Appendices

A   Regional Composition of Edo Japan
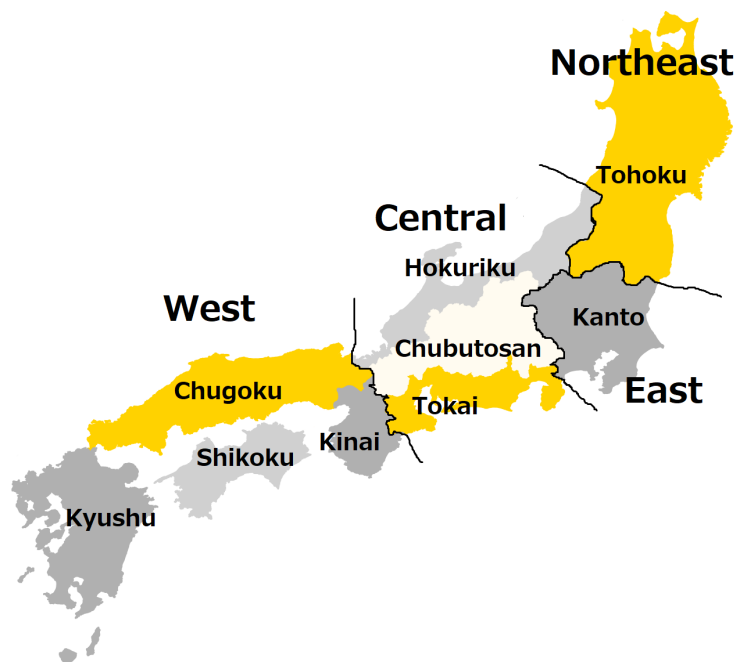

Figure A1: Defined Regions of Japan

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.[33] 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,

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[33]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.
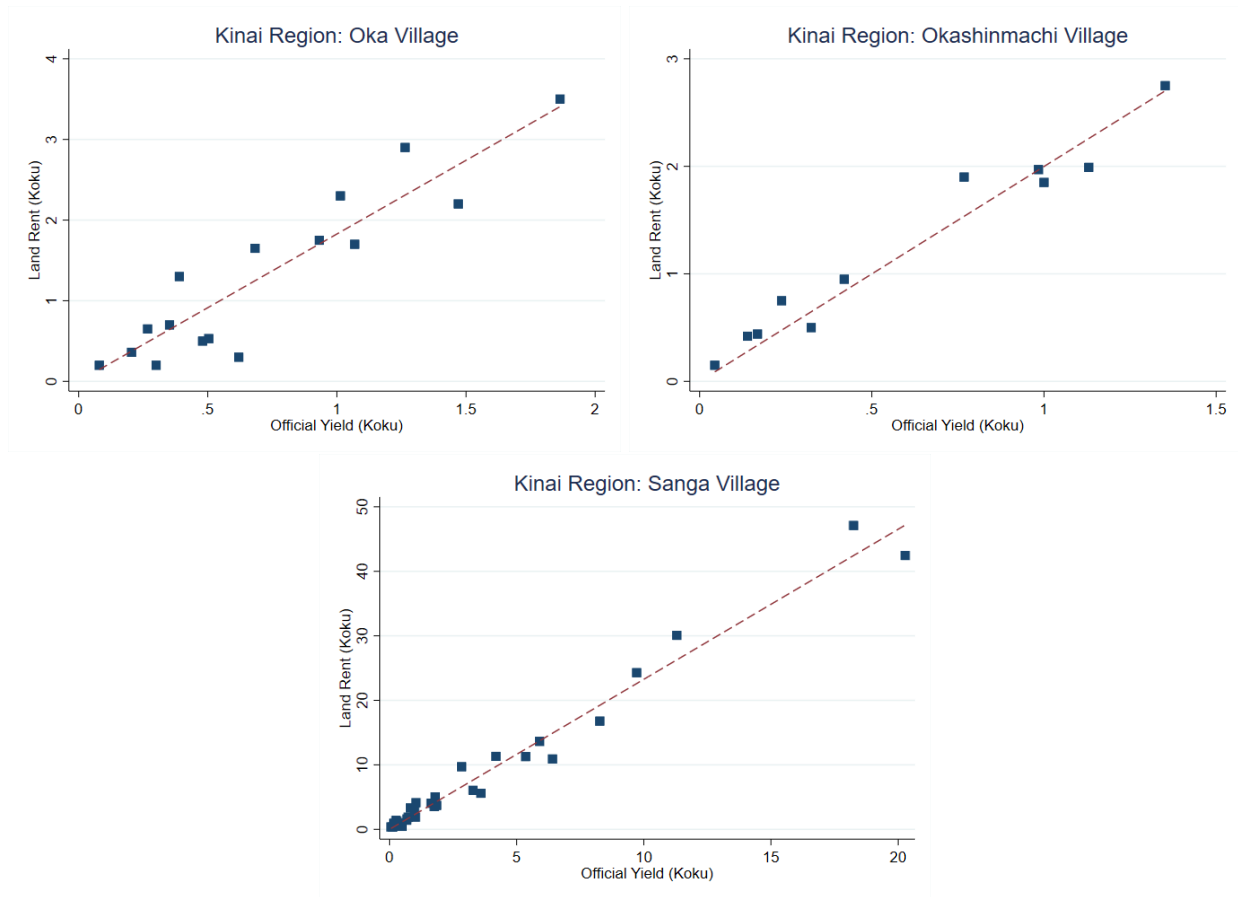
Figure A2: Rent by Land Plot

