them and make them stand on trial.[54]

The accent verification used to be mainly implemented in the examinations for *Xiucai* degrees (*Tongshi*) in *Wanping* County and *Daxing* County but was expanded to larger areas later.[55] In 1844, the regulation read as below:

> Every county subordinate to *Shuntian* Prefecture and *Tianjin* Prefecture should verify examinees' accents strictly and keep the records in Provincial Education Commissioners (*Xuezheng*), as the common practice in Wanping County and Daxing County.[56]

In 1745, a special censor on examinees' accent (*Shen Yin Yu Shi*) was established, but his responsibilities had not been specified.[57] The censor would also be punished if he failed to identify the cheaters:

> If an examinee pretends to have a registered residence at Daxing County and Wanping County, the *Linsheng* guarantor's degree shall be canceled first, and then he shall be investigated for bribery and stand on trial, and he can no longer take the Imperial Examination. The accent censor shall also stand on trial.[58]

C.2.3 Curriculum and Syllabi

The curriculum of the Imperial Examinations can be divided into three main categories: the first is rudimentary knowledge to beginners, the second is core Confucianism classics, and the third is direct preparation materials for the Imperial Examinations.

The children in Qing Empire started to receive education at the age of around 8. In this stage, which is often called "Meng Xue", the education emphasized the children's ability to read

[54]Gang Kun et al. (1995). *Changes in Qing's Political System (Qinding Daqing Huidian Shili)*. Shanghai Classics Publishing House, 240

[55]Xiwei Liu (2012). *On Imperial Examination Migrants in the Qing Dynasty (Qingdai Keju Maoji Yanjiu)*. Central China Normal University Press, 278-279

[56]Tedeng'e (1844). *Regulations on the Ministry of Rites (Libu Zeli)*

[57]Xiwei Liu (2012). *On Imperial Examination Migrants in the Qing Dynasty (Qingdai Keju Maoji Yanjiu)*. Central China Normal University Press, 278-279

[58]Gang Kun et al. (1995). *Changes in Qing's Political System (Qinding Daqing Huidian Shili)*. Shanghai Classics Publishing House, 257

and write Chinese characters. Additionally, the children were also taught basic moral codes. This stage had a variety of textbooks, and teachers usually chose textbooks on their own. The most famous textbooks were "Three-Characher Scripture (San Zi Jing)", "the Book of Family Names (Bai Jia Xing)", "Thousand Characters (Qian Zi Wen)", and so on. According to a Qing teacher's private school regulations, this stage took one or two years.[59]

The second stage required the students to read and recite core Confucianism classics, because the Imperial Examination System in Qing Empire made test questions from these classics, including The Four Books (The Great Learning, The Doctrine of the Mean, The Confucian Analects, and The Works of Mencius) and The Five Classics (The Book of Songs, The Book of History, The Book of Changes, The Book of Rites and The Spring and Autumn Annals). According to a school's regulation, the students should read and recite about 300 characters every day, and it would take the students around two years to get familiar with all the core Confucianism classics.[60] In fact, this stage might require students to read other art, philosophical or historical books, but the additional reading requirement varied across schools, teachers and students.

The third stage required students to get familiar with the writing standards of the Imperial Examinations. The students must write the "eight-part essays" according to a specified form, which could only be acquired by intense learning. In this stage, the private publishers compiled the "eight-part essay" examples in large volumes for sale, which were often called "Zhi Yi", so there was not a standardized textbook in the market. These books were so practical to prepare for the Imperial Examinations that some examinees only read them and ignored the core Confucianism classics.[61] However, according to the comments of contemporary observers, the academic value of these books was very low.[62]

C.2.4 Appointment Procedures

Although jinshi was the highest degree in the Imperial Examination System, the new candidates must take additional exams to be ranked for available official positions. The winners in the additional exams could take a fast track in appointment and promotion, while the losers must wait in a long line for limited appointment opportunities, as they would not be appointed until there had been available positions in the bureaucracy. Therefore, the additional exams were no less important for a jinshi degree holder to get an appointment.

Firstly, after acquiring a jinshi degree, the new candidates must take the Court Exami-

[59]Chang Wang (n.d.). *Regulations of the Free Private School (Yi Shu Gui Tiao)*

[60]Chang Wang (2011). "Regulations of Youjiao School (You Jiao Shu Yuan Gui Tiao)". In: ed. by Hongbo Deng. Zhongxi Book Company, 624

[61]Zongxi Huang (1972). "The Imperial Examinations (Keju)". In: *The Compilation of Modern China's Historical Materials (Jindai Zhongguo Shiliao Congkan)*. Ed. by Yunlong Shen. Taibei Wenhai Press, 2108-2109

[62]Xuanzong Fu, Changping Zhao, and Chengbin Shan (2016). *The Continued Compilation of the Abstracts of the Complete Library of the Four Branches: Classics (Siku Quanshu Zongmu Tiyao: Jingbu)*. Shanghai Classics Publishing House, 957

nation(*Chaokao*), and then only the winners would be admitted to Hanlin Academy (*Hanlin Yuan*).[63] The losers in *Chaokao* must wait in the long queue at the Ministry of Personnel (*Li Bu*), and then it could take them up to years to be appointed as an official by the Ministry of Personnel.[64] This is the first divergence among jinshi degree holders.

