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ABSTRACT

This paper documents persistence in the power of elite families in Central China despite dynastic change. We study the impact of the fall of the Ming Dynasty (1368-1644) on couples and their descendants (treatment of people), and present evidence on the response of multigenerational family lines to a big shock. Local Ming elites suffered a decline in influence in the short run, but in the long-run their descendants recovered and tightened their grip on power in their role as the elites of the new Qing Dynasty (1644-1911). In contrast to the recovery of family lines, the fall of Ming had a more persistently negative impact on the regions that historically were most strongly negatively affected by the shock (treatment of regions). The paper suggests that the elite reversal is due to trauma caused by Ming destruction that shifted norms towards the most socially respectable career paths based on the civil service exam; these norms were, to a greater degree, intergenerationally transmitted in family lines that suffered more from the destruction in the fall of the Ming dynasty.

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1 Introduction

China's civil service examination (*keju*), with a history spanning about 1,300 years, stands out as one of the world's most enduring institutions, integral to the selection of the elite during the imperial period.[1] Despite its longevity, there is limited understanding of why some institutions persist while others change. One question that has not been fully answered in the literature is whether elite persistence through continuous family lines is related to institutional persistence. This paper studies the responses of a sample of families in central China to the fall of the Ming dynasty (1368-1644) across several generations.[2]

The families resided in Tongcheng county, a location that in many ways mirrored the destruction associated with the transition from the Ming to the Qing (1644-1911) dynasty, a period during which approximately 36 million people—about 16% of the population—lost their lives. Our focus is on almost 500 couples who directly experienced the fall of the Ming in their lifetime, along with the four subsequent generations descended from these couples. Even though this five-generation sample covers a relatively long period of time, information at the individual level is typically observed every 33 years, allowing for an effective means to track family responses to the shock. Data comes from genealogies that record each male's highest lifetime status based on *keju* participation, as well as other information on his wife, children, and residential location.

The response of multi-generational families to a big shock is something on which relatively little is known. The fall of the Ming yields a unique natural experiment that allows us to examine this in detail. While many couples in Tongcheng lived in villages that experienced heavy destruction, others were more fortunate, with their villages suffering less damage. Our treatment-versus-control analysis employs a framework that goes beyond merely comparing couples who directly experienced the fall of the Ming versus those who did not. Informed by the treatment versus control assignment of the first generation, we are able to follow all the descendants of all couples, whether they were affected or not by destruction for the subsequent four generations. We term this approach the "treatment of people". This allows us to examine the differential outcomes of the great-great-grandsons of those who lived through the fall of the Ming to see if the shock propagates within family lines across generations.

We first show that first-generation men in heavily destroyed villages had a much lower chance to join the elite than men from less destroyed villages (about 30% less), which is what one would expect as warfare, disease, and famines in the course of the fall of the Ming made passing the

[1] While the specific form underwent changes, *keju* existed from about 600 AD to 1904 (Ho 1962, Elman 2013, Shiue 2017). China's imperial period is generally taken to be 221 BC (Qin) to 1911 AD. Following North (1991), we define institutions as humanly devised constraints that structure political, economic, and social interaction.

[2] Chinese clans are also referred to as lineages or common descent groups; we use these terms interchangeably.

exam, gateway to elite status, difficult. Perhaps surprisingly, however, men are more, not less, likely to belong to the elite if their great-great-grandfather lived in a village that was heavily destroyed during the fall of the Ming. That is, there is a reversal in elite attainment. Losses in the first generation turn into gains starting in the third generation, and cumulatively, over five generations, men from family lines in which ancestors suffered heavily more than compensate the first-generation loss of their family line. This is consistent with the idea that early losses do not deter later family members from pursing a *keju* degree. The long-run impact of the shock turns out to be qualitatively different from a faded version of the shock's short-run impact.

Examining the reasons behind the reversal provides new evidence on elite persistence and the endurance of the institutions they shape. We first ask whether there was significant turnover following the dynastic transition from the Ming to the Qing, producing a clean slate among the governing elites, or if the Qing elites in Tongcheng were primarily descendants of Ming dynasty elites who shifted their loyalty to the new regime. Such a scenario would imply that the success of family lines of elites could be an important component in the durability of certain institutions. We are able to link first-generation males to their own ancestors—for a total of seven generations—to assess whether those ancestors had elite status during the Ming era. We find that Ming elite families played a key role in elite attainment during the Qing. The context illustrates a scenario of elite re-capture and persistence.

Unpacking the process further, we show that two responses were central to how family lines recovered from the destruction and losses incurred with the fall of the Ming. The first is fertility control. Family lines had a better chance of one of their sons attaining elite status in the next generation if they had fewer sons. A plausible reason is that with fewer (or no) brothers, a young man would benefit from a greater concentration of family resources, increasing his chances of success in the *keju* exam. Second, male descendants of families that moved away from heavily destroyed villages in the aftermath of the fall of the Ming had a higher chance to attain elite status than those who remained in such villages. In line with evidence on migration and human capital theory, we document that outmigrants were typically younger and more affluent than non-migrants. Fertility and migration responses were temporary strategies, lasting no more than one to two generations. In addition, we also show that the fall of Ming somewhat reduced the chance that a couple's son could marry and thus establish the next generation.

Information on residence location allows us to compare the shock's impact on elite attainment in terms of the "treatment of people" described above, versus its impact on villages—the latter reveals the difference in historically destroyed villages versus historically less destroyed villages tracked over time. For simplicity, we refer to the latter as the "treatment of regions". Both the short-run and long-run impacts of treatment of regions have been widely studied in the literature.

In our case, the treatment of people and the treatment of regions coincide in the first generation, but differences emerge in later generations as migration occurs. We find a more negative treatment of regions effect on elite attainment, compared to the corresponding treatment of people effect. The extent is large enough that, even by the fifth generation, the cumulative treatment-of-regions effect is negative, whereas the cumulative treatment-of-people estimate is positive. Thus, depending on whether the focus is on the recovery of people, or on the recovery of regions, this choice will lead to qualitatively different conclusions about the long-run effects of the shock.

We further investigate reasons for why treated family lines turned to focus on elite attainment, compared to control groups. While improvements in the civil service exam and tax changes may have increased incentives to join the elite by investing in the *keju* career path, these factors cannot explain why treated family lines behaved differently from control family lines. Instead, we suggest that differential trauma due to varying levels of destruction explains the difference. First-generation couples in treated villages experienced higher levels of loss in terms of lives, land, and property compared to other couples; in other words, more trauma was the consequence. At the same time, compared to land and property, the skills required to pass the *keju* are a relatively portable form of wealth. We hypothesize that disproportionate trauma for first-generation treated couples led to a stronger emphasis on the *keju,* which these families transmitted from one generation to the next through the numerous ways parents influence their children's preferences.

Several pieces of empirical support are provided. First, by employing canonical parent-child mobility regressions, we estimate a higher level of intergenerational elite persistence among treated family lines compared to control family lines. Because well-known models imply a higher intergenerational coefficient when parents invest more into their children (Becker and Tomes 1986), this is consistent with the stronger emphasis on the *keju* among the more traumatized treated family lines. Furthermore, treated family lines are more likely than control lines to experience both upward mobility (a higher chance to join the elite) and downward mobility (a lower chance of losing elite status). Additionally, the difference in intergenerational elite mobility between treated and control family lines became stronger after the fall of the Ming.

The strength of intergenerational transmission of elite status also differed within the set of treated family lines. We find that elite persistence was particularly strong when older and younger generation had more opportunities for face-to-face interaction, not only between father and son but also between mother and son. Furthermore, elite persistence was relatively high when family lines did not change location from one generation to the next. This was likely because staying put increased the likelihood that connections between the young and their parents, but also to other family members—such as uncles, aunts, cousins—who could transmit family norms would be sustained.

Influential work has demonstrated that staggering differences in living standards today may be traced back to events centuries in the past, and that historical interventions can affect economies in the long-run by generating persistent effects (Acemoglu, Johnson, and Robinson 2001, Dell 2010, Nunn and Wantchekon 2011, Voigtlaender and Voth 2012; Nunn 2020 is a survey). It is well-understood that empirical analysis of causal pathways over many years is complicated. Not only are there a large number of relationships that could potentially matter, but there are also numerous time-varying shocks that complicate identification (historical contingencies; Cantoni and Yuchtman 2021). By employing longitudinal data across generations that are typically 30 to 35 years apart, the present analysis is tied to frequent observations even though the sample period covers several centuries.[3] We also provide additional evidence both for this paper's narrative, and against other initially plausible explanations, such as sample composition, health differences, and differential parental investments into their children.

Studies on the long-run impact of historical interventions typically employ spatial data, comparing affected with not affected regions, but the role of locational fundamentals for persistence findings is generally unknown (Voth 2021). Some research suggests that it is the people who live in a region that matter, rather than the region as such.[4] To better understand the relative importance of "regions" versus "people", information on migration flows is needed. The present paper employs such data, documenting a more positive long-run impact on people than on regions in the aftermath of a large shock. This not only extends existing evidence that migration dilutes regional persistence, but it also reconciles broader findings in the literature, which tends to find quite a bit of evidence of persistence when considering the regional level but less persistence in terms of people.[5] More generally, we highlight potential benefits from combining people and regions perspectives in the same analysis.

We also connect to a large body of literature on how families shape behavioral norms and attitudes, transmitting them across generations, and how this might affect political institutions (Alesina and Guiliano 2014, 2015, Bisin and Verdier 2023a,b). For example, second-generation immigrants often exhibit labor force participation patterns that reflect their parents' country of

[3]The present analysis spans more than 350 years. Some grandfathers of first-generation males are born in the first quarter of the 16th century, while the latest deaths are recorded for the last quarter of the 19th century. Other recent research employing Chinese family genealogies has other foci, such as fertility (Shiue 2017, Hu 2023), migration (Hess 2023), and changes in mobility over time (Shiue 2024a).

[4]Putterman and Weil (2010) show that development indicators reflecting the history of the population's ancestors rather than the history of the place they live today improve the indicators' ability to predict current income.

[5]Voigtlaender and Voth (2012) find weaker regional persistence for cities subject to large inflows from outsiders; related work using limited information on migration includes Lowes, Nunn, Robinson, and Weigel (2017) and Arthi, Richardson, and Van Orden (2024). Evidence for substantial regional persistence is in Dell (2010), Nunn and Wantchekon (2011), Jia (2014), Valencia (2019), and Grosjean and Khattar (2019), while using family data Ager, Boustan, and Eriksson (2021) and Bleakley and Ferrie (2016) show that wealth shocks can dissipate rapidly. Less evidence for regional persistence is found in Miguel and Roland (2011) and Feigenbaum, Lee, and Mezzanotti (2022).

origin (Fernandez and Fogli 2009, Alesina and Guiliano 2010), and attitudes towards risk and human capital are correlated between parents and children (Dohmen, Falk, Huffman, and Sunde 2012, Becker, Grosfeld, Grosjean, Voigtlaender, and Zhuravskaya 2020). This paper shows that not only is the proposed change in attitudes towards the *keju* in line with other historical evidence, but our analysis of intergenerational parent-child micro data shows that family lines disproportionately transmit these new attitudes when they have been relatively strongly affected by the historical shock. Additionally, our finding that the degree of intergenerational transmission increases with face-to-face time between parents and children further strengthens this evidence.

The paper also contributes to studies on institutional persistence versus change. Local families compete with each other for power, similar to the struggle for political power among groups highlighted in existing analysis (Acemoglu and Robinson 2008). In our context, local families compete through the *keju* system to gain favor with the central government. By demonstrating that the strength of local Ming elite families remained unchanged, if not increased, during the Qing, we complement existing evidence for elite persistence in China that emphasizes the importance of within-family transmission of skills beyond income and wealth (Alesina, Seror, Yang, You, and Zeng 2022). Our analysis is for a much earlier period than existing work, allowing us to observe persistence versus change for an extended time. We also illustrate how elite persistence can contribute to the persistence of the *keju* as an institution. Finally, this paper addresses the question of whether cultural norms are largely immutable or can change over relatively short periods of time (Guiso, Sapienza, and Zingales 2006, Acemoglu and Robinson 2024). In our setting, the deterioration of family norms in the late Ming was followed relatively swiftly by different family norms in the early Qing, which is evidence that such norms can change relatively quickly.

The following section 2 provides the needed background on the Ming-Qing dynastic transition in general and what happened in Tongcheng in particular. Section 3 introduces the data and describes our approach to causal effects estimation. The main empirical finding of an elite reversal is presented in section 4 and contrasted with regional persistence findings. Section 5 shows using intergenerational regressions that the shock has led to a higher emphasis on the *keju* for treated family lines that has been transmitted from generation to generation. Section 6 presents some concluding observations. The Appendix includes further discussion of the dataset, a discussion of sample selection resulting from a focus on longer family lines, and important robustness checks.

2 The Fall of the Ming Dynasty

2.1 Macro Developments

Dynasties in imperial China are generally defined by periods of rule by a family or clan, where each successive emperor traces his paternal lineage to a common ancestor. The Ming dynasty lasted for 276 years, from 1368 to 1644, while the Qing dynasty–the country's last imperial dynasty–lasted for 268 years, from 1644 to 1911. Ethnically, the Ming dynasty was led by the Han people, who originated in the central plains (present-day Henan province), while the Qing dynasty was ruled by the Manchus, a semi-nomadic people with roots in China's northeast (Manchuria region). Because the large majority of China's population is Han, Manchu rule was perceived to be a foreign conquest in many parts of the country.[6]

Several factors contributed factors to the collapse of the Ming dynasty. These include a decline in the state's fiscal accounts, exacerbated by corruption, as well as the increasing expenditures of the imperial court. A series of natural catastrophes in the late 1620s and 1630s increased the price of grain, leading to famine, epidemics, and crises, and climatic conditions contributed to the fall of the Ming as well (Brook 2010, Lee and Zhang 2013). Deteriorating economic conditions eroded the legitimacy of the Ming rulers, contributing to the frequency of internal rebellions in the early 17th century. International affairs played a role as well. While in the 16th century about half of the silver mined in Japan and the New World flowed into China, by the end of the Ming ongoing military campaigns and an international economic depression led to a shortage of silver, which contributed to rising demand for taxes and economic depression in China.

The fall of the Ming dynasty entailed not only destruction brought about by conflict between Ming and Qing armies and the collateral damage it inflicted on Chinese civilians, but also the associated economic devastation that led to famine due to harvest failures and epidemics. In addition, the death toll increased because of an increase in local uprisings, as exemplified by the case of Tongcheng below. While dynastic transition throughout China's history usually entailed violence and political strife, the end of the Ming Dynasty was an exceptionally devastating period. Ge (1999) estimates that during the Ming-Qing transition, the size of population dropped from 221 million in the year 1630 to 185 million in 1680 (see also Cao 2022). Regardless of the particular source, the fall of the Ming ranks among the largest negative shocks in world history, especially among those not primarly caused by a pandemic.

[6]There is no consensus among historians on the exact length of time that it took for the Qing to complete its conquest of China, but what is clear is that the fighting was not done by the year 1644, when the Manchus seized control of the Ming capital, Beijing. Some scholars contend that the fall of the Ming Dynasty began with the campaign of the Jin khan Nurhaci against the Ming in 1618, or even in the late 16th century (Spence and Wills 1979). Regardless of the specific timeframe, there is broad support for the idea that transition from the Ming to the Qing dynasty took a major part of the 17th century.

What were the consequences of the fall of the Ming dynasty? First, in terms of structure, China remained a largely agrarian, pre-industrial economy, with large-scale industrialization arriving only in the 20th century. Geographically, prior to Western intervention and the First Opium War of 1840-42 that gradually gave more weight to coastal-based activities and foreign trade, the economic focus was oriented towards geographic centers inland along the major rivers, the capital Beijing, and inner Asia (see Keller and Shiue 2022). At the same time, despite dynastic change the basic mode of government in China did not change. Qing rulers relied on local elites to implement their policy in much of the empire, as the Ming had before them. Given a relatively low level of central government revenue, the military and bureaucratic forces of the Qing conquerors were insufficient to impose widespread changes on China's immense rural area and population, even if they had wanted to (Spence and Wills 1979). Thus, despite the change in the ruling dynasty at the capital, political power 'on the ground' in China remained with the local groups that held power, and to a large extent that was the scholar-official elite. The following summarizes the Ming-Qing transition and the role of the local elite in the sample region.

2.2 Tongcheng County: Developments until the Fall of the Ming

During the sample period, Tongcheng was part of Central China's Anhui province. The area spanned about 110 kilometers East-to-West and 70 kilometers North-to-South, and it was located just north of the Yangzi river. Many of Tongcheng's inhabitants settled in the area during the transition from the Yuan (1271-1368) to the Ming dynasty. The topography of the county ranges from hilly or mountainous in the northwest to low-lying and well-watered areas in the southeast, though subject to frequent inundations. Tongcheng city, the capital of the county, is located on a small plain amid the northern hills, away from the dangers of flooding (Beattie 1979a; see Figure 1).

During the sample period, farming was the most important activity in Tongcheng. Much of the county's area towards the south and east was fertile. Most farming was small-scale although a few families had significant landholdings. Some parts of the population were artisans, merchants, or city officials (yamen and runner), and some men considered a scholar-official career by preparing for the civil service examination (*keju*). Because these men–and their families–had the highest social reputation with the local population, it is appropriate to think of them as the local elite. In the words of Ho (1962), participation in the *keju* is "the ultimate gateway to power". The high monetary and non-monetary returns from passing the *keju* are laid out in Chang (1955, 1962), Ho (1962), and Chen, Kung, and Ma (2020), as well as in section F.[7]

[7]While the *keju* during the Qing was not generally subject to hereditary or occupational restrictions, and it was highly competitive, a system with time-varying regional quotas for the number of degree was in place. However,

While Tongcheng in the early Ming was a fairly unknown place like so many other counties outside of China's traditionally most developed area, in 1404 the county succeeded in being recognized for having its first national graduate (*jinshi*) named in the civil service examination. By the 16th century, Tongcheng had started to become a place noted for scholarship as evidenced by more than a tripling in the number of *jinshi* from the 15th to the 16th century (12 and 39, respectively; Beattie 1979 a,b). Many of the top candidates during the late Ming came from a relatively small set of families, consistent with a strong intergenerational transmission of elite skills. The most successful clans in terms of the *keju* were the Fangs and the Yaos, followed by the Ho, Wu, Ch'i, and Tai clans. While the present paper does not include any of these six leading clans, it does include the Ma clan which might have ranked seventh or eighth in Tongcheng during the late Ming (Beattie 1979b).