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
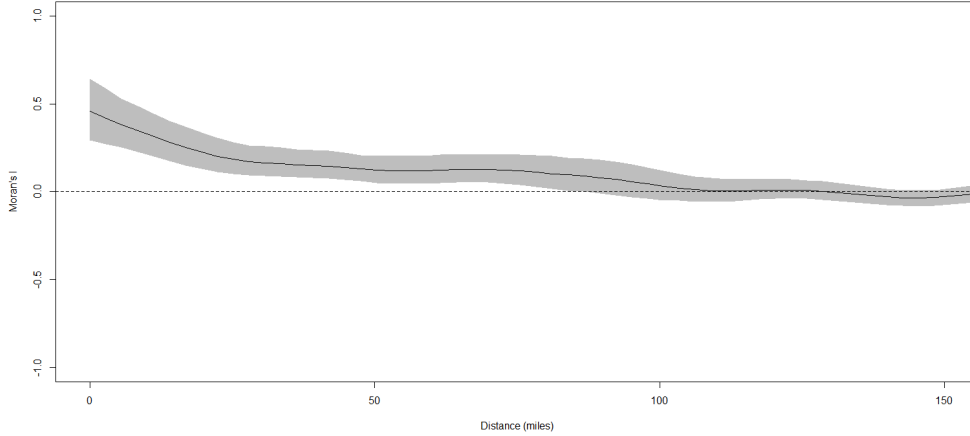
C Spatial autocorrelation

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.

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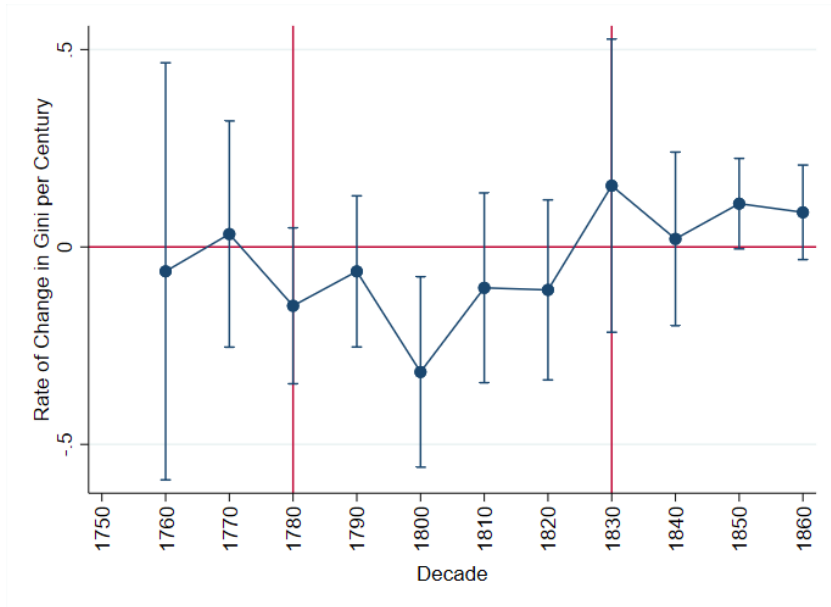
Figure A4: The Rate of Change in Gini in Japanese Villages

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

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Table A5: Sample Averages: Preferred Weighting

			Wealth Owned by		
	(1)	(2)	(3)	(4)	(5)
	Gini	Share Landless	Bottom 40%	Top 20%	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	Wealth Owned by		
		Landless	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	Wealth Owned by			Villages
		Landless	Bottom 40%	Top 20%	Top 10%	
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.[34] 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.[35] The allotted lands under this system, known as *kubunden*, were often paddy fields and distributed based on the peasant's age, sex, and class.[36] 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.[37] The system was far from

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[34]See Von Glahn (2016) 185

[35]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).

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

[37]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).[38] 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).[39] 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.[40]

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[38]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.

[39]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.

[40]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).[41] 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.

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[41]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

	Central Japan	Northeastern Japan			
Prefecture	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) OLS	(1) 1st Stage	(1) 2nd Stage	(2) OLS	(2) 1st Stage	(2) 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*

Nasu, Kokichi (2005) "Yoshikawa mura shūmon ninbetsu aratame chō Volumes 1-3" *Nishikawa chō*

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*

Saku, Takashi (1969) "Echizen no kuni shūmon ninbetsu aratamecho 3" *Yoshikawa kobunkan*

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*

Tochigi kenshi hensan iinkai (1979) "Tochigi kenshi shiryō hen kinsei 5" *Tochigi ken*

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*

Tōkyō toritsu daigaku gakujyutsu kenkyūkai (1970) "Meguro kushi shiryōhen" *Tōkyō to Meguro ku*

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 ch0shi shiryōshū 2" *Yokawa chō kyōiku iinkai*

Yokkaichi shi (1993) "Yokkaichi shi 9" *Yokkaichi shi*

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