The admittees in Hanlin Academy, who were called "Hanlin Bachelors" (*Shu Ji Shi*), mainly did paperwork. Three years later, Hanlin Bachelors had to take Hanlin Academy's Graduation Examination (*San Guan*, also called To Release from the Institute), to graduate from Hanlin Academy. The winners in the final exam could remain appointed as an official at Hanlin Academy, while the losers would also join the official reserve at the Ministry of Personnel and wait for an appointment. This is the second divergence among Hanlin Bachelors inside Hanlin Academy.

However, according to the Ministry of Personnel's appointment regulation, those who failed at the Hanlin Academy's graduation examination were still prior to appointment in comparison with those failed at the imperial court examination, so they did not need to wait for too long before appointments, as a contemporary observer noted:

> The official candidates from Hanlin Academy and the Household Administration of the Heir Apparent, no matter how their performances are, if recommended for positions, will take priority over others waiting in the queue... If recommended for District Magistrate, then they will be appointed first, without the routine procedures, so they are nicknamed as the Tiger Class.[65]

Theoretically, all the Imperial officials must be appointed by the emperor himself. Therefore, the Ministry of Personnel's proposed candidate must be interviewed by the emperor before the appointment came into effect.[66] The emperor could also directly designate someone as an official, but he could only choose someone he knew very well in this case. As the emperor often visited Hanlin Academy by himself and consulted officials there about policy, the survivors of the two divergences had significant advantages in promotion, as a contemporary observer noted below:

> Officials in Hanlin Academy are in a low rank—only the 7th. However, they directly serve the emperor in paperwork, so their treatment is the same as high officials.[67]

[63] Only the three candidates who had got the highest grades in the National Examination could waive the Court Examination and got admitted into Hanlin Academy directly.

[64] Zhenguo Zhang (2010). "Researches on Qing's Civil Official Selection (Qingdai Wenguan Xuanren Zhidu Yanjiu)". PhD thesis. Nankai University, 348-361

[65] Kejing Zhu (1983). "Notes in Hanlin Academy (Hanlin Yipin Ji)". In: *Two Volumes in Ming'an House (Ming An Er Zhi)*. Yuelu Press

[66] Zhenguo Zhang (2010). "Researches on Qing's Civil Official Selection (Qingdai Wenguan Xuanren Zhidu Yanjiu)". PhD thesis. Nankai University, 58

[67] Kejing Zhu (1983). "Notes in Hanlin Academy (Hanlin Yipin Ji)". In: *Two Volumes in Ming'an House (Ming An Er Zhi)*. Yuelu Press

Obviously, Hanlin Academy was a fast promotion track, so jinshi degree holders took Hanlin Bachelor as a higher honor:

> After three years, Hanlin Bachelors will take the Hanlin Academy Graduation Examination. The winners will remain appointed in Hanlin Academy to do paperwork, while the losers will be appointed as Supervising Secretaries (*Jishi Zhong*), Censors (*Yu Shi*), Secretaries in a Bureau of a Ministry (*Zhu Shi*), Secretaries in the Grand Secretariat (*Zhong Shu*), Judges (*Tui Guan*), District Magistrates (*Zhi Xian*), and Educational Posts (*Jiao Zhi*)... They can waive the tests to serve the central and provincial governments, do paperwork and organize exams... The Hanlin Bachelors who have remained in Hanlin Academy are promoted faster than other officials. During Qing Dynasty, they are the main source of Prime Minister candidates, and numerous of them have been appointed as high officials in central government and provincial governors. All the jinshi degree holders take Hanlin Bachelors as an honor.[68]

The appointment procedure of jinshi degree holders is demonstrated in Figure A.7.

In general, official selection in Qing Empire was meritocratic. Firstly, jinshi was the most important source of middle- and high-level officials. If low-level officials are defined as those below the 4th rank, then based on Qing emperors' interview records, the degree distribution across official ranks is calculated in Table A.13. jinshi had occupied about one-third of middle- & high-level official positions and only one-fifth of low-level official positions, while *Juren* had occupied about one-third of low-level official positions and only one-sixth of middle- & high-level official positions.