Tongcheng's location directly in the path of the invading Qing armies from the north made it an important battleground as Ming armies arriving from the south sought to defend their dynasty. Tongcheng's population thus suffered directly as a consequence of the civil war. In addition, the battles destroyed much of the county's key resources; by 1643, it is estimated that 75% of the arable land was destroyed, and the defending Ming armies relied on the depleted food resources of the county, contributing to starvation (Beattie 1979a). In combination, these factors generated a high level of destruction, with reports indicating that as many as 160,000 people in Tongcheng were killed in a single year before peace returned (Beattie 1979b). In addition to these macro factors, the scale of destruction in Tongcheng during the Ming-Qing transition was increased by local developments centering on the relationship between local elite and general population. We turn to these now.

2.3 Tongcheng's Elite in the Ming-Qing Transition[8]

The final decades of the Ming saw an increase in tensions between Tongcheng's elite and the general population. This escalation not only amplified the scale of destruction in the fall of the Ming dynasty but also plays an important role for understanding elite behavior in Tongcheng during the Qing. The Tongcheng gazetteer notes that "previously the scholar-officials and worthies of the county had all been noted for virtuous conduct in their localities while the common people stood universally in awe of the authorities and respected the scholar-officials. But by the Tianqi [1621-28] and Chongzhen [1628-44] reigns, many of the long-established families and powerful lineages had become accustomed to license and extravagance; their young men and serfs made depredations everywhere which the common people resented" (Tongcheng 1827).

quotas were not binding at the county but at a higher level (Bai and Jia 2016). The new quota rules adopted after 1700, for example, did not affect the composition of local elites in Tongcheng (Beattie 1979b).

[8]Sources for this section are Beattie (1979 a,b) unless mentioned otherwise.

Important examples of egregious behavior by the local elite include tax and labor service evasion and attempting to obstruct the accurate registration of land ownership, on which the land tax depended. Under the Ming, there were generous rates of exemption from labor services and from the land tax-based service levy for all officials and degree-holders. In Tongcheng there were persistent efforts to extend these privileges illegally to other family members, and tax avoidance by the elites became even stronger after the imposition of seven successive land tax surcharges after 1619. Also, in 1581, when the Tongcheng county magistrate attempted to re-survey the cultivated acreage to create a more fair land tax assessment, strong protests led by local elites—who had the most to lose from the reassessment—ensued, and the re-survey was abandoned.

This behavior of the local elite may have been linked to the success of Tongcheng clans in having some of their sons pass the civil service examination in the late Ming. In particular, increased education and prestige led many families to change their lifestyles, abandoning a rural and frugal lifestyle in favor of a more extravagant life style in the city of Tongcheng. The transformation was partly fueled by expanding commercial activity, which included daily markets in Tongcheng city and an increasingly monetized economy in the Yangzi valley. From the perspective of the general population, the trend towards absentee landlordism through the move of landowning elites to the capital city due to its greater amenities must have indicated a clear deterioration of behavioral norms. The growing number of elite families in Tongcheng city also contributed to why the provincial governor approved to fortify the city with a wall in the year 1576.

Thus, the final Ming years in Tongcheng, as in other parts of the Yangzi valley, were characterized by antagonism and eventually violent clashes between elites and general population. A decade-long period of violence, bloodshed and devastation in Tongcheng began in 1634 when two local warlords with their forces attacked the city, plundering and then burning down hundreds of houses belonging to wealthy families. In response to this violence, a number of local elites fled downstream to the Nanjing area or south across the Yangzi river. At the same time, the scorn and aggression of the local population towards the local elite was not indiscriminate. One of the few exceptions of the local elite whose fields and houses were not attacked was Tai Chuncai a retired county magistrate, whose previous conduct had earned him the goodwill of the population. This indicates that the general population still made distinctions between different factions of the local elites—it was 'payback' time for some, but not for others. Overall, there does not appear to have been a general hatred directed towards scholar-official elites in Tongcheng.

By 1645, troops loyal to the Manchu conquerors started to control the Tongcheng area. Reports indicate that they were welcomed with relief, and there was little sign of local loyalist resistance on behalf of the vanquished Ming dynasty. Thus, despite the presence of numerous officials in Tongcheng in the early 17th century who appeared to have strong loyalties to the Ming government,

there is scant evidence of a marked desire to resist the new rule. While news of the fall of Beijing to the Qing (1644) elicited lamentations, with people reportedly unable to sleep or eat, historians interpret such reports as evidence for ritualized loyalty to a fallen dynasty. This behavior stands in contrast to heroic loyalty and readiness for self-sacrifice in nearby places like Yangzhou, Jiading, and Jiangyin, where thousands were butchered and many officials committed suicide rather than surrender to the Manchu conquerors.

The typical behavior of the local elite families was a pattern of collaboration with the new rulers. In the case of some families this was particularly striking. For example, while Chang Ping-wen became in 1639 a noted martyr to the Ming cause by defending a Shantung city to his death against the Manchu leader himself, his cousin Chang Ping-chen, the governor of Zhejiang in 1644, moved over to the Qing a year later and obtained eventually a top-level position in the Qing administration (president of Board of War). Thus, historicans believe that by collaborating with rather than resisting to the new rulers, Tongcheng's elite "rode out the storm" in the transition from the Ming to the Qing (Spence and Wills 1979).

Consistent with that, there was a definite continuity in the composition of at least part of the local elite in Tongcheng over a very long period. An important reason is that during the early Qing there was an increased focus on career paths with the highest reputation and prestige, based on the civil service examination, and filling them out with socially productive behavior. At the macro level, one reason is that the *keju* was held more consistently every three years so that the expected return from participating was higher (Shiue 2017). At the local Tongcheng level, tax exemptions for officials and degree holders were abolished in 1657, and since the new taxes were tied to the land holdings of these men (not the income as officials), this increased the relative return of a *keju* career relative to land-holding. The 1657 changes also eliminated any remaining benefits to relatives of the holder of the degree or office. Since it was not possible anymore for relatives to free-ride on a degree holder's achievement in the family, a man knew that he would have to participate in the keju himself to obtain any benefits. Many clans began to devote more of their income for education, and historical evidence suggests that Tongcheng's leading clans channeled their energies now more exclusively into the *keju* than before.

The increase in the focus of Tongcheng's leading families on the *keju* may also have been driven by a change in how best to exert influence. During the Ming dynasty, elites tended to rely on factional allegiances with other groups, while in the Qing this model of political influence gave way to a way to the direct exploitation of personal patronage through the provincial and national government (see Wakeman 1970). For this to work a family would have to get one of their sons into an official position at the provincial or national level, and success in the *keju* was the only way to achieve that. Another, and perhaps the main reason why Tongcheng's leading families

increased their emphasis on the *keju* is one of self-control and self-preservation. To the extent that clan members had success in the keju they would have the highest possible social reputation, and if the selfish and disruptive exploitation of land-holding and tax privileges was to be avoided, a focus on *keju* careers would serve the clan's long-run self-interest.

Historical accounts indicate that changes in behavior of the elites during the Qing were also informed by the memory the destruction that many elite families suffered by the hands of the local population during the late Ming. For example, it is noted that the traumatic shock of the late Ming uprisings induced a chastened mood in the local elites, and a new focus on socially more benevolent behavior. It would be natural that the memory of traumatic events in the late Ming would afflict more strongly families that lived through heavy destruction themselves, and to the extent that the new norms are intergenerationally transmitted, treated descendant would be more affected by it than descendants of control couples. Before we present sample evidence on these questions, the following section introduces the data.

3 Data

This study draws on information from genealogies of seven clans in central China. We begin by introducing general features of Chinese family genealogies before turning to the particular set employed in this study, which comes from Tongcheng, a county in China's Anhui province. We then turn to the main estimation sample, which are all family lines that starting with a couple that lived through the fall of the Ming dynasty first-hand extend over at least five generations. We also introduce two different causal effects, referred to as treatment of people versus treatment of regions, and perform balance checks in the pre-shock period. Additionally, two important issues are discussed in the Appendix. The first is representativeness. Section B.2 examines how this sample of seven clans compares to other Chinese populations. While broad administrative data for Tongcheng does not yet exist we use both information on other populations in Tongcheng as well as statistics at the national level to assess this. The second issue is a discussion of changes in the composition of the sample by focusing on relatively long family lines (five generations or more). This is examined in section C.

3.1 Chinese Family Genealogies as a Source of Economic Data

Chinese genealogies are patrilineal accounts of a family's history that have ritual significance because one purpose is to provide information on the common ancestry of a group of people. Documenting intergenerational links is therefore central to Chinese family genealogies, and many of them are recorded as a family tree. During the sample period, genealogies also served key

economic functions, including in the area of property rights, taxation & public goods provision, social policies, and education (see section B.1).

For China, genealogies are a classic source of socio-economic data (see surveys by Liu 1978, Shiue 2016). In addition to the record of time of birth and death, as well as career achievements, marriage and children, genealogies provide sometimes other information as well; see Figure A.2 as an example. Because documenting intergenerational links is a key purpose, genealogies are particularly useful for longitudinal family analysis over the long-run, and there has been a growing interest in genealogies for countries and periods where official data does not yet exist (Black, Duzett, Lleras-Muney, Pope, and Price 2022, Minardi, Corti, and Barban 2023, and Buckles, Price, Ward, and Wilbert 2023).

Family genealogies are both privately held and privately funded, and it is well-known that this introduces a resource bias. Figures drawn from genealogies tend to be biased upwards compared to population averages (e.g., Stelter and Alburez-Gutierrez 2022). Chinese family genealogies from Taiwan have been compared with records from the highly reliable Japanese household registration system (1905-1945), leading to a favorable evaluation of both the completeness and the accuracy of Chinese genealogies (Harrell 1987). It is important to emphasize that the present treatment-control analysis takes data 'differences' through the inclusion of fixed effects, and it relies therefore less on the completeness of the sample than many studies in which full population counts are of central importance.

The following section introduces the main sample, with additional information on representativeness and sample selection discussed in section B.

3.2 The Sample: Seven Clan Genealogies from Tongcheng

Several tens of thousands Chinese family genealogies are known to be held by archives and libraries today (Wang 2008). We employ seven genealogies from Tongcheng county in Anhui province for three related reasons. First, during the late Ming dynasty Tongcheng changed from a typical agricultural region to one that is known for having produced some of China's high-ranking officials (see section 2.2). Being touched by elite-dom is essential for our study. While Tongcheng is not comparable to China's traditionally most developed areas, neither is Tongcheng one of the large majority of regions that hardly ever produced a top-finalist in China's civil service exam. This allows us to learn something on elite formation and persistence at the same time when the sample is not highly unusual for China during the sample period.

Second, historical sources on the local Tongcheng economy are available. Although Tongcheng was not in the heart of the Yangzi delta, the county is part of the relatively central part of China,

rather than its periphery. Several editions of the local gazetteer are extant, the earliest from the 15th century and the most recent one compiled in the year 1827. Research on Tongcheng during the sample period is based on several dozen of clan genealogies and has produced at least one monograph (Beattie 1979b). This rich historical material guides the narrative in the present paper.

Third, research on Tongcheng genealogies has a relatively long tradition, starting with work by sociologists in the 1980s and continuing with cliometric studies of the 2010s (including Telford 1986a, 1992 and Shiue 2017, respectively). It is well-known that Chinese family genealogies come in different levels of quality and completeness, and the cumulative efforts of data corroboration, cleaning, and consistency checks has improved the inferences that can be made from the data.[9]

The seven particular Tongcheng genealogies in this study are chosen because together they yield a sample that is, to the best of our knowledge, broadly representative of the composition of social status for China overall during the sample period. The sample consists of a mix of richer and poorer clans. In particular, the sample includes the Ma clan which was among the top-ten (but not top-five) Tongcheng clans during the Ming-Qing (Beattie 1979b). The other six clans in our sample are less accomplished than the Ma in producing local elites. All entries of a given genealogy are included in our sample. Because a fundamental principle of Chinese genealogies is that all males are members of the clan irrespective of their status, this ensures that the majority of the sample are from the lowest class, as would be the case for China overall.[10] With this mix of clans, we obtain roughly 20% for the upper class as defined by Fei (1946), and the fraction of local and provincial civil service examination graduates is similar to the 2% reported by Chang (1955). See section B.2 for more on representativeness.[11]

The main estimation sample is formed with two restrictions. First, we select the parts of the family trees where the husband is born between the years 1590 to 1644. Then, husbands would have been at most 44 years old at the onset of the decade-long destruction in Tongcheng starting in 1634; moreover, choosing 1644 as the final year is consistent with the fact that completing the Ming-Qing transition took some time after 1644. The lives of men born between 1590 and 1644 would thus typically be affected by the fall of the Ming (we consider alternative windows as robustness checks). Second, the sample consists of family lines that are observed for five generations, which are the first generation–husbands born between 1590 and 1644–together with their descendants in the following four generations. This restriction eliminates family lines from the sample that are not

[9]For example, in a survey vital dates for husbands and wives are given in 76% of the cases in the case of Anhui genealogies, compared to close to 90% for genealogies from Hubei province (Telford 1986b).

[10]Exclusions from the clan of men born to a clan father are virtually non-existent. Adoptions do occur but are rare; we have dropped this handful of cases from the sample.

[11]While the mix of richer and poorer clans is a way of matching the national status composition, we exploit important variation within clans as well by including clan fixed effects; see Table 4.

Table 1: Elite Status and Civil Service Exam Participation

(1)	(2)	(3)	(4)	(5)
Group	Description	Elite	N	Fraction (%)
A	Non-Elite	0	6,712	83.7
B	Official Student	1	529	6.6
C	Imperial Academy Student	1	400	5.0
D	*Shengyuan*, *shengyuan* w/ office;	1	199	2.5
E	Military *juren* or *jinshi*; civil *juren*	1	98	1.2
F	Civil *jinshi*	1	83	1.0
All			8,021	100.0

Notes: Table gives information on a elite status in the five generation sample. More detailed information is given in Table A.1.

observed for five generations; important reasons for this are infant mortality and inability to marry due to lack of resources. Section C examines the impact of the fall of the Ming on the composition of the sample by influencing whether a given family line is observed for five generations or not.

Turning to our key variables, the elite indicator is shown in Table 1, column (3). The genealogies provide standardized information on each man's highest lifetime career achievement, which is summarized in column (2) of Table 1. Participation in the civil service examination was key to elite status. In our baseline, anyone who graduates from the *keju* at any level–local, provincial, or national–is an elite, and also men who prepare for but have not yet passed the *keju* (students)–belong to the elite. Being an official student would already mean an extraordinarily high level of status. Table 1 is derived from a more disaggregated status classification based on 23 social classes, see Table A.1.[12]

Summary statistics for the five generation sample–first-generation men plus all of their descendants in the next four generations–are shown in Table 2. Linking the first generation forward four times, the husbands in the fifth generation are unique. Each man in the fifth generation is the great-great grandson of the man in the first generation. Panel A indicates that the total number of observations in the five generation sample is N = 8,084. There are about 1,600 different five generation family lines. Because some males in the fifth generation are brothers, the number of unique men in the fourth generation is lower than 1,600, and in the third generation the number of unique men is even lower, and so forth, until in the first generation there are 163 unique males. Notice that 91% of the first generation men are linked to the fifth generation (= 1,515/1667).[13]

[12]There are two reasons for the relatively high share of *juren* and *jinshi* in Table 1. First, Tongcheng during the sample period is above the average region in terms of *keju* graduates. Second, the figure of 2.2% is based on a five generation sample, and observing at least five generations implies poor individuals are less common; see section C for more discussion.

[13]While in principle each family line is observed in all five generations, in practice the number of observations falls somewhat from the first to fifth generation because identifying vital statistics can be incomplete; see section

Table 2: Summary Statistics: Five-Generation Linked Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Generation	N	Birth Year	Death Year		Elite	Social Status	Residence Change	Sons
		Median	Median	Max			Mean	
1	1,667	1619	1678	1728	0.251	4.320	0.198	3.272
2	1,661	1653	1718	1759	0.224	4.320	0.276	3.667
3	1,632	1686	1743	1796	0.157	3.540	0.229	3.322
4	1,609	1716	1778	1850	0.106	2.505	0.147	3.391
5	1,515	1748	1803	1886	0.063	1.998	0.104	2.224
Total	8,084				0.163	3.366	0.189	3.193
Panel B. Clan	Chen	Ma	Wang	Ye	Yin	Zhao	Zhou	Total
N	373	903	4,527	1,175	513	531	62	8,084
(%)	(4.6)	(11.2)	(56.0)	(14.5)	(6.3)	(6.6)	(0.8)	(100.0)
Elite	0.063	0.417	0.124	0.290	0.018	0.008	0.032	
Sons	3.456	2.685	3.335	3.062	3.162	3.119	1.952	

Notes: Shown are statistics for the five generation sample; number of observation varies to some extent by variable; value for N given in Panels A. and B. is for male birth year. Elite is an indicator variable, see Table 1. Social Status is based on about 30 descriptors and ranges from 0 to 22, see Table A.1. Residence Change is equal to 1 if the head of household in a family line resides in generation x in a different town or village than in generation x-1. Sons is number of sons of a male head of households from all female partners he had during his lifetime.

There are differences in how many years of calendar time each family line takes to complete five generations. Specifically, the typical member of the second generation dies in the early 18th century (median death year of 1718, see column (3)), while the typical midpoint of life of the fifth generation is around the year 1850 (see Figure A.6 for typical lifetimes by generation). The latest death in the sample is in the year 1886 (column (4)), and given that the earliest birth of the first generation males is in the year 1590, this sample spans almost 300 years.

