Adoption, Inheritance, and Wealth Inequality in Pre-industrial Japan and Western Europe

Abstract

This paper uses Japanese village censuses, 1637-1872, to measure inequality in landownership. Surprisingly, inequality was low and stable unlike Europe where it was high and increasing. To explain this, I study inter-generational land transmissions. I find that Japanese households without sons adopted male heirs, thereby keeping lands in the family. In contrast, elite English male lines failed 25% of the time as adoptions were uncommon, leading to a highly unequal redistribution of their lands. Finally, the institutional differences in adoption had roots in 4th century church policy and this may partially explain why Europe was more unequal by 1800.

Wealth was highly concentrated in much of Western Europe by the eve of the industrial revolution. This was due to a gradual concentration of wealth that may stem back to the 14th century (Alfani, 2015; Alfani and Ryckbosch, 2016; Alfani and Ammannati, 2017; Bengtsson et al., 2018; Alfani et al., 2022). Only the catastrophic shocks of the black death, and world wars allowed wealth inequality to decline (Piketty et al., 2006; Roine and Waldenström, 2009; Alfani, 2015; Saez and Zucman, 2016; Scheidel, 2017; Alvaredo et al., 2018). Such evidence has given rise to a narrative of inevitable wealth concentration over the very long-run in the absence of catastrophic shocks although the mechanism remains unclear (Scheidel, 2017). However, the evidence is overwhelmingly from Western societies so we cannot be sure whether this is a Western or a universal phenomenon.

This paper uses new data from 584 villages to measure landownership inequality in pre-industrial rural Japan, 1640-1870. I primarily focus on the distribution of lands because it was by far the most important form of wealth in the pre-industrial context. Surprisingly, land distribution was highly equal with an average Gini coefficient of 0.57. Furthermore, 85% of households owned some land. Japan had a society of landowning peasants. Importantly, I also find landownership inequality in Japan had no trend so this was a stable equality.

In comparison, the most comparable village-level data from pre-industrial Italy and England show substantially higher Gini-coefficients of 0.7-0.9 (Alfani, 2015; Alfani and Ammannati, 2017;

Kumon, 2021; Alfani et al., 2022) and an upward trend in inequality over time. Although less comparable, data from other Western European societies shows much greater inequality in land and other forms of wealth (Alfani and Ryckbosch, 2016; Bengtsson et al., 2018) while evidence from China suggests similarly low landownership inequality (Buck, 1937). I further address data comparability concerns but conclude that such concerns are unlikely to explain differences in inequality. Overall, there is strong evidence for a divergence in inequality outcomes between England, Japan, Germany and Italy. Further, there is suggestive evidence of a regional divergence in inequality. Western Europe converged towards societies of landless laborers since medieval times. In contrast, records from East Asia dating back to ancient times consistently show landowning peasant societies.

How did Japanese villages have such equal land distributions? I hypothesize that the key difference was in the institution of adoption, which was common in East Asia but not in Western Europe. Adoptions were used during this period as an heirship strategy when the household failed to biologically produce a son (Kurosu and Ochiai, 1995). Therefore, in the absence of a biological son, an adopted son could inherit the lands and keep the land in the family. An additional benefit was the reduction of landless heirs in Japan where impartible inheritance (primogeniture), the inheritance of lands by one heir, was the norm. The surplus sons, who were not in line to inherit lands, were often adopted into other households. Thus, this reduced the number of landless households in the next generation. Together, adoption could lead Japan and other East Asian societies to converge towards a low landownership inequality equilibrium.

In contrast, Western Europeans had very limited options for securing heirs due to the lack of both polygyny and adoptions. This greatly increased household extinctions. Upon household extinction, these lands were redistributed to other male lines via wills or the marriage of surviving daughters (Habakkuk, 1994). Such redistributions were highly unequal. In particular, assortative mating meant wealthy heiresses married wealthy men leading to greater concentrations of land in fortunate families of which there are many examples (Clay, 1968). Thus, household extinctions were a channel that generated greater inequality.

How far can adoption explain differences between Japan and Western Europe? I study this using linked household landownership data across multiple generations which allows me to look at how lands were transmitted across generations. If adoptions were important, they should have greatly reduced household extinctions among landowning households.

I begin by showing there were no large differences in features of inheritance beyond adoption within these villages. First, the fertility patterns of the rural elite in Japan were similar to their English counterparts. Thus, without adoptions, the household extinction rates would have been similar. Second, the Japanese mostly practiced impartible inheritance (or primogeniture) which leads to unequal land distributions (Bartels et al., 2020; Wegge, 2021). This institutional setting was similar to much of England but not to other European regions where partible inheritance also occurred. If anything, this feature would suggest a more unequal land distribution in Japan.

I next show that adoption was motivated by the securing of heiship which has lacked strong empirical grounding. Using the linked village data, I show that adoptions were much more likely when a household lacked a male biological heir. I use the sex of the first child as an instrumental variable to show that this was not driven by endogeneity. Therefore, adoptions were being used to reduce household extinctions as theorized. This contrasts with the adoptions motivated by child welfare in Western societies today.

Finally, I show household extinctions were greatly reduced among landowning households in Japan due to adoptions. This is not driven by the gradual selling of lands by households that were planning to go extinct. I show this by looking at the effects of landownership on extinction. I instrument landownership with landownership lagged by 20 years which is arguably uncorrelated with later intentions to sell lands. Additionally, I show households with more than the mean amount of land almost never went extinct despite having a 20% chance of having no male biological heir. Poorer households also had greatly reduced rates of household extinction due to adoptions but they did occasionally go extinct. This was presumably because they failed to attract an adoptee before death due to their limited amounts of land wealth. However, the extinction of such poor households may have reduced inequality because this resulted in less land poor households.

Overall, adoption in Japan was functioning such that only 10% of lands needed to be redistributed due to household extinctions per century. This contrasts with data from England where male lines went extinct at least 25% per generation, 1200-1800.[1] Assuming 3 generations per century, this implies 75% of lands were passed on to other male lines in each century due to household extinctions.

[1]The figures are for childlessness among the English peers from Gobbi and Goñi (2021) and for the royal tenants from (Russell, 1948).

Adoptions made a clear difference in landownership inequality but why did some societies have adoptions while others did not? The historical evidence shows differences did not exist preceding the 4th century, when adoption was practiced across Eurasia. Studies from both ancient East Asia and ancient Greece/Rome show adoptions were used as a means of insuring against the significant risk of not having a son. However, the church began preaching against adoptions in the 4th century (Goody, 1983; Gager, 2014). The institutional change was gradual but effective and the use of adoption beyond the early middle ages became rarities in most of Western Europe. This led household extinctions to play a major role in land distributions in Western Europe. This finding is consistent with the higher inequality in Western Europe relative to East Asia. This novel institutional mechanism is therefore a plausible partial explanation of the observed divergence in land inequality between East Asia and Western Europe.

A contribution of this paper is to show a long-run regional divergence in wealth inequality. The past literature had mostly focused on sporadically available estimates of inequality. In the case of Asia, this mostly came from the 18th century onwards. Milanovic (2018) found cross-country evidence of pre-industrial *income* inequality being lower in Asian societies after the 18th century and this is consistent with my findings.[2] Scheidel (2017) attempted to look at a longer time scale with more fragmentary data but he concluded that all societies were converging towards high inequality in the absence of catastrophic shocks such as the world wars and the black death. However, I show evidence for an alternative path of stable equality in Japan, and perhaps China, which long predates the 18th century. This newly documented dimension of divergence in landownership inequality also adds to the well known case of divergence in living standards across East Asia and Western Europe.

A second contribution is to show a novel mechanism that can explain differing wealth inequality outcomes across countries. I add to a literature that has attempted to explain inequality through three approaches. At the macro level, studies have shown the importance of capital and its inheritance as a mechanism that generates inequality (Piketty, 2011, 2014; Saez and Zucman, 2016). At the micro level, studies using detailed micro-data have identified potential explanations such as differential returns on wealth (Bach et al., 2020), taxation (Jakobsen et al., 2020), tax evasion

[2]Income inequality is measured using social tables, which exploits estimated differences in inequality between typical social classes. Milanovic (2018) finds income inequality is negatively correlated with population density. The regions with high population density were predominantly Asian, where rice production allowed for more people to subsist per area.

(Alstadsæter et al., 2019), genetics (Barth et al., 2020), or inheritance (Boserup et al., 2016; Elinder et al., 2018; Adermon et al., 2018). Interestingly, Japanese peasants mostly practiced impartible inheritance which increased wealth inequality in Germany (Bartels et al., 2020; Wegge, 2021). Despite this, I show that inequality was low because adoption can significantly mitigate this mechanism.

An implication of this paper is that religious institutions impacted economic development through its effect on inequality. This is a novel channel in a longstanding literature linking religion to economic development since the seminal book by Weber (1930). The past literature had argued religion played a major role in economic development through its effect on human behavior (Becker and Woessmann, 2009; Schulz, 2022; Henrich, 2020), social organization (Greif and Tabellini, 2017), or its effect on resource allocation (Cantoni et al., 2018). This paper suggests the church reforms also affected economic development through landownership inequality. Therefore, the church may have been a major unintentional actor placing Western Europe on its unique path of economic development.

Data

My main data source are the Japanese village population censuses (*Shumon Ninbetsu Aratame Cho*) from 584 villages with sporadic observations in between 1634-1872. The population censuses were annually compiled by all villages in Japan by order of the lords. The original motive was to use censuses to help enforce a ban on Christians by the Tokugawa shogunate. The censuses included the names, ages, household compositions, and a declaration of religion to identify Christians. Despite Christianity having almost disappeared in Japan by the 18th century, the surveys continued until 1870 by taking on new administrative roles. Many of these censuses began listing information on household landholdings which was the main source of wealth at these times. Importantly, I also observe landless households which are often not registered in tax registers as they were not taxable.

From the perspective of economists, landholdings can be interpreted as landownership because peasants had well-established rights to sell, rent, use, and inherit their lands. The lords owned land by law but in effect only taxed lands. Further, an institution separating the samurai from farmers (*heinōbunri*) meant the samurai class lived in urban areas and did not individually own lands. Instead, they earned a salary from the lords. This contrasts with the landed aristocracy of con-

[Figure 1 here]

temporary Europe. The samurai class are therefore not included in this analysis of landownership inequality as they were earning wages. An analysis including the samurai requires studying income inequality and a past study has shown the samurai were surprisingly poor; they earned only 20% more income than the average peasant (Saito, 2015). However, their income can be conceptualized as wages because it was comparable to other high wage professions such as urban carpenters and tatami makers (Yamamura, 1974). The remainder of this paper will use the term landownership to refer to what has traditionally been labelled landholdings in the case of Japan and other European societies such as England (Kumon, 2021).

I have collected population censuses from three sources. The first are data published in local histories which were digitized.[3] The second is the"Population and Family History Project" database at Reitaku university. The third is the online database of Hiroshi Kawaguchi entitled DANJURO. To focus on land inequality in an agricultural setting, I drop all observations from cities, post stations, and coastal villages where non-agricultural activities were common. This leaves 2,476 village-year observations from 584 villages which I refer to as the Japanese inequality data.[4] There are unsurprisingly fewer observations for earlier years, due to survival bias with a dip in the 1870s when the censuses ended (see figure 1a). I also observe 84 villages over the long-run, defined as multiple observations spanning more than two decades. I use this long-run data to investigate time trends. Unfortunately, the data is highly sporadic so that villages can reappear in my sample after being missing for decades. For econometric purposes, this precludes the use of many time series techniques that require complete time series.

The geographic breadth of the data is rich and representative of the main island of Honshu, with approximately 80% of the population (see figure 1b). The topographic map (with white shade indicating higher elevations) shows how mountains dominate much of the landscape, amounting to approximately two thirds of land area. Unsurprisingly, there are few observations from mountainous terrain which only had small pockets of habitable areas. On the other hand, there are many

[3]This data includes other village level administrative sources such as the "goningumi mochidaka chō" that list all households by the five household group who were jointly held responsible for certain problems caused by other group members. This source occasionally includes information on landownership by households.

[4]I have dropped multiple observations in a decade by keeping the year closest to the middle of the decade. A detailed list of source material are available in appendix J.

observations in the plains where population was concentrated. The sampling for the islands of Kyushu and Shikoku in the southwest are poor and results from these areas must be interpreted with caution.

The village censuses contained information on landownership that were expressed in the value of the yield in units of *koku* (volume of rice grain equivalent) or mon (copper coins) and in some rare cases the land area. These values often came from cadastral surveys in the late 16th to early 17th century. These "official yields" were therefore outdated so fail to account for increased plot size or increased productivity. They also did not include landownership outside the village. Thus, there are sources of measurement error but how far can they affect a measure of inequality at the village level?

Ideally, I want landownership to be in the value of land rent net of tax. The land rent net of tax in each year is a function of official yields as in equation 1.

$$land\ rent\ net\ of\ tax_{i,t} = yield_{i,0}(\Delta prod_{i,t} \times land\ rental\ rate_{i,t} - tax\ rate_{v,t})\alpha_{i,t} \tag{1}$$

The left hand side refers to the land rent net of tax which is the economic value of owning the land. Yield is the value of the yield in period 0 (or the official yield) when yields were measured. $\Delta Prod_{i,t}$ is the change in productivity since the measurement of yield and period t. $\alpha_{i,t}$ captures other factors which cannot be controlled but affects land prices such as yield risk. This would include any investments or depreciation on the plot that affects the value. The land rental rate is the implicit or explicit share of yield being awarded to the landowner in return for his rights. Finally, tax rate is what was paid by the landowner to the lord in proportion to the official yield.[5] As I am computing inequality measures that rely on landownership relative to total land owned, such as Gini coefficients, there is no problem if relative value is a function of the official yields multiplied by a constant or

$$\begin{aligned}\frac{land\ rent\ net\ of\ tax_{i,t}}{total\ land\ rent\ net\ of\ tax_v} &= \frac{yield_{i,0}(\Delta prod_{i,t} \times land\ rental\ rate_{i,t} - tax\ rate_{v,t})}{\sum_{i=1}^{N} yield_{i,0}(\Delta prod_{i,t} \times land\ rental\ rate_{i,t} - tax\ rate_{v,t})} \\ &= \gamma_{v,t} \times yield_{i,0}\end{aligned}$$

[5]The burden of tax went to the landowner due to the highly inelastic supply of land rental. The in-elasticity was due to laborers having limits to the area he/she could cultivate.

[Figure 2 here]

where $\gamma_{v,t}$ is constant within a village-year. This would hold if changes in productivity, land rental rates, and tax rates were uniform within the village. It is not possible to make the stronger assumption that $\gamma_{v,t}$ is constant across villages in a given year due to widely differing tax rates which precludes inequality measures beyond the village level.

The weaker assumption that $\gamma_{v,t}$ is constant within the village raises two concerns. First, did the land rent per official yield ($\Delta prod_{i,t} \times land\ rental\ rate_{i,t}$) vary across plots? Second, did tax rates per official yield vary across plots?

I can test these assumptions using land records from large landowners who recorded the land rent, land tax, and official yield of their plots. These records were made for the purposes of land rental and land sales for which this information was required. I use records that were transcribed in Takeyasu (1966) and Shoji (1986) which come from the regions of the Kinai (centered around Osaka) and the island of Shikoku in the 19th century. Although the data is from a limited number of villages, the basic institutions were largely similar across Japan, so these can be considered as representative case studies. There are 64 records that have all variables while another 63 have all data except the land tax.

Figure 2 shows both the land rent and land tax for plots of land owned by two landowners. It is immediately clear that the land tax was almost perfectly correlated with the official yield.[6] The few outliers are almost certainly due to these plots being located in another village. This shows the land tax was a fixed rate based on the official yield. Therefore, it is safe to assume the tax rate was constant within any village-year.

The land rental rates (gross of tax) relative to the official yield shows more variation. When I include data from the other villages, the coefficient of variation of land rents relative to the official yield is 0.3 (see appendix B.1).[7] Therefore, the official yield is a decent proxy of true land incomes (especially when we consider this issue is shared by modern wealth data). Perhaps more importantly, land rental rates do not vary strongly with plot size in these two villages nor the other

[6]These findings are not entirely trivial because it was not individual plots but the aggregate village holdings that were taxed by the lord at this time in a system known as *muraukesei*. It was then the village's responsibility to distribute the tax burden across the plots. These findings confirm the individual tax burden was set based on the official yield of each plot.

[7]There is an upward bias because some of the lands may have been in other villages and there is variation in the year of the record so the data is not within a village-year.

villages (see appendix B.1).