Table A.13: Degree Distribution across Official Ranks

Emperor	**Middle- & High-Level Officials (%)**			**Low-Level Officials (%)**		
	jinshi	*Juren*	*Others*	jinshi	*Juren*	*Others*
Yongzheng	33.9	9.6	56.5	16.2	31.2	52.6
Qianlong	30.9	14.9	54.2	25.1	44.5	30.4
Jiaqing	30.2	15.4	54.4	24.3	35.5	40.2
Guangxu	41.3	12.2	46.5	19	20.2	60.8
Total	34.5	13.4	52.1	21.1	34.8	44.1

Source: Zhiming Wang (2016). *Research on Qing Officials' Career Path: Analysis based on Emperor's Interviewees' Resumes (Qingdai Zhiguan Renshi Yanjiu: Jiyu Yinjian Guanyuan Lvli Dangan De Kaozheng Fenxi).* Shanghai Bookstore Publishing House, 168

[68] Erxun Zhao et al. (2020). "Regulations on Official Selection (Xuan Ju Zhi)". In: *Draft of Qing History (Qing Shi Gao).* Zhonghua Book Company

Table A.14: The Proportion of jinshi in Qing's Crucial Positions

Position	Total Number	jinshi	Percentage
Minister (Shang Shu)	744	339	46%
Senior Censors-in-Chief (Zuo Du Yu Shi)	430	221	51%
Governors-General (Zong Du)	585	181	31%
Governors (Xun Fu)	989	390	39%

Data Source: Dezhao Wang (1984). *Research on the Imperial Examination Institutions in Qing Dynasty (Qingdai Keju Zhidu Yanjiu)*. Zhonghua Book Company, 58

The proportion of jinshi degree holders in the Qing Empire's crucial positions was summarized in Table A.14. jinshi degree holders occupied about half of the crucial positions in the central government (Minister and Senior Censor-in-Chief and about one-third of the crucial positions in provincial governments (Governors-General and Governors).

Secondly, Hanlin Bachelors was the main source of senior officials. The Court Examination, i.e. the Hanlin Academy admission exam, was highly competitive: the total amount of jinshi degree holders in the Qing Empire is 26848, while the number of Hanlin Bachelors was only 6065, so only about a quarter of jinshi degree holders could be admitted as Hanlin Bachelors.[69] After four or five promotions, Hanlin Bachelors was expected to reach the 1st and 2nd rank official positions.[70]

Hanlin Bachelors were recognized by contemporary observers as promising candidates for the Grand Ministers of State (*Jun Ji Da Chen*), i.e., the *de facto* Prime Ministers in the Qing Empire.[71] The total amount of Grand Ministers of State in the Qing Empire was 138, among which 64 were Hanlin Bachelors, so Hanlin Bachelors occupied 46% of the Grand Ministers of State.[72]

C.2.5 Superstitious Beliefs and Practices

The degrees in the Imperial Examination System were so attractive that the examinees often turned to supernatural power. The examinees were so anxious about their grades in the Imperial Examinations that they became the most important clients for the fortunetellers.

> The fortunetellers in the imperial capital can only make profits when examinees consult them as an Imperial Examination is being held. The fortunetellers have a variety

[69] Runqiang Li (2007). *Qing's Jinshi Degree Holders and their Academic Culture (Qingdai Jinshi Qunti Yu Xueshu Wenhua)*. China Social Science Press, 79

[70] Runqiang Li (2007). *Qing's Jinshi Degree Holders and their Academic Culture (Qingdai Jinshi Qunti Yu Xueshu Wenhua)*. China Social Science Press, 107

[71] Dezhao Wang (1984). *Research on the Imperial Examination Institutions in Qing Dynasty (Qingdai Keju Zhidu Yanjiu)*. Zhonghua Book Company, 56-57

[72] Jianhua Wu (1994). "A Brief Analysis of Hanlin Bachelors in Qing Dynasty (Qingdai Shujishi Qunti Jianxi)". In: *Social Science Journal (Shehui Kexue Jikan)* 4, pp. 107–115

> of tricks to make profits. Some of the fortunetellers care more about short-term profits, then they will answer "you must get enrolled" every time an examinee asks them. The examinees are happy to hear their predictions, so a lot of examinees will go to ask these fortunetellers. Some of the fortunetellers care more about the long-term profits, then they will say "you cannot get enrolled" every time an examinee asks them. Because the losers occupy around 70% of all the examinees, the examinees will believe that these fortunetellers have better skills and honest sayings. As a result, these fortunetellers can make much more profits in the following years. Some of them enjoy a high fame in such fortunetelling practice and make profits for all their lives.[73]

Apart from fortunetellers, examinees often sought for anxiety alleviation by praying for dream oracles in temples:

> The Temple of Two Gentlemen in the imperial capital is at the foot of inner city in the west. The Juren degree holders going to the imperial capital to take the national level examinations must go there to pray for oracles, which will be shown in followers' dreams. All of them put money in the hands of the two servant statues standing on the left and right respectively. It is said that the oracles there are the most effective.[74]

Finally, China's religions even used Imperial Examination degrees as promised awards for followers. A famous Buddhist booklet in Qing told eight stories, in which the main characters had successfully got degrees in the Imperial Examinations as a reward for their conservative attitudes towards sex.[75] In Taoism, February 3rd was believed to be the birthday of the God of Literature (Wen Chang Di Jun), and it was no surprise that examinees made large-scale worship rituals in that day:

> The examinees in Taizhou County worship the God of Literature very piously. In addition to the two public schools in the prefecture and county, there are more than ten halls worshiping him. On the day before February 3rd, each hall raised fund respectively, playing music and songs overnight for three days.[76]

[73]Kuo Shen (2016). "Deception Tricks (Miu Wu Jue Zha Fu)". In: *Brush Talks From Dream Book (Meng Xi Bi Tan)*. Zhonghua Book Company

[74]Mai Hong (1981). "The Temple of Two Gentlemen (Er Xiang Gong Miao)". In: *Records by Yijian (Yi Jian Zhi)*. Zhonghua Book Company

[75]Anshi Zhou (2013). "For the Degree Seekers (Quan Qiu Gong Ming Zhe)". In: *Compilation of Zhou Anshi's Essays (An Shi Quan Shu)*. Unity Press

[76]Yitian Lu (1984). "Notes in a Cold House (Leng Lu Za Zhi)". In: *Collection of Qing Notes as Historical Materials (Qingdai Shiliao Biji Congkan)*. Ed. by Zhonghua Book Company. Zhonghua Book Company, 120

C.3 The Life of a Qing Intellectual

C.3.1 Preparation for Imperial Exams

An intellectual's life starts with preparation for the Imperial Examination. As a child, he had to go to private schools to prepare for the examination to get the *Shengyuan/Xiucai* degree (the Child Examination, *Tong Shi*). As only *Shengyuan/Xiucai* degree holders were permitted to study in official Confucian schools on prefecture or county levels (*fu zhou xian xue*) and take the province-level examinations, the Child Examination was no less important for him than higher-level examinations. Indeed, the preparation for the Child Examination would take him many years. According to Zhang's estimate, the expected age of acquiring the *Shengyuan/Xiucai* degree was 24.[77] This indicates that a child should spend more than ten years preparing for the *Tong Shi* examinations.

After acquiring *Shengyuan/Xiucai* degree, he was permitted to study in the official schools to prepare for the Provincial Examinations to acquire the *Juren* degree. The Provincial Examination is believed to be the most difficult part of the Imperial Examination System.[78] According to Zhang's estimate, the expected age for acquiring *Juren* degrees was 31.[79] Theoretically, *Juren* degree holders could be directly appointed as officials, but the chance was too little. Therefore, he must prepare for the National Examinations to get the jinshi degree to pursue an official career path. According to Zhang's estimate, the expected age for acquiring a jinshi degree was 33-36.[80] Zhang also shows that the expected age of death of a *Shengyuan/Xiucai* degree holder was about 60.[81] Therefore, preparation for the Imperial Examinations had taken more than half of an intellectual's life, and preparation for the Child Examination had taken about two-thirds of all his preparation time for all the Imperial Examinations.

C.3.2 Becoming a Professional Bureaucrat

After passing all the examinations, the intellectual could expect to be appointed as an official. However, he might have to queue for many years for an available position. After being appointed, his official career would largely depend on his performance in his position. His performance was evaluated by Qing Empire's three assessment systems:

1. The Ratings Fulfilled System (*Kao Man*). In the Ratings Fulfilled System, an official's

[77]Zhongli Zhang (1955). *The Chinese Gentry: Studies on Their Role in Nineteenth-Century Chinese Society.* Seattle: University of Washington Press, 95

[78]Dezhao Wang (1984). *Research on the Imperial Examination Institutions in Qing Dynasty (Qingdai Keju Zhidu Yanjiu).* Zhonghua Book Company, 35

[79]Zhongli Zhang (1955). *The Chinese Gentry: Studies on Their Role in Nineteenth-Century Chinese Society.* Seattle: University of Washington Press, 126

[80]Zhongli Zhang (1955). *The Chinese Gentry: Studies on Their Role in Nineteenth-Century Chinese Society.* Seattle: University of Washington Press, 122

[81]Zhongli Zhang (1955). *The Chinese Gentry: Studies on Their Role in Nineteenth-Century Chinese Society.* Seattle: University of Washington Press, 96

performance was evaluated every three years in his 9-year term of office, so the assessment schedule is individual-specific. In this system, the emperor was in charge of the assessment of high-rank officials in Beijing and provincial governors, high-rank officials in Beijing were in charge of the assessment of low-rank Beijing officials, and provincial governors were in charge of the assessment of local officials at lower levels. This assessment system was aborted in 1665.[82]

2. The Capital Evaluation System (*Jing Cha*). The officials working in Beijing were evaluated every three years, but the assessment schedule was not individual-specific. The emperor was in charge of the assessment of high-rank officials in Beijing, while high officials and the Minister of Personnel were in charge of the assessment of low-rank officials in Beijing. The Capital Evaluation System was suspended from 1687 to 1723.[83]

3. The Great Reckoning System (*Da Ji*). Local officials were evaluated every three years, and its schedule was not individual-specific, either. Before 1686, the emperor interviewed local officials by himself; while after 1686, the provincial governors were in charge of the assessment of local officials. [84]

In addition to his performance in his position, other factors including his ethnicity, originality, age, morality, and even physical appearance would also affect his career path as an official.[85]

Retirement as Local Gentry According to regulation, officials above a particular age threshold should be considered to be too old for his position. The age threshold was set at 55 in 1757, then set at 65 in 1768, and then set at 70 in 1798.[86] In general, Qing officials should have retired at the age of around 70. However, the enforcement of this rule was flexible.