About 16 percent of the men in the five-generation sample become members of the elite according to our definition, and the fraction of the sample that did so fell over time (column (5)). This secular decline is due to increased competition during the Qing dynasty in the civil service examination. Given that the number of top officials was held approximately constant when at the same time China's population substantially grew (see Chen, Kung, and Ma 2020, Shiue 2024a), the fraction of top officials necessarily declined. The analysis below accounts for this trend by including fixed effects for each year in the sample. A man's social status, column (6), is determined by a broader set of activities than just his participation in the *keju*, see Table A.1. The data also

A.1.

provides in most cases the location in which a given family line resided in a generation, and based on this changes of residence are inferred. Table 2 indicates that from one generation to the next, a family line changes residential location on average in 18.9 percent of cases, though that fraction is higher especially in the second and third generation (column (7)).[14] We also see that a man had on average somewhat more than three sons from his female partners (column (8)). Sources and characteristics of the variables employed in this study are described in section A.1.

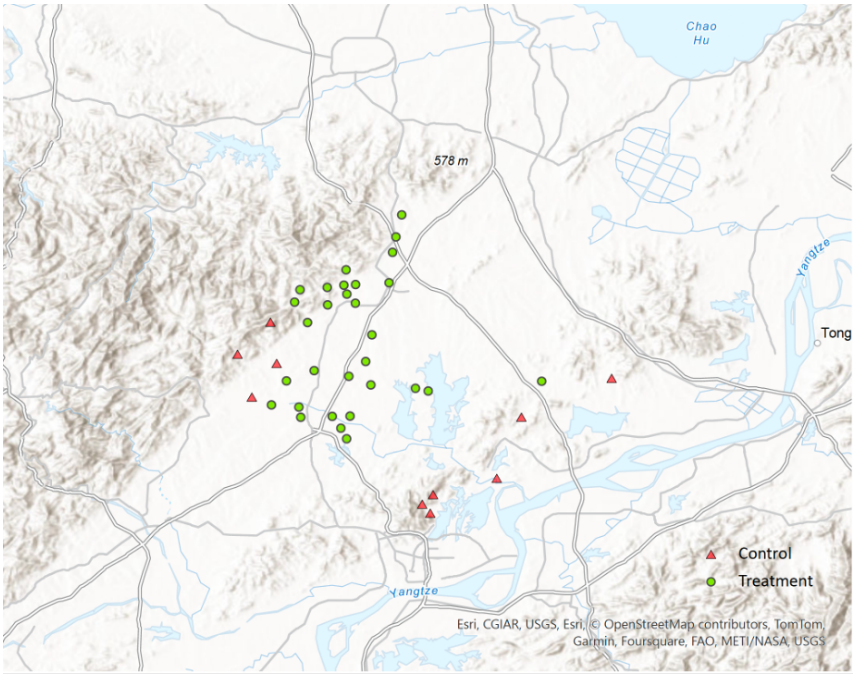
Panel B of Table 2 shows summary statistics by clan. Of the seven clans included in this study, men of the Ma clan are most frequently part of the local elite, consistent with other historical evidence (Beattie 1979b). Also the Ye clan produces regularly local elites, whereas members of the Zhao clan hardly ever have one of theirs participating in the *keju* (4 out of 531 in five generations). Panel B also provides information the number of sons males from different clans typically have. While richer households have often more children in pre-industrial settings, and imperial China is no exception, men of the resourceful Ma clan do not have a particularly high number of sons compared to men from other clans. We will return to this in section 4 below.

We estimate causal effects from the fall of the Ming using a treatment-control design. All husbands born between the years 1590 and 1644 are potentially treated by the fall of Ming, and whether they actually are is determined by whether they resided in an area of Tongcheng county that experienced high levels of destruction, or not. This treatment measure is based on mortality figures during the key period 1635 to 1645 (Telford 1992).[15] Figure 1 shows the location of the villages and towns in which first-generation sample couples lived. The lower part of the figure shows part of the Yangzi river. Treated locations are marked as circles, control locations as triangles. Consistent with other historical evidence (Beattie 1979b), Figure 1 shows that the large majority of Tongcheng was subject to relatively high levels of destruction. Furthermore, villages not strongly impacted by the fall of the Ming, that is, control locations, tend to be situated in the more peripheral and mountainous parts of Tongcheng. This is plausible because the costs of persecution in peripheral and mountainous regions would be relatively high (as in Nunn and Puga 2012). In the five generation sample with N = 8,084 (Table 2), 90% are treated and 10% control observations.

[14] Movements for the first generation are observed because the first generation has been backward-linked to their fathers and grandfathers.

[15] We convert Telford's (1992) measure into a binary indicator suitable for treatment-control analysis; the indicator is one for High and Medium levels of mortality, and zero otherwise.

Figure 1: Tongcheng Villages and Destruction during the Fall of the Ming

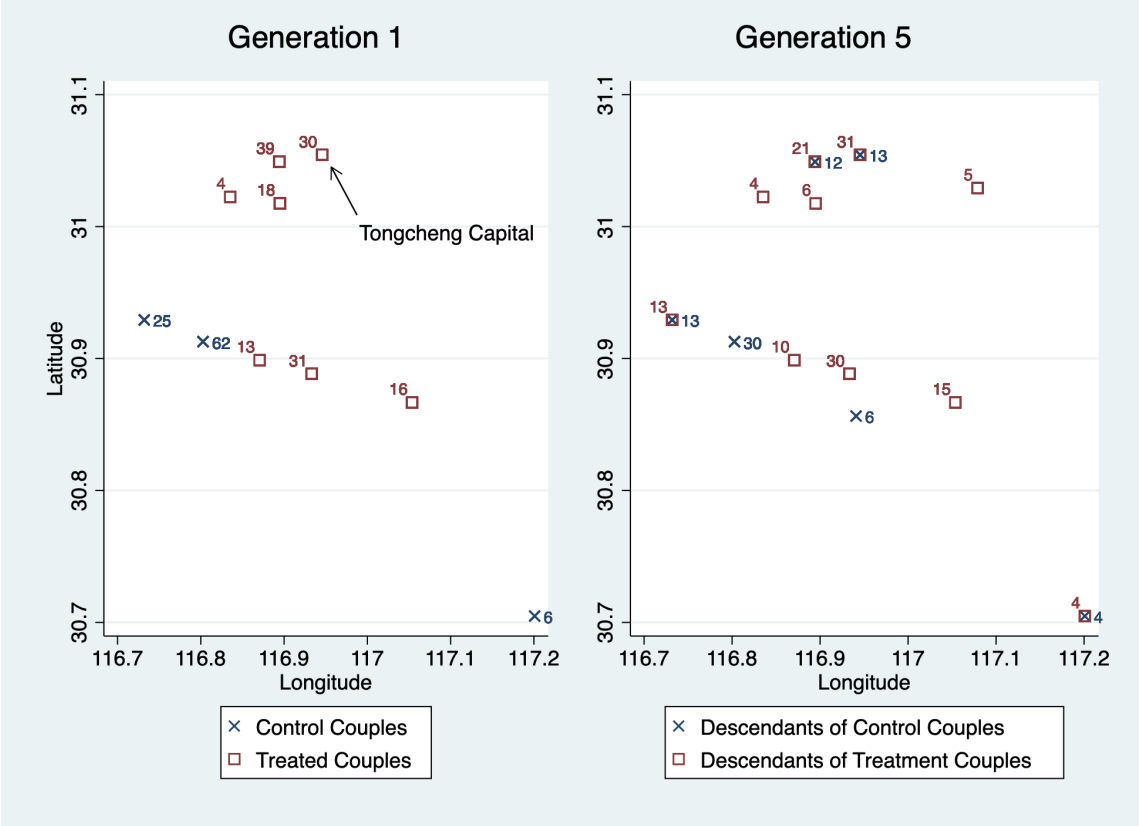


Notes: Shown are villages of Tongcheng in which first-generation couples lived. Highly affected locations (treated) marked with circles, less affected locations (control) with triangles. Source: Telford (1992).

Knowing the residence location of each family allows us to map the treatment of villages in Figure 1 to a treatment of families depending where they lived in the first generation. This is depicted for men of the Ma clan in Figure 2, left panel. The west-most location, for example, was home to 25 Ma members in the first generation, whereas 30 Ma members lived in the county city (northern-most location, labeled "Tongcheng Capital"). The west-most location was relatively little affected by the fall of Ming (control), while Tongcheng city was heavily destroyed and hence treated; this is labeled with crosses and squares, respectively.

Our definition of treatment for generations two to five is derived from the treatment assignment in the first generation by extending the first-generation treatment assignment of a particular man (or, couple) to all his descendants in the next four generations. For example, all descendants of the 30 Ma couples that resided in Tongcheng city in the first generationa are treated in generations two to five, no matter in which location they live. In particular, in the fifth generation, 13 descendants of first-generation treated Ma members reside in the western-most village (right panel of Figure 2); however, that village was not heavily destroyed in the fall of the Ming (left panel of Figure 2). We refer to this treatment definition as treatment of people. It captures the idea that the children (and perhaps grandchildren, etc.) of those that suffered from a particular experience may take that treatment as a core memory of the family's history with them wherever they go.

Figure 2: Ma Clan Residence Locations in the First and Fifth Generations



Notes: Left panel shows locations of the Ma couples in the first generation, with squares (crosses) indicating those living in treated (control) locations. Right panel shows locations of the 5th generation descendants of those in the right panel, with squares indicating those descendants whose ancestors resided in generation 1 in destroyed locations. Numbers indicate the number of heads-of-households of a particular type in that location.

Treatment of people differs from the more commonly estimated treatment effect across regions. Here, this treatment of regions effect is the difference in outcomes for treated versus control villages according to the assignment in generation one. It is apparent that there is no difference between treatment of people and treatment of regions in the first generation, however, there will be a difference in subsequent generations to the extent that family lines migrate between historically treated and historical control locations. For example, the 13 descendants of first-generation treated Ma members living in the fifth generation in the western-most location are "control" in the sense of treatment of regions but "treated" in the sense of treatment of people. Is the difference between treatment of regions and treatment of people effects quantitatively important? Clearly, the answer depends on how persistent the families' location choices are. From Table 2, family lines move in 18.9% of all generational transitions between locations, although movements between the sets of treatment and control locations are less common. Irrespective of how frequent migration movements are, treatment of people provides a new perspective on how shocks affect the welfare

of inter-generationally linked families, which in turn may provide new insights on the mechanisms that underlie long-run economic effects.

In principle, any difference in how treated versus control family lines fared after the fall of the Ming could be related to differences that existed between treatment and control observations before the shock. To examine how likely this is, we check for pre-shock differences between treatment and control samples. We exploit links of the first-generation men to their parents and grandparents in the previous two generations, and compare differences between what will be treatment and control samples in the fall of the Ming dynasty. Table 3 presents the results for all N = 490 couples that are potentially affected by the shock (husband born between years 1590 and 1644).

Table 3: Differences between Treatment and Control Samples Before the Shock

	Control	Treatment	Difference	p-value
	N = 54	N = 436		
A. Test of Equality of Means				
I. Father of First Generation Male				
Elite	0.24	0.30	-0.06	0.35
Social Status	6.00	5.18	0.82	0.37
Birth Year	1589.16	1586.90	2.26	0.37
Lifespan	55.86	53.78	2.08	0.25
II. Mother of First Generation Male				
First Wife	0.11	0.12	-0.01	0.82
III. Grandfather of First Generation Male				
Elite	0.41	0.30	0.11	0.10
Social Status	5.22	5.62	-0.40	0.64
B. Tests of Equality of Distribution				
Social Status of Father of First Generation Male				0.31

Notes: Lifespan is year of death minus year of birth. First Wife is an indicator whether a man's mother was the female that the man's father married before other partnerships with females. Test for equality of distribution is Kolmogorov-Smirnov.

Panel A, section I of Table 3 reports tests of the equality of the mean of various characteristics of the first-generation males' fathers. Having an elite father turns out to be not very different for treatment and control samples, 0.30 versus 0.24, respectively, see Table 3, section A. I. Lifespan and social status among control fathers is somewhat higher than among treatment fathers, though the difference is not statistically significant. We also assess pre-shock characteristics in terms of the mothers of the first-generation men. The number of female partners a man has is a measure of resources of the family (see section A.1.4). We see that the share of mothers of these men who were the first of several female partners in the household was similar in treatment and control

samples (section II of Table 3).

By considering the grandfathers of the first-generation males we can extend the pre-shock analysis. Some of these grandfathers were born in the early 1500s, more than a century before the fall of the Ming dynasty, and with two pre-shock and five post-shock generations the analysis spans more than 350 years. Grandfathers of the treatment generation males in the treatment and control samples turn out to belong to the elite at a rate of 0.41 among the control and 0.30 among the treated couples (difference not statistically significant, see Panel A., section III.). While being in the elite tends to be relatively frequent among control couples in the grandfather generation, the reverse is true in the father generation. Finally, since social status is defined over 23 discrete categories we compare the distributions for treatment and control samples; they turn out to be similar (p-value of 0.31, see Table 3, section B.). Overall, the evidence for pre-shock differences between treatment and control samples suggests any differences are limited.

The previous has analyzed all N = 490 men that were born between 1590 and 1644. We also ask how treatment and control observations compare during the pre-shock period in the five generation sample, because to the extent that the fall of Ming has a different impact on whether five generations are observed or not for the treatment versus the control observations, results might be different. This turns out to be not the case, however. The share of distinct first-generation men that has an elite father is 0.33 for the control and 0.27 for the treatment observations (p-value for test of difference of 0.58, see Table A.3). Thus, being able to observe five generations does not change the composition of key sample characteristics. See section C for additional information on the impact of the fall of the Ming on the length of family lines.

4 The Impact of the Fall of the Ming on Being Elite

4.1 Treatment of People

This section presents our first main result. We ask whether the fall of the Ming had a differential impact on those living in areas that were more heavily impacted, and if so, whether this differential impact was still present in any of the four following descendant generations (referred to as treatment of people). We relate the elite measure to an indicator of treatment, d_p, defined as relatively high impact in the village in which the man resided in the first generation (see Figure 1), using the following OLS specification

$$e_{ic(p)g} = \alpha + \beta_g \left[I \left[t = g \right] \times d_p \right] + \beta_f hfstat_{c0} + \eta_g + X'\gamma + \varepsilon_{ic(p)g}, \tag{1}$$

where $e_{ic(p)g}$ is elite indicator of man i belonging to couple c in generation g who is a descendant of pair p in the treatment generation. The term $I[t = g]$ is an indicator function equal to one if observation t belongs to generation g, and zero otherwise, while η_g are fixed effects for each of the five generations. Equation (1) also includes the social status of the father of the male in the first generation, denoted by $hfstat_{c0}$. Conditioning on first-generation father status further reduces omitted variables concerns. Recall that there is no significant difference in the average of $hfstat_{c0}$ between treatment and control samples (Table 3, Section A. I).

Equation (1) includes also a vector X of additional variables. First, there are fixed effect for each of the men's birth years. Lifetime in terms of calendar time varies substantially within a given generation, and including birth year fixed effects helps to account for shocks over time that might affect whether one is able to be in the elite. Second, we include a fixed effect for each of the seven male clans, denoted by m, $m = 1, ..., M$. They capture time-invariant differences, for example in the level of clan resources, that may affect an individual's response to the fall of the Ming. Similarly, equation (1) adds a fixed effect for each of the wives' clan-of-origin (130 different clans), denoted by f, $f = 1, ..., F$; also characteristics of the wife's clan might affect the response of the husband.[16] The error term $\varepsilon_{ic(p)g}$ is assumed to be mean-zero but possibly heteroskedastic. We cluster by couple of the treatment generation (p). The shock may trigger effects that last for more than one generation, and if intergenerational strategies play a role the behavior of members of the same family line in different generations, and possibly all descendants of the same first-generation couple, may be dependent. Conditional on included variables, we assume that β_g gives the mean difference in $e_{ic(p)g}$ due to the fall of the Ming in generation g. The sample consists of all men that are descendant couples of the first generation in generation two to five, plus the men of the first generation themselves. Results are presented in Table 4.

[16] We do not include the clan subscripts m and f in equation (1) to simplify the notation.

Table 4: The Impact of the Fall of the Ming

	(1)	(2)	(3)	(4)
Generation 1	−0.290*	−0.237*	−0.209*	−0.286**
	(0.120)	(0.100)	(0.103)	(0.104)
Generation 2	−0.026	−0.025	−0.009	0.052
	(0.130)	(0.115)	(0.118)	(0.106)
Generation 3	0.213**	0.183**	0.194**	0.211**
	(0.060)	(0.047)	(0.053)	(0.052)
Generation 4	0.149**	0.100*	0.111*	0.088*
	(0.052)	(0.040)	(0.043)	(0.041)
Generation 5	0.131*	0.105*	0.117*	0.127*
	(0.053)	(0.047)	(0.050)	(0.052)
First-Generation Father Status	0.026**	0.021**	0.018**	0.016**
	(0.003)	(0.002)	(0.003)	(0.003)
Fixed Effects				
Generation	Y	Y	Y	Y
Birth Year	N	Y	Y	Y
Male Clan	N	N	Y	Y
Female Clan	N	N	N	Y
Mean d.p.	0.163	0.163	0.163	0.163
N	8,076	8,074	8,074	8,041

Notes: Dependent variable is elite status indicator; sample consists of all men in generations 2, 3, 4, and 5 from couples formed by male descendants of the treatment (first) generation, as well as the treatment generation couples themselves. Estimation of equation (1) by OLS. d.p. stands for dependent variable. Robust standard errors clustered at the level of treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

We begin with a specification that has only fixed effects for each generation, see column (1). In the first generation, the coefficient on treatment is estimated at -0.29. This says that for every ten men in the control group that become elite in the first generation, due to the shock only just over seven treated men do. It is plausible that war, famine, and disease would make it more difficult to succeed in the civil service exam. For the second generation, the treatment coefficient β_g is close to zero, whereas point estimates are positive for the following three generations (column (1), Table 4). This points to a reversal in elite attainment, which indeed is confirmed by the analysis below. The father status variable $hfstat_{c0}$ enters with a positive sign, indicating that men from higher-status family lines are more likely to become elite. This is because preparing for the *keju*

is costly so that men from families with more resources have an advantage.