A related concern is that productivity differences could exist across landowners. If large landowners had faster technological growth, this cannot be detected by the above exercise that focuses on single landowners. However, when true land values have been compared to the outdated official yield across landowners, such correlations are not observed (Takeyasu, 1966). There was little reason for productivity growth to be widely different within villages when available technologies were similar. Official plot yields were a very strong indicator of land values.

A final issue is that censuses only recorded lands within the village. This will tend to bias my inequality estimates downwards because it was large landowners who were most likely to have holdings in other villages. However, landownership outside the village would have been small due to a system of law that gave less legal protection to land rights outside of the village of residence (Nakabayashi, 2013). I can also estimate the extent of land owned in other villages by looking at the proportion of land owned by non-residents in 47 villages where such data is available. The average is 15%, a small proportion of land. I later show this can cause a modest downward bias in my inequality estimates which does not affect my conclusions.

In the following sections I will compute the Gini coefficient, share landless, and the share of land held by the bottom 20%, bottom 40%, top 20%, and top 10% which are the standard inequality measures within the literature. They are all computed using standard formulae at the household level, the unit at which land was owned, inclusive of the landless. I focus on Gini coefficients when looking at time trends but this is to avoid repetition due to the high correlation of these measures (see appendix B.3). The observations will be weighted by total households-village-decade. The village-decade weight gives equal weight to each village-decade so that I better capture long-run fluctuations. The total household weight gives higher weight to larger villages although I show the results do not change when I weight each village equally.

[Figure 3 here]

[Table 1 here]

Inequality Estimates

Time Trends

I first estimate time-trends in inequality using long-run data from 85 Japanese villages, 1647-1872. I estimate a linear time trend using village fixed effects.[8] As there is potential regional heterogeneity, I estimate it in aggregate and by region (as defined in appendix A).

Figure 3a plots the data with the regression prediction by region. It shows there is much heterogeneity in inequality trends by village due to local phenomena. However, there is no clear trend in aggregate. This is confirmed in the regression as shown in table 1 where I find a negative but insignificant coefficient. When splitting the sample by region, the central and northeast regions have marginal significance but with opposite trends.

There are a number of concerns with this analysis. First, there may be non-linear trends in the data that are hidden when only looking for linear trends. In particular, the major famines of the 1780s and 1830s may have functioned like a "catastrophic shock" that reduced inequality and counteracted an overall increase. Although figure 3a shows no sign of this, I formally test this in appendix D.1. I show the famine years in the 1780s coincided with decreased inequality while the famine in the 1830s had no effect. However, this did not mask a general positive trend in other decades.

Second, villagers could be increasing landownership outside the village that are not included in the village census. I test this in appendix D.2 where I proxy external holdings using the total land owned in each village. The total land owned is the sum of all within-village landownership by residents. The remainder of the lands were either owned by non-residents or abandoned due to depopulation/environmental reasons. Therefore, decreasing total landownership could reflect increasing external holdings in the region. However, I find no evidence for this.

For the purposes of comparison, I can conduct similar analysis as above in the case of 18 rural Italian villages, 1307-1809, which were collected from tax records and made available in (Alfani,

[8] Specifically, I estimate $ineq_{v,t} = \alpha_v + \beta year_t + \epsilon_{v,t}$

2015; Alfani and Ammannati, 2017). I refer to the original articles for a detailed description of the data. For the purposes of measuring village-level wealth inequality, many aspects of the data are comparable. The Italian data is based on real estate at the household level. The inequality measures are also at the village level. However, the Italian data is inclusive of housing. The distribution of housing is unknown for Italy but a detailed study from 18th century Spain by Nicolini and Ramos Palencia (2016) showed non-land properties were more equally distributed than agricultural lands. Further, non-land assets were only 12% of the value of real estate. If these societies were similar, the Italian measures underestimate land inequality and most of the inequality will be generated by lands. Another issue is that the propertyless are not included. This will decrease the measured inequality although the available evidence suggests the bias are small (Alfani, 2015; Alfani and Ammannati, 2017; Alfani and Di Tullio, 2019).

The differences in wealth inequality trends between the two regions in figure 3 are striking. All villages are generally trending upwards after the black death. The rate of increase was also very high with a 0.07 increase in gini points per century (table 1). Italian villages clearly had very different dynamics to Japan.

Inequality Levels

I next estimate inequality levels for Japan as a whole. Although my observations are limited to a sample of village, there is much geographic breadth. In appendix C, I use the data to show there is strong spatial auto-correlation in inequality up to 100 miles. Therefore, each observation contains information on its unobserved neighbors. These facts can be used to justify regional level estimates.

One issue with this approach is that some regions lack any observations. In order to partially account for unobserved areas, I assume persistence in land ownership inequality between the Tokugawa period, 1647-1872, and the modern era, 1883-1895. This assumption is reasonable due to the slow moving nature of wealth inequality combined with their being less than two decades between the two points of observation. To proxy landownership inequality in modern Japan, I use prefectural level data on the share of farmlands under tenancy as a proxy for landownership inequality. This data was originally recorded in prefectural statistic books and later compiled by Arimoto et al. (1984). The share of land under tenancy records the area of plots farmed by tenants divided by the

[Table 2 here]

total area. This is a measure of inequality because lands that could not be cultivated by household members were generally rented out.

Given this assumption of persistence, I can "backwardly project" inequality in the Tokugawa period for regions lacking observation. The estimation is conducted in two steps. First, I estimate an OLS regression of inequality measures in the two periods. Second, I predict inequality in regions with few observations. I summarize the important parts of this process here and provide further details in appendix E.

In the first step, I coded all village locations into modern prefectures and estimated the correlation in inequality between the modern and pre-industrial periods.[9] I use the share of land under tenancy in the 1880s as my measure of modern inequality. Unsurprisingly, I find a very strong correlation except for the share landless for which I get the correct sign but no significance. In the second step, I estimate landownership inequality in Japan as a whole by combining my sample averages with the OLS predictions of inequality in prefectures with less than three observations.

The resulting estimates reveal a society of landowning peasants (see table 2). The share of land owned by each class of peasant sheds light on the structure of landownership. The bottom 15% were landless while the next 25% owned 7% of the land. These were small landowners who would need to additionally rent large amounts of lands to make a living. The middle class peasants, from the 5th to the 8th decile of landownership, owned 32% of the land and would have been less reliant on tenancy. Finally, the top 20% were the large landowning class who owned 61% of the land. They could rent out their surplus lands to the lower classes within the village. Despite the existence of inequalities, it is surprising that such a large share of the population owned significant amounts of land.

The regional estimates show there was some regional variation. Gini coefficients varied from 0.5 to 0.69 with the most equal areas being the Kanto region surrounding Edo (current day Tokyo) and the coastal prefectures to the west of it. In contrast, the most unequal areas was the Kinai region surrounding Osaka and Kyoto and the northern coastal regions. Importantly, the next section shows that even the most unequal regions in Japan were more equal than the typical Western

[9]Specifically, I estimate $Pre-industrial\ inequality_i = \alpha + \beta Modern\ inequality_i + \epsilon_i$

European village by 1800.

There are a number of concerns with the methodology that are addressed in detail in appendix E. First, the weighting could be changed to give equal weight to each village. However, re-estimating inequality using this method only changes the Gini coefficient to 0.59 and is not driving the results. Second, I could alternatively use only predicted inequality from the backward projection. Such an approach leads to a lower inequality estimate of 0.54. Third, I can also include coastal villages, where fishing was an important industry and agricultural lands were less important. However, I still find a Gini coefficient of 0.58. Fourth, the lack of observations of landownership outside the village may be causing a severe downward bias. I can estimate an extreme upper bound for inequality by assuming the richest person owned all of the land outside the village. Assuming such land amounted to 18% of within-village landownership values, as implied by the available data, the implied extreme upper bound Gini coefficient will only modestly increase to 0.64. Thus, the narrative of a landowning peasantry are robust to various concerns.

International Comparisons

Table 3 compares a cross-section of inequality across societies as they approached industrialization. Some caution is required in interpreting the results due to the differing data and methodologies across these studies.

The most comparable data come from Germany, Italy, Japan and England which are measured at the village-level and wealth is in the form of real estate or lands. Like the case of Japan, these records do not include real estate outside of the village. They also do not include the state, church, or feudal properties, much like the exclusion of the samurai class in Japan. However, there are a number of major differences. First, the German and Italian estimates include non-land properties. However, as stated earlier, Nicolini and Ramos Palencia (2016) showed that lands were 88% of the value of real estate in 18th century Spain. Further, lands were more unequally distributed than non-land properties. If these societies were similar to Spain, the bias due to this difference is downward. Second, the measures for Germany and Italy do not include propertyless people (indicated by a "+" on the table) leading to a downward bias although indicators from these studies suggest it is small. Third, the measures for England are from commons that got enclosed via parliamentary enclosure

[Table 3 here]

(Kumon, 2021). As the commons were relatively equal, this is a significant underestimation of inequality. Fourth, the unit of measurement in England is adult males instead of households. The direction of this bias is unclear although most adult men would have had their own household and biases are likely to be minor. Finally, the large landowners whose holdings spanned many villages appear as relatively small landowners in village-level inequality estimates. This was a small issue in Japan, where cross-village landownership was limited as explained above, but may lead to greater downward biases in Europe where there were less limitations on cross-village landownership. The overall impression is that the European village level estimates are downwardly biased.

The measures from all other societies were made at the national level. As the national-level inequality also accounts for between-village inequality, it will upwardly bias inequality although the magnitude remains unclear. However, the percentage landless is an alternative measure of inequality which does not account for differences in levels of inequality. Therefore, it is robust to this concern. Therefore, the share landless (where available) is the key comparison measure for these societies.

With these limitations in mind, the evidence suggests East Asian societies were more equal than those in Western Europe.[10] Village-level Gini coefficients in Western Europe are generally close to 0.8 while that in Japan is closer to 0.6. Only Germany has comparable inequality but this is explained by the catastrophic shocks that decreased its inequality, as I will explain below. As shown earlier, an upper bound estimate of Japanese village-level inequality would suggest a Gini coefficient of 0.64 which is still far lower than the Gini coefficient of most village-level inequality estimates in Western Europe. Moreover, the other potential biases, mostly work against this conclusions. The alternative measure of the share landless, which can be compared with national level estimates, show East Asia had very low shares of landless (mostly below 20%) unlike in Europe where it is generally above 50%. These high shares of landless in itself indicate that Gini coefficients must also have been much higher in these regions than Japan.[11]

Another concern is that these results are driven by the timing of observations. Western Europe

[10]Eastern Europe may have been more unequal as demesnes, farms that were owned and managed by lords, dominated the lands and this limiting peasant holdings (Cerman, 2012).

[11]It would take the extreme assumption that the landed class had a perfectly equal distribution to conclude Japan was less equal than Western Europe. In the case that 50% were landless, the gini coefficient would be 0.5.

[Figure 4 here]

was about to start an industrial revolution, and the underlying factors that created modern growth may have also increased inequality. In figure 4, I show the longer-run trends where available. It shows the trends in inequality in Italy were upward long before industrialization. The only exception is the catastrophic shocks of the black death, and in the case of Germany the thirty years war, 1618-1648, which temporarily reduced wealth inequality (Alfani, 2015; Alfani et al., 2022). Although there is no time series for England, Campbell (2008) suggests 47% of the rural population were landless laborers in 1290 and other data from the hundred rolls in 1280 suggests land ownership inequality among peasants had a gini coefficient of roughly 0.75.[12] Therefore, increasing wealth inequality had little to do with incoming industrialization.

In contrast, the more patchy data from Japan and China suggest my observations are not from a time when society was abnormally equal. Rather, these societies were equal throughout the records stretching millennia. China introduced the equal fields system in 485 that was continued up to 780. Each man of age 15-59 was theoretically allocated 100 *mu* of lands although the reality was less equality due to land scarcity (Mitani, 2015). This was also inherited by Japan via the *Handen* system from the 7-10th centuries (Iyanaga, 1980). Although we know little of the context of these policies, it is likely that these policies accepted realities of relatively equal landownership rather than being a radical redistribution imposed by the state (for more detail, see Appendix G).

My findings also match wider findings from the literature. (Lundh and Kurosu, 2014) compare landownership distributions within villages in seven rural areas across pre-industrial Eurasia and find similar patterns. Another approach by Milanovic et al. (2010) uses social tables to estimate income inequality across classes. While this captures other aspects of inequality, it should be highly correlated with wealth inequality because wage inequality was relatively low. Their study finds similar regional patterns in income inequality. Importantly, Japan was relatively more equal in income inequality despite including the samurai class (Saito, 2015). Thus, these results are not an artefact of the differing social structures.

Overall, the large magnitude of difference across societies lends confidence to East Asia being more equal than the West despite the differences in measures. However, one caveat is that we lack

[12]Medieval English peasants did not own lands by law but had many land rights which can be considered land ownership in the economic sense.

measures in many society-centuries so the hypothesis of regional differences require further empirical testing. We also cannot be certain of the exact magnitude of difference. However, what we know for certain is that the share of landless households, where available, show East Asian households commonly owned lands unlike their Western European counterparts. These measures also match the wider historiography of the rise of the landless class in pre-industrial England (Shaw-Taylor, 2001), and Holland (Van Bavel, 2005). In contrast, the East Asian literature has often focused on the landowning peasant (Smith et al., 1959; Huang, 1990). The new puzzle which emerges is why landownership patterns differed so markedly across these two regions.

Explaining Inequality

How can we explain the low landownership inequality in Japan relative to Western Europe? The literature on pre-industrial inequality has surprisingly few explanations. A cross-country descriptive study by Milanovic (2018) shows areas with higher population densities had lower income inequality.

One prominent hypothesis, which lacks empirical evidence, is the effect of struggles between the state and peasants over land rights in Europe. The state wanted to maximize taxes while peasants resisted such efforts. Although the reasons remain unclear, serfdom emerged in the East and free peasants in the West (Brenner, 1976). Episodes of struggles include the parliamentary enclosures (Marx, 1867; Humphries, 1990) and the Danish agrarian reforms (Boberg-Fazlić et al., 2022) among others.[13] The more market oriented institutions changed existing land rights that were often in the form of commons where many individuals held rights over single plots of lands. This was gradually replaced by private ownership by individuals. This also allowed for plots of land to be sold which made land accumulation easier.[14] In contrast, the argument is that Eastern European peasants were repressed and lacked land rights although there is little empirical evidence.

Where does Japan fit in terms of the struggle between the state and peasants? Despite a feudal structure, peasants had secure de-facto landownership rights that was more similar to Western Europe. Unlike in Western Europe, this was due to the state indirectly pushing for clearly defined

[13]The effect of parliamentary enclosures in England is strongly contested in the literature (Clark and Clark, 2001; Shaw-Taylor, 2001)

[14]While it could also be argued that these reforms directly changed land distribution, much like the modern land reforms in Latin America, reforms like the parliamentary enclosures and Danish agrarian land reforms tried to translate pre-existing land rights into private landownership. Therefore, direct effects on inequality seem minimal.

[Figure 5 here]

land rights since the *Taikō Kenchi* in the 16th century. This allowed for land accumulation among peasants. However, Nakabayashi (2013) shows evidence that land markets were less functional in Japan due to limited land rights for holdings outside one's village of residence. This reduced the amount of land accumulation that extended beyond the home village. Therefore, part of the story of lower inequality could be attributed to the differing arrangements of landownership rights in Feudal Japan.

Other important hypotheses include the effects of regressive taxation (Alfani and Di Tullio, 2019) the development of mortgage markets Allen (2006), agricultural producitivity (Clark, 1998), and inheritance institutions. Regarding the last mechanism, (Wegge, 2021) shows areas with partible inheritance in Germany had lower inequality although this explanation has limitations due to the endogeneity of such institutions (Hrdy and Judge, 1993; Huning and Wahl, 2021) as can be seen in East Asia (Hirai, 2003; Zhu et al., 2015). Further, this fails to explain the case of Japan where impartible inheritance was common (Hayami, 1983).

Adoption and Inequality

This paper proposes an additional mechanism based on the use of adoption as heirship strategy. Adoption is where a person becomes the legal parent of an adoptee and the adoptee gains the rights associated with being a biological child. Adoption affects land distributions because it gives the adoptee the rights over wealth inheritance. Unlike in the modern era, where adoption is often about the welfare of the adoptee, most adoptions in the pre-industrial era was about the continuation of male lines. Importantly, adoption was widespread in East Asia but not in Western Europe so this institution may have contributed to differences across these regions.