After his retirement, the official also enjoyed political and economic privileges in his local community. Indeed, retired officials were a crucial part of the local gentry in Qing Empire, and they took many responsibilities in local governance, such as providing public goods and services for the local community.[87]

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[82]Gang Xue (2020). *The Study on the Assessment of the Civil Officials in Qing Dynasty (Qingdai Wenguan Kaohe Yanjiu)*. China Social Sciences Press. Chap. Two.

[83]Gang Xue (2020). *The Study on the Assessment of the Civil Officials in Qing Dynasty (Qingdai Wenguan Kaohe Yanjiu)*. China Social Sciences Press. Chap. Three.

[84]Gang Xue (2020). *The Study on the Assessment of the Civil Officials in Qing Dynasty (Qingdai Wenguan Kaohe Yanjiu)*. China Social Sciences Press. Chap. Two.

[85]Zhiming Wang (2007). *Research on Yongzheng Emperor's Bureaucracy (Yongzheng Chao Guanliao Zhidu Yanjiu)*. Shanghai Classics Publishing House, 67-101

[86]Erxun Zhao et al. (2020). "Regulations on Official Selection (Xuan Ju Zhi)". In: *Draft of Qing History (Qing Shi Gao)*. Zhonghua Book Company

[87]Zhongli Zhang (1955). *The Chinese Gentry: Studies on Their Role in Nineteenth-Century Chinese Society*. Seattle: University of Washington Press, 3-71

C.3.3 Non-Official Intellectuals

Even though the Imperial Examination System was a lure for many Qing Empire's intellectuals, plenty of them pursued alternative career paths. Some did so because they did not pass higher-level exams and had to seek jobs elsewhere.

Informal Government Staff Qing Empire had a limited bureaucracy in comparison with its large population. According to a contemporary's calculation, Qing Empire in 1850 only had 26,408 bureaucrats in total.[88] Therefore, Qing Empire heavily relied on informal staff in real governance. Working as informal government staff was a good opportunity for the exam losers to utilize their comparative advantages because it involved a lot of paperwork, as a contemporary noted below:

> We have failed in the Imperial Examinations, so we must turn to other careers. Only working as informal government staff is close to reading books, and then many of us choose it.[89]

Private School Teachers Another popular career choice for failed candidates was working as teachers in private schools. In 1723, Qing Empire required local governments to help set up more private schools and hire intellectuals as teachers:

> Counties shall set up private schools in large local communities, and hire *Shengyuan* degree holders with good academic and moral performance to work as teachers there, whose corvee shall be waived and salaries shall be provided.[90]

Attorneys An indecent career choice for failed candidates was working as attorneys. Attorney jobs involved a lot of paper works, so intellectuals had comparative advantages there. However, attorneys were treated with disdain in Qing Empire because they were believed to be the root of quarrels and riots. Therefore, it was a shame for intellectuals to work as attorneys, as a contemporary noted below:

> Some intellectuals were so poor that they had to undertake lawsuits to earn food. I felt sympathy for them and gave them money to feed their family. I also sent them to schools to continue their study and paid the tuition, and then persuaded them to change their jobs.[91]

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[88] Qi Zhong (1897). *Records of Trivial Matters in Qing Dynasty (Huang Chao Suo Xie Lu)*

[89] Huizu Wang (1786). *Advice on Governance (Zuo Zhi Yao Yan)*

[90] Gang Kun et al. (1995). *Changes in Qing's Political System (Qinding Daqing Huidian Shili)*. Shanghai Classics Publishing House. Vol. 396

[91] Tingyao Gao (1859). *My Life as an Official (Huan You Ji Lue)*

Others Failed candidates also had other less popular career alternatives. Merchant families from *Huizhou* prefecture sometimes had their descendants join their family business if they could not expect a career path from the Imperial Examinations, as a family historical record wrote below:

> (He) did not succeed in the Imperial Examinations in childhood, so he abandoned his academic career and went into business. And then he inherited from his ancestors the family business.[92]

Some other failed examinees even became doctors:

> (He) prepared for the Imperial Examinations when he was a child, and he could write distinct essays. At first, he did not know how competitive the Imperial Examinations could be, and then he failed many times. As a result, he inherited his ancestors' business and studied medicine.[93]

As the poor intellectuals had received strict training in handwriting, there are records that they often sold their calligraphy:

> His family was poor, and he made ends meet by teaching children and selling calligraphy.[94]

Sometimes they might also sell paintings:

> His family was poor, and he worked as a teacher. However, the tuition could not cover his daily expense, and then he sold paintings as supplementary.[95]

Some intellectuals even became fortunetellers:

> He made a living by teaching students, and he also studied divination. . . . . And then he shut down his school and moved to *Lizhou* prefecture with his divination books. He dwelled in the house of Liu Qingli, a *Shengyuan* degree holder, and became a fortuneteller.[96]

[92]Runzhuang Shi (n.d.). "The Biography of Mr. Gongshu Cheng in the West of Xi County (Xi Xi Gong Shu Cheng Jun Zhuan)". In: *Bibliographies of Cheng Family Southern Branch's Historical Records in Xin'an County.* Ed. by Mihong Cheng

[93]Letao Wang (1999). *Doctors in Xin'an County (Xin An Yi Ji Kao).* Anhui Science & Technology Press, 111

[94]Shao Liang (2002). "Essays in Liang Ban Qiu Yu An (Liangban Qiuyu An Suibi)". In: *The Continued Imperial Collection of Four Divisions (Xu Xiu Siku Quanshu).* Ed. by Yun Ji et al. Vol. 1263. Shanghai Classics Publishing House, 142

[95]Tingji Zhong (1992). "The Local Gazetteer of Sheng Lake (Shenghu Zhi)". In: *The Compilation of China's Local Gazetteers: Villages and Towns (Zhongguo Difangzhi Jicheng: Xiangzhen Zhi Zhuanji).* Vol. 11. Shanghai Bookstore Publishing House, 528

[96]The Palace Museum (Gugong Bowuyuan) (2011). *The Records of Qing's Literacy Inquisition: Amplified Version (Qingdai Wenziyu Dang: Zengding Ben).* Shanghai Bookstore Publishing House, 237

C.4 University Admissions in Republican China

This section evaluates the affirmative actions embedded in the admission policy of universities in the Republic of China, pointing out it can be divided into two periods: (1) before 1938, admission was decentralized, and universities enjoyed much freedom by organizing their own admission exams; (2) after 1938, driven by the Second Sino-Japanese War, the admission procedure was largely controlled by the government. Corresponding to the changes in admission policy, the geographical distribution of admitted students became more equal. Before 1938, as universities tended to organize admission exams in nearby cities, the eastern provinces in China enjoyed significant advantages in admission over the provinces in middle and western China. After 1938, as universities had moved inwards and the government had issued affirmative policies in admission, the inequality had somewhat abated, but not totally vanished.

C.4.1 University Admission Before 1938

Before 1938, the universities enjoyed much freedom in organizing admission exams and making admission decisions. Each university could independently make admission plans, set exam questions, organize exam timetables and locations, and make admission decisions. The government only intervened sporadically. As a contemporary observer noted:

> The classrooms, laboratories, and lecturers in each university are quite limited, and it is quite difficult to make a unified decision. The decision is impossible to standardize. It will have fewer difficulties if every university can allocate admissions by themselves.[97]

Students' performance in admission exams was the only determinant in universities' admission decisions. Even though some distinct students could waive the admission exams, they had to get good grades in the graduation exam of middle school.[98] The universities only had vague admission requirements on students moral and physical quality. Tsinghua University only requires the students "should behave with integrity and have never been expelled from school."[99] The students could get admitted in as long as they did not have a severe health problem.[100]

[97] "Proposition that University Admission in Each Department Should be Allocated According to Need (Daxue Geke Xuee Yiongfou Shi Xuyao Yufou Er Zhuojia Fenpei An)" (1936). In: *Compilation of Propositions and Resolutions in Each Education Conference (Lijie Jiaoyu Huiyi Yijuean Huibian)*. Ed. by Shuangqiu Tai et al. Institute for Educational Compilation and Translation (Jiaoyu Bianyi Guan), 18-19

[98] "The 1938 Regulations on Recommendation for University Admission of Distinct Students in the Graduation Examination in Each Province and Prefecture and Graduates from National Senior High Schools (Ershiqi Niandu Ge Shengshi Gaozhong Huikao Chengji Youxiu Xuesheng Ji Guoli Ge Zhongxue Gaozhong Biyesheng Baosong Mianshi Shengxue Banfa)" (1938). In: *Communique from the Ministry of Education (Jiaoyu Bu Gonggao)*. Vol. 10, 19-20

[99] Xuewei Yang, Xin Liu, et al., eds. (2003). *Compilation of Literature on China's Examination History: The Republic Era (Zhongguo Kaoshishi Wenxian Jicheng: Minguo)*. Vol. 7. Higher Education Press, 42-43

[100] Tao Li (2014). "A Study on Admission System of National Universities in Republic Era (Minguo Shiqi Guoli Daxue Zhaosheng Yanjiu)". PhD thesis. Southwest University, 51