Actual lifetime of men in each of the five generations varies in terms of calendar time, and to account for common shocks we include one fixed effect for each of the men's birth years. This does not drastically change the findings, see column (2). The following specifications introduces a fixed effect for each of the seven male clans. This reduces the point estimate of the first-generation father status variable somewhat, however the pattern of the treatment coefficients by generation are similar to before (column (3)). Finally, we add fixed effects for the birth clans of the wives (130 different clans). While the size of the impact in each generation changes somewhat, the overall pattern, from negative in the first to positive by the third generation, is the same as before (see column (4)).

To summarize, even though the shock was detrimental to becoming elite in the first generation, by the second generation elite attainment of the descendants of treatment and control couples is comparable, and from the third generation on descendants of treatment couples become members of the local elite at a higher rate than descendants of control couples. This suggests that the initial loss did not discourage descendants of treated couples to make future investments into succeeding in the *keju.* One explanation consistent with the historical evidence is that the fall of Ming shock has disproportionately increased the incentives to become scholar-official for treated descendants. We will evaluate this explanation in section 5.

4.2 Treatment of Regions

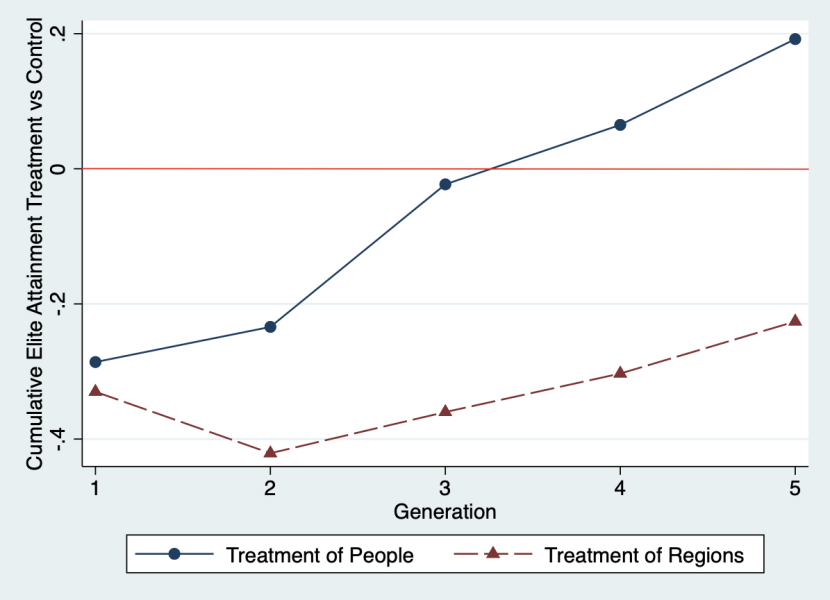
This section examines the impact of the fall of the Ming across regions. We employ the same five-generation sample as in the previous section, but instead of comparing descendants of first-generation treated couples with descendants of control couples wherever they migrate to, now we compare men who live in a particular generation in historically treated locations with men who live in that same generation in historical control locations, irrespective of where they resided in the first generation. The following equation is estimated by OLS:

$$e_{icg} = \alpha + \delta_g \left[I \left[t = g \right] \times I \left[r = 1 \right] \right] + \delta_f hfstat_{c0} + \eta_g + X'\gamma + \varepsilon_{icg}, \tag{2}$$

where $I \left[r_{ig} = 1 \right]$ is an indicator function equal to one if individual i in generation g resides in a historically destroyed location, and zero otherwise. The specification exploits cross-sectional variation across regions, with one treatment coefficient δ_g per generation. Figure 3 shows cumulative point estimates from equation (2), with full generation-by-generation coefficients with standard errors in Table A.4.

Figure 3 shows the cumulative impact of the fall of the Ming on regions as the lower of the

Figure 3: Treatment of People versus Treatment of Regions



Notes: Treatment of Regions shows cumulative point estimates from estimating equation (2)); Treatment of People shows cumulative point estimates of column (4), Table 4, based on equation (1). See Table A.4 for coefficients and standard errors. Difference in coefficients in generation 1 due to parameter restrictions across generations; they disappear in generation-by-generation estimation, see Table A.5.

two series, while the upper series is the cumulative impact of treatment of people (from Table 4, column (4)).[17] The impact on regions is more negative than the impact on people, both because of a more negative point estimate in generation 2 and because the recovery of elite attainment in generations 3, 4, and 5 is slower. We conclude that a cumulative reversal in elite attainment is only obtained when estimating treatment of people, but not when estimating the treatment of regions effect. Furthermore, over five generations, the treatment of people impact is positive whereas the treatment of regions impact over five generations remains negative (0.19 versus -0.22, repsectively). This may help to explain broader findings in the literature that regional shocks tend to have highly persistent effects, whereas in terms of people the impact of shocks can be less persistent (see the Introduction).

Note that the positive treatment of people impact over five generations means that the initial loss in elite attainment was more than compensated in the subsequent four generations. In this sense, the fall of Ming has actually strengthened the position of those initially weakened by the shock. Other evidence confirms that the position of Tongcheng's great families might have been strengthened by the fall of the Ming, and they were at times able to take over the property of their deceased neighbors upon their return from temporary exile (Beattie 1979a). The next section

[17]The difference between impact on region and the impact on people in generation 1 is due to restricting a select set of parameters to be the same across all five generations to economize on degrees of freedom. Table A.5 shows that when these restrictions are dropped, results are identical.

will shed more light on who these families were in the context of a set of strategies that families adopted to respond to the fall of the Ming dynasty.

Robustness We have examined the robustness of the results in Table 4 in a number of dimensions. First, we vary the time window for potentially treated first generation males that anchor the five generation sample (Table A.5). Second, we isolate Tongcheng city because of its historical significance, as well as the importance of geographic distance to Tongcheng city (Table A.9). Third, we consider modified definitions of which men belonged to the elite (Table A.8). We also consider the role of birth order in influencing the flow of parental resources, as well as the extent to which resource differences lead not only to differences in elite attainment but also to health and status differences (Table A.9 and Figure A.9 respectively). In terms of data, we assess the role of estimated vital statistics and residence location (Figures A.1 and A.3, respectively). A discussion of the representativeness of the sample is in section B.2, while section C examines the shock's impact on a man's chance to marry and selection in the five generation sample.

4.3 Elite Strategies towards the Fall of the Ming

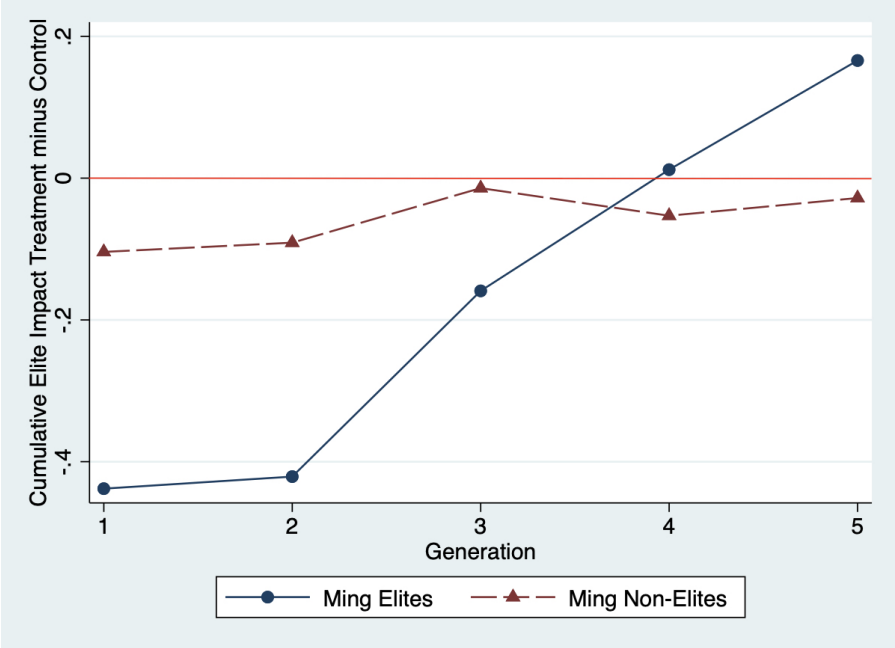
4.3.1 The Role of Ming Elites

An important question is whether the family lines behind the elite reversal of Figure 3 are newcomers under the Qing or whether they were already part of the elite during the Ming period. We use information on the last Ming generation to distinguish families who had elite status in the late Ming from families that did not. Coming from a Ming elite family is defined by an indicator equal to one if the father of the first-generation male was elite, and zero otherwise. These fathers would have typically reached the zenith of their careers in the early 1600s, the dawn of the Ming dynasty. Estimating a version of equation (1) that allows for different treatment coefficients for Ming elites and Ming Non-Elites leads to the cumulative treatment effects for these two subsamples shown in Figure 4.[18]

These results indicate that families who were elites under the Ming are central to the elite reversal under the Qing. Even if the massive destruction during the fall of the Ming dynasty had leveled the playing field in Tongcheng, Figure 4 suggests that former Ming elites were able to recapture their leading position in Qing times ("Ming Elites" series). Conversely, families that did not belong to the elites during the Ming do not exhibit major changes in elite attainment, and the cumulative point estimate remains negative over five generations ("Ming Non-Elites" in Figure 4). In sum, the reversal in elite attainment documented above is due to elite persistence, in the sense that the families who were elite during the Ming tend to also be the elite during the Qing

[18]Full estimation results with standard errors, as well as additional results, are presented in Table A.6.

Figure 4: Ming-Qing Persistence of Elites



Notes: Figure shows cumulative treatment coefficients based on columns (1a) ("Ming Elites") and (1b) ("Ming Non-Elites") of Table A.6.

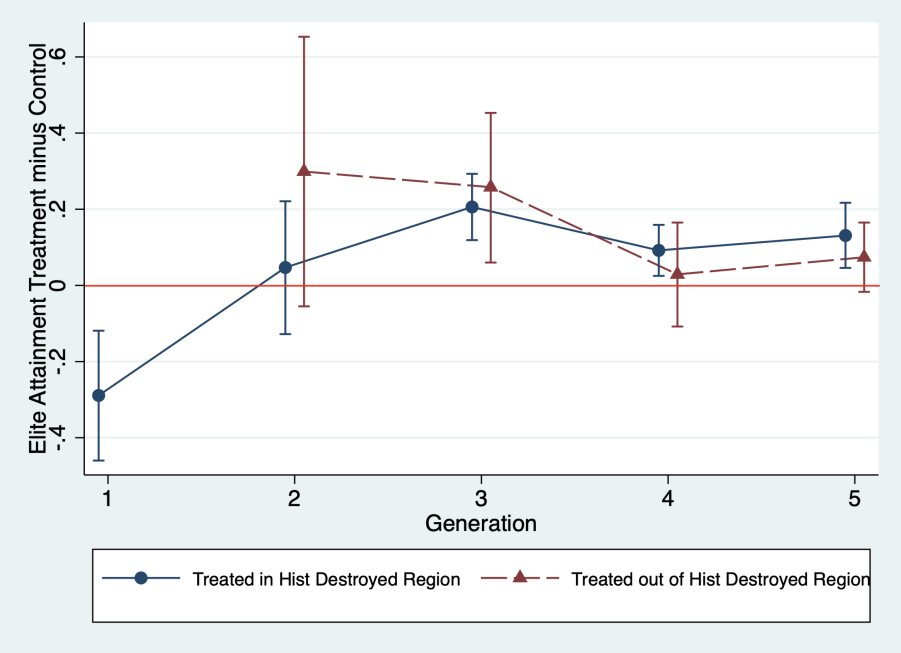
dynasty. Furthermore, our findings on elite persistence is in line with evidence on Tongcheng as a whole (Beattie 1979b).

4.3.2 Migration Strategies

Figure 3 shows the difference between how the shock affected historically hit regions over five generations, versus how it affected family lines that had lived in treated regions when the shock originally hit. If the families in the sample had not moved, there would be no difference between these two lines. We now study migration patterns based on the location of each family line in a given generation (for example, see the locations of the Ma clan in Figure 2). While some will outmigrate from historically destroyed regions, others will stay there, and a third group might move into historically destroyed regions. Figure 3 shows that the Treatment of People series lies above the Treatment of Regions series, implying that on net treated people who migrated out of historically destroyed regions became elite to a greater extent than control families who on net migrated into historically destroyed regions. The following examines this further. Figure 5 generalizes the earlier treatment of people specification of Table 4, column (4) by distinguishing two sets of treated family lines, those that currently live in historically treated regions and those that currently live in historically control regions.

In the first generation, all treated family lines reside in historically destroyed villages, as this

Figure 5: The Role of Outmigration



Notes: Figure shows effect on elite attainment for two sets of treated family lines, those who reside in a particular generation in a historically destroyed villages (circles), versus those who reside in a historically less destroyed villages (triangles). Estimation analogous to equation (1) by OLS. Also shown are 90 percent confidence intervals based on standard errors clustered on first-generation couple.

is what defines treatment at the level of people. In the second generation, though, some of the treated family lines (about 3%) reside in villages that were not treated by the shock–these family lines have outmigrated immediately after the fall of the Ming dynasty. While elite attainment of these outmigrants varies, they tend to be more successful in the *keju* than treated family lines that stay in historically destroyed villages (point estimates of 0.30 versus 0.05, respectively, see Figure 5). This is evidence that staying in a village that was destroyed in the recent past is detrimental to becoming elite.[19] At the same time, the advantage of movers over stayers shrinks in size in the third generation, before it disappears entirely in generations four and five. Thus, the advantage of residing in a historical control region is relatively short-lived–it does not exceed one generation. In the longer run, elite attainment is determined more by the experience of the family line during the fall of the Ming than by the historical level of destruction of the region in which the family line currently lives.[20] Evidence on factors that determine migration decisions comes from comparing treated family lines that outmigrated versus treated family lines that stayed in historically treated

[19]Similarly, control family lines that move to historically destroyed regions in the second generation tend to be less successful than control family lines that stay in historically less destroyed regions (not shown).

[20]By the fifth generation, about 7 percent of all treated family lines have outmigrated to historically less destroyed regions. Most treated family lines that move to historically less destroyed regions do so only once over these five generations, however, a few move several times back and forth.

villages. Focusing on the first and second generations, Table 5 shows the results.

Table 5: Correlates of Outmigration from Treated Regions

	Stayers	Movers	Difference	p-value
	N = 1,456	N = 46		
Second Generation				
Husband Birth Year	1651.2	1661.2	10.0	<.01
Wife Birth Year	1655.4	1663.2	7.9	<.01
First Generation				
Elite	0.21	0.37	0.16	<.01
Number of Females	1.30	2.15	0.85	<.01
Number of Sons	3.26	4.70	1.44	<.01
Husband Lifespan	59.16	62.07	2.91	0.18
Wife Lifespan	62.36	49.48	-12.89	<0.01

Notes: Table compares means for two sets of treated family lines, those who remain in a historically treated region in generation 2 and those who move to a historically not treated region in generation 2. Number of observations for Wife Lifespan is N = 1,443 Stayers, N = 46 Movers.

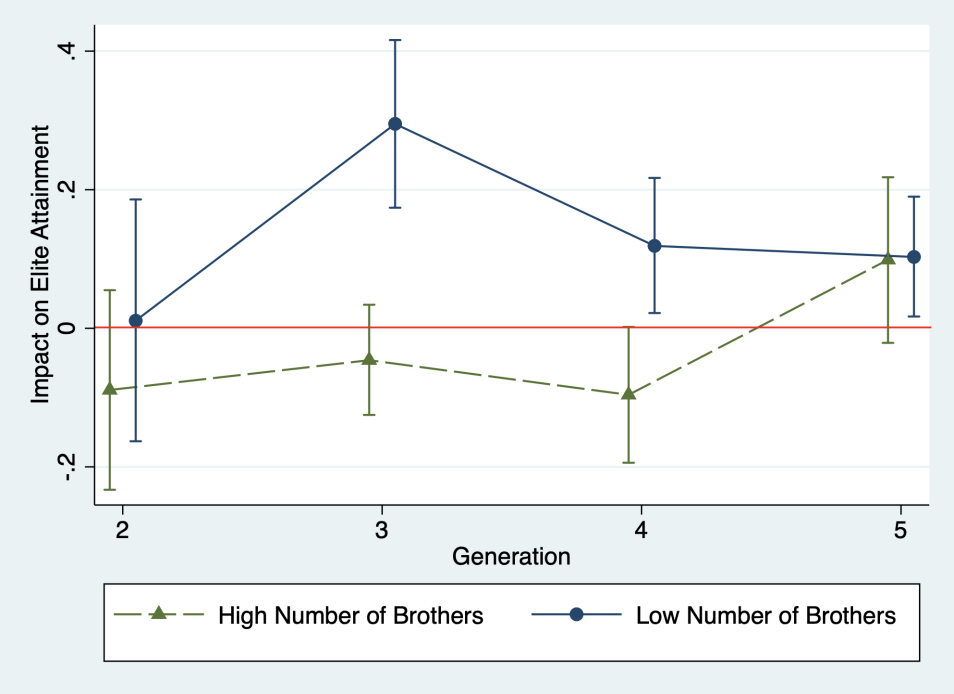
Table 5 indicates that families outmigrating from historically destroyed areas are younger compared to families that stay behind, as indicated by the relatively late birth year of both husband and wife. A plausible reason for this is is that migrants who are relatively young have a longer time horizon over which to recoup the costs of migration. Other results show that migrant families tend to be those who have the resources to cover the cost of migration. Specifically, families that move out of areas that were destroyed in the fall of the Ming are more likely to have been elite in the first generation. Thus, while treated first-generation men in general are less likely to be part of the elite due to the shock (see Table 4, Generation 1), those that decide to leave destroyed regions immediately after the shock are disproportionately people that attained elite status despite the negative shock. Other signs of affluence are positively correlated with a higher probability of moving away from the historically destroyed regions. For example, husbands from larger families–more sons–are more likely to outmigrate immediately after the shock (see "Number of Sons", Table 5), and their migration tends to facilitate becoming elite (Figure 5).[21] In contrast, the next section will show that in later generations high fertility is negatively correlated with elite attainment.