Adoption was useful in the pre-industrial world where child mortality was high. Assuming similar fertility across societies, some households succeeded in producing one or many male heirs while others did not. In figure 5, I illustrate this with a case with five households, two with two heirs, two with no heirs, and one with one heir. In Japan, a household with more than one male heir could give them up to a household in need of male heirs via adoption (see figure 5c). This benefits the adoptee who will own more land than if he remained in his parent's household. The

overall effect is that lands were kept in the family resulting in some stability across generations.

In contrast, Western European households very rarely adopted children. When they failed to produce male heirs, the household went extinct. Thereafter, marriage and inheritance norms redistributed the lands of the extinct. If a daughter survived, she would inherit the lands and usually marry into another household leading to greater concentration of lands. If no children survived, the lands will be redistributed via will. Most notably, rich heiresses tended to marry rich men due to positive assortative mating at this time (Kurosu and Ochiai, 1995; De La Croix et al., 2019; Clark and Cummins, 2022), leading to land concentration.

There were further problems due the lack of an option to make surplus heirs an adoptee. If the society has impartible inheritance (primogeniture), the surplus son will become landless which further increases inequality (see figure 5b). If the society had partible inheritance, there is some inequality generated by the randomness of fertility and mortality across households (see figure 5d. These factors can lead to inequality beyond the effects of marriages and wills.

One important extension beyond the simple cases above is to allow for differing inequality across households. In that case, adoption need not be practiced among all households. In fact, landless households going extinct can reduce landownership inequality. Moreover, it is more important that the rich practice adoption because their extinction leads to greater land concentration than the extinction of a poorer household.

Adoption was not the only heirship strategy available at the time. One could marry early and have high fertility within marriage. Another strategy was polygyny which could further increase births while also hedging against the risk that the wife was infertile (Kumon and Saleh, 2023). However, both strategies were unreliable due to the high variance in fertility and mortality. Moreover, adoption was special due to two factors. First, it could fully insure against the risks of varying fertility and high child mortality. Second, other strategies had the opposite risk of creating too many children which was expensive. Thus, institutions like polygyny was restricted to the richest in pre-industrial Japan but did not occur in peasant households. In contrast, adoption was used often among landowning peasant.

One concern with the mechanism is that adoption may have developed endogenously with inequality. Surprisingly, adoption was widely practiced across Eurasia during ancient times. In East Asia, the practice began by the Han period in China, 206 BCE-220 CE, the Nara period in

Japan, 710-794, and the early Chosun dynasty in Korea, 1392-1910, as seen by genealogies or law codes (Hayashi, 1988; Brown and de Crespigny, 2009; Peterson, 1996). The institution of adoption continued to be widely practiced into the 18th century. In particular, adoption is well-studied for the elite class and adoption rates were as high as 8% in China, 1750-1849, 21% in Korea, 1750-1849, and 37% in Japan, 1700-1799. (Moore, 1970; Feng and Lee, 1998; Kim and Park, 2010).[15] Importantly, adoption was clearly motivated by the desire to secure an heir in these societies (Feng and Lee, 1998; Kim and Park, 2010).[16][17]

Beyond East Asia, adoption was also common in the ancient Near East and Mediterranean, such as in Babylonia, Middle Assyria, Greek and Roman Egypt, Greece and Rome (Hübner, 2013).[18] In fact, the term "adoption" originated in ancient Rome (Goody, 1969; Corbier, 1991).[19] The most convincing evidence for its widespread use in ancient Europe comes from a Roman census list of 1450 individuals. For those over age 50, almost all households had a male heir which could only have been possible with adoption in an ancient mortality regime (Huebner, 2013).[20] This also confirms the people of ancient Rome were using adoption as a means of securing heirs. Such practices survived into the middle ages, where Germanic and Frankish people are known to have had various rituals for adoptions (Lynch, 2019).

Unlike East Asia, Western Europe began its general abandonment of adoption in the fourth century when the church made concerted efforts to discourage the institution (Goody, 1983; Gager, 2014). The institutional change was gradual but effective and the use of adoption beyond the early middle ages became rare in most regions.[21] It was only in the 19th century that laws began to accept adoptions in Western Europe (Mignot, 2019). Thus, the two regions had very similar

[15]The Chinese case is from the Qing nobility, the Korean case is from the *Bulcheonwye* families, and the Japanese case is from the samurai of a small sample of lords.

[16]The motive of securing heirship can be seen in East Asian societies where adoption increased when birth rates fell.

[17]There was some regional variation in how adoption was practiced, with Koreans and Chinese favoring the adoption of children and limiting adoptees to relatives from the male line (Kurosu, 2013). This may have affected slightly weakened the effects of adoption.

[18]The evidence is mainly from law codes, such as the code of Hammurabi (1792BCE-1750BCE) or the middle Assyrian law code (1450-1250BCE), or from adoption contracts such as those from Roman Egypt.

[19]The practice of adoption was also seen in areas practicing Hinduism but not in places practicing Islam (Leonard, 2011).

[20]Beyond the census, there are also many famous cases of adoptions among Roman emperors, including the infamous Nero, when the male line failed.

[21]A few cases of adoption include that by Joanna II, queen of Naples, 1414-35, adopting heirs when she was childless. There were also documented cases of adoption in France and Spain (Vassberg, 1998; Gager, 2014). Yet, these cases are of little concern for my purposes as it was neither widely practiced or used as a means of securing heirship. The high rates of extinction, as observed in many royal or elite lines, suggest adoption was not widespread.

adoption institutions until a policy shock led to differences emerging by the medieval period.

Within this historical context, one puzzle is why Western Europe abandoned adoptions that was a common feature of many agricultural societies. One explanation is theological. Contemporaries argued that adoption can overshadow the "divine adoption" of becoming God's child via baptism (Gager, 2014). The church also discouraged emphasis on earthly concerns such as by using adoption to determine wealth transmission after death.[22] Despite the bible including a few cases of adoption, such as that of Moses, the idea was that adoptions motivated by wealth inheritance was wrong.

Alternatively, Goody (1983) argues that the change was motivated by the financial benefit of the church. The shift in policy happened after laws changed allowing the church to own property from the 4th century. This encouraged the church to increase its properties by accepting "god's share" of bequests from childless families who willed it to them.[23] Interestingly, both of the major explanations show there was little awareness of the potential consequences for inequality. Further, the financial incentives for the church may have led to the persistence of this policy. The consequence of this institutional change in Europe was the widespread use of marriage and wills to redistribute the land of the extinct which gradually generated greater inequality.

Empirical Evidence: Adoption and Inequality

I use evidence from three Japanese villages where the annual censuses have continuously survived allowing for the construction of annual panel data. The data includes information on landownership, household composition, the relationship of each member to the household head, and the names and ages of all individuals over many generations. The use of annual observations is important for identifying adoption. Household members are recorded as adopted when they enter the household but lose this distinction if they become the household head, as they often did. The annual data also allows me to observe households that go extinct due to the lack of heirs.

Due to the need for detailed data, this is a limited sample. Two villages, Ishibushi village, with observation from 1752-1812, and Tonosu village, with observation from 1790-1859, are from the

[22] One fifth century priest, Salvian, made this point by stating that through adoption, "some very wretched and most unholy people, who are not bound by the bonds of children, nevertheless provide for themselves chains with which to bind the unfortunate necks of their own souls". See Goody (1983) 101.

[23] This may have been a highly successful source of revenue as one estimate states one third of the productive land in France was owned by ecclesiastical hands by the end of the seventh century (Goody, 1983).

[Figure 6 here]

current region of Fukushima in northeast Japan while Hanakuma village, with observation from 1789-1869, is from the current region of Hyōgo. The size of the villages were close to average with the exception of Ishibushi which was slightly smaller. They were also relatively equal with Gini coefficients ranging from 0.39-0.47 but these factors should not affect adoption behavior. While this is just three villages within Japan, adoption occurred throughout Japan at this time (Ōnuma, 2018). If anything, the adoption rates were lower in these three villages than other villages so I may underestimate the effects (Ōto, 1996; Okada, 2006) (for further details, see Appendix H).

I first show how Japanese households performed at biologically producing male heirs. To do this, I take each household-generation and look at the number of surviving heirs at the end of their reproductive cycle. This under counts the number of surviving heirs because I only observe male sons who are resident in the village. However, these were stem households so it would have been rare for all sons to out-migrate and leave the household heir-less.

I plot the number of surviving heirs against landownership in bins in figure 6a.[24] The data shows that the land poor class, with less than 1 koku of holdings, had a 34% chance of having no male heir while the land rich had a slightly lower chance of 24%. Therefore, landownership could increase fertility and lessen the probability of having no heir but this also had its limits.

This was equally true for other societies, including the elite of England in normal years and times of calamity (see figure 6b).[25] I find that 28% of English elite households had no male heir during normal years, and an even larger 42% failed to have a male heir during the century after the black death when mortality rates rose. This relationship was highly stable over many centuries and we know the later elites did no better at securing heirs (Gobbi and Goñi, 2021). Therefore the securing of male heirs was a common issue for these societies due to 1) half of children being female and 2) the high mortality rate during this era meant approximately one third of children died before adulthood (Wrigley et al., 1997).

[24]The end of reproduction was usually when the wife was age 45 but could be earlier due to mortality of one member of the couple. The average landownership was 4 *koku* (a local unit measuring value in volume of rice). The bins are 0, 0 to 1, 1-3, 3-5, 5+ in koku units. Those below 1 koku can be considered land poor and those within the 6 koku bin can be considered land rich.

[25]I use data from the inquisition post mortem as collected by Russell (1948) to plot the number of male heirs who inherited the land upon the death of an elite class, the tenant in chief, who held feudal land tenure from the king. Only single male heirs were recorded, and if none existed, all female heiresses were recorded.

[Table 4 here]

[Table 5 here]

Adoption was an institution that could resolve the issue of heirship. The Japanese peasants often adopted adult men to marry into their household. The adoptee would usually be the surplus sons of other peasants, who were not in line to inherit lands. They did not have to be relatives, as in other societies, although this was preferred. In the extreme the next generation could be composed of total strangers (Kurosu and Ochiai, 1995; Kurosu, 2013). Adopting adults had the advantage of reducing risk associated with mortality at younger ages.

Unlike the modern Western style adoption where child welfare is a key motive, the Japanese adopted in order to preserve the male line. Therefore, adoption was not coincidentally solving the issue of heirship in some households. Rather, it was expressly used to resolve the issue of heirship. I can causally show this by testing whether parents had adopted a male heir by the end of their reproduction conditional on their success at biologically producing male heirs as shown in equation 2.

$$Adopted\ Male\ Heir_i = \alpha_v + \beta_1 Biological\ Male\ Heir_i + \beta_2 landownership_i + \epsilon_i \quad (2)$$

The dependent variable is a dummy for whether the parents adopted a son by the end of their reproductive cycle. This will capture a subset of adoptions that eventually occurred. The key independent variable is either a dummy of whether a male heir exists or the number of male heirs. I instrument this with the sex of the child for the first observed birth which is exogenous.[26] As controls, I use village fixed effects and the quantity of landownership.

Table 4 shows the instrument of the sex of the first child is highly correlated with male heir-ship. Using the instrument, I show that the lack of heir increased the chance of adoption by 0.44 which is much higher than the OLS based estimate. I get a similar result if I change the independent variable to the number of heirs. I can also account for the ages of the children and their chances of survival to adulthood or whether any sons had left the village but the results remain the same (see appendix I). The magnitude of these results show the lack of male heirship was the key driver of adoption in Japan at this time.

[26] Although infanticide was common at the time, it would have been extremely rare for this to occur on the first birth. Moreover, there was not sex-bias in infanticide but instead there was sex-balancing (Drixler, 2013). In line with this, 82 of 177 observed first births were male which is slightly less that 50%.

[Figure 7 here]

How did this affect household extinctions? To answer this, I reorganize the data and take one observation at the point of household succession (when the household head changes) or extinction. I estimate how landownership affected household disappearances and extinctions.

$$Extinction_i = \alpha_v + \beta_1 landownership_i + \epsilon_i \tag{3}$$

The dependent variable is household extinctions. As household extinctions are not explicitly mentioned in the census, it can be liberally defined as cases in which households disappear from the village census. However, this definition may also capture migration (although household migration was rare) so I also make a conservative definition based on households that both disappear and have no potential heirs. The main explanatory variable is landownership measured by the value of the land in *koku* as explained above. I use village fixed effects to control for village heterogeneity.

One concern is that households deciding to go extinct may have slowly sold off their lands leading to reverse causality. I therefore instrument landownership with a 20 year lagged landownership which should precede the decision to sell off lands and address reverse causality.

I find that regardless of the definition of household extinction, landownership had a strong negative effect (see table 5). The magnitude appears small but this is because only 14% of households disappeared and only 4% went extinct per generation. Therefore, the estimates suggest owning lands quickly reduced the probability of extinction to zero. As explained earlier, the negative correlation between household extinction and landownership should theoretically have decreased landownership inequality.

Another way of addressing the effect of adoption is to look at the rate of adoption/extinction. To do this, I take each household-year as an observation and estimate the effect of landownership on extinction which I show in figure 7a.[27] The striking finding is that households with the average (3.5-4 *koku*) or above in landownership were not going extinct. This was clearly driven by adoption, defined as the number of cases where an adoptee succeeded the household as plotted in figure 7b. Adoption rates were much higher among the rich which is consistent with findings from (Kurosu,

[27] I use village fixed effects and landownership bins of 0, 0-1, 1-3, 3-5, and 5+. The average landownership was 3.5-4 *koku* of land.

2013) for other villages in contemporary Japan. Adoption also functioned close to its theoretical ideal of preventing all household extinctions. This is not surprising as both the adopter and adoptee had much to gain from the relationship. Adoption also functioned, but to a lesser degree, among poorer households. Most notably, it was land poor households with lands worth less than 1 *koku* or those that were landless that had the highest rate of extinction. While some of these households succeeded in finding adoptees before death, others failed due to the small amounts of landownership. However, the extinction of the landless must have decreased inequality because poor households tended to disappear, decreasing the share of the poor within villages.

How effectively did adoption insulate lands from being redistributed via social mechanisms? One measure of this is the share of lands owned by households that went extinct. I find extinctions led to only 10% of lands being redistributed per century. Such lands were taken by relatives or passed to village organizations who at times found families to take over the land (Okada, 2006). This contrasts with the English data in figure 6b where 20-30% of the richest male lines were going extinct per generation suggesting 60-90% of lands would have been transmitted to other male lines within three generations or approximately one century. Although there is no comparable data to track landownership in England, there is no shortage of documented cases of households becoming rich due to marriages to heiresses (Clay, 1968; Habakkuk, 1994; Payling, 2001; Broad, 2004).[28] The assortative matching involved in marriage meant the lands of the rich generally stayed among the rich (De La Croix et al., 2019; Clark and Cummins, 2022).

Finally, was there greater equality in Western Europe preceding the 4th century? While this would be a desirable piece of evidence, there is little evidence for land inequality from Ancient Europe. What exists come from Roman Egypt, which may be informative due to it being part of the biggest empire in Europe (Bagnall, 1992). The first is from 216 CE in the village of Philadelphia in the Fayum where the gini coefficient was 0.53 for private lands excluding the landless. The second is from 308/309 CE in the village of Karanis where the gini coefficient for private lands was 0.43 excluding the landless. These are similar numbers to post-black death rural Italy where the inequality figures also excluded the landless. While these are two small case studies, these findings are consistent with a relatively equal society.

[28]For example, Broad (2004) documents the rise of the Verney family from the 17th century as a consequence of three generations of eldest sons marrying substantial heiresses with no evidence of initial sentimental attachment.

Conclusion

This paper began by questioning whether high wealth inequality was a universal or Western phenomenon. The first section of the paper showed that high wealth inequality seems to have been a Western phenomenon. Detailed data from 584 villages in Japan, 1640-1870, showed no trend in landownership inequality. Moreover, an estimate of landownership inequality for Japan as a whole suggests low inequality with Gini coefficients of 0.57. This low landownership inequality was not limited to this time and place. Fragmentary evidence from over a millennia across East Asia is also consistent with a very long-run equilibrium of low inequality. This contrasts with the finding in the literature that Western Europe converged towards high inequality in landownership, with Gini coefficients above 0.7. This trend was also a long-run phenomenon that preceded the black death. The west converged towards societies of landless laborers while the east converged towards societies of land-owning peasants.

I then proposed a new mechanism explaining why Japanese land inequality was so different from Western Europe. I showed how adoption played a critical role in securing male heirs and led to lands being kept in the male line in East Asian societies. In the particular case of Japan, I showed that similar to Western Europe, households with all levels of wealth struggled to secure biological heirs. However, adoption was used as an heirship strategy to insure against the lack of biological heirs. Adoption functioned very effectively at keeping land within the male line. Almost no households with more than the average level of land went extinct. It was only land poor and landless households, with marginal amounts of land, that went extinct.