Obviously, such an admission arrangement was against the students from faraway inner provinces. Deterred by (1) high travel costs and (2) severe disparity in middle school education levels, the students from inner provinces had little chance to get admitted. A proposal to allocate admissions according to provinces was submitted at the tenth Education Union Conference held by the Education Ministry but had not been accepted by the government. The proposal wrote as below:

> Among the newly admitted students in the national colleges and universities, some provinces had very few or even no one. The schools deliberately organize admission exams in the regions with easily available transportation, and nearly all the newly admitted students are from the regions with easily available transportation..... The hosts of national education only take the exam performance as the standard to improve the education level, but they do not know the students from faraway provinces are not inferior in intelligence, as they have only suffered from worse education, then they have performed worse in exams. The reason for worse education is the lack of qualified personnel. If affirmative action cannot be taken now, then the student quality can never be improved, and then they will never have any chance to get admitted into national schools..... Firstly, the Education Ministry should notify the national colleges and universities that they should reserve some planned positions for province-specific admissions. Secondly, the provinces should offer an allowance to the admitted students from there.[101]

The origins of newly admitted students in the universities in 1931, 1932, and 1934 are described in Table A.15 parently, the admission was in favor of the students from economically developed provinces in eastern China, such as Hebei, Zhejiang, Guangdong, and Jiangsu. In general, Jiangsu and Guangdong students occupied more than 10% of the newly admitted respectively. By contrast, the proportion of students from inner provinces like Yunnan, Gansu, Shaanxi, and Guizhou was usually below 1%.

C.4.2 University Admission After 1938

After the breakout of the Second Sino-Japanese War in 1937, the universities moved inwards, and the government had tighter control over admission in order to keep the country unified. From 1938 to 1940, the Education Ministry appointed a university admission committee in charge of setting exam questions and making admission decisions for each university.[102] After 1940, the

[101] Xuewei Yang, Xin Liu, et al., eds. (2003). *Compilation of Literature on China's Examination History: The Republic Era (Zhongguo Kaoshishi Wenxian Jicheng: Minguo).* Vol. 7. Higher Education Press, 43

[102] "The 1938 Regulations on Unified Admission of National Universities (Ershiqi Niandu Guoli Ge Yuanxiao Tongyi Zhaosheng Banfa Dagang)" (1938). In: *Communique from the Ministry of Education (Jiaoyu Bu Gonggao).* Vol. 10, 9-10

right of setting exam questions and making admission decisions was handed back to universities, but the government still controlled the exam content and the total admission amount.[103]

To improve the chance that students from inner provinces were admitted into universities, the government divided the country into exam districts, making sure each district had exam rooms. The ten exam districts in 1942 were Chongqing, Chengdu, Kunming, Guiyang, Northwestern China, Guangdong & Guangxi, Zhejiang & Jiangxi, Fujian, Hunan, and Hubei. Each district had an admission committee in charge of setting exam questions and grading exam papers. The universities outside a district could also designate the district as its admission committee.[104] Obviously, the exam rooms had been much more easily available for students from inner provinces, and they could also benefit from district-specific exam papers.

The change in the origins of admitted students is reflected in Table A.16. Compared with Table A.15, the proportion of students from Hunan had increased from 4% to 10%; in Sichuan, from 6% to more than 20%. By contrast, the proportion of Jiangsu students had decreased from 15% to less than 10%; in Hebei, from 9% to 2%. However, the inequality between provinces still existed.

[103]Tao Li (2014). "A Study on Admission System of National Universities in Republic Era (Minguo Shiqi Guoli Daxue Zhaosheng Yanjiu)". PhD thesis. Southwest University, 40

[104]The Education Annual Committee (Jiaoyu Bu Jiaoyu Nianjian Bianzuan Weiyuanhui) (1948). *The Second Annual of China's Education (Dierci Zhongguo Jiaoyu Nianjian).* Commercial Press, 530-543

Table A.15: The Origins of Admitted University Students in ROC (1931–1934)