[21]One exception to this is that a relatively short lifespan of the mother in the first generation is positively correlated with outmigration. The reason for that might be that a relatively early death of the mother releases the younger generation from old-age caretaking duties, and thus it facilitates the young family to move away.

4.3.3 Fertility Control Strategies

In addition to migrating out of destroyed regions, couples employed fertility strategies to raise the likelihood that one of their own would become part of the local elite. While generally, richer couples tend to have more children in pre-industrial economies, under certain circumstances the family might have the incentive to limit fertility. The aftermath of the fall of the Ming may be one of these circumstances. We are estimating equation (1) for two subsamples, namely for family lines

Figure 6: Fertility and Elite Attainment



Notes: Figure shows effect on elite attainment for two subsamples, those family lines with more than the median number of brothers in that generation, versus the family lines that has less than or equal to the median number of brothers in that generation. Dependent variable is elite indicator. Estimation of equation (1) by OLS. Also shown are 90 percent confidence intervals based on standard errors clustered on first-generation couple.

that have more than the median number of sons in that generation, and for family lines that have less. These sons are brothers from the viewpoint of the next generation males. Figure 6 shows the impact of elite attainment for the subsample of high number of brothers as well as the impact for the subsample of low number of brothers, by generation.

Notice that the impact on elite attainment for the two subsamples is similar in generations 2 and 5, however, for generations 3 and 4, family lines with a low number of brothers are more successful that one of their males succeeds in the *keju* than family lines that have a higher number of brothers. The difference is particularly striking for generation 3, which is of central importance for the reversal in elite attainment, see Table 4. The results suggest that by engaging in fertility

control to limit the number of sons, families seek to raise the chance that one of their offspring becomes elite by concentrating parental investments on that son. The finding is consistent with evidence for fertility control in Ming-Qing China to take advantage of temporarily high returns to *keju* participation (Shiue 2017).[22]

5 Increased Emphasis on the *keju*

In this section we discuss a plausible explanation for the strategies that led to elite reversal. Consider the hypothesis that the shock generated trauma that tilted the focus of Tongcheng families more towards wealth derived from passing the *keju*, that is, becoming member of the scholar-official elite rather than landlordism or other careers.[23] First, there is evidence that the revolts and destruction of the late Ming made a strong impression on Tongcheng's leading families. In particular, it is noted that memory of the traumatic shock of the late uprisings chastened the mood of the local elites to avoid blatant exploitation of excessive privilege and to cooperate more in terms of tax collection. Second, the best way to achieve this was to focus on the socially most respected scholar-official careers. Learning took place until late into the night even for girls, surplus income from agriculture was used for paper and brushes for poor but ambitious scholars, and, overall, Tongcheng's leading families focused their competitive energies more exclusively than before on the *keju*. The main motivation behind this change in behavior was to avert further conflict with the general population, and adopting these new norms was in the leading families' own long-term interest.

The following presents micro evidence in support of this explanation. If the destruction during the fall of the Ming has led to a greater emphasis on a *keju* career among the descendants of treated couples, it would tend to lead to higher elite attainment relative to the control descendants, in line with the results in Table 4. Furthermore, to the extent that the intergenerational transmission of these changed norms is important, based on workhorse models of parental investments in children such as Becker and Tomes (1986) one expects a stronger intergenerational elite relationship. To assess this, we employ the well-known framework of intergenerational mobility that relates son characteristics to father characteristics using OLS:

$$e_{ic(p)g} = \alpha + \omega_1 e_{ic(p)g-1} + X\psi + \epsilon_{ic(p)g}. \tag{3}$$

Here, $e_{ic(p)g}$ is the elite indicator for son, $e_{ic(p)g-1}$ is the indicator for his father, and the vector

[22]These results are for the total number of brothers, that is, biological and half-brothers, though findings for the number of biological brothers are similar.

[23]The following paragraph is based on Beattie (1979a, b).

X includes generation and birth year fixed effects. The higher is ω_1, the more is the son's elite membership influenced by his father being elite. Higher values of ω_1 mean more elite persistence (or, lower mobility). We present results for equation (3) separately for the sample of descendants of first generation treated couples and for the sample of descendants of first generation control couples. In addition, a pooled version of equation (3) allows the intergenerational parameter to vary for treated and control descendants:

$$e_{ic(p)g} = \alpha + \omega_1 e_{ic(p)g-1} + \omega_2 \left\{ [I[t=g] \times d_p] \times e_{ic(p)g-1} \right\} + \omega_3 [I[t=g] \times d_p] + X\psi + \epsilon_{ic(p)g}. \quad (4)$$

In equation (4), parameter ω_2 is a measure of the difference in the intergenerational elite parameter between treatment and control observations. To ensure that the results are not directly influenced by the fall of Ming shock, only the post-shock observations of generations 3, 4, and 5 are employed.[24] Results are shown in Table 6. The pooled specification, equation (4), yields a point estimate for descendants of control couples of 0.091. This contrasts with a point estimate for the treated descendants that is more than three times as large ($0.334 = 0.091 + 0.243$; column (1)). Allowing for different birth year and generation fixed effects by estimating the by-sample specification (equation (3)) yields a somewhat higher point estimate for control descendants, however, the point estimate for treated descendants is still more than twice as high (columns (3) and (2), respectively). Furthermore, a similarly large elite mobility coefficient difference between treatment and control samples does not exist before the fall of Ming shock.[25] The relatively high post-shock elite persistence for treated descendants supports the hypothesis that the norms shifted towards the *keju* for these men, but not for the control group.

[24] Fathers of generation-2 males would be directly affected so the first included generation here is generation 3.

[25] Using the sample of Table 3 with the first and second pre-shock generations, there is no significant difference in elite mobility between treatment and control samples.

Table 6: Intergenerational Transmission of Elite Status: Treated vs. Control Descendants

	(1) Pooled	(2) Treated	(3) Control
Father Elite	0.091	0.329**	0.152+
	(0.086)	(0.033)	(0.087)
Father Elite x Treated	0.243**		
	(0.091)		
Treated	0.011		
	(0.017)		
N	4,755	4,284	436

Notes: Dependent variable is son elite status indicator. Estimation of equation (4) in column (1) and equation (3) in columns (2) and (3). Also included are generation as well as birth year fixed effects. Robust standard errors clustered at the level of the treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

Further evidence comes from considering factors that would facilitate or complicate the intergenerational transmission of norms within the family. Not only fathers but also mothers as well as uncles and aunts might play a role. In the process of imparting knowledge to a son of how to pass the *keju*, face time may be a key ingredient, because knowledge is often not fully codified–written down–but rather tacit, and face-to-face interaction helps to transmit tacit knowledge (Polanyi 1966). To examine this, we ask whether the degree of elite persistence among treated descendants depends on the extent to which the lifetimes of son and parents overlap. This is captured by variable $Z_{ic(p)g}$ in the following equation:

$$e_{ic(p)g} = \alpha + \omega_1 e_{ic(p)g-1} + \omega_2 \left[Z_{ic(p)g} \times e_{ic(p)g-1} \right] + \omega_3 Z_{ic(p)g} + X\psi + \epsilon_{ic(p)g}. \quad (5)$$

We employ three different definitions for the variable $Z_{ic(p)g}$, computed using birth and death dates: (1) an indicator that is equal to one if the overlap in lifetimes of father and son exceeds 15 years; (2) an indicator that is equal to one if the overlap of lifetimes of mother and son exceeds 15 years; and (3) if the overlap of lifetimes of father and mother *on average* with the son's is at least 15 years.[26] Mothers may have been important for the preparation of their sons for the *keju* in this setting. Conversely, one can think of factors that would be a barrier to intergenerational knowledge transmission. An important one is physical separation, because it makes face-to-face

[26]The 15 year age constraint captures the idea that the relatively high-level skills to pass the *keju* may not be transmissable before the son reaches the age of 15.

interactions harder. We thus consider an alternative variable $Z_{ic(p)g}$ which is equal to one if the son generation of the family line resides in another village than the parent generation, and zero otherwise. Results are shown in Table 7.

Table 7: Determinants of Intergenerational Transmission

	(1)	(2)	(3)	(4)
	Lifetime Overlap			
	Parent = Father	Parent = Mother	Parent = Father and Mother	Changing Location
Father Elite	0.146*	0.198*	0.077	0.313**
	(0.072)	(0.008)	(0.078)	(0.042)
Father Elite x High Overlap	0.139+	0.088	0.203*	
	(0.088)	(0.077)	(0.089)	
Father Elite x Changing Loc.				−0.230**
				(0.084)
High Overlap	0.022	−0.035	0.018	
	(0.019)	(0.029)	(0.019)	
Changing Location				0.086*
				(0.041)
N	4,211	4,211	4,211	4,211

Notes: Dependent variable is son elite status indicator. Sample is all treated descendants of generations 3, 4, and 5. High Overlap is 15 or more years of overlap in lifetime between parent and son. Changing Location is younger generation living in different village or town than parent generation. Also included are male father's status in generation 1 as well as generation and birth year fixed effects. Robust standard errors clustered at the level of the treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

A positive value of ω_2 is estimated for the case of high lifetime overlap of father and son (column (1), Table 7). This is consistent with more opportunities for face-to-face interactions between father and son fostering elite persistence. In terms of magnitudes, the intergenerational coefficient for father-son pairs with limited opportunities for face-to-face interaction is about half the size of that for father-son pairs with high lifespan overlap (= 0.146, compared to 0.285 = 0.146 + 0.139). The analogous specification for overlap of lifetimes between mother and son does not yield a similarly large coefficient, see column (2). At the same time, as long as the average lifetime overlap of the

Table 8: Absolute Mobility of Elites: Treatment versus Control Descendants

Panel A: Control Descendants

		Father: Not Elite	Father: Elite
Son	Not Elite	378 (97.9%)	60 (83.3%)
	Elite	8 (2.1%)	12 (16.7%)
		386 (100.0%)	72 (100.0%)

Panel B: Treated Descendants

		Father: Not Elite	Father: Elite
Son	Not Elite	3,309 (94.2%)	409 (58.1%)
	Elite	204 (5.8%)	295 (41.9%)
		3,513 (100.0%)	704 (100.0%)

Notes: Table shows transition matrix for intergenerational mobility in being elite. Results for post-shock period using generations 3, 4, and 5. Columns sum to 100 percent.

son with father and mother is at least 15 years, or, there are at least 30 years of overlap between the mother and father combined, the intergenerational elite parameter is increased, and the point estimate of 0.203 is larger than for either father or mother alone (column (3) compared to columns (1) and (2), respectively). This suggests that father and mother face time with the son substitute for each other in the intergenerational transmission of norms. Turning to the role of changes in the family's residence for the transmission of norms, we see that moving is associated with a lower intergenerational coefficient, consistent with the hypothesis of less knowledge transfer in families where younger and older generations are physically separated (column (4)). Note that this result does not contradict our earlier finding that outmigration from historically destroyed locations in the second generation benefits elite attainment (Figure 5), because here we make a comparison between two groups of treated family lines for generations 3 to 5.[27]

Differences between treated and control descendants in terms of elite persistence so far do not speak to absolute mobility differences, to which we turn now with an analysis of transition matrices (Table 8). Panel A shows that 83.3% of sons of elite fathers do not become elites themselves among the control descendants. In contrast, the same is true for only 58.1% of the descendants in treated family lines (Panel B), or, downward mobility in elite status is more than 30% lower among sons of treated family lines. Turning to upward mobility, 2.1% of all non-elite fathers have an elite son among family lines in the control sample, in contrast to 5.8% of the sons that move upward among sons of treated family lines. Thus, upward mobility in treated family lines is almost three times the rate of upward mobility in control family lines. Overall, these absolute mobility results strengthen the evidence that a higher level of trauma among treated family lines that is intergenerationally

[27]In addition, Changing Location in Table 7 is the move between any two villages, not between the set of historically treated and control villages.

transmitted may have played an important role in the elite attainment reversal documented above.

6 Conclusions

This paper has used family data from Central China to study the multigenerational responses of families to a major shock. Results indicate that a big shock may have consequences over at least five generations, and the long-run impact looks qualitatively different from the short-run impact. Key to this appears to be that families adapted to changed circumstances.

We also find a long-run impact of the shock on people that is substantially less negative than the shock's long-run impact on regions. This is important because economic policies are often formulated in terms of regions (so-called place-based policies). Our analysis provides new evidence that it may be valuable to distinguish regions from the people who live in them in other contexts. For example, we could ask what drives the resilience of regions, in addition to the resilience of people who live there. Data that accounts for the behavior of migrants will make a big difference, especially if shocks have long-run consequences. Family data, as employed here, may be a useful complement.

One issue that this paper has not fully addressed is the role of groups to influence and control social behavior. While in our analysis treatment assignment varies at the individual level, clans clearly play a role for the change in the norms in Tongcheng during the sample period. Family data on Chinese clans might be a good setting to examine long-run implications of group effects, and contrast them with geographic neighborhood effects.

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A Data

A.1 Sources and Data Characteristics

The present research is based on data whose collection was begun by Ted Telford, a sociologist at the University of Utah, see Telford (1986a). It was extended and further developed by Telford and by the present authors. The dataset underlying this research is drawn from information on more than 11,000 couples that were the members of seven Tongcheng clans. Up to 20 generations are recorded in this data, with 1298 as the earliest birth year and 1929 as the latest year of death; this is not untypical for Chinese family genealogies, see the survey by Liu (1978). Most observations are for the Qing period (1644-1911).

A.1.1 Elite Membership and Social Status

Being part of the elite in this study is measured by an indicator variable equal to one if a man was studying for or had successfully passed the civil service examination. The coding is given in the text in Table 1, and it is also shown in Table A.1 below (column (3)). This elite indicator is related to a broader set of descriptors which classify a man's social status into 23 ranked categories of highest lifetime achievement. The 23 categories are shown in Table A.1, column (1), while the descriptors are in column (2) of Table A.1.

Table A.1: Elite Status and Genealogy Descriptors

(1) Social Status	(2) Description	(3) Elite
0	No title, degree, and evidence of wealth	0
1	Honorary or posthumous title; village head; other honors	0
2	Multiple wives in consecutive marriage (two or more not living at the same time)	0
3	Evidence of moderate wealth of 1st degree family, incl. minor and expectant official, lower level degree (*shengyuan*, *jiansheng*), and official student	0
4	Wealthy family member 2nd degree, incl. official, *juren*, *gongsheng*, and *jinshi*	0
5	Wealthy family member 1st degree, incl. official, *juren*, *gongsheng*, and *jinshi*	0
6	Educated, scholar, no degrees or office; editor of genealogy; refused office, or prepared but did not pass exam	0
7	Two or more wives or concubines at the same time	0
8	Substantial evidence of wealth and property; set up lineage estates, large donations, philantrophy; wealthy farmer, landowner, or merchant	0
9	Official Student	1
10	Military *shengyuan*, minor military office	0
11	Purchased *jiansheng* and/or purchased office	0
12	Student of the Imperial Academy	1
13	Civil *shengyuan*; minor civil office	1
14	Expectant official; no degrees	0
15	Expectant official one of the lower degrees	1
16	Military *juren*, *jinshi*; major military office	1
17	Civil official with no degree, minor degree, or purchased degree	0
18	*juren*, *gongsheng*, with no office	1
19	*juren*, *gongsheng*; with expectant office	1
20	*jinshi*, no office	1
21	*jinshi* with official provincial post or expectant official	1
22	*jinshi* with top-level position in Imperial bureaucracy (Hanlin Academy, Grand Secretariat, Five Boards, Prime Minister)	1

Notes: Table gives information on a man's social status (column 1) based on standardized descriptors in the genealogies (column 2); the elite indicator of Table 1 is given in column (3). Classification based on Telford (1986a, 1992), Chang (1955, 1962), Ho (1962), and Eberhard (1962).

In a representative sample of Chine during this period, group 0 (lowest social status) would be the majority, and that is the case with the seven Tongcheng genealogies chosen here (lowest status group accounts for about 70 percent of the sample). There were several ways to achieve high social status, and monetary wealth is only one of them. In fact, wealthy farmers, landowners, or merchants did not have the highest status–they were in group 8, see Table A.1–unless they were also participants in the *keju*, in which case the latter would take precedence as the highest lifetime status. There is broad consensus that passing the *keju* meant the highest social status in imperial China (Ho 1962, Chen, Kung, and Ma 2020), and it is confirmed by historical accounts

of Tongcheng. The genealogy of the Yao clan, for example, stipulated that [succeeding in the] *keju* was to only way for the lineage to become great, while the genealogy of the P'an stated that a constant scholarly tradition would ensure that descendants of the lineage would never in a thousand years be reduced to commoners (Beattie 1979b).