In contrast, land transmissions were very different in Europe. Although similarly rich land data is not available, the genealogies of the rich suggest household extinction occurred in at least one quarter of cases per generation. Therefore, within a century, over three quarters of the lands must have been inherited outside the male line via social mechanisms, such as the marriage of an heiress or will. This led to a gradual concentration of land among households that inherited the lands of extinct households.

Finally I discussed the validity of this mechanism for explaining the different outcomes observed in Western Europe and East Asia. I show that institutions were actually very similar across Eurasia in ancient times. It was the Christian church's teachings against adoption, beginning in

the fourth century, that led to a gradual divergence in the use of adoption. By the early middle ages, adoption became rare in Western Europe while it continued to be practiced in East Asia. One implication of this mechanism is that high inequality in Western societies may have been an unintended consequence of church policy stemming from the 4th century.

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Table 1: Long Run Trends by Region

	Japan					Italy		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	West	Central	East	Northeast	Tuscany	Piedmont	Venice
Time	-0.035	0.012	0.044*	-0.005	-0.077	0.069***	0.062***	0.076**
	(0.032)	(0.039)	(0.024)	(0.035)	(0.051)	(0.006)	(0.014)	(0.027)
preblack						0.110***		
						(0.034)		
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	1924	458	282	387	797	99	27	26
Adj-R^2	0.913	0.981	0.941	0.804	0.847	0.646	0.840	0.589

Standard errors are in parenthesis and clustered by village.
$*p < 0.1, **p < 0.05, ***p < 0.01$
Source: Japanese inequality data

Table 2: Village-level Landownership Inequality Estimates for Tokugawa Japan

Region	Gini	Share	Wealth Owned by		
		Landless	Bottom 40%	Top 20%	Top 10%
Kyushu	0.59	0.17	0.06	0.63	0.45
Shikoku	0.60	0.17	0.06	0.64	0.46
Chugoku	0.55	0.11	0.07	0.58	0.40
Kinai	0.69	0.34	0.02	0.73	0.53
Tokai	0.52	0.10	0.08	0.55	0.37
Tosanchubu	0.60	0.16	0.05	0.64	0.46
Hokuriku	0.65	0.20	0.03	0.69	0.50
Kanto	0.50	0.07	0.10	0.55	0.38
Tohoku	0.57	0.19	0.07	0.61	0.42
Japan	0.57	0.15	0.07	0.61	0.43

All prefectures are weighted by rural population in the 1870s in order to calculate overall inequality.
Source: Japanese inequality data

Table 3: Wealth Inequality in Pre-industrial Societies

Country	Year	Type	Unit	Gini	Landless %
East Asia					
China	1930s	Land	Rural Households	0.35–0.43	17–33
Japan*	1647-1872	Land	Rural Households	0.57	16
Western Europe					
England*	1720-1850	Land	Rural Adult Males	0.7-0.9	40-60
France+	1825	Land	Rural Households	0.71	
Germany+*	1800	Real Estate	Rural Households	0.53	
Sweden	1750	Wealth	Rural Households	0.72	50.4
Denmark	1789	Wealth	Rural Households	0.87	59
Finland	1800	Wealth	Rural Adult Males	0.87	71
Northern Spain	1749-59	Land	All Households	0.87	
NW. Italy+*	1700-99	Real Estate	Rural Households	0.77	
NE. Italy+*	1750	Real Estate	Rural Households	0.79	
Central Italy+*	1700-99	Real Estate	Rural Households	0.75	

+ indicates propertyless are excluded. * indicates village-level estimates. Chinese estimates from the 1930s use figures for North China and South China to get a range of Gini coefficient. The proportion landless is from two different estimates for all of China in Buck (1937). English estimates are based on land areas rather than values. French estimates are based on tabulated data from Heywood (1981) as described in appendix F. Northern Spain's estimates are from Palencia, Northwest Italy estimates are from Piedmont, Northeast Italy estimates are from the Republic of Venice, and Central Italy estimates are from Tuscany.
Sources: Buck (1937), Soltow (1979), Heywood (1981), Soltow (1981), Brandt and Sands (1990), Kung et al. (2012) , Alfani (2015), Nicolini and Ramos Palencia (2016), Alfani and Ammannati (2017), Bengtsson et al. (2018), Alfani and Di Tullio (2019), Kumon (2021)

Table 4: Adoption and Male Heirship

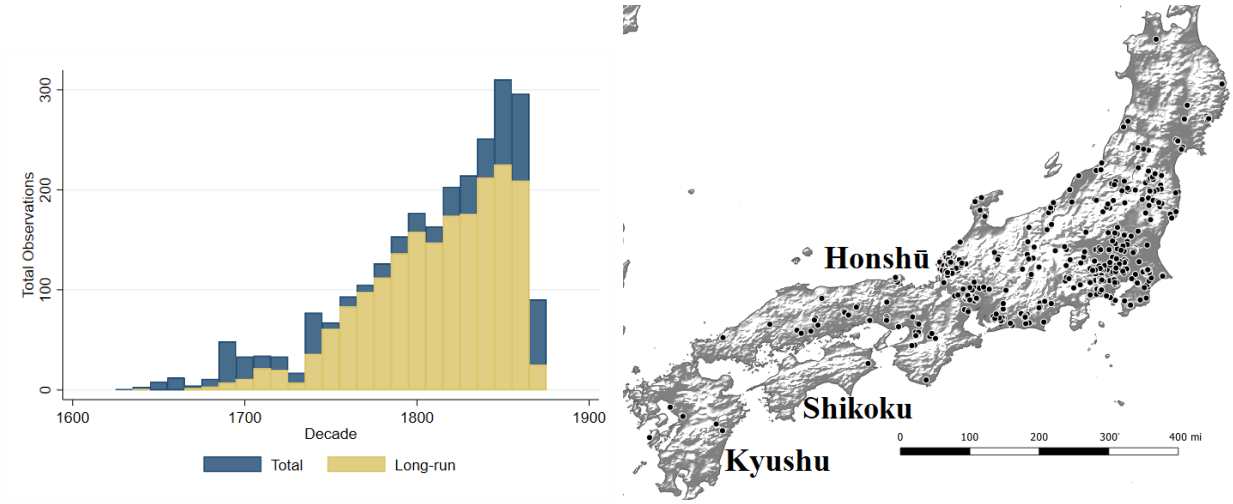
	(1)			(2)		
	OLS	1st Stage	2nd Stage	OLS	1st Stage	2nd Stage
=1 if No Bio. Heir	0.231***		0.443**			
	(0.044)		(0.196)			
Number of Heirs				-0.107***		-0.201**
				(0.019)		(0.095)
Landownership (Koku)	0.002	-0.000	-0.001	0.002	0.006	0.000
	(0.003)	(0.009)	(0.005)	(0.003)	(0.019)	(0.006)
=1 if First Child Male		-0.201***			0.444***	
		(0.062)			(0.131)	
Village FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	350	177	177	350	177	177
Adj-R^2	0.103	0.060	0.149	0.077	0.047	0.032
First Stage F-stat			10.674			11.478

Huber-White robust standard errors in parentheses.
$*p < 0.1, **p < 0.05, ***p < 0.01$
The dependent variable is whether there is an adopted heir within the household at the end of reproduction. Heir refers specifically to male heirs. Koku is a local unit measuring value in volume of rice.
Source: DANJURO database

Table 5: Landownership and Extinction

	(1) Household Disappearances			(2) Household Extinctions		
	OLS	1st Stage	2nd Stage	OLS	1st Stage	2nd Stage
Landownership	-0.022***		-0.022***	-0.007***		-0.009***
	(0.004)		(0.005)	(0.003)		(0.003)
20 YR Lagged Landownership		0.871***			0.871***	
		(0.049)			(0.049)	
Village FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	336	336	336	336	336	336
Adj-R^2	0.113	0.655	0.113	0.018	0.655	0.016
First Stage F-stat			321.655			321.655
Mean Dep. Var.	0.095	3.346	0.095	0.039	3.346	0.039

Huber-White robust standard errors in parentheses.
$*p < 0.1, **p < 0.05, ***p < 0.01$
The dependent variable is whether a household went extinct at the point of succession. Heir refers specifically to male heirs. Koku is a local unit measuring value in volume of rice.
Source: DANJURO database



(a) Observations by Decade **(b) Observations Across Space**

Figure 1: Observations Across Space and Time

Source: Japanese inequality data

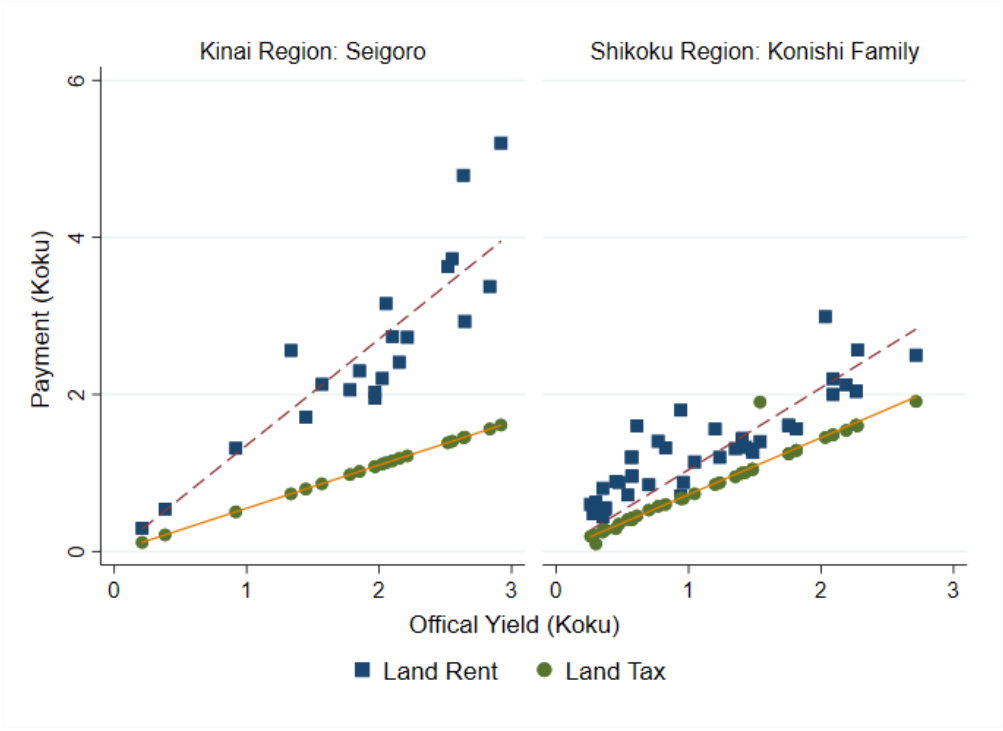
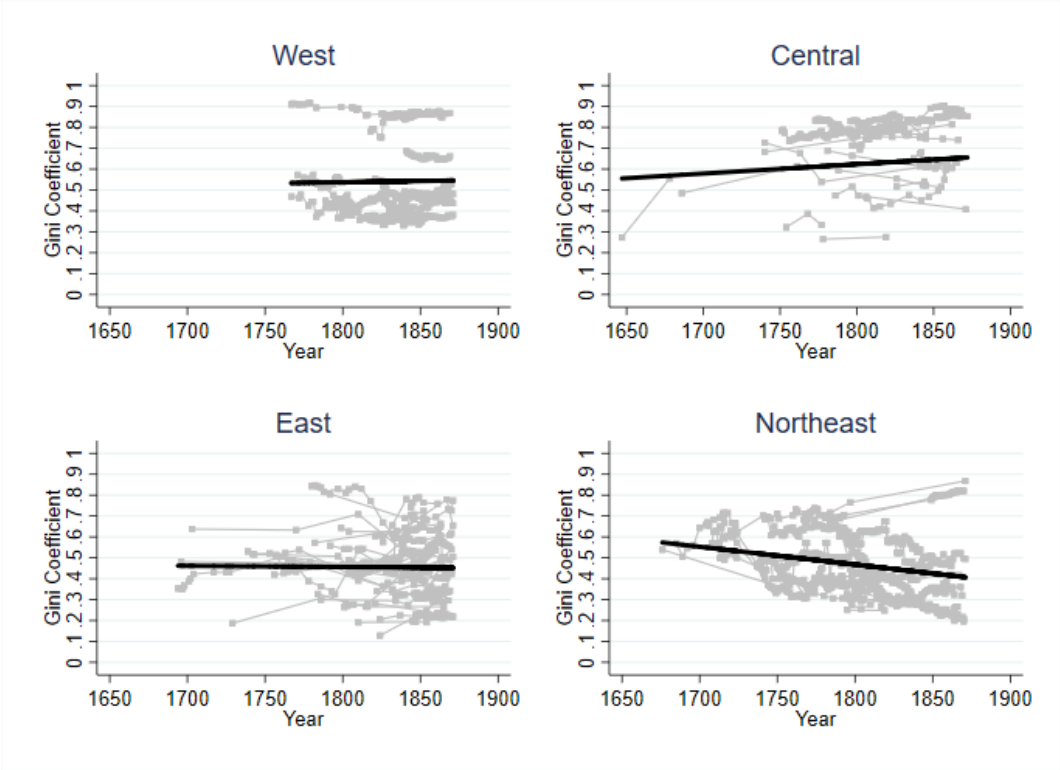
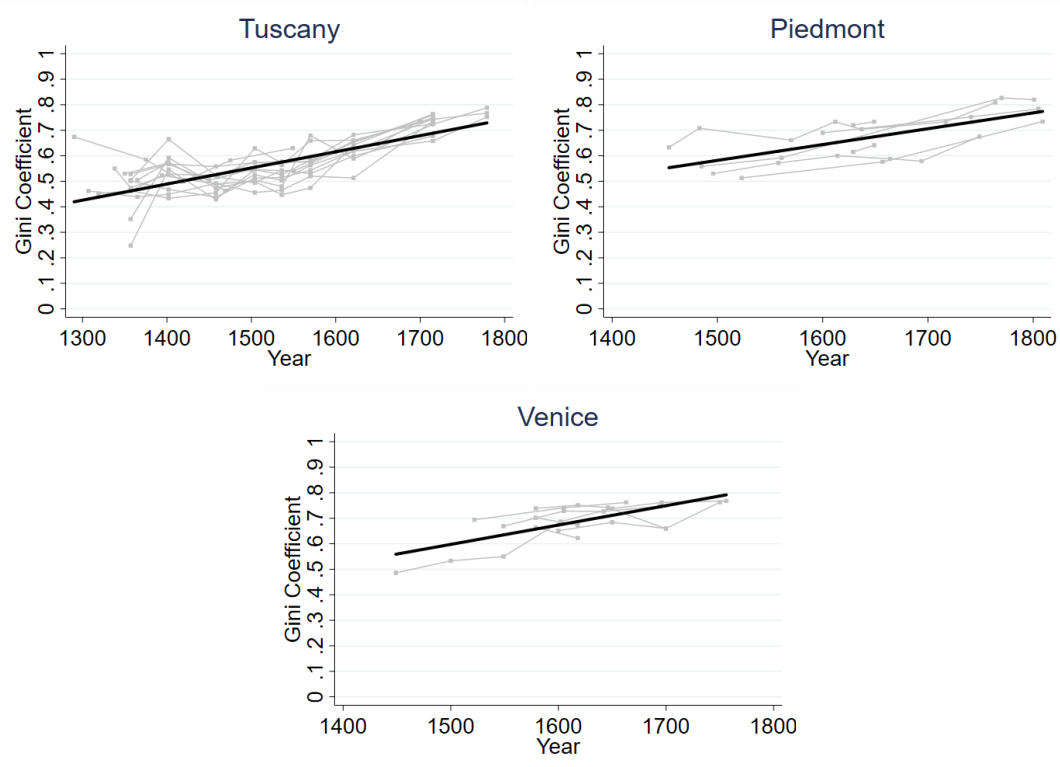


Figure 2: Land Rents and Land Tax Relative to Official Yields

Source: Takeyasu (1966) and Shoji (1986)