Province	1931		1932		1934	
	Amount	Share	Amount	Share	Amount	Share
Hebei	4268	9.60%	4142	9.70%	3701	9.69%
Shandong	2857	4.20%	1659	3.88%	1674	4.38%
Zhejiang	2469	5.60%	3582	8.35%	2972	7.78%
Guangdong	5844	13.30%	6072	14.21%	7168	19.56%
Anhui	1916	4.30%	1901	4.45%	1291	3.38%
Henan	1236	2.80%	1338	3.12%	1238	3.24%
Sichuan	2885	6.60%	2853	6.07%	2144	5.61%
Hubei	1302	3.00%	1350	3.16%	1190	3.12%
Jiangxi	1346	3.10%	1376	3.21%	1186	3.11%
Shanxi	2387	5.40%	2250	5.27%	1946	5.10%
Hu'nan	1592	3.60%	1811	4.24%	1721	4.51%
Liaoning	3003	6.80%	1756	4.12%	1407	3.68%
Guangxi	1073	2.40%	1274	2.98%	1192	3.12%
Fujian	2609	6.90%	1846	4.37%	1665	4.36%
Jiangsu	6647	15.10%	7122	16.67%	5902	15.46%
Gansu	164	0.40%	199	0.47%	119	0.31%
Jilin	865	2.00%	567	1.32%	297	0.78%
Heilongjiang	327	0.70%	338	0.79%	106	0.28%
Yunnan	329	0.70%	320	0.75%	219	0.57%
Shaanxi	361	0.80%	236	0.55%	229	0.60%
Guizhou	184	0.40%	204	0.48%	189	0.58%
Rehe	84	0.19%	69	0.16%	36	0.09%
Suiyuan	104	0.20%	78	0.18%	86	0.23%
Chahaer	133	0.30%	132	0.31%	92	0.24%
Menggu	2	0.01%	11	0.03%	12	0.03%
Ningxia	25	0.06%	20	0.05%	28	0.07%
Xinjiang	54	0.12%	55	0.13%	55	0.14%
Qinghai	7	0.02%	42	0.10%	19	0.05%
Xikang	6	0.01%	7	0.02%	2	0.01%
Tibet	51	0.11%	51	0.12%	-	-
Foreign	37	0.08%	54	0.13%	124	-

Data Source: The Education Ministry (Jiaoyu Bu) (1933). *The Statistics of National High Education in 1932 (Ershi Niandu Quanguo Gaodeng Jiaoyu Tongji)*. Commercial Publishing House, 25-26; The Education Ministry (Jiaoyu Bu) (1935). *The Statistics of National High Education in 1933 (Ershiyi Niandu Quanguo Gaodeng Jiaoyu Tongji)*. Commercial Publishing House, 89-90; The Education Ministry (Jiaoyu Bu) (1936). *The Statistics of National High Education in 1934 (Ershisan Niandu Quanguo Gaodeng Jiaoyu Tongji)*. Commercial Publishing House, 36

Table A.16: The Origins of Admitted University Students in ROC (1938–1943)

Province	**1938**	**1939**	**1940**	**1941**	**1942**	**1943**
Hebei	2.14%	2.93%	2.48%	2.12%	2.41%	2.35%
Shandong	1.32%	2.04%	1.82%	2.42%	1.80%	2.15%
Zhejiang	6.23%	9.09%	9.68%	7.78%	5.11%	9.12%
Guangdong	20.99%	9.25%	12.12%	10.30%	8.73%	9.73%
Anhui	3.33%	4.47%	5.60%	5.45%	4.65%	3.86%
Henan	2.60%	4.69%	5.08%	5.05%	7.19%	4.60%
Sichuan	21.37%	12.67%	12.57%	16.57%	17.89%	25.42%
Hubei	5.31%	4.85%	4.40%	5.52%	3.87%	4.27%
Jiangxi	3.48%	4.05%	5.71%	4.62%	4.70%	2.02%
Shanxi	1.37%	1.83%	1.65%	1.10%	1.61%	2.50%
Hu'nan	9.62%	10.56%	13.13%	13.41%	16.68%	9.10%
Liaoning	1.54%	1.17%	1.27%	1.21%	0.55%	0.89%
Guangxi	1.83%	1.29%	2.39%	2.90%	4.41%	1.79%
Fujian	3.94%	3.25%	2.96%	4.10%	6.44%	7.79%
Jiangsu	7.82%	16.09%	12.86%	9.29%	5.14%	7.18%
Gansu	0.20%	0.26%	0.73%	0.53%	1.48%	0.39%
Jilin	0.26%	0.19%	0.20%	0.16%	0.08%	0.15%
Heilongjiang	0.05%	0.02%	0.04%	0.08%	0.02%	0.04%
Yunnan	2.07%	0.59%	1.01%	1.94%	1.99%	1.60%
Shaanxi	1.56%	1.06%	1.07%	0.67%	2.45%	1.36%
Guizhou	1.48%	0.56%	0.57%	1.99%	1.98	1.59%
Rehe	0.02%	0.03%	0.03%	0.10%	0.03%	0.02%
Suiyuan	0.05%	0.05%	0.01%	0.05%	0.08%	0.13%
Chahaer	0.05%	0.14%	0.11%	0.04%	0.01%	0.00%
Menggu	0.00%	0.02%	0.00%	0.00%	0.00%	0.57%
Ningxia	0.04%	0.02%	0.00%	0.00%	0.01%	0.02%
Xinjiang	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%
Qinghai	0.00%	0.00%	0.00%	0.10%	0.12%	0.04%
Xikang	0.00%	0.14%	0.26%	0.30%	0.16%	0.28%

Data Source: The Education Annual Committee (Jiaoyu Bu Jiaoyu Nianjian Bianzuan Weiyuanhui) (1948). *The Second Annual of China's Education (Dierci Zhongguo Jiaoyu Nianjian)*. Commercial Press