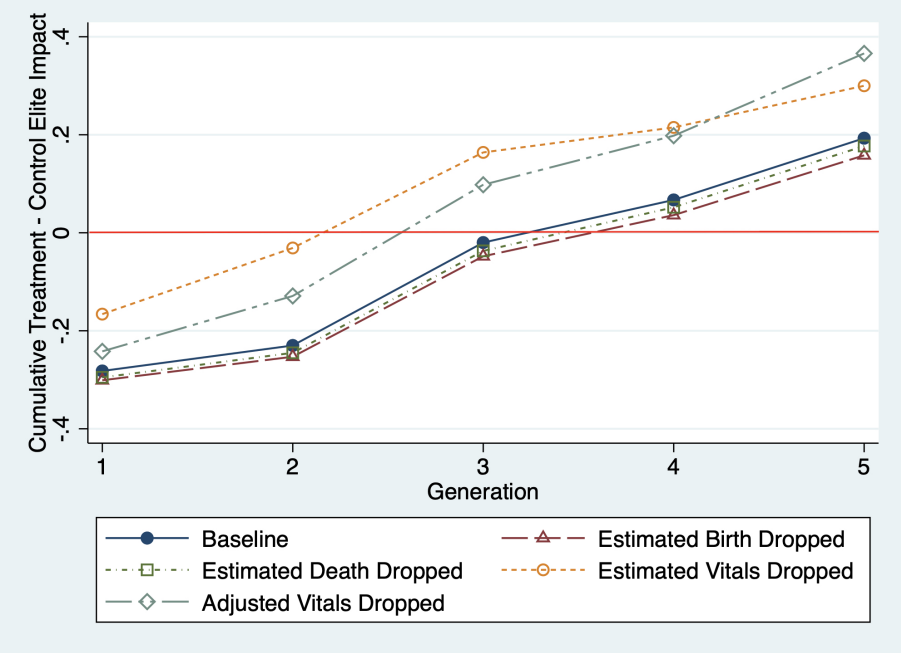
Monetary rewards played a role for the *keju* as well, however, because passing the *keju* at a higher level–e.g. *jinshi* (national) versus *shengyuan* (local)–stochastically translated into positions that were not only more important but also more lucrative (see section F for additional information). In order to account for such differences between different elite levels, we have experimented with non-binary definitions of elite; these specifications lead to broadly similar results as our baseline indicator definition of elite, see Table A.8.

A.1.2 Vital Statistics and Lifespan

Information on vital statistics in the dataset is relatively complete compared to other Chinese family genealogies.[28] Specifically, of the N = 490 men potentially treated by the fall of the Ming (born 1590 to 1644) we know their year of death in 485 of the cases (99%). Vital statistics are important for verifying the intergenerational links in the data, and we drop all family lines that cannot be hard-matched on vitals (both year and month of birth as well as death). Birth and death dates are to some extent estimated based on other information in the genealogies. For example, a genealogy may state that a particular person "died in the year the Taipings entered Tongcheng". This determines the year of death up to two years in the 1850s, but it is also clear that some measurement error in vital statistics remains present. Other vitals are estimated using model life tables, a well-established tool in demography, using methods described in Telford (1990). Vital statistics are also at times adjusted in the process of cleaning the data (orthographic errors, etc.). If information is estimated or adjusted, this is noted in the dataset, and Figure A.1 compares results under different approaches for such data.

[28] See, for example, the survey of close to 1,000 genealogies from all over China by Telford (1986a).

Figure A.1: Incomplete Vital Data



Notes: Cumulative estimates based on equation (1) shown for five different samples.

Figure A.1 indicates that a pattern of elite reversal is obtained also when relying solely on recorded data. A disadvantage of limiting the analysis to recorded data is that it is representative mostly for higher-status individuals (Telford 1990), which is why this study prefers the augmented vital statistics data as the baseline.

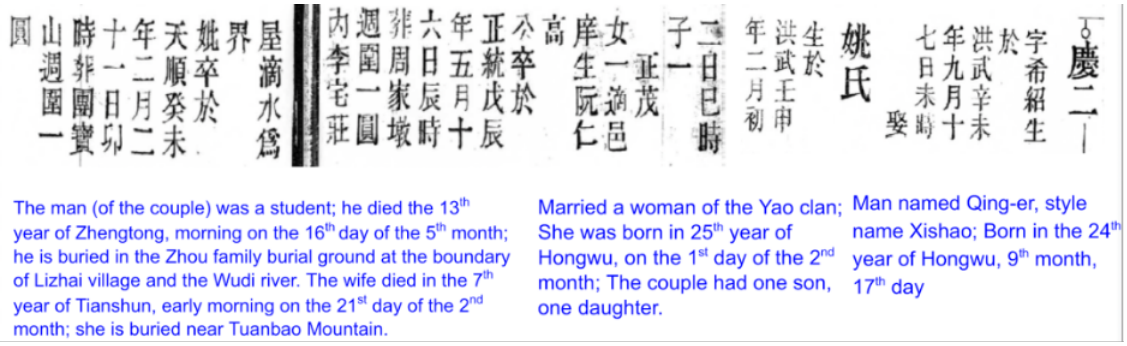
A.1.3 Residence Information

Information on where a family line lives in a particular generation is based on every piece of information explicitly indicated, either in the body of the genealogy or in its prefaces. The location of residence is confirmed by information on a person's burial site location. Assuming that it is most preferred to be buried close to home, a shift in the family's burial grounds indicates that the family line changed its residence. Figure A.2 gives an example of how genealogies report burial location, in this case from the Zhou clan of Tongcheng.[29]

While there is no direct measure of the estimation of residence location in the data, it is plausible that estimation of residence location is more common for families whose burial location is unknown. We thus contrast the baseline results with results for the subsample for which there is information on burial location of the husband. Results are shown in Figure A.3.

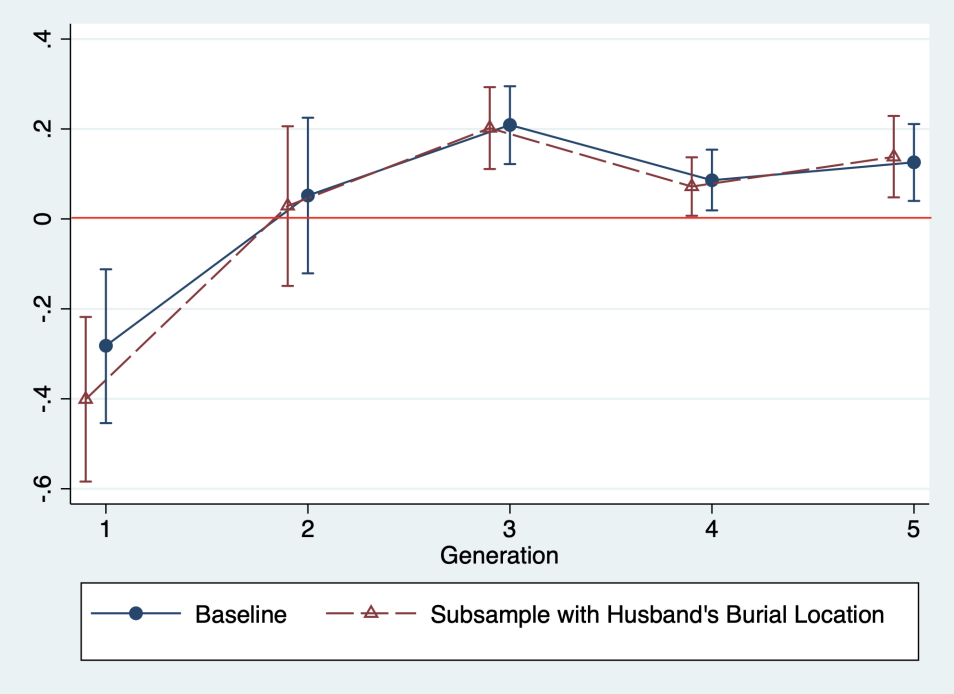
[29]Figure A.2 is a case in which genealogical information is organized in a horizontal layout. Other standard layouts are vertical. Tabular information in a book is more practical than the drawing of a family tree when the clan is relatively large and there are many generations. Shiue (2024b) discusses current methods in OCR and data extraction in the context of Chinese family genealogies.

Figure A.2: Genealogy Example: The Zhou Clan of Tongcheng, Anhui



Notes: Authors' translation.

Figure A.3: The Role of Estimated Residence Data



Notes: Estimates of equation (1) for two different samples, the baseline as in Table 4, column (4), and the subsample in which husband's burial location information is present (N = 7,430).

While the point estimate of the first-generation loss in elite attainment is somewhat different, overall Figure A.3 shows the pattern of estimates for observations with burial information is similar to the pattern of the baseline. Based on this it is unlikely that the estimation of residence location affects the results in a major way. Note that this information on the family line's movements from one generation to the next concerns permanent, not temporary migration. High-level officials, in particular, would typically spend their working-age years away from their home regions, either in

another province or in the capital, Peking, and they would return to their home for retirement (Beattie 1979b).

A.1.4 Male and Female Clans, Number of Female Partners, and Fertility

While the dataset includes the men of seven clans, on the female side the wives come from 130 different birth clans. Clans matter for social mobility because they share to some extent property among all of their members. Common clan resources in Tongcheng were used for social policies such as poverty reduction, and some clans socialized tax liabilities of the members of their group (Beattie 1979b). Furthermore, marriage decisions during this sample period were often made to rise in terms of status, and the clan would spend significant amounts of resources to find a marriage partner for their child from a highly regarded clan (Beattie1979b). The inclusion of male and female clan fixed effects means that our estimates are "within clan", that is, they abstract from differences in resources across clans.

Information in our data is arranged by couple, and in the five generation sample, 81% of all couples are unions in which a given man has exactly one lifetime married wife. In the remainder a given man is part of several couples. The leading reason for that is that the man's first wife dies relatively early and he has the resources to marry another wife (poor men typically cannot afford marriage expenses more than once in their lives). Men also have unmarried female partners (concubines) or multiple married wives (2.0% and 0.5% of all couples, respectively). Richer, higher-status men tend to have more female partners. In the five generation sample the elite indicator is positively correlated with the number of female partners (0.26).

Fertility in the analysis is measured as the total number of sons a man has (from all female partners). From the viewpoint of the younger generation, these men are biological brothers or half-brothers. A focus on biological brothers instead, however, leads to similar results as those shown in Figure 6.

B Genealogical Data and Sample Composition

A key reason why this study employs data from family genealogies is that for the sample period there are not alternative sources–specifically, official or other high-quality, broadly representative data does not exist.[30] And yet, it is important to understand the nature of the present sample, and the extent to which it may be representative for the country, region, and time under study. The following begins with biases that are inherent to using genealogies, followed by a discussion

[30]For a comparison of population dynamics for Tongcheng county based on official tax records versus clan records, see Shiue (2024a). Figures based on clan records appear to be considerably more reliable.

of the region in China where our sources come from (Tongcheng county in Anhui province), before turning to the specific clans of Tongcheng versus other populations in the county. Next we discuss the role of focusing on long family lines for the composition of the sample. We conclude with an analysis of the representation of different clans over time.

B.1 Genealogies as Data Source

Selection on Wealth Maintaining a family history is costly and requires a certain level of literacy. These resources exist only in a subset of families, and positive selection is a key concern of employing genealogies. This is well-recognized in the literature, and it affects both genealogies that were compiled in the past (such as ours) and records provided today through crowd-sourcing (e.g., ancestry.com), because families that today have records of their ancestors as well as the resources to enter the information on crowd-sourcing websites are likely richer than the typical family. Researchers have started to estimate the size of this wealth bias for a period when census-like administrative data has become available. For example, Stelter and Alburnoz (2022) find that life expectancy at age thirty in the late 19th century German Empire based on the large genealogical database Famlinx is about five years longer than according to national life tables. For Tongcheng during the sample period, the absence of broadly representative data means such comparisons cannot be made. However, starting for the early 20th century comparisons between information from Chinese family genealogies and broadly representative data have been made, and the implications for the usefulness of Chinese genealogies, both in terms of accuracy and in terms of completeness, for the present research are favorable (Harrell 1987).

Important Forebears Another concern is that, especially as a privately held and self-reported document, genealogies might misrepresent the origin of the family to be related to some important forebear, or, more generally, overstate the achievements of the lineage. In the case of the Tongcheng genealogies of Tongcheng there is never any sign that records have been tampered with in order to attach a group to some other lineage of greater distinction. Historians believe that this was because interest in genealogical matters and competition for social prestige was so strong that deliberate attempts to enhance a lineage's prestige in this way would almost surely, if discovered, have backfired and lowered the lineage's reputation (Beattie 1979b).

Misrepresentation and Economic Functions of the Genealogy Misrepresentation or lack of accuracy would also have reduced the value of genealogies in economic terms. Economic functions provided by Chinese family genealogies include the following. First, the genealogy defines who is a member of the lineage, and who is not. As such the genealogy determines rights and responsibilities for each individual belonging to the group, as well as allegiances in case of conflict, both with other

lineages as well as with the government. Second, the genealogy gives important property rights to its members, in particular settlement rights in a certain area as well as access to common clan resources (e.g., common land, ancestral halls).

Third, the genealogy defines individual rights and resposibilities in the area of taxation and public good provision, given that the central government's presence at the local level was limited during the sample period. In particular, so-called clan assessments, essentially taxes that the clan imposed on its members, varied by the status and position of each clan member; they are among the best information on incomes for this period (see Chang 1955, 1962). To prevent hardship, the genealogy also laid out the safety net provided by the clan, and it also at times socialized tax liabilities across the members of the clan (Beattie 1979b). Genealogies also contain the rules of the clan, a significant instrument of social control, and these clan rules fulfilled quasi-governmental functions in the area of jurisdiction by taking action against their own clan members who broke clan rules (Spence and Wills 1979). Misrepresentation in the genealogy would thus compromise a range of important economic functions of the genealogy, which would not be in the clan's self-interest.

B.2 Sample Representativeness

The genealogies in this study are selected with the goal to have a sample that might be broadly representative of China's population while at the same time include some top-level scholar-officials so that a study of elite mobility versus persistence becomes feasible. The sample is broadly representative in terms of the composition of low- versus high-status holders to what we know for China as a whole. In particular, Chang (1955) takes the view that *shengyuan* holders and above were in the upper class, and estimates that they were in the top 2% of the total population in the later half of the Qing period. In the present analysis, the part of the population corresponding to Chang's (1955) definition accounts for just over 3% of the sample. Also, Fei (1946) proposes a wider estimate of the upper income groups, at 20%, and in our sample the share of these groups is just above 20%.

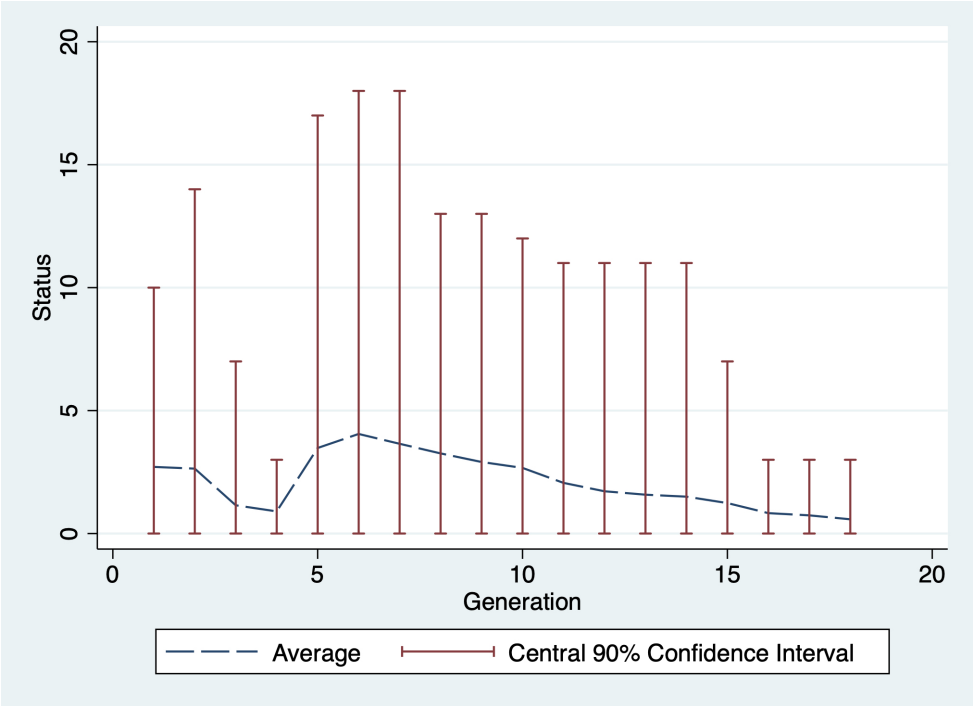
How about representativeness at a regional level? Tongcheng is a county of Anhui province. This province is close to the median in terms of top-level *keju* graduates per population across all 18 core provinces of China (Ho 1962). Within Anhui province, Tongcheng county accounts for a disproportionate share of *jinshi* during the Ming dynasty, at about five times the rate of the typical Anhui county. However, with only about 51,000 degrees awarded in all of China over more than 600 years of the Yuan, Ming, and Qing dynasties, *jinshi* were rare, and many parts of Anhui did not produce a single *jinshi* over centuries. Furthermore, compared to top counties of neighboring Jiangsu province, Tongcheng's share of *jinshi* was rather low, and consistent with that, among all counties in Anhui and Jiangsu, Tongcheng ranked fifteenth (Beattie 1979b). While

during the late Ming Tongcheng became noteworthy in terms of *keju* achievements relative to the locally surrounding areas, it never played an exceptional role at the national level.

In the late 18th century, estimates put the size of the seven clans in this study at about 1.5% of Tongcheng's total population (Shiue 2024a). The seven clans are not exclusively drawn from the most important families of the area. In particular, based on elite representation during the late Ming, our seven include none of the top-four ranked clans of Tongcheng (the Fang, the Yao, the Chang, and the Tso; Beattie 1979b). This is in part because genealogies of some of the most important clans are not available (Beattie 1979b). Of the seven clans in the present analysis, historical analysis recognizes only the Ma clan for its achievements (Beattie 1979b). Therefore, close to 90% of the observations in our five generation sample comes from clans that are not exceptional in this sense (see Table 2, Part B).

Another aspect of sample selection concerns the timing of when a clan's genealogy is first compiled. In particular, progenitor bias is the hypothesis that a particularly successful man is the reason why a particular clan has the resources and decides to have a genealogy. The earliest birth in our data is recorded for the year 1298, a member of the Chen clan. Given that by construction, the first generation in our analysis is born between 1590 and 1644, the five generation sample does not include a progenitor.

Figure A.4: Average Clan Status by Generation



Notes: Shown are average and 90% confidence interval of a clan's average social status for the first to the eighteenth generation. Status varies from 0 to 22 (Table A.1).