(a) Japan



(b) Italy

Figure 3: Pre-industrial Rural Wealth Inequality Dynamics

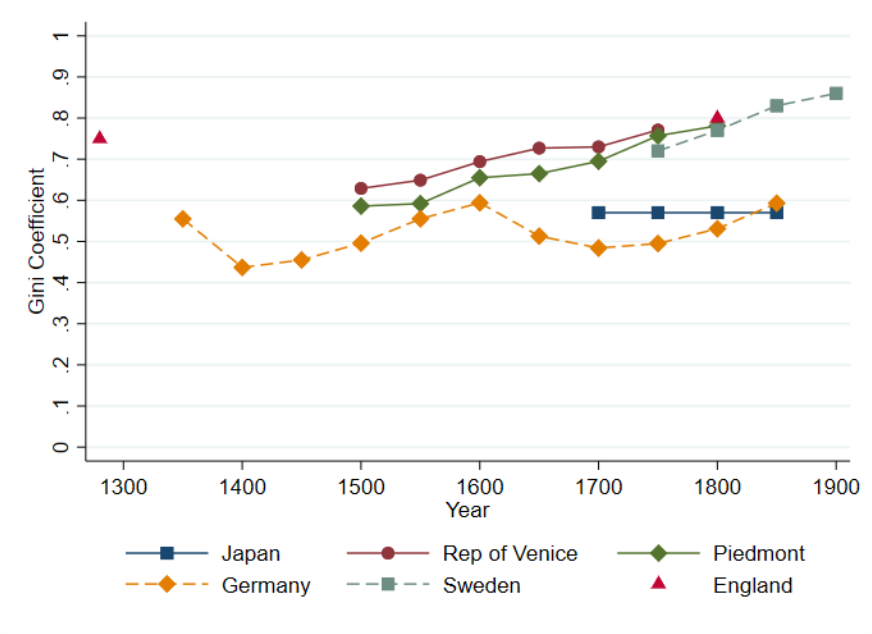
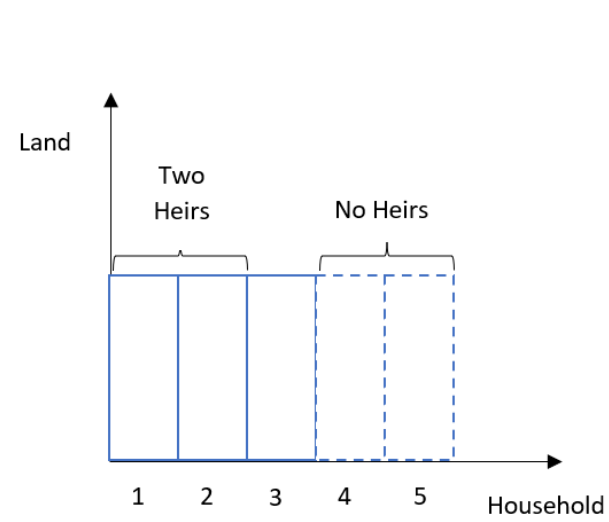
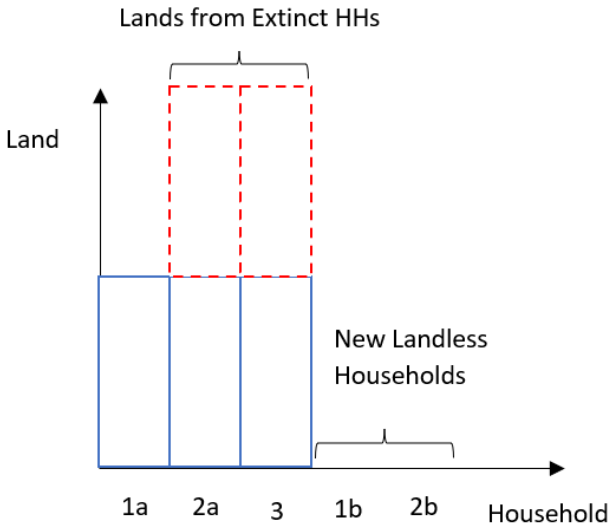


Figure 4: International Trends in Rural Wealth Inequality

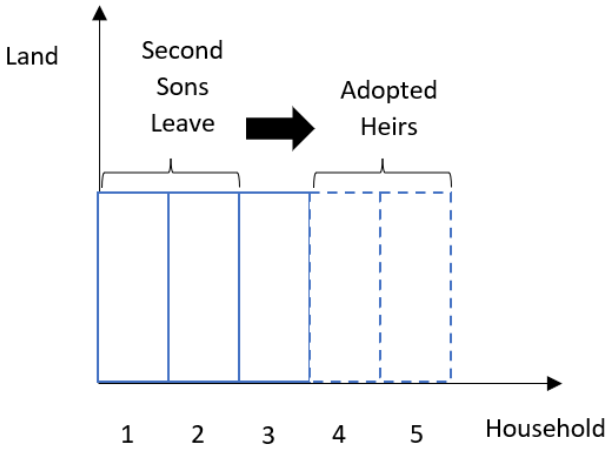
Sources: Japanese inequality data, Alfani (2015), Bengtsson et al. (2018), Alfani and Di Tullio (2019) Alfani et al. (2022), Kumon (2021)



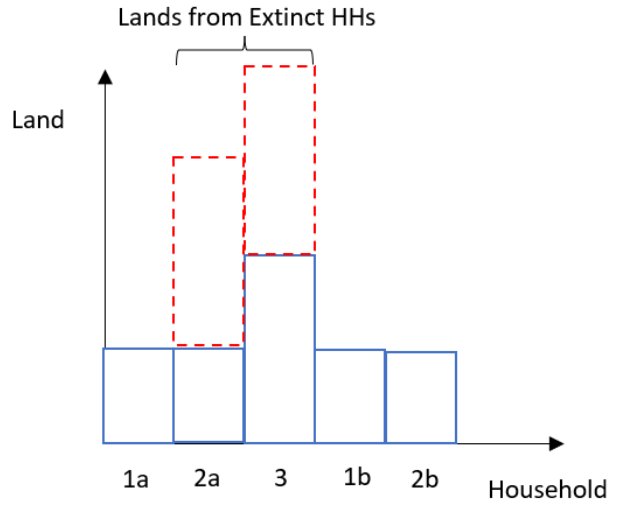
(a) First Generation



(b) Second Generation: No Adoption and Impartible



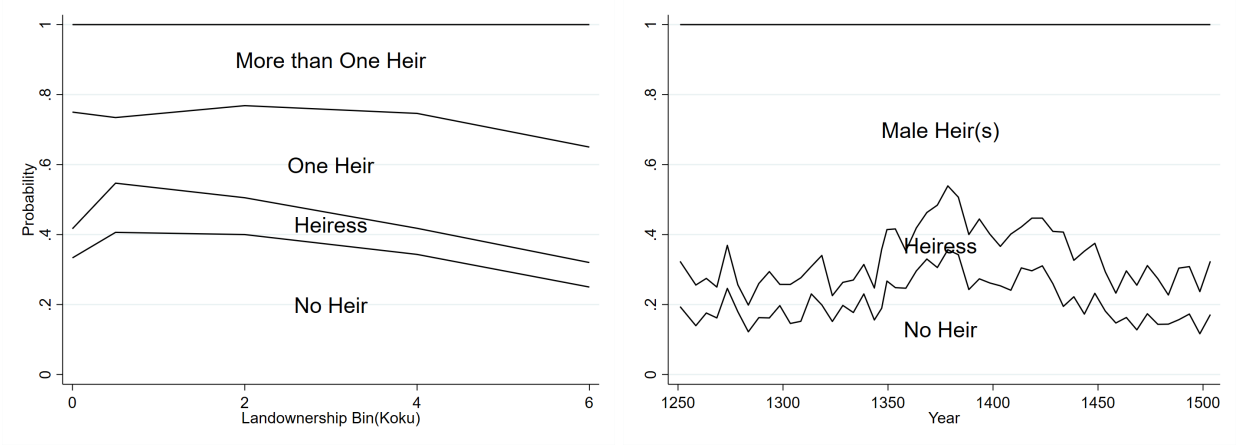
(c) Second Generation: Adoption



(d) Second Generation: No Adoption and Partible

Figure 5: Land Distribution Across Two Generations

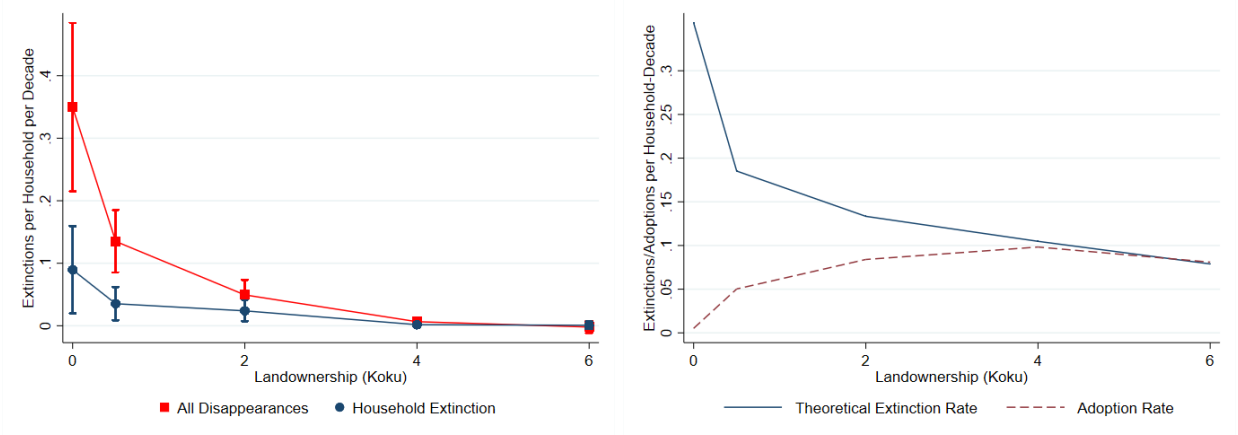
Households a and b refers to new households formed by two sons from the same household, excluding the case of adoption.



(a) Japanese Heirship by Landownership **(b) English Elite Heirship over Time**

Figure 6: Share of Households by Biological Heirship

Note: I use the number of biological heirs listed in the sources at the end or reproduction (Japan) or at the point of death (England).
Source: Japanese inequality data, Russell (1948)



(a) Extinction Rates **(b) Adoption and Theoretical Extinction Rates**

Figure 7: Rates of Extinction and Adoption per Decade by landownership

Online Appendices

A Regional Composition of Edo Japan

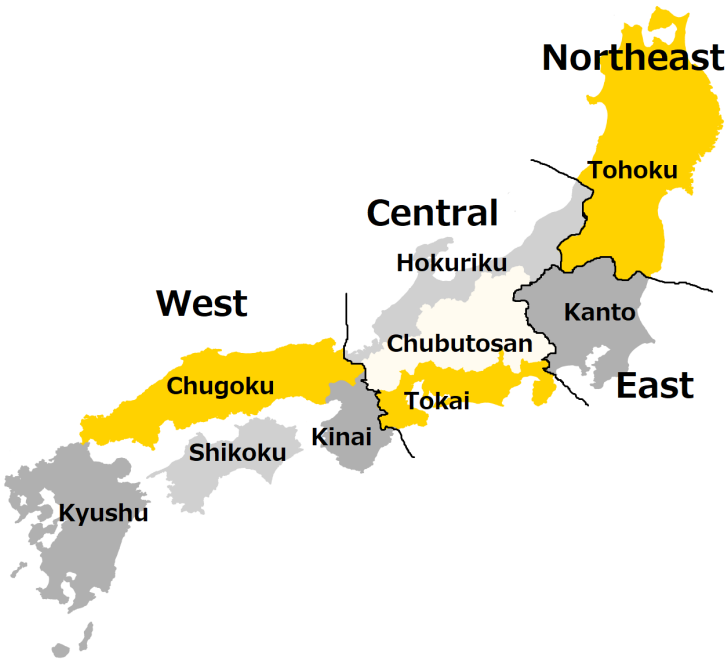


Figure A1: Defined Regions of Japan

The commonly used regional definition during the Edo period, the gokishichidō, were created based on roads stretching away from the former capital of Kyoto. This means the regions were not defined based on proximity which is desirable when grouping provinces. Therefore, I grouped provinces into region as defined by figure A1 which are closer to modern regional definitions.[29] These definitions make sense as they better adhere to natural or economic cohesion. For example, the Kinai region is centred around the Osaka plains and the Kanto region dominated by the Kanto plains, each of which are surrounded by mountainous terrain. On the other hand, other regions were less economically cohesive but were defined by features such as mountain ranges in the case of the Chubutosan region. These regions generally match the patterns in inequality making them useful geographic units. I also define larger geographical units, West, Central, East, and Northeast,

[29]There are a few notable tweaks. Chugoku refers to the combination of the *Saniin* and *Sanyō*. Kinai includes *Kii* province, which was traditionally grouped with Shikoku, to avoid complications in border. The Chubutosan region attempts to merge the current *Chubu* region with the traditional *Tosan* region. It attempts to capture the central mountain ranges so it notably includes *Kai* province.

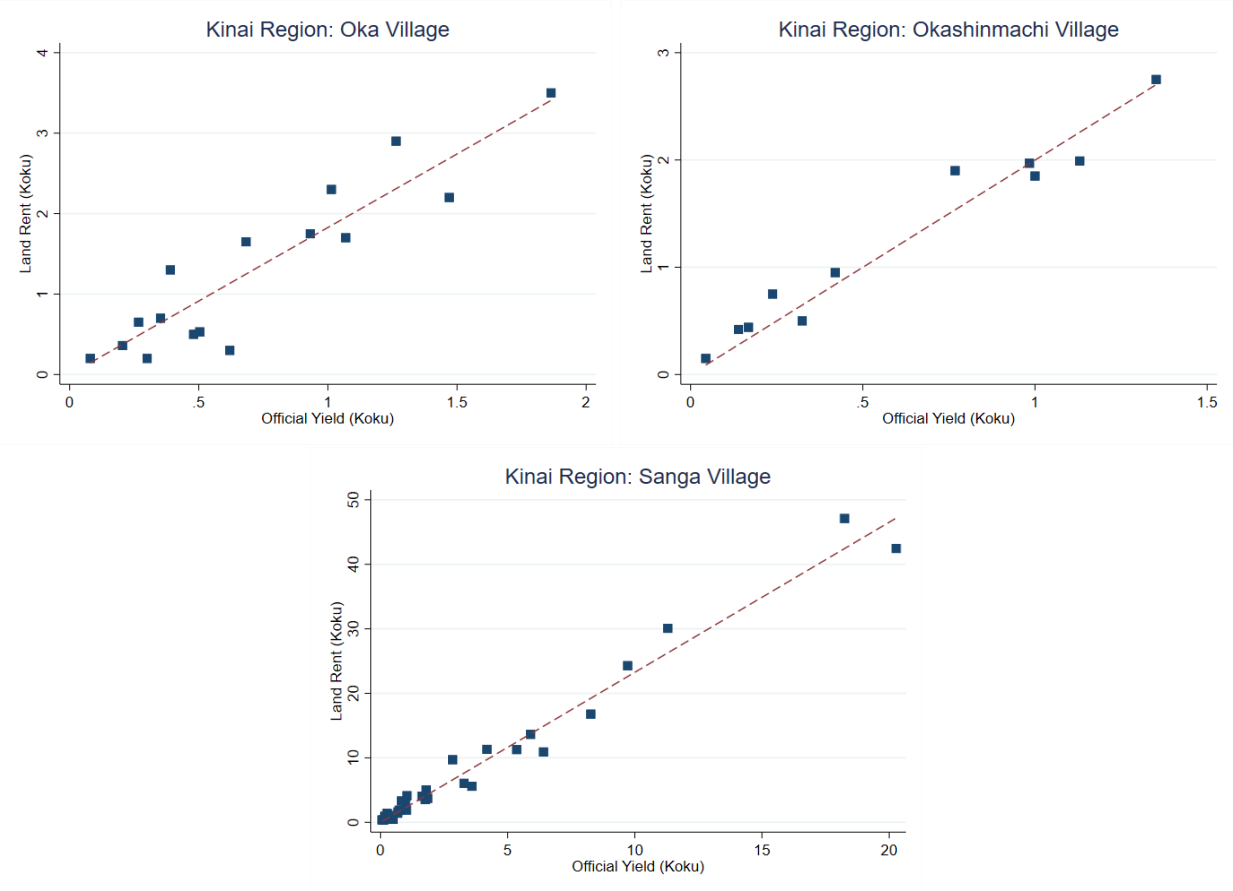


Figure A2: Rent by Land Plot

but this is purely for purposes of presentation.

B Data

B.1 Testing the Accuracy of Official Yields as a Measure of Value

Figure A2 plots the observations from villages in which only land rent and official yields are available. The observed land rents adhere closely to the best linear fit that passes the origin. There is also no clear non-linear correlation between official yields and land rents.

One way of measuring the variation from the line of best fit is to take the coefficient of variation of the rent divided by the official yield. If the rent was a multiple of the official yield, this would imply the official yield was a good measure of the value of land. I find the coefficient of variation was 0.37 (Seigoro's holdings), 0.19 (Konishi family), 0.41 (Oka village), 0.26 (Okashinmachi village),

Table A1: Additional Summary Statistics of Villages

Region	Num. of Villages	Num. of HHs	Gini	SD of Gini
Kyushu	5	82.71	0.54	0.22
Shikoku	1	8.00	0.35	.
Chugoku	26	55.62	0.52	0.13
Kinai	14	64.73	0.63	0.21
Tokai	40	71.59	0.49	0.15
Tosanchubu	59	64.86	0.61	0.15
Hokuriku	153	49.04	0.64	0.15
Kanto	193	54.55	0.50	0.16
Tohoku	93	75.36	0.44	0.18
Japan	584	60.41	0.53	0.17

Source: Japanese inequality data

0.41 (Sanga village) with the average being 0.33. This is downwardly biased because I assume all lands and owned within a village. However, some of these landowners likely had a few holdings in other villages which can introduce further variation due to differences in land quality, climate, crop type, or the surveyors in the cadastral survey.

Despite this, there remained some variation in land rents relative to yields. The main reason for variation is due to changes in productivity and changes in plot size since the cadastral surveys. As taxes per plot were usually fixed relative to the official yield, any other increases in yield were not taxed. These findings show that despite such increases in yields, the variation did not become large on average. This is because plot size increases were limited due to spatial constraints. Further, technology likely diffused evenly within a village. The other main reason for measurement error is that there was measurement error within the cadastral survey.

B.2 Summary Statistics of Dataset of Villages

I show the summary statistics where each village is equally weighted. For the national level estimates, each region is equally weighted. The number of households in each village averaged 60 suggesting reasonably large villages. Unfortunately, I do not have the number of individuals in many of the villages where only the household land ownership is listed. However, given average households would have had 3-4 people, this suggests populations of around 200 in the average village.

Table A2: The Correlation of Inequality Measures

Gini	Prop. Landless	Share b20	Share b40	Share t20	Share t10
Prop. Landless	0.72				
Share b20	-0.75	-0.62			
Share b40	-0.90	-0.75	0.89		
Share t20	0.96	0.71	-0.65	-0.85	
Share t10	0.93	0.60	-0.56	-0.75	0.95

Source: Japanese inequality data

B.3 Correlation of Inequality Measures

The main part of the analysis uses Gini coefficients due to the high correlation of all inequality measures as can be seen by the correlation matrix in table A2

C Spatial autocorrelation

The degree of this correlation is estimated by looking at spatial correlation which can be measured using Moran's I statistic.28 This statistic essentially measures the correlation coefficient of observations across space with a positive (negative) indicating positive (negative) spatial correlation. Thu null is zero spatial correlation, so that the error term e(s) is totally random. This means geographic proximity would have zero predictive power for inequality.

Figure 9 plots a non-parametric estimate of Moran's I statistic across distance. It shows the postive spatial correlation exists up to approximately 100 miles. Thus, I can use nearby observations of up to 100 miles to account for areas with no observations. 100 miles is much bigger than prefectures so I can use village inequality observations to estimate prefectural averages.

D Robustness of Trends

D.1 Non-linear Trends

One concern is that dynamics in inequality over time are not captured by a simple linear trend. In the case of Italy, the black death reduced inequality and broke the trend. In the case of Japan, major famines hit regions to various degrees in the 1730s, 1780s, and 1830s which could have impacted inequality. Could the noise caused by such events have concealed the underlying trend?

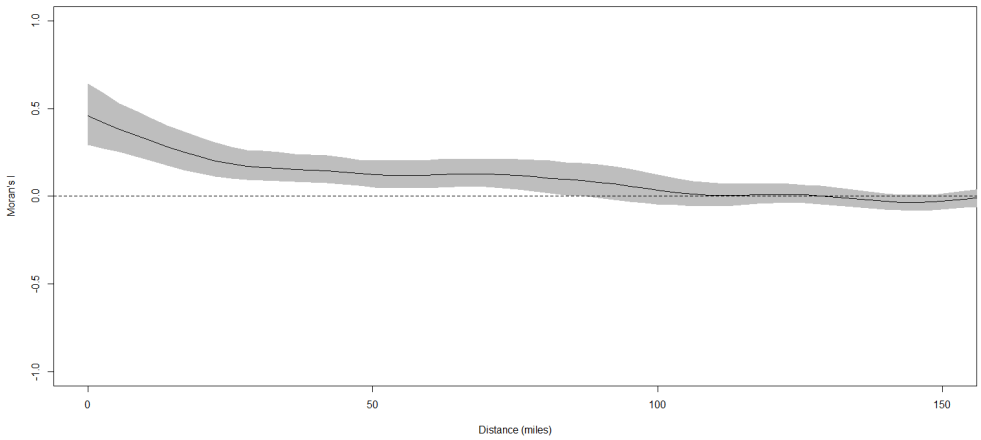


Figure A3: Spatial correlation of Inequality

I use gini coefficients as the measure of inequality.
Source: Japanese inequality data

To account for this, I attempt to capture how the slope of inequality trends were changing over time by estimating equation 4.

$$\frac{Gini_{v,d} - Gini_{v,d-k}}{k} = \sum_{d} \beta_d decade_d + \epsilon_{v,t} \tag{4}$$

I take one observation per village-decade by using the year closest to the middle of the decade. If there is an identical but changing trend among all villages, I should be able to detect patterns over time. I adjust for multiple testing using a Bonferroni correction.

Figure A4 graphically shows the results. No obvious pattern emerges with the slope meandering around zero change. The main concern, which was a hidden gradual increase in inequality, cannot be detected using this methodology.

D.2 Cross-Village Holdings

Another concern with the long-run estimates of village level inequality is that cross-village landownership may be increasing. This could result in increasing inequality because the rich tend to have more cross-village inequality. However, my data only includes land within the village held by villagers so this may not be detected in my measures of within-village inequality. One robustness test for this concern is to estimate the trend in the total land owned by residents of the village.

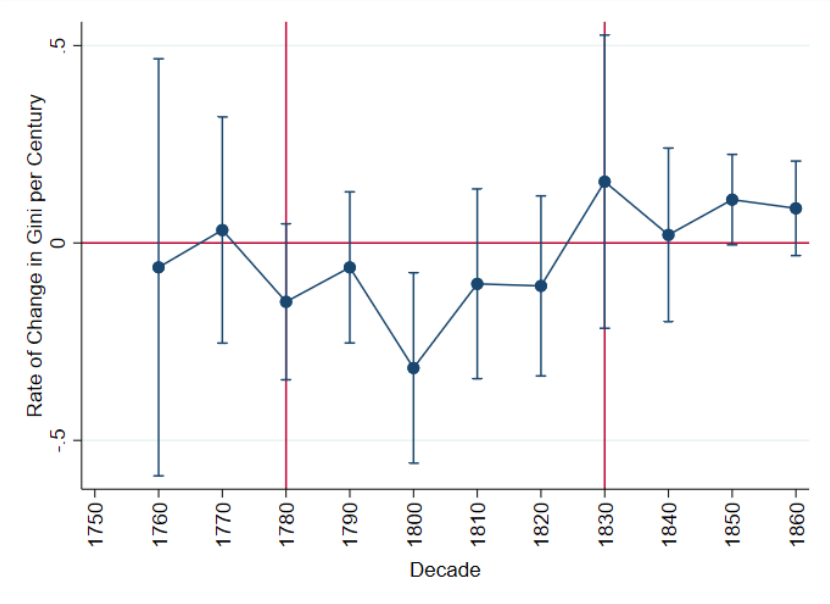


Figure A4: The Rate of Change in Gini in Japanese Villages

95% Confidence Interval plotted. Bonferoni adjusted standard errors. All observations weighted by village population. Vertilcal lines indicate the decade of famine.

If this is not increasing, this would suggest cross-village holdings were not increasing. However, a negative effect in itself would not necessarily mean cross-village holdings were increasing. This could be driven by famines that are known to have depopulated the region and led to the abandonment of much land. Such a channel would also decrease total landownership among villagers but not increase cross-village holdings.

The results of a village fixed effect regression with the dependent variable being the total landownership are given in table A3. They show the lack of any statistically significant increase in cross-village holdings in Japan as a whole. The same can be said when I split the data by regions although the standard errors are much larger. There is no evidence that cross-village holdings are driving my results.

D.3 Weighting by Village-decade

I weight the data so that each village-decade gets the same weight. This does not change the results except to make the positive trend in central Japan insignificant.

Table A3: Trends in Total Land Owned by Villagers

	(1) All	(2) West	(3) Central	(4) East	(5) Northeast
Time	-0.031	0.023	-0.113	-0.068	-0.001
	(0.031)	(0.063)	(0.078)	(0.052)	(0.045)
Village FE	Yes	Yes	Yes	Yes	Yes
Obs	1924	458	282	387	797
Adj-R^2	0.486	0.322	0.305	0.548	0.385

The dependent variable is total land as a share of the maximum observed land. Standard errors are clustered by village. Observations are weighted by village-decade-total households. Time is in unit of centuries.
Source: Japanese inequality data

Table A4: Long Run Trends by Region using Village-Decade weight

	(1) All	(2) West	(3) Central	(4) East	(5) Northeast
Time	-0.025	-0.005	0.028	0.003	-0.070*
	(0.023)	(0.033)	(0.030)	(0.033)	(0.037)
Village FE	Yes	Yes	Yes	Yes	Yes
Obs	1924	458	282	387	797
Adj-R^2	0.900	0.965	0.940	0.819	0.851

Standard errors are clustered by village. Observations are weighted by village-decade. Time is in unit of centuries.
Source: Japanese inequality data

E Estimating Inequality Levels

In order to backwards project inequality in prefectures with no (or low) observations, I estimate the following regression.

$$Preindustrial\ inequality_i = \alpha + \beta Modern\ inequality_i + \epsilon_i \tag{5}$$

Each village is one observation and I weight each village by the total number of households. This means bigger villages get a heavier weight which makes sense because they should hold greater information on inequality.

If I assume there is a certain correlation between the two measures, I can "predict" the dependent variable using modern inequality data for prefectures in which the pre-industrial measures are unavailable. This is an important process because I am missing observations in some prefectures and inequality varied by prefecture. Therefore, this backward projection allow me to account for heterogeneity across prefectures when a particular prefecture has zero observations.

The modern inequality data is taken from the share of land under tenancy, 1883-1895, as recorded by Arimoto et al. (1984). As the data was not available in all years for all prefectures, I use the first year in which the data becomes available. This means most data is from 1883 or 1884 and the mean year is 1884. With the exception of one prefecture, Toyama prefecture whose first datapoint is 1895, the observations are before 1888. The use of the first year available is due to the higher likelihood of correlation with past inequality. As a result, the modern inequality data was almost all collected within two decades of the collapse of the Tokugawa regime.

The results of the regression are presented in table A5. I find a very strong statistical correlation between the two measures of inequality across time. This is unsurprising due to the proximity of the two periods and the slow moving nature of landownership inequality. The only exception is the share landless, which may be due to the lower bound of zero for the share landless. In fact many villages had no landless households. However, the negative sign is consistent with our expectations so I use this measure.

Using these results, I then predict Tokugawa period inequality and backwardly project inequality levels for Japan as a whole. To do this, I have the option of using the backward projection or the

Table A5: Sample Averages: Preferred Weighting

			Wealth Owned by		
	(1) Gini	(2) Share Landless	(3) Bottom 40%	(4) Top 20%	(5) Top 10%
Land under Tenacny (%)	0.359***	-0.073	-0.156***	0.343***	0.295***
	(0.103)	(0.104)	(0.040)	(0.095)	(0.096)
Obs	584	584	584	584	584
Adj-R^2	0.046	-0.000	0.054	0.047	0.036

All villages are weighted by the number of households by region.
Source: Japanese inequality data

sample averages (if there are observations) for each prefecture. My preferred method is to use the sample averages if I have more than 3 observations. In all other cases, I use the backward projection.

However, my choice of cut-off of 3 villages is arbitrary. To address this I can go to the other extreme of using pure predictions (see table A6) but this does not greatly change the result. Another options is to ignore all prefectures with no observations. Table A7 shows these results which are also very similar. Finally, within the backward projection regressions, I could have weighted each village equally rather than using the number of households as a weight. Table A8 shows the result if I use this alternative method. The results are very similar. Finally, I can also include coastal villages in my regression. These were dropped because village level inequality measures have focused on non-coastal rural areas. However, coastal villages are included in national measurements of inequality. The results are shown in table A9 and there is no large difference. Therefore, the methodology does not seem to be driving the results.

Table A6: Village-level Landownership Inequality Estimates: Only Backward Projection

Region	Gini	Share Landless	Wealth Owned by Bottom 40%	Top 20%	Top 10%
Kyushu	0.55	0.17	0.07	0.61	0.43
Shikoku	0.57	0.17	0.06	0.63	0.45
Chugoku	0.54	0.12	0.07	0.59	0.40
Kinai	0.63	0.28	0.04	0.68	0.48
Tokai	0.49	0.10	0.09	0.54	0.35
Tosanchubu	0.58	0.17	0.06	0.62	0.44
Hokuriku	0.62	0.22	0.04	0.68	0.50
Kanto	0.48	0.06	0.11	0.55	0.38
Tohoku	0.50	0.16	0.10	0.56	0.38
Japan	0.54	0.15	0.07	0.60	0.41

Source: Japanese inequality data

Table A7: Village-level Landownership Inequality Estimates: Only Sample Averages

Region	Gini	Share Landless	Wealth Owned by Bottom 40%	Top 20%	Top 10%	Villages
Kyushu	0.54	0.08	0.08	0.60	0.42	5
Shikoku	0.35	0.00	0.15	0.51	0.29	1
Chugoku	0.52	0.11	0.07	0.58	0.38	26
Kinai	0.63	0.26	0.04	0.68	0.49	14
Tokai	0.49	0.08	0.10	0.55	0.37	40
Tosanchubu	0.61	0.21	0.05	0.65	0.47	59
Hokuriku	0.64	0.36	0.03	0.70	0.50	153
Kanto	0.50	0.06	0.10	0.57	0.39	193
Tohoku	0.44	0.12	0.12	0.51	0.34	93
Japan	0.53	0.13	0.08	0.59	0.40	584

All villages are weighted equally for regional averages. For the overall average, I weigh the regional average by population in 1798.
Source: Japanese inequality data

Table A8: Village-level Landownership Inequality Estimates: Alternative Weighting

Region	Gini	Share Landless	Wealth Owned by Bottom 40%	Top 20%	Top 10%
Kyushu	0.59	0.17	0.06	0.63	0.45
Shikoku	0.60	0.17	0.06	0.64	0.46
Chugoku	0.60	0.17	0.06	0.64	0.45
Kinai	0.60	0.17	0.06	0.64	0.45
Tokai	0.59	0.17	0.06	0.64	0.45
Tosanchubu	0.59	0.17	0.06	0.63	0.44
Hokuriku	0.62	0.17	0.05	0.66	0.47
Kanto	0.59	0.17	0.06	0.63	0.44
Tohoku	0.54	0.18	0.08	0.59	0.41
Japan	0.59	0.17	0.06	0.63	0.45

All villages are weighted equally.
Source: Japanese inequality data

Table A9: Village-level Landownership Inequality Estimates: Inclusive of Coastal Villages

Region	Gini	Share Landless	Wealth Owned by Bottom 40%	Top 20%	Top 10%
Kyushu	0.60	0.18	0.06	0.64	0.45
Shikoku	0.61	0.18	0.06	0.65	0.46
Chugoku	0.55	0.12	0.07	0.59	0.40
Kinai	0.69	0.34	0.02	0.73	0.53
Tokai	0.55	0.12	0.07	0.58	0.39
Tosanchubu	0.61	0.16	0.05	0.64	0.46
Hokuriku	0.65	0.22	0.04	0.69	0.50
Kanto	0.52	0.10	0.10	0.57	0.40
Tohoku	0.58	0.19	0.07	0.61	0.42
Japan	0.58	0.16	0.06	0.62	0.44

All villages are weighted based on the number of households.
Source: Japanese inequality data

F Additional Wealth Inequality Estimate: France in 1825

I use data tabulated in Heywood (1981). This is a lower bound estimate because I assume no within group inequality. I assume the lowest bracket of people (0-20 Francs) owned 5 Francs worth of land. This is arbitrary but this is within a subset of numbers for the 0-20 Franc category that is consistent with the share of land value owned by each class.