Figure A.4 shows the average social status by generation across clans. Note that clan status is not typically highest in the first generation, the progenitor, but rather it is highest several generations later. That it does not always take a *jinshi* for a clan to have a genealogy is true also in Tongcheng, where the compilation of family records of P'an clan started with a man who was a disppointed examinee who spent much of his life teaching (Beattie 1979b). The decline in average social status from the 6th generation on, also evident in Table 2, is due to China's limited economic development during the Qing combined with a lower chance to succeed in the *keju* due to a roughly constant number of official positions despite rapid population growth (Shiue 2017, 2024a).

One may also ask whether a lineage will dissolve itself and cease to produce family records as soon as there are no (more) successful *keju* graduates from the lineage. For Tongcheng county, the answer to this is no, as there were several large and well-organized lineages, such as the T'ang, Kuei, and the Tung, whose members never achieved keju degrees (Beattie 1979b). Furthermore, recall bias–that infrequent ex-post recording might lead to overstated achievements–is unlikely in the present case because Tongcheng lineages updated their genealogies frequently (Beattie 1979b).

C Long Family Lines: The Five Generations Sample

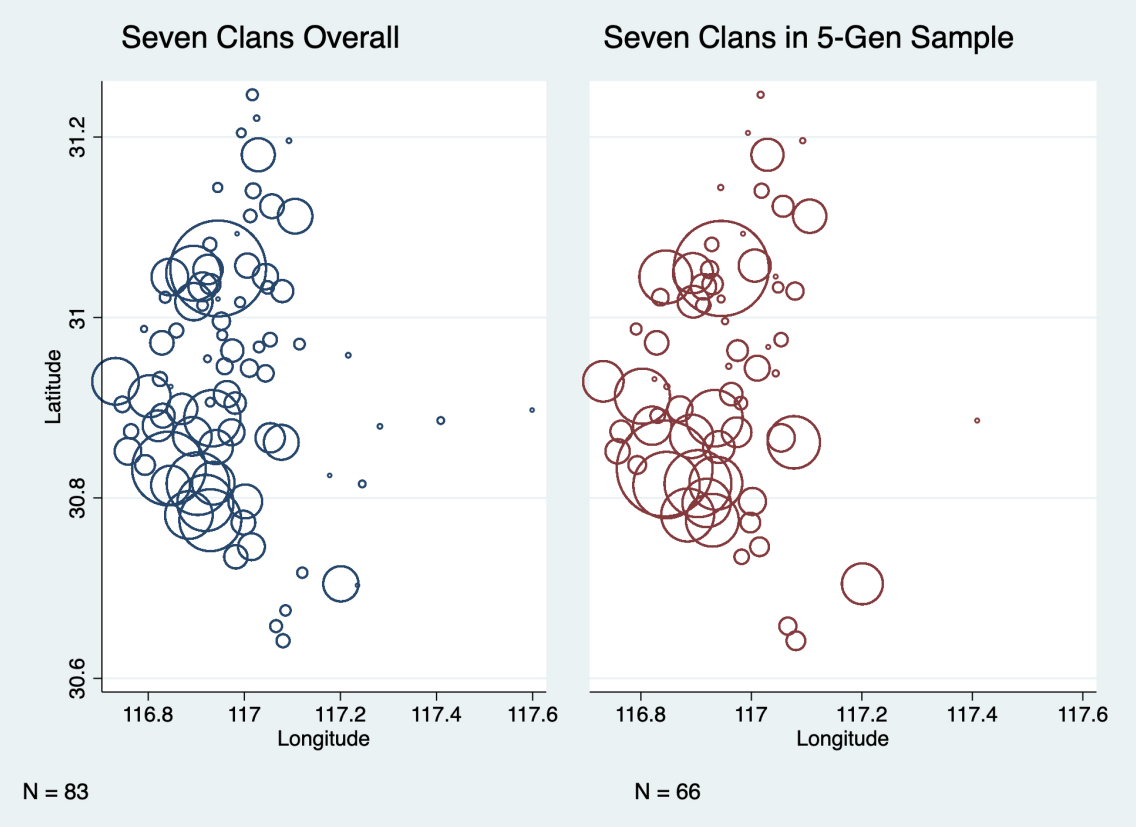
This section discusses changes in the sample that result from employing family lines with at least five generations. Figure A.8 illustrates that requiring at least five generations may affect the size and the composition of the sample by showing a control male in the second generation who does not have a wife. As a consequence, this family line will not be part of the five generation sample.

Genealogies place more emphasis on the continuation as opposed to the interruption of family lines, and as a consequence, the focus is on married husbands rather than single men that do not have children. During the sample period in China, often between 10 and 20% of males did not marry (in contrast, marriage was virtually certain for women). The two main reasons for non-marriage in Ming-Qing Tongcheng were death as a child due to illness and lack of resources to start a new household (see Telford 1986a).[31] Because the fall of Ming might raise child mortality or reduce a family's resources, this might affect the length of family lines and therefore the composition of the estimation sample. The following analyzes this first in geographic terms by comparing the set of villages that are present in the five generation sample and the set of villages in the sample of all first generation couples. We then proceed to estimating the impact of the shock on the probability of a male to marry. Finally, we compare the first pre-shock generation in the sample overall with the first pre-shock generation in the five generation sample.

[31] Migration outside of the county was another reason because it could prevent the family in Tongcheng to update the genealogy with that man's information; however, outmigration over longer distances was rare.

Figure A.5 shows the extent to which the five-generationally linked sample is a subset of the clan records overall in terms of villages that are included. Specifically, there are N = 83 locations in the sample overall, which shrinks to N = 66 in the sample that requires at least five consecutive generations (son to great-great grandfather).

Figure A.5: Length of Family Lines and Selection in Terms of Geography



Notes: Shown are residence locations of members of the seven male clans (1) overall on the left, and for (2) couples in the five generation sample on the right. Size of circle is proportional to number of heads of household.

Furthermore, it is primarily locations with relatively few households that disappear through the focus on longer family lines.

Next, we turn to the impact of the shock on the probability to marry, because only men that marry can have children that would be recorded in the genealogy. There are a total of N = 806 male children of first generation couples. If a male's parents resided in an area of high mortality ('treated') of Tongcheng, the male had a 71.3% chance of getting married himself, while if a male's

parents were part of the control observations, his chance of marriage was 78.6% (N = 708 and N = 98, respectively). Thus, sons of control couples had a roughly five percentage point higher chance of marriage (p-value of difference in means test is 13.4%). The following expands on this by including additional control variables. We estimate the following equation using OLS:

$$married_{ip} = \alpha + \beta_1 d_p + \beta_f hfstat_{c0} + X'\gamma + u_{ip}, \tag{6}$$

where $married_{ic(p)}$ is an indicator whether son i of first-generation couple p married later in his lifetime, or not. The variable d_p is equal to one if his parents were treated in the fall of the Ming dynasty, zero otherwise, and $hfstat_{c0}$ is the social status of the son's grandfather. The vector includes birth year as well as male and female clan fixed effects. Table A.2 shows the results.

Table A.2: The Probability of Continuing the Family Line

	(1)	(2)	(3)	(4)
Variable Z =			Elite	Social Status
Treatment	-0.105^{+}	-0.018	-0.056	-0.033
	(0.059)	(0.072)	(0.095)	(0.099)
Treatment x Z			0.202	0.006
			(0.135)	(0.011)
Z			0.054	0.017
			(0.135)	(0.011)
Fixed Effects				
Birth Year	Y	Y	Y	Y
Male Clan	N	Y	Y	Y
Female Clan	N	Y	Y	Y
N	801	788	788	788

Notes: Dependent variable is marriage indicator, measured by whether a son is listed as an adult husband in the genealogy or not. Sample is all male children of first-generation couples. Estimation by OLS. Measure of Z is for first generation. Social status of the son's grandfather included in all specifications. Robust standard errors clustered at the level of treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

There is some evidence that sons of treated couples have a lower chance to marry (Table A.2, column (1)). However, once differences across clans are controlled for by including clan fixed effects, the point estimate of treatment on son probability to marry is close to zero, see column (2).

Next, we augment equation (6) with interactions that capture non-linear marriage effects, if

Table A.3: The Length of Family Lines and Sample Composition

	(1)	(2)	(3)	(4)	(5)	(6)
	All			Five Generations		
	Control	Treatment	p-value of diff	Control	Treatment	p-value of diff
	N = 54	N = 436		N = 21	N = 142	
A. Test of Equality of Means						
Elite	0.24	0.30	0.35	0.33	0.27	0.58
Social Status	6.00	5.18	0.37	6.86	4.50	0.09
B. Tests of Equality of Distribution						
Social Status			0.31			0.29

Notes: Statistics for first-generation males in two samples; in columns (1) to (3) on the left are all first-generation males–birth year between 1590 and 1644– in the seven clans, while on the right in columns (4) to (6) statistics are reported for the subset of them that can be linked at least over five generations. Test for equality of distribution is Kolmogorov-Smirnov.

present. Table A.2 shows results for heterogeneity in terms of the father being elite and in terms of the social standing of the father (columns (3) and column (4), respectively). The interaction term in column (3) enters with a positive point estimate, indicating that sons of treated fathers tend to have higher chance to marry if their father is elite; however, the coefficient is imprecisely estimated, and also the linear treatment coefficient is not precisely estimated. Similar results are obtained for social status, see column (4). Overall, we do not estimate a strong impact of the fall of the Ming on the probability to marry. To the extent that this result from second-generation sons extends to later generations, one does not expect that sample composition and characteristics of the five generation sample is very different from the sample of all first generation couples. We turn to comparing these samples now.

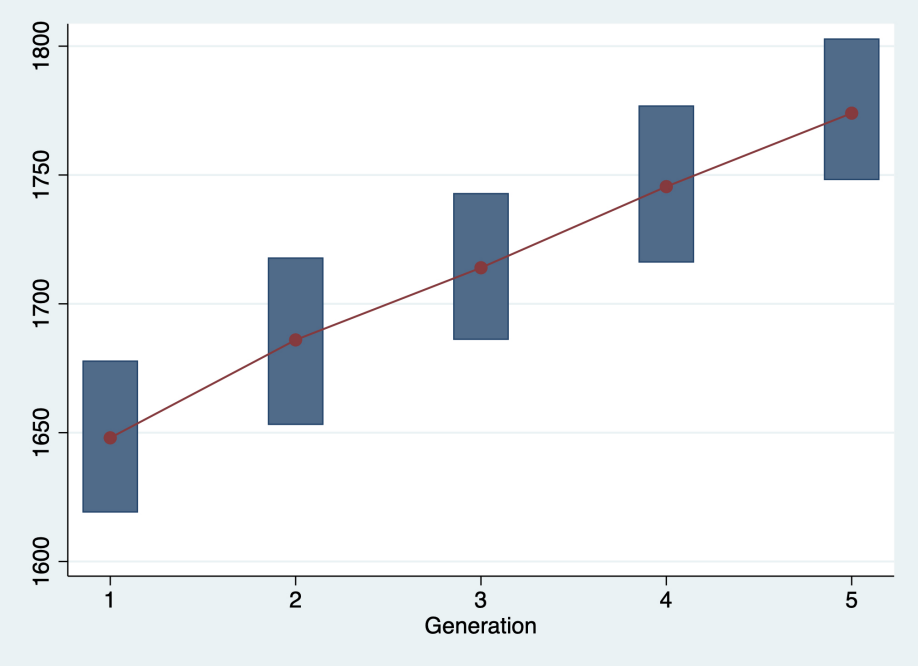
Table A.3 shows in columns (1) to (3) statistics for the sample of all males that were born between 1590 and 1644 (or, first generation males). On the right side, the same statistics are reported for the subset of first generation couples of family lines that go on for at least four more generations (columns (4), (5), and (6)).

Overall, one third of all couples in these clans have at least one great-great-grandson in the fifth generation. The sum of all clan couples living at the time of the fall of the Ming is N = 490 (= 54 + 436), while the sum of unique first-generation couples in the five generation sample is N = 163 (= 21 + 142). In principle, this sample attrition is consistent with considerable changes in the composition of the sample. However, actual changes in the sample are limited. First, the share of control observations increases through imposing five linked generations from 11.0% to

12.8% (= 54/490 and 21/163, respectively; Table A.3), and also the means for elite attainment and social status change in favor of the set of control observations. However, these changes are moderate in size, and statistical tests do not indicate that the difference between treatment and control samples has strongly increased by requiring five generations long family lines.[32] Overall, the evidence provided in Tables A.2 and A.3 suggests that the focus on long family lines by itself is unlikely the main driver behind the elite reversal documented in the text.

Sample Representation over Time and Across Clans Figure A.6 provides information on the lifetimes of men across generations. The typical lifetime of fifth-generation men ends in the early 19th century.

Figure A.6: Typical Lifetimes by Generation

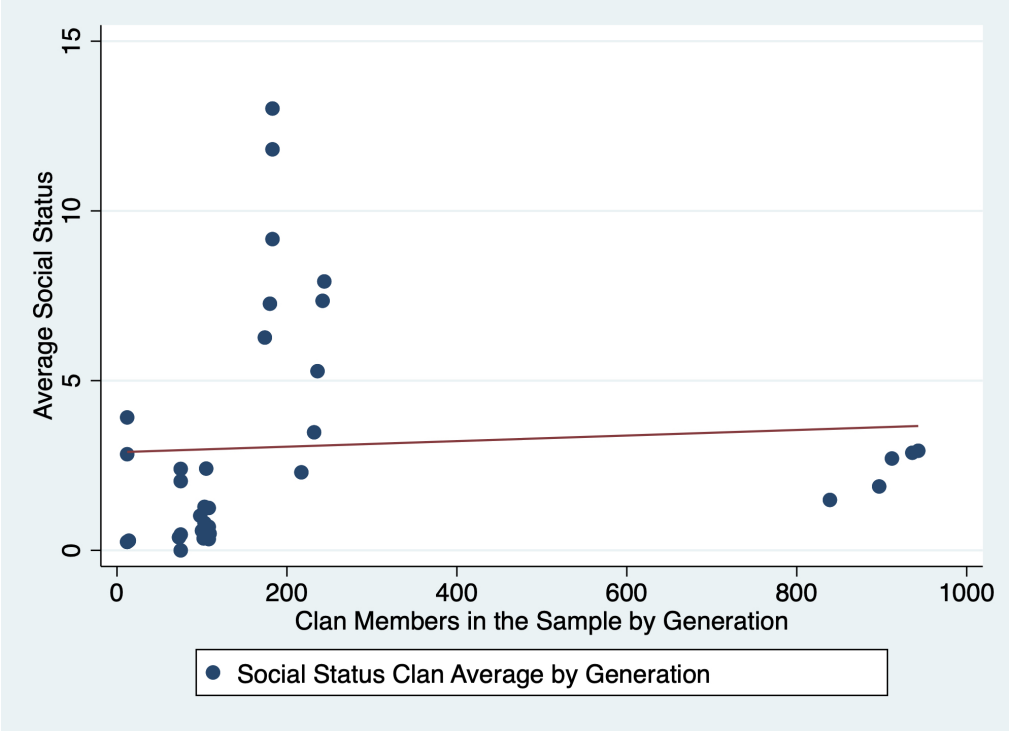


Notes: Bars show median birth year and death year by generation, with the line giving the average life midpoint (1/2*(birth year + death year)) by generation.

Furthermore, the representation of different clans in the five generation sample is fairly stable over time, and the relationship between clan size and measures of clan resources is relatively weak.

[32] Average social status is now higher among control compared to treated observations at a 10% significance level, which tends to go against our finding of elite reversal (Figure 3).

Figure A.7: Clan Size and Status by Generation



Notes: Figure shows average social status and number of sample men across clans, by generation. Social status ranges from 0 to 22, see Table A.1.

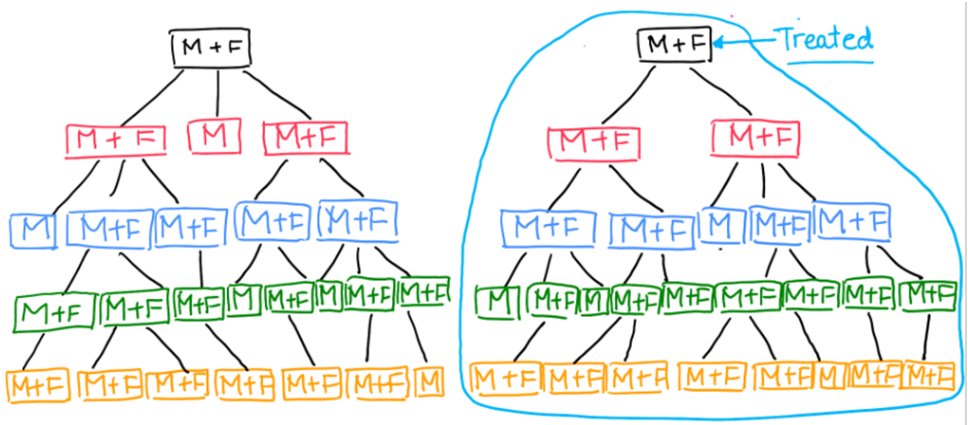
Figure A.7 shows the number of clan members in a given generation versus the average of social status for the clan in that generation as an example. This confirms that the composition of the five generations sample is not strongly biased towards high-resource clans.

D Supplemental Material

D.1 Extending Treatment Assignment Across Generations

Figure A.8 illustrates the concept of treatment of people.

Figure A.8: Treatment of People: An Illustration



Shown in the top row of the family trees are two first-generation couples, each consisting of a male (M) and a female (F). The couple on the right resided in location belonging to a region of Tongcheng that experienced high levels of mortality, and is therefore treated, while the first-generation couple on the left lived in a location belonging to a region that was affected less, and is therefore part of the control sample. This treatment assignment is carried forward to all members of the next four generations of descendants. In particular, all descendants of the first-generation treated couple are themselves treated, independent of whether the family in that particular generation still lives in a region of Tongcheng that was historically affected or not.