G The Equal Field System and Beyond in East Asia

The earliest reliable evidence on wealth inequality in China comes from the equal fields system introduced in 485 by the Northern Wei then continued by the Sui and Tang dynasties up to the year 780. During the Tang period, land was distributed to males of age 15-59 with 80 *mu* of personal share lands and 20 *mu* of permanent tenure lands for 100 *mu* in total.[30] The personal share lands reverted to the state upon death while the permanent tenure lands could be inherited to heirs. The amount of allotments were never more than ideals and lands were never fully distributed to everyone due to land scarcity. However, the total allocation of 100 *mu* were also conceptualized as upper bound landownership for peasants and prevented the accumulation of landownership (Mitani, 2015). Overall, the system tended to keep society relatively equal.

The Japanese also adopted this system via the *Handen* system of the 7th to 10th centuries.[31] The allotted lands under this system, known as *kubunden*, were often paddy fields and distributed based on the peasant's age, sex, and class.[32] Specifically, were two classes of peasants; the *ryō* were standard peasant households and comprised the vast majority while the *sen* were the lower class who were similar to the unfree peasants of England. Males of the *ryō* class got 2 *tan* of land while females got two thirds of males. The *sen* class got one third of the *ryō* peasants in their respective age-sex category (see table A10). The maintenance of this system required large-scale population surveys that occurred every 6 years to register all people. Any deaths resulted in confiscation of land, while those who were turned older than 6 were allotted lands.[33] The system was far from

[30] See Von Glahn (2016) 185

[31] The accurate dates of the policy remain unknown but the earliest date may be 652. The policy weakened in 806 and collapsed by the mid 10th century. See Mitani (2015).

[32] Paddy fields comprised perhaps 82% of cultivated land at this time (Takashima, 2016).

[33] As surveys occurred every 6 years, those who were older than 6 must be registered for the second time. This allowed the identification of such individuals. This also meant that some peasants got lands as early as 6 to as late as 11 years of age.

Table A10: The allotments under the *handen* system

Class	Sex	Age	Allotment	Estimated Yield net of tax and seed
Ryo	Male	6+	2 *tan*	2.25 *koku*
Ryo	Female	6+	$\frac{4}{3}$ *tan*	1.5 *koku*
Sen	Male	6+	$\frac{2}{3}$ *tan*	0.75 *koku*
Sen	Female	6+	$\frac{4}{9}$ *tan*	0.50 *koku*

Tan units are in Nara tan which are 20% larger than the current tan. Estimates of yield are in current koku units (a local unit measuring value in volume of rice) assuming 315 soku of yield per Nara cho, 15 soku of taxation per cho, and 20 soku of seed per cho.

perfect and there are known cases where allotted lands were far away from the homes of residents (Iyanaga, 1980).[34] Moreover, land quality must have differed to some degree. Yet, the system did give all people rights to cultivate land.

How much land rent net of taxation could people earn from this system? There is some evidence from cases of land rental at this time. As government lands (*koden*) could be rented out in return for 20% of expected yields, similar rates of land rents must have been the norm in private fields (Iyanaga, 1980).[35] Taxes are estimated to have been perhaps 5-7% of yields so there would have been 13-15% of yield being earned by peasants from land rights (Sawada, 1972). Although these figures are rough estimates due to the limited nature of the sources, the clear finding is that equality in land distribution was a feature of Japan in the 7th-10th centuries. As it is unclear how lands were distributed preceding the *handen* system, it is unknown whether equality was driven by state policy or if policy simply acknowledged widespread equality.

What is the available evidence for land distributions between the equal field system and early modern time? In the case of China, most estimates were compiled in a study by Von Glahn (2016). Data from the household ranking system in the 11th century indicate only 33% of households were landless. In the period 1706–1771, the Gini coefficient of landownership in acreage in Huolu county, Hebei province, hovered around 0.6. This includes landless households who composed 16–26% of households at any time. There is no clear trend in inequality. By the republican period, there are a number of figures for landless ranging from 17% by Buck (1937) and 33% by agricultural surveys.[36]

[34] I emphasize that my argument rests on the right of the peasant to the land's share of income, rather than the legal definition for which there is considerable debate.

[35] The rent depended on the timing of payment in the system of *chiso*. If rent was paid before the harvest, the rent was 20% of yields. If paid after the harvest, an additional interest rate was collected.

[36] The figures by Buck are an under-estimate as they most likely over-surveyed literate peasant who tended to have land.

Estimates of the share of land under tenancy range from 29-42% which are low and comparable to Japan in the 1880s (Esherick, 1981).[37] These estimates may over-estimate inequality because many are unlikely to account for the multilayered ownership of lands such as topsoil rights that were held be tenants. In terms of trends, Brandt and Sands (1990) investigates inequality in the republican period to find little change in inequality since the 1880s using the limited available data.

In the case of Japan, after the collapse of the *handen* system, a feudal system based on privately held estates (*shōen*) were established. Land rights were distributed according to various rights called *shiki*. The lord was on the top of the hierarchy of ownership, while peasants also held rights over surplus net of tax (as the *sakute*) or use rights (as the *sakunin*) (Inagaki, 1981; Nishitani, 2006). Unfortunately there are few sources to study land distribution beyond the top hierarchy of elites and temples until the 17th century. Yet, it remains the case that peasants held landownership rights within this system through which relative equality could have been sustained. Moreover, unskilled wages remained exceptionally low in this period at just 10 copper coins which could perhaps sustain 1-1.5 people in rice or perhaps double the number using inferior grains (Bassino et al., 2011). For the population to have been sustained under such a low wage environment, it seems likely that most peasants earned supplementary incomes in the form of landownership incomes as can be seen in subsequent periods (Kumon, 2022).

Overall, the available evidence from East Asia over the very long-run are weak but are consistent with the hypothesis that this region was equal relative to Western Europe.

H Adoption in Other Japanese Regions

This section attempts to show external validity of the findings on adoption within Japan. Table A11 shows the summary statistics of the villages in the panel database. Two of the villages were typical in size with around 60 households and 250 people while the other was slightly smaller with 38 households and 181 households. They were also equal relative to our earlier estimates. However, these factors should not affect how adoption was conducted.

[37] Brandt and Sands (1990) computes the Gini coefficient for acreage including the 33% of landless households in the 1930s to have been 0.72. This estimate is an upper bound estimate of inequality levels as the country grew both wheat and rice with very different acreage requirements. Rice based lands could have more than triple the land value compared to wheat. Thus, even a perfectly equal distribution of land in value will have unequally distributed land acreage.

Table A11: Summary Statistics of Three panel Dataset Villages

	Hanakuma Village 1789-1869	Ishibushi Village 1752-1812	Tonosu Village 1790-1859
Village Level			
Population excluding servants	250	181	259
Total Households	66	38	62
Household Size	3.9	4.9	4.1
Landholdings (*koku*)	3.91	3.51	3.53
Landholdings Inequality (Gini)	0.45	0.39	0.47
Household-Generation Level			
Number of Observed Births	3.06	2.66	2.68
Number of Surviving Male Heirs	0.88	1.04	1.10
=1 if No Biological Male Heirs	0.45	0.23	0.28
Number of Adopted Male Heirs	0.11	0.10	0.13

Source: DANJURO dataset

Table A12: Heirs by Region

Prefecture	Central Japan	Northeastern Japan			
	Gifu	Fukushima		Yamagata	
	Nishijo	Shimomoriya	Niita	Yoshikawa	Tsukanome
	1773-1870	1716-1869	1720-1870	1758-1845	1814-55
Male Heirs					
Biological son	75%	51%	53%	71%	67%
Adopted son	18%	32%	25%	23%	22%
Others	7%	17%	22%	5%	10%

Sources: (Ōto, 1996; Okada, 2006)
Note: Two more villages from Yamagata are available on Ōto (1996) but the numbers are similar. They have not been included for space limitations but adoption rates were 16% and 22%.

For the purposes of this paper, I coded the outcome of each household-generation at the end of their reproductive cycle. This is when the wife reaches age 45. If there is no wife, this is when the husband (or unmarried man) reaches age 45. If both husband and wife die before age 45, this is coded as the end of the reproductive cycle. This definition allows me to investigate both family reproduction and its relationship to succession measured at the end of reproduction. While it is more desirable to compare family reproduction and succession measured at death, this will require a much longer time series.

Each household has about 1 surviving male heir on average. This reflects the lack of population growth such that net reproduction is zero. The share of households with biological male heirs is around 0.25 in two villages while Hanakuma village has a rate of 0.45 which is much higher. This may reflect Hanakuma village being close to Osaka meaning there was much out-migration. The code only looks at the cross-section of the household at the point of reproduction so it does not account for children who (temporarily) out-migrated. This is likely to lower the effects I find in regressions investigating how heirship relates to adoption.

The adoption rate was 10-13% in the three villages when the household reached the end of reproduction. This is a lower bound of adoption because many households would have adopted later in the lifecycle. If I code for the share of adopted male heir at the point of succession, the average in these 3 villages is 18%.

I can compare these findings to comparable evidence on adoption in other Japanese villages within the secondary literature (see table A12). The evidence is from Fukushima prefecture in addition to Gifu and Yamagata prefectures that are not represented in the panel data. They show high adoption rates ranging 18-32% and the adoption rates in these villages was lower than in most villages studied within the literature. Thus, the adoption rate was low in my region of study and adoptions may have worked even more efficiently in other regions.

While this is a wider set of data, the data constraints required to construct evidence on succession leads to limitations. However, if we are to only study whether adoptions occurred in villages there is a wider literature that covers many other regions (Hayami, 1973; Kurosu and Ochiai, 1995; Ochiai, 2004; Toishi, 2016; Ōnuma, 2018). Most convincingly, (Ōnuma, 2018) uses data from the *minji kanrei ruishū*, a survey of customs across Japanese region in Tokugawa times, to show adoption was widespread across all regions. Thus, the use of adoption across the Japan is in no

Table A13: Alternative Specifications of Adoption and Male Heirship

		(1)			(2)	
	OLS	1st Stage	2nd Stage	OLS	1st Stage	2nd Stage
Age Adjusted Heirs	-0.126***		-0.209**			
	(0.021)		(0.098)			
Age + Leaver Adjusted Heirs				-0.089***		-0.162**
				(0.018)		(0.078)
Landholdings (Koku)	0.002	0.007	0.001	0.002	0.020	0.002
	(0.003)	(0.017)	(0.005)	(0.004)	(0.025)	(0.006)
=1 if First Child Male		0.425***			0.549***	
		(0.117)			(0.142)	
Village FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	350	177	177	347	177	177
Adj-R^2	0.086	0.055	0.069	0.054	0.064	0.006
First Stage F-stat			13.118			14.971

Huber-White robust standard errors are in parenthesis. $*p < 0.1, **p < 0.05, ***p < 0.01$
The dependent variable is whether there is an adopted heir within the household at the end of reproduction. Heir refers specifically to male heirs. Koku refers to the local unit in volume of rice.
Source: DANJURO database

doubt.

I Adoption and Male Heirship

One issue with table 4 is that having male successors requires them to survive to adulthood. However, I do not control for child age. I construct alternative independent variable where I age adjust the number of male heirs by accounting for potential mortality using Life tables from Meiji Japan, 1891-98. I also cannot account for heirs who left the village and may be alive. However, I can add male heirs who may be potentially alive outside the village. I adjust for these in table A13 and find the results are the same.

J Sources

I use village census data collected by the Population and Family History Project at Reitaku University and the DANJURO database administered by Hiroshi Kawaguchi. In addition, I digitized data from the following local histories.

Anan shishi hensan iinkai (1989) "Anan shiryō hen kinsei" *Anan shi*

Atsugi shi kyōiku iinkai shōgai gakushūbu bunkazai hogoka (2009) "Atsugi shishi Kinsei shiryō hen 5" *Atsugi shi*

Bitchū chōshi henshū iinkai (1974) "Bitchū chōshi shiryō hen" *Bitchū chōshi kankō iinkai*

Chiba kenshi hensan shingikai (1969) "Chiba ken shiryou 2" *Chiba ken*

Chita shishi hensan iinkai (1984) "Chita shishi shiryōhen 4" *Chita shi*

Chiyoda chō (1990) "Chiyoda chōshi kinsei shiryōhen" *Chiyoda chō*

Ebina shi (1994) "Ebina shishi shiryō hen kinsei 1" *Ebina shi*

Ebina shi (1996) "Ebina shishi shiryō hen kinsei 1" *Ebina shi*

Enzan shishi hensan iinkai (1995) "Enzanshishi shiryōhen 2" *Enzan shi*

Fukukawa shishi hensan iinkai (2004) "Furukawa shishi 8" *Furukawashi*

Fuchū shi (1988) "Fuchū shishi shiryō hen 2" *Fuchū shi*

Fujimi shishi kyōiku iinkai (1990) "Fujimi shishi shiryōhen 4" *Fujimi shishi*

Fujino machi (1994) "Fujino machishi shiryō hen jyō" *Fujino machi*

Fujioka shishi hensan iinkai (1990) "Fujioka shishi shiryō hen kinse" *Fujioka shi*

Fukuroi shishi kyōiku iinkai (1975) "Fukuroi shishi shiryō 2" *Fukuroi shishi kyōiku iinkai*

Fukushima ken (1965) "Fukushima kenshi 8" *Rinsen shoten*

Fukushima ken (1985) "Fukushima kenshi 9" *Rinsen shoten*

Fukushima ken (1986) "Fukushima kenshi 10 jyō" *Rinsen shoten*

Fukushima ken (1986) "Fukushima kenshi 10 ge" *Rinsen shoten*

Fukushima shishi hensan iinkai (1968) "Fukushima shishi 8" *Fukushima shi kyōiku iinkai*

Fukushima shishi hensan iinkai (1971) "Fukushima shishi 9" *Fukushima shi kyōiku iinkai*

Fukushima shishi hensan iinkai (2000) "Fukushima shishi shiryō sōsho 76" *Fukushima shi kyōiku*

iinkai

Fujiidera shi (1985) "Fujiidera shishi 7" *Fujiidera shi*

Fujiyoshida shishi hensan iinkai (1994) "Fujiyoshida shishi shiryōhen 4" *Fujiyoshida shi*

Fukui shi (2004) "Fukui shishi shiryōhen 8" *Fukui shi*

Futsu shishi hensan iinkai "Futsu shishi shiryō shū 1" *Futsu shi*

Gifu ken (1968) "Gifu kenshi shiryōhen kinsei 4" *Gifu ken*

Gifu shi (1978) "Gifu shishi shiryō hen kinsei 2" *Gifu shi*

Haibara chōshi hensan iinkai (1992) "Shizuoka ken Haibara chōshi shiryō 3 jyō" *Haibara chō kyōiku iinkai*

Handa shishi hensan iinkai "Handa shishi shiryō hen 5" *Handa shi*

Hanno shishi henshū iinkai (1984) "Hanno shishi shiryōhen 8" *Hanno shi*

Hasuda shishi kyōiku iinkai shakai kyōiku ka (2000) "Hasuda shishi kinsei shiryō hen 1" *Hasuda shishi kyōiku iinkai*

Hidaka shishi henshū iinkai (1996) "Hidaka shishi kinsei shiryō hen" *Hidaka shi*

Hiraizumi chōshi hensan iinkai "Hiraizumi chōshi shiryō hen 2" *Hiraizumi chō*

Hiratsuka shi (1983) "Hiratsuka shishi 3" *Hiratsuka shi*

Honkawane chōshi hensan iinkai (2000) "Honkawane chōshi shiryō hen 2" *Honkawane chō*

Ibaraki kenshi hensan kinsei shi daini bukai (1971) "Ibaraki ken shiryō kinsei shakai keizai hen 1" *Ibaraki ken*

Ibaraki kenshi hensan kinsei shi daini bukai (1976) "Ibaraki ken shiryō kinsei shakai keizai hen 2" *Ibaraki ken*

Ibigawa chō (1970) "Ibigawa chō shi shiryōhen" *Ibigawa chō*

Imaichi shishi hensan senmon iinkai (1973) "Imaichi shishi shiryō hen kinsei 1" *Imaichi-shi*

Ina sonshi hensan iinkai (2003) "Ina sonshi 3" *Inamura*

Inoue, Kazuo & Gotō, Kazuo (1986) "Mikawa no kuni Hoi chihō shumon ninbetsu aratamechō" *kokusho kankō kai*