D.2 Treatment of People and Treatment of Regions: Estimation Results

Table A.4 shows the results for the two different forms of treatments considered in this paper, treatment of people and treatment of regions. Cumulative point estimates are shown in the text in Figure 3.

Table A.4: Treatment of People versus Treatment of Regions

	Treatment of People		Treatment of Regions	
	By Generation	Cumulative Point Estimate	By Gen	Cumulative Point Estimate
Gen 1	-0.286^{**} (0.104)	-0.286	-0.330^{**} (0.112)	-0.330
Gen 2	0.052 (0.106)	-0.234	-0.091 (0.104)	-0.421
Gen 3	0.211^{**} (0.052)	-0.023	0.061 (0.056)	-0.360
Gen 4	0.088^{*} (0.041)	0.065	0.057 (0.045)	-0.303
Gen 5	0.127^{*} (0.052)	0.192	0.077^{**} (0.025)	-0.226
Father Status	0.016^{**} (0.003)		0.016^{**} (0.003)	
Fixed Effects				
Generation	Y		Y	
Birth Year	Y		Y	
Male Clan	Y		Y	
Female Clan	Y		Y	
Mean d.p.	0.163		0.163	
N	8,041		8,041	

Notes: Dependent variable is elite indicator; sample consists of all men that constitute couples formed by male descendants of the first generation in generations 2, 3, 4, and 5, as well as the first generation males themselves. Estimation of equation (1) by OLS. Father Status is status of the husband's father in the first generation. Gen stands for generation, d.p. stands for dependent variable. Robust standard errors clustered at the level of treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

Treatment of people and treatment of regions is equivalent in the first generation, because treatment at the level of people is based on the region in which these couples lived in the first generation. Thus, if the sample consists only of first-generation males, the two treatment definitions yield the same results, see Table A.5.

Table A.5: First Generation: Treatment of People and Treatment of Regions Are Equivalent

	Treatment of People	Treatment of Regions
Generation 1	−0.198*	−0.198*
	(0.089)	(0.089)
Father Status	0.043**	0.043**
	(0.008)	(0.008)
Fixed Effects		
Generation	Y	Y
Birth Year	Y	Y
N	1,670	1,670

Notes: Dependent variable is elite indicator; sample consists of all observations of the five generation sample in generation one. estimation by OLS. Father Status is status of the husband's father in the first generation. Robust standard errors clustered at the level of treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

The different treatment coefficients for the first generation in Figure 3 are the result of parameter restrictions to economize on the number of parameter estimates (same fixed effects in all generations).

D.3 Ming Elites versus Ming Non-Elites

Table A.6 shows results of estimating equation (1) that allow for differences in the effects on Ming elite and Ming non-elite family lines.

Table A.6: Elite Persistence: Reversal and the Role of Ming Elites

	(1a) Ming Elites	(1b) Ming Non Elites	(2) Ming Elites	(3) Ming Non Elites
Gen 1	-0.438^{**}	-0.104	-0.194^{+}	-0.136
	(0.136)	(0.115)	(0.102)	(0.121)
Gen 2	0.017	0.013	0.007	-0.014
	(0.204)	(0.078)	(0.103)	(0.089)
Gen 3	0.262^{**}	0.077	0.098	0.085
	(0.076)	(0.055)	(0.071)	(0.052)
Gen 4	0.171^{*}	-0.039	0.134^{+}	0.027
	(0.085)	(0.052)	(0.071)	(0.036)
Gen 5	0.154^{*}	0.025	0.118	0.004
	(0.061)	(0.050)	(0.072)	(0.040)
Fixed Effects				
Generation	Y		Y	Y
Birth Year	Y		Y	Y
Male Clan	Y		Y	Y
Female Clan	Y		Y	Y
N	8,041		2,696	5,311

Notes: Dependent variable is elite indicator; estimation by OLS, in columns (1a) and (1b) of a generalized version of equation (1) that allows treatment coefficients, generation fixed effects, and first-generation Father status to vary by a Ming elite indicator; columns (2) and (3) estimate equation (1) for the subsamples Ming elite and Ming non-elite. Gen stands for generation. Robust standard errors clustered at the level of treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

The first two columns of Table A.6 show results allowing for different treatment coefficients for Ming elites versus Ming non-elites in a pooled specification. We see that Ming elites experienced the initial loss followed by a subsequent recovery more strongly than Ming non-elites (compare columns (1a) and (1b), respectively).

E Robustness

E.1 Treatment Time Window

Results are potentially affected by our definition of first generation males as those who are born between 1590 and 1644. Results for four alternative definitions are shown in columns (2) to (5) of Table A.7.

Table A.7: Robustness – Alternative Definitions of First Generation Men

First-Generation Males Birth Year	(1) Baseline 1590-1644	(2) 1595-1644	(3) 1600-1644	(4) 1590-1639	(5) 1590-1634
Generation 1	−0.286**	−0.278**	−0.298**	−0.273*	−0.334**
	(0.104)	(0.105)	(0.112)	(0.105)	(0.105)
Generation 2	0.052	0.036	0.033	0.058	−0.003
	(0.106)	(0.106)	(0.112)	(0.105)	(0.104)
Generation 3	0.211**	0.172**	0.172**	0.220**	0.222**
	(0.052)	(0.051)	(0.055)	(0.052)	(0.050)
Generation 4	0.088*	0.077+	0.082*	0.092*	0.087*
	(0.041)	(0.041)	(0.038)	(0.041)	(0.039)
Generation 5	0.127*	0.111*	0.110*	0.129*	0.126*
	(0.052)	(0.050)	(0.052)	(0.052)	(0.049)
First-Generation Father Status	0.016**	0.016**	0.016**	0.016**	0.016**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
N	8,041	7,376	6,814	7,616	7,124

Notes: Dependent variable is elite status indicator; sample consists of all men and women in generations 2, 3, 4, and 5 that constitute couples formed by male descendants of the treatment (first) generation, as well as the treatment generation couples themselves. Estimation of equation (1) by OLS with alternative samples. Samples differ in the definition of first generation males. Fixed effects for generation, birth year, male clan, and female clan included. Robust standard errors clustered at the level of treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

We see that key findings are robust to alternative definitions for the men that are potentially affected by the fall of the Ming. Table A.7 indicates that in all alternative specifications, columns (2) to (5), we estimate a first-generation reduction followed by a long-run increase in elite attainment caused by the shock. Moreover, point estimates for a given generation are typically in a relatively small range. We conclude that results are robust to alternative definitions of the treatment time window for first-generation males.

E.2 Elite Definition

Next, we consider alternative definitions of which man belongs to the elite. The baseline definition includes graduates of the *keju* at all three levels (local, provincial, and national), together with those men who became official students preparing for the *keju*, see Table A.8.

Table A.8: Alternative Definitions of Elite

Elite Definition	(1) Baseline	(2) Including Other Educated	(3) Only Juren and Jinshi	(4) Non-binary
Generation 1	−0.286**	−0.354**	0.002	−0.241+
	(0.104)	(0.096)	(0.012)	(0.127)
Generation 2	0.052	0.006	0.025	0.166
	(0.106)	(0.105)	(0.016)	(0.130)
Generation 3	0.211**	0.202**	0.047*	0.373**
	(0.052)	(0.057)	(0.018)	(0.082)
Generation 4	0.088*	0.120**	0.019+	0.174**
	(0.041)	(0.042)	(0.011)	(0.062)
Generation 5	0.127*	0.132*	0.028*	0.241**
	(0.052)	(0.055)	(0.011)	(0.082)
First-Generation Father Status	0.016**	0.018**	0.002**	0.024**
	(0.003)	(0.003)	(0.001)	(0.004)
N	8,041	8,041	8,041	8,041

Notes: Dependent variable is elite status indicator; sample consists of all men and women in generations 2, 3, 4, and 5 that constitute couples formed by male descendants of the treatment (first) generation, as well as the treatment generation couples themselves. Estimation of equation (1) by OLS with alternative samples. Samples differ in the definition of first generation males. Fixed effects for generation, birth year, male clan, and female clan included. Robust standard errors clustered at the level of treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

The elite definition underlying column (2) adds men who were educated but not tyical students or graduates of the *keju*. This group includes editors, those who attempted to pass the *keju* but failed, and those who did pass but refused to accept an official position. A more narrow definition of elite is adopted in column (3), where the focus is on provincial and national graduates (*juren* and *jinshi*, respectively). In the final specification, column (4) of Table A.8, we adopt a non-binary definition. It assigns a value of one to official and imperial academy students, a value of two for men who passed the *keju* at the local level (*shengyuan*), and a value of three to men who passed the *keju* at the provincial or national level.

Results in Table A.8 indicate that the patterns are similar in that over time treated family lines tend to become elite at a higher rate than control family lines, and the treatment-control difference tends to be significant in later generations. One difference that emerges is that when

elite is restricted to *juren* and *jinshi*, no first-generation loss in elite is estimated (column (3)). However, with this definition, only 2% of the sample are elite, and this relatively low number may result in changing estimates. Moreover, the historical record shows that *keju* participants below *juren* and *jinshi*, in particular *shengyuan* (graduates at local level) often played key roles in formulating as well as implementing new policies and norms in Tongcheng (Beattie 1979b). Men as highly ranked as *juren* or *jinshi* would also often live away from Tongcheng and only return for during their retirement. For these reasons we prefer the broader, baseline definition of elite. Finally, column (4) shows that adopting a non-binary definition of elite that gives higher values to higher-ranked *keju* participations leads to results that are qualitatively similar to the baseline.

E.3 Tongcheng Capital City and Distance to Tongcheng

The historical record indicates that Tongcheng's capital city played a role different from other towns and villages in the county. In addition to central-place functions typical for a capital, it was the location of choice for highly-ranked men in the late Ming who became absentee landlords, as well as because since 1576 it had a city wall. The following examines the role of Tongcheng city for our results, see Table A.9.

Table A.9: Capital City and Birth Order

	(1) Baseline	(2)	(3)	(2)	(4) Birth Order FE
Generation 1	−0.282**	−0.314**	−0.304**	−0.278**	−0.260*
	(0.103)	(0.102)	(0.101)	(0.104)	(0.103)
Generation 2	0.052	0.032	0.041	0.056	0.060
	(0.106)	(0.106)	(0.107)	(0.104)	(0.103)
Generation 3	0.210**	0.186**	0.193**	0.209**	0.213**
	(0.052)	(0.049)	(0.051)	(0.053)	(0.052)
Generation 4	0.087*	0.074+	0.081+	0.088*	0.085*
	(0.041)	(0.041)	(0.044)	(0.041)	(0.041)
Generation 5	0.127*	0.117*	0.122**	0.127*	0.124*
	(0.052)	(0.044)	(0.046)	(0.052)	(0.052)
Tongcheng Capital		0.159**	0.171**		
		(0.034)	(0.039)		
Distance to Capital			0.003		
			(0.005)		
Birth Order = 1				0.033+	
				(0.020)	
N	8,012	8,012	8,012	8,006	7,994

Notes: Dependent variable is elite status indicator; sample consists of all men in generations 2, 3, 4, and 5 that constitute couples formed by male descendants of the first generation, as well as the treatment generation couples themselves. Estimation of equation (1) by OLS. Tongcheng Capital is an indicator variable that a male is currently residing in the county city. Distance to Capital is the geographic distance to Tongcheng city in kilometers, divided by 10. A fixed effect for each level of male birth order included in column (5). All regressions include father status of first-generation male, as well as fixed effects for generation, birth year, male clan, and female clan. Robust standard errors clustered at the level of treatment generation couple; **/*/+ indicates significant at the 1%/5%/10% level.

We see that residing in Tongcheng city is positively correlated with elite attainment, see Table A.9, column (2). This is consistent with central-place functions that are persistent over time. At the same time, accounting for capital city location does not drastically change the pattern of the treatment coefficients across generations (column (2) compared with column (1)). Furthermore, conditional on capital city location, a village or town's distance to the capital does not play a major role for elite attainment, see column (3).

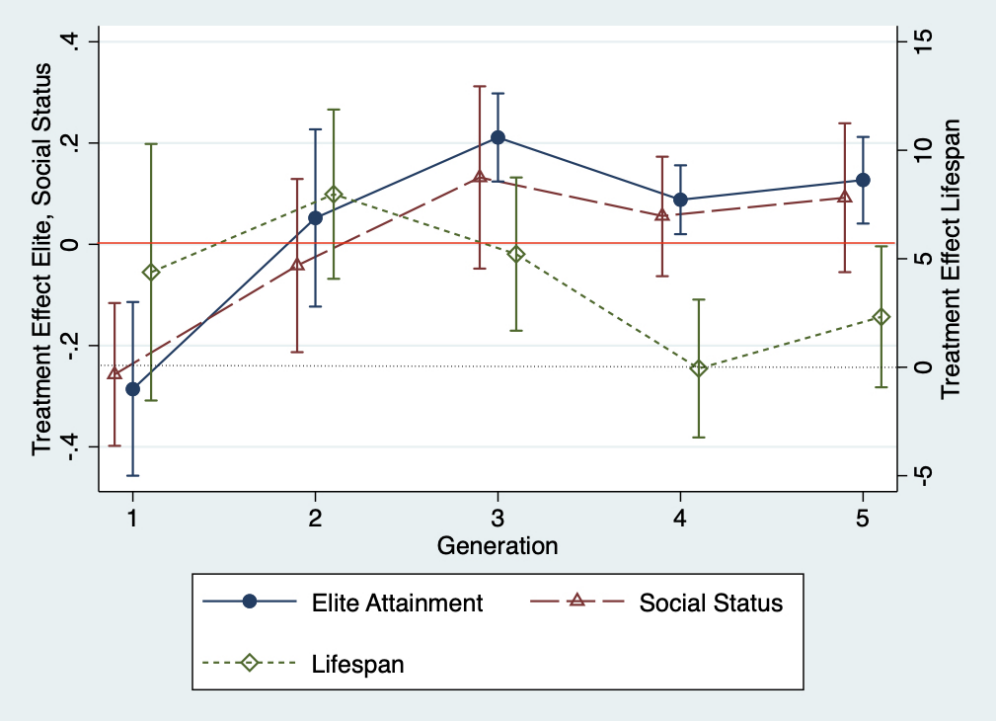
E.4 Parental Allocation of Resources

Parental investments may play a major role for achievements of the next generation, and there is evidence for imperial China that parental investments were higher for first- and early born sons. Thus we ask whether birth order affects elite attainment in the present context. Results indicate that a first-born male is somewhat more likely to become elite, see Table A.9, column (4). At the same time, the level and pattern of treatment coefficients is similar to before, and that continues to hold when a separate fixed effect is included for every birth order, see column (5). We conclude that the elite reversal is not primarily explained by a particular parental resource allocation across their children.

E.5 Elite versus Social Status and Lifespan

One might be concerned that the elite reversal documented in the text reflects mostly a broad effect that is common to other measures of family resources, such as good health or high social status. To find out, we have estimated equation (1) with alternative dependent variables that capture such characteristics. Figure A.9 shows key results by generation.

Figure A.9: Elite, Social Status, and Lifespan Compared



Notes: Estimates of equation (1) for three dependent variables: (1) elite indicator, (2) social status, and (3) lifespan in years. Social status divided by 10. 90 percent confidence intervals of point estimates shown.

Baseline elite attainment estimates follow the results of Table 4, column (4). The pattern of estimates for social status as the dependent variable is not unlike the pattern for elite attainment, see Figure A.9. This is not surprising because *keju* participation also affects the broader social status of the man (see Table A.1). At the same time, the pattern is less clear, in particular, there is no significant reversal in social status in generations three to five.

Lifespan results indicate that the impact of the fall of Ming on a man's lifespan over five generations is different from its impact on elite attainment. Thus, while a long lifespan tends to help a man to pass the *keju* (because it allows more attempts), the dynamics of elite attainment differ from is obtained for lifespan. Overall, the results of Figure A.9 support the hypothesis that the shock caused an intergenerationally transmitted shift in norms towards *keju* participation.

F *Keju* Graduation, Official Position, and Income

Among the civil service exam degrees, *shengyuan* was the lowest degree of the recognized categories of government education, conferred upon those who had passed the local degree threshold. The *shengyuan* who were more competent were awarded with the *gongsheng*, "imperial student" title; above them in rank were the *juren* (graduate of the provincial examinations), and above the *juren* were the *jinshi* (graduate of the national examinations). The levels are building up on each other tournament-style, that is, in order to have the *jinshi* degree one must have the *juren* and the *shengyuan*, and in order to be *juren* one must have passed the *shengyuan* examination. There were no age requirements or limitations for advancement, but since the examinations required a high level of literacy and years of study, the earliest that one could attain the *jinshi* degree would be in the low twenties, and it was not unheard of for a man in his fifties to still be a *shengyuan*. Not all *shengyuan* advanced to the next levels, and those who didn't may have given up and turned instead to working for officials in a secretarial capacity, or, helping to manage local affairs—settling disputes, organizing local public goods projects, improving welfare and security interests, or providing education in their community (Chang 1962). In that sense, preparing for the civil service examinations had returns even for those who did not pass, let alone pass at the highest levels of the examinations.

Elite status in society translated into income and wealth differences. It is well established that preparing for and passing the civil service examination had high monetary returns. Chang (1962) presents details on the income and wealth of top-level exam graduates (*jinshi*) as well as officials. There is no systematic information on the income or wealth of individual men, but having passed a certain level of degree made a person eligible for a certain level of official position. For example, there were nine levels of civil positions during the late 19th century (Chang 1962, Table 1). A

district magistrate would be seventh-ranked civil official, while a provincial governor would be a second-level civil official. The mapping between degree and official position was not deterministic, however, the level of office was increasing in the degree that a man had obtained. Becoming a top-level official in the imperial bureaucracy with only a *shengyuan* degree was almost impossible, and conversely, most *jinshi* had better-paid positions than being a district magistrate. The level of degree is useful because they are consistently mentioned in the data. At least for certain periods, the salaries of government officials at different levels are known (see Chang 1962). However, official salaries accounted for only a small part of the total compensation of government officials; the larger portion of their income were other contributions, in part from the local population, on which there is less systematic data.