Iruma shishi hensan shitsu (1986) "Iruma shishi kinsei shiryō hen " *Iruma shi*

Iwaki-shishi hensan iinkai (1972) "Iwaki-shishi 9" *Iwaki-shi*

Iwatsuki shi (1982) "Iwatsuki shishi kinsei shiryō hen 4" *Iwatsuki shi*

Iwai shishi hensan iinkai (1994) "Iwaishishi shiryō hen kinsei" *Iwaishi*

Izumozaki chōshi hensan iinkai (1988) “Izumozaki chōshi shiryō hen 2” *izumozaki chō*

Kadoma shi (1997) “Kadoma shishi 3” *Kadoma shi*

Kaizu chō (1970) “Kaizu chōshi shiryōhen 2” *Kaizu chō*

Kami chōshi henshū iinkai “Kami chōshi shiryō hen” *Kami chō*

Kamifukuoka shishi hensan iinkai (1997) “Kamifukuoka shishi shiryōhen 2” *Kamifukuoka shi*

Kaminokawa chōshi hensan iinkai (1979) “Kaminokawa chōshi shiryōhen kinsei” *Kawanokawa chō*

Kamogawa shishi hensan iinkai (1991) “Kamogawa shishi shiryōhen kinsei 1” *Kamogawa shi*

Kanagawa ken kenminbu kenshi henshū shitsu (1983) “Kanagawa kenshi shiryōhen 4” *Kanagawa ken*

Kanagawa ken kenminbu kenshi henshū shitsu (1973) “Kanagawa kenshi shiryōhen 6” *Kanagawa ken*

Kanagawa ken kenminbu kenshi henshū shitsu (1976) “Kanagawa kenshi shiryōhen 8” *Kanagawa ken*

Kanagawa ken kenminbu kenshi henshū shitsu (1979) “Kanagawa kenshi shiryōhen 8 (2)” *Kanagawa ken*

Kanuma shishi hensan iinkai (2002) “Kanuma shi kinsei 2 bessatsu” *Kanuma shi*

Kariya shishi hensan henshū iinkai (1992) “Kariya shishi 6” *Kariya shi*

Katsuragi Chōshi henshū iinkai (1988) “Katsuragi chōshi kinsei shiryō hen” *Katsuragi chō*

Kawaguchi shi (1985) “Kawaguchi shishi kinsei shiryō 1” *Kawaguchi shi*

Kawajima chō (2005) “Kawajima chōshi shiryōhen kinsei 1” *Kawajima chō*

Kawakami sonshi kankōkai “Kawakami sonshi shiryōhen” *Kawakami murashi kankōkai*

Kawamata chō kyōiku iinkai “Kawamata chōshi shiryō 5” *Kawamata chō*

Kazo shishi hensanshitsu (1984) “Kazo shishi shiryōhen 1” *Kazo shi*

Kitakami shi (1983) “Kitakami shishi 9 ” *Kitakami shishi kankōkai*

Kohama shishi hensan iinkai (1981) “Kohama shishi shyoke monjyo hen 3” *Kohama shi*

Komae shi (1979) “Komae shi shiryōshū 9” *Komae shi*

Kōri chōshi hensan iinkai (1992) “Kōri chōshi 6” *Kōri chōshi shuppan iinkai*

Kōriyama shi (1981) “Kōriyama shishi 8” *Kōriyama shi*

Kosai shishi hensan iinkai (1979) “Kosai shishi shiryōhen 1” *Kosai shi*

Kosai shishi hensan iinkai (1986) “Kosai shishi shiryōhen 6” *Kosai shi*

Koshigaya shi (1974) “Koshigaya shishi 6” *Koshigaya shi*

Kōta chō kyōiku iinkai (1994) “Kota chōshi shiryōhen 1” *Kota chō*

Kozakawa chōshi hensan iinkai (2005) “Kozakawa chō shi Kinsei shiryō hen” *Kozakawa chō*

Kōzan chōshi hensan iinkai (2004) “Kōzan chōshi shiryōhen 2” *Kōzan chō*

Kuki shi kyōiku iinkai (2013) “Kuki shi Kurihashi chōshi” *Kuki shi kyōiku iinkai*

Kumamoto shishi hensan iinkai (1994) “Shin Kumamoto shishi shiryō hen 3” *Kumamoto shi*

Maihara chōshi hensan iinkai (1999) “Maihara chōshi shiryō hen” *Maihara chō*

Makabe machishi hensan iinkai (1990) “Makabemachi shiryō kinsei hen 3” *Makabe machi*

Matsubara shishi hensan iinkai (1974) “Matsubara shishi 4” *Matsubara shi*

Matsushima chōshi (1989) “Matsushima chōshi shiryō hen” *Matsushima chō*

Mino kashige shishi (1977) “Mino kashige shishi shiryō hen” *Mino kashige shi*

Minō shishi henshū iinkai (1970) “Minō shishi shiryō hen 4” *Minō shi*

Misato shishi hensan iinkai (1990) “Misato shishi 2” *Misato shi*

Miyama chōshi hensan iinkai (1973) “Miyama chōshi shiryōhen” *Miyama chō*

Miyamura shi henshū iinkai (2003) “Miyamura shi shiryōhen 1” *Miyamura*

Miyazaki ken (1994) “Miyazaki kenshi shiryōhen kinsei 3” *Miyazaki ken*

Monzen chōshi hensan senmon iinkai “Shinshū Monzen chōshi shiryō hen 3” *Ishikawa ken Monzen machi*

Motosu chō (1975) “Motosu chōshi shiryōhen” *Motosu chō*

Nagano ken (1973) “Nagano kenshi kinsei shiryō hen 5-1” *Nagano kenshi kankō iinkai*

Nagano ken (1975) “Nagano kenshi kinsei shiryō hen 8” *Nagano kenshi kankō iinkai*

Nagano ken (1977) “Nagano kenshi kinsei shiryō hen 4-1” *Nagano kenshi kankō iinkai*

Nagano ken (1978) “Nagano kenshi kinsei shiryō hen 2-1” *Nagano kenshi kankō iinkai*

Nagano ken (1981) “Nagano kenshi kinsei shiryō hen 7-1” *Nagano kenshi kankō iinkai*

Nagano ken (1989) “Nagano kenshi kinsei shiryō hen 6” *Nagano kenshi kankō iinkai*

Nagareyama shiritsu hakubutsukan (1987) “Nagareyama shishi kinsei shiryō hen 1” *Nagareyama shi*

Nagareyama shiritsu hakubutsukan (1988) “Nagareyama shishi kinsei shiryō hen 2” *Nagareyama shi*

Nakajima chōshi hensan senmon iinkai (1995) “Nakajima chō shi shiryō hen” *Nakajima chō*

Nakajyō chōshi hensan iinkai (1984) “Nakajyō chōshi shiryō hen 2” *Nakajyō chō*

Narashino shishi henshū iinkai (1986) “Narashino shishi 2” *Narashino shi*

Narita shishi hensan iinkai (1977) “Narita shishi kinsei hen shiryōshū 4 ge” *Narita shi*

Nariwa chōshi henshū iinkai (1994) “Nariwa chōshi shiryō hen” *Nariwa chō*

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Niigata ken (1981) “Niigata kenshi shiryōhen 6” *Niigata ken*

Niigata ken (1981) “Niigata kenshi shiryōhen 7” *Niigata ken*

Niigata shishi hensan kinseishi bukai (1993) “Niigata shishi shiryō hen 4” *Nigata shi*

Niitsu shishi hensan iinkai (1987) “Nitsu shishi shiryōhen 2” *Nitsu shi*

Nishiaizu machishi hensan iinkai (1994) “Nishiaizu machishi 4 jyō” *Nishiaizu machishi kankō iinkai*

Nitta chōshi hensanshitsu (1987) “Nitta chōshi 2” *Nitta chō*

Ōgaki shi (1968) “Shinshū Ōgaki shishi shiryō hen 1” *Ōgaki shi*

Ōgaki shi (2010) “Ōgaki shishi shiryōhen kinsei 2” *Ōgakishi*

Ogawa chō “Ogawa chō no rekishi shiryō hen 4” *Ogawa chō*

Oguchi sonshi hensan senmon iinkai (1978) “Oguchi sonshi 1” *Oguchi mura*

Ōhara chōshi hensan iinkai (1988) “Ōhara chōshi shiryōshū 1” *Ōhara chō*

Ōhara chōshi hensan iinkai (1989) “Ōhara chōshi shiryōshū 2” *Ōhara chō*

Ōhara chōshi henshū iinkai (2006) “Ōhara chōshi shiryōhen chū” *Mimasaka shi*

Ōimachi shi (1988) “Ōimachi shi shiryōhen 2” *Ōimachi*

Okegawa shi (1982) “Okegawa shishi 4” *Okegawa shi*

Ōmiya chōshi hensan iinkai (1979) “Ōmiya chōshi shiryō hen” *Ōmiya machi*

Ono chō (1988) “Ono chōshi shiryōhen 1 ge” *Ono chō*

Ono shishi hensan senmon iinkai “Ono shishi 5” *Ono shi*

Ōta kushi shiryōhen hensan iinkai (1997) “Ōta kushi shiryōhen Hirakawa ke monjyo 3” *Tōkyō to Ōtaku*

Ōta shi (1978) “Ōta shishi shiryō hen kinsei 1” *Ōta shi*

Otowa chōshi hensan iinkai (2001) “Otowa chōshi shiryōhen 2” *Otowa chō*

Ōuda chōshi henshū iinkai (1996) “Ōuda chōshi shiryōhen 2” *Ōuda chō*

Oume shi goudo hakubutsukan (1986) “Oume shishi shiryōshū 36” *Oume shi*

Rikuzen Takata shishi henshyū iinkai “Rikuzen Takata shishi 12” *Rikuzen Takata shi*

Ryoukami sonshi hensan iinkai (1989) “Ryoukami sonshi shiryō hen 4” *Ryoukami son*

Sabae shishi hensan iinkai (1986) “Sabae shishi shiryō hen 2” *Sabae shi*

Sagae shishi hensan iinkai (2005) “Ishikawa mura shumon ninbetsu aratame chō” *Sagae shi kyōiku iinkai shakai kyōiku ka*

Sagae shishi hensan iinkai (2006) “Ishikawa mura shumon ninbetsu aratame chō 2” *Sagae shi kyōiku iinkai shakai kyōiku ka*

Sakado shi kyōiku iinkai (1987) “Sakado shishi kinsei shiryōhen 1” *Sakado shi*

Sakae machi (1972) “Sakae chōshi shiryōshyū 1” *Sakae machi*

Saku, Takashi (1967) “Echizen no kuni shūmon ninbetsu aratamecho 1” *Yoshikawa kobunkan*

Saku, Takashi (1968) “Echizen no kuni shūmon ninbetsu aratamecho 2” *Yoshikawa kobunkan*

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Saku, Takashi (1970) “Echizen no kuni shūmon ninbetsu aratamecho 4” *Yoshikawa kobunkan*

Saku, Takashi (1971) “Echizen no kuni shūmon ninbetsu aratamecho 5” *Yoshikawa kobunkan*

Saku, Takashi (1972) “Echizen no kuni shūmon ninbetsu aratamecho 6” *Yoshikawa kobunkan*

Sakurai shishi hensan iinkai (1981) “Sakurai shishi shiryō hen ge” *Sakurai shi*

Sanbu chōshi (1984) “Sanbu chōshi shiryō shū kinsei hen” *Sanbu chō*

Santō chōshi hensan iinkai (1986) “Santō chōshi shiryōhen” *Santō chō*

Sayama chōshi hensan iinkai (1966) “Sayama chōshi 2” *Sayama chō*

Sayamashi (1985) “Sayama shishi kinsei shiryō hen 1” *Sayamashi*

Seki shi kyōiku iinkai (1993) “Shinshū Seki shishi shiryōhen kinsei 2” *Seki shi*

Setagaya ku (1961) “Setagaya ku shiryou 4” *Setagaya ku*

Settsu shishi hensan iinkai (1982) “Settsu shishi shiryō hen 2” *Settsu shi*

Shibatashi (1968) “Kinsei Shomin shiryō” *Shibata shishi kankou gyōji jimukyoku*

Shibayama chōshi hensan iinkai (1998) “Shibayama chōshi shiryōshū 3” *Shibayama chō*

Shimōsa chōshi hensan iinkai (1985) “Shimōsa chōshi kinsei hen shiryōshū 1” *Shimōsa chō*

Shimoyama mura (1986) “Shimomurayama sonshi shiryō hen 2” *Shimomurayama*

Shinpen Okazaki shishi hensan iinkai (1983) “Shinpen Okazaki shishi 7” *Okazaki shi*

Shinpen toyokawa shishi henshū iinkai (2003) “Shinpen toyokawa shishi 6” *Toyokawa shi*

Shinshyū Neagari chōshi henshyū senmon iinkai (1993) “Shinshyū Neagari chōshi shiryō hen jyō” *Neagari machi*

Shinshū Inazawa shishi hensan kaijimu kyoku (1986) “Shinshū Inazawa shishi shiryōhen 10” *Inazawa shi*

Shinshū Inazawa shishi hensan kaijimu kyoku (1988) “Shinshū Inazawa shishi shiryōhen 10” *Inazawa shi*

Shizuoka shi (1975) “Shizuoka shishi kinsei shiryō 2” *Shizuoka shi*

Taiei chōshi hensan iinkai (1990) “Taiei chōshi shiryōhen 2” *Taiei machi*

Taishi chōshi henshū iinkai (1970) “Taishi chōshi shiryōhen” *Taishi chō*

Takatomi machi (1977) “Takatomi chōshi shiryō hen” *Takatomi machi*

Tarō machi kyōiku iinkai (1993) “Tarō chōshi shiryōshk̄insei 4” *Tarō machi kyōiku iinkai*

Tenryū shi (1974) “Tenryu shishi shiryōhen 1” *Tenryū shi*

Tenryū shi (1975) “Tenryu shishi shiryōhen 2” *Tenryū shi*

Tenryū shi (1977) “Tenryu shishi shiryōhen 4” *Tenryū shi*

Tenryū shi (1978) “Tenryu shishi shiryōhen 5” *Tenryū shi*

Tochigi kenshi hensan iinkai (1975) “Tochigi kenshi shiryō hen kinsei 3” *Tochigi ken*

Tochigi kenshi hensan iinkai (1975) “Tochigi kenshi shiryō hen kinsei 4” *Tochigi ken*

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Tochigi kenshi hensan iinkai (1977) “Tochigi kenshi shiryō hen kinsei 6” *Tochigi ken*

Toda shi (1983) “Toda shishi shiryōhen 2” *Toda shi*

Toda shi (1985) “Toda shishi shiryōhen 2” *Toda shi*

Tōgane shi (1978) “Tōgane shishi 2 shiryō hen” *Tōgane shi*

Tōkamachi shishi hensan iinkai (1992) “Tōkamachi shishi shiryōhen 4” *Tōkamachi shi*

Tokiwa sonshi hensan iinkai (2003) “Tokiwa sonshi” *Tokiwa mura*

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Tōkyō to Shinagawa ku “Shinagawa kushi zoku shiryō hen 1” *Shinagawa ku*

Toyota chōshi hensan iinkai (1988) “Toyota chōshi shiryōshū kinsei hen 1” *Toyota machi*

Tsuruga shishi hensan iinkai (1983) “Tsuruga shishi shiryō hen 4 ge” *Tsuruga shi*

Tsuru shishi hensan iinkai (1992) “Tsuru shishi shiryō hen 4” *Tsuru shi*

Unakami chōshi hensan iinkai (1988) “Unakami chōshi shiryōhen 2” *Unakami machi*

Urawa shi sōmubu shishi hensan shitsu (1986) “Urawa shishi 3” *Urawa shi*

Utsunomiya shishi (1980) “Utsunomiya shishi 4” *Utsunomiya shi*

Wajima shishi hensan senmon iinkai (1972) “Wajima shishi shiryōhen 2” *Wajima shi*

Wakō shi (1982) “Wakō shishi shiryō hen 2” *Wakō shi*

Yachiyo shi hensan iinkai (1989) “Yachiyo shi no rekishi shiryō hen kinsei 1” *Yachiyo shi*

Yamagata ken (1976) “Yamagata kenshi shiryōhen 16” *Yamagata ken*

Yamagata ken (1983) “Yamagata kenshi shiryōhen 18” *Yamagata ken*

Yokawa chōshi henshū iinkai (1993) “Yokawa ch0̄shi shiryōshū 2” *Yokawa chō kyōiku iinkai*

Yokkaichi shi (1993) “Yokkaichi shi 9” *Yokkaichi shi*

Zushi shi (1988) “Zushi shishi shiryō hen 2” *Zushi shi*