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Political Economy and Population Growth in Early Modern Japan †‡

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Abstract

During the feudal Edo period (1603-1868) in Japan, the shogunate government relied for regional control on hereditary feudal barons as well as its own *bakufu* bureaucracy. Compared with hereditary lords, *bakufu* officials had shorter and uncertain tenure. Examining easily available historical data, the paper finds that regions ruled by *bakufu* bureaucrats are associated with (a) slower population growth, (b) slower growth in productive capacity, and (c) higher incidences of civil unrest. The evidence supports Mancur Olson's thesis that those with coercive power will be led by their "encompassing interest" to provide growth-friendly environment when they are assured of a stable, long-term tenure.

†JEL classification codes: H2 N4 P5.

‡Key words: bureaucracy; Mancur Olson; feudalism; taxation; population; economic growth.

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1 Introduction

Remember this my child. An oppressive government is fiercer and more feared than a tiger. Confucius

Violence and coercion are one of the central facts in human life, economic or otherwise. That use of coercion for predation entails disastrous consequences for economic development has been recognized for a long time. Adam Smith noted that

in those unfortunate countries where men are continually afraid of the violence of their superiors, they frequently bury and conceal a great part of their capital stock in case of their being threatened with any of those disasters to which they consider themselves as at all times exposed. This is said to be a common practice in Turkey, in Indostan, and, I believe, in most other governments of Asia. It seems to have been a common practice among our feudal ancestors.¹

Then it seems clear that domestication of violence is a critical precondition for economic development. In the words of Robert H. Bates,

Political development occurs when people domesticate violence, transforming coercion from a means of predation into a productive resource. Coercion becomes productive when it is employed not to seize or to destroy wealth, but rather to safeguard and promote its creation. ²

The canonical form of "political development" is introduction of credible constitutional constraints. North and Weingast (1989) explain how the Glorious Revolution brought in credible constitutional commitments and laid the foundation for the subsequent financial revolution in late 17-th century Great Britain. Firmin-Sellers (1996) documents a similar development in the Gold Coast, before the newly independent government of Ghana crushed

¹Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776). Re-quoted from de Long and Shleifer (1993).

²Robert H. Bates, *Prosperity and Violence: The Political Economy of Development* (2001).

it. De Long and Shleifer (1993) study growth of cities in early modern Europe, and conclude that absolutist governments were more likely to adopt destructive tax policies than constitutional polities, and that the difference led to lower economic growth and slower growth of cities in regions and periods ruled by absolutist monarchs.

Those with coercive power, however, would not necessarily resort to maximum pillage. Rational autocrats, or even bandits, will exercise prudence in taxing their subjects or victims, if they are assured a stable, long-term grip on their domain, lest their policy destroy the source of lucrative future revenue. The resulting economic policy may be surprisingly congenial to economic growth. McGuire and Olson (1996) elegantly expound this intuitive idea. Roving bandits may resort to confiscatory taxation, but monopolization of theft by stationary bandits will lead to lenient taxation and decent provision of public goods. In their terminology, these benevolent stationary bandits have "encompassing interest" in the conquered domain.³

This paper empirically examines the Olsonian thesis using Japanese historical data from the feudal Edo period (1603-1868). The regional control by the shogunate government in Japan relied on hereditary feudal barons as well as its own *bakufu* bureaucracy during the period.⁴ The shogunate government of *bakufu* retained about one quarter of the country's total landmass for direct control, leaving the remaining three-quarters in the care of hereditary lords. Compared with hereditary barons, *bakufu* officials had much shorter and uncertain tenure. Stable long-term tenure gave virtual property rights for future revenue from the domains to the hereditary barons; *bakufu* bureaucrats lacked comparable rights.

Examining easily available historical data, the paper finds that regions ruled by *bakufu* bureaucrats are associated with (a) slower population growth, (b) slower growth in produc-

³The nature of the political regime may also promote or hinder technological innovation. Acemoglu and Robinson (2002) develop a model where political elites may block technological and institutional development, because of a 'political replacement effect'. Innovations often erode elites' incumbency advantage, increasing the likelihood that they will be replaced. They show that elites are unlikely to block development when there is a high degree of political competition, or when they are highly entrenched. It is only when political competition is limited and also their power is threatened that elites will block development.

⁴Japanese words are to be italicized in the paper, following the usage in *The Cambridge History of Japan* (1991).

tive capacity, and(c) higher incidences of civil unrest. I take the findings as evidence that hereditary feudal barons behaved like Olson's stationary bandits with encompassing interest, while short and uncertain tenure of bakufu officials impaired their incentives to pursue growth-friendly economic policies.

The remainder of the paper proceeds as follows. Section 2 gives a brief introduction to salient features of political economy during the Edo period. Section 3 introduces the data. Broad patterns in regional population changes are discussed in Section 4. Section 5 presents the main empirical results, followed by concluding remarks in section 6.

2 Political Economy in Early Modern Japan: A Primer

This section will give a brief introduction to some of the salient features of political economy during the Edo period (1603-1868). Owing to decades of industrious scholarship on the part of Japanese historians, a broad consensus now seems to exist on most major questions regarding the Japanese society of the period. Among handily available publications in English, Encyclopedia Britannica provides a concise account. Readers looking for a more comprehensive treatment are referred to Totman (1996) or *The Cambridge History of Japan, Volume 4: Early Modern Japan*.

When in 1603 shogun Tokugawa Ieyasu (1542-1616) established his central military government of bakufu in Edo, or modern Tokyo, he was ending a series of bitter civil wars lasting for more than a century. The civil wars had shaken to the core the ancient governing authorities based in or allied with the imperial court in Kyoto. The political and economic foundations for the new era had been emerging under the hegemony of Oda Nobunaga and Toyotomi Hideyoshi, senior partners of Ieyasu whom he outlived and succeeded to consummate unification of the country.

A key phenomenon was the separation of the samurai warrior class and the peasants whereby the samurai class was moved into the daimyo's headquarter towns, leaving a disarmed peasantry confined to the villages in the countryside. Out of the conflicts among daimyo lords heading armed groups of samurai warriors emerged regional warlords. The alliance headed in turn by Nobunaga, Hideyoshi, and Ieyasu came up as the eventual winner

in the contest among these warlords.

In all newly obtained domains, Hideyoshi, the first unifier of Japan, introduced massive cadastral surveys, or *kenchi*, for a thorough registry of land and people. Ieyasu inherited this practice into his own government. Each domain was carefully assigned *kokudaka*, or productive capacity converted into *koku* units of rice output, the main staple and commodity of the period.⁵ All *daimyo* fiefs were granted by the *shogun* in return for a pledge of allegiance. It was of vital importance to the *shogun* that he knew how much he was giving to whom, not to destabilize the hard-won armed peace.

While the supremacy of the shogunate was unquestioned, the central military government, or *bakufu*, had to compromise with still powerful and potentially hostile barons and grant hereditary rights to individual fiefs. The *bakufu* made sure, however, that strategically placed friendly barons, those with family relation (*gokamon*) and old allies (*fudai*), keep the former enemies (*tozama*) under sufficient restraint. All these *daimyo* barons were given domains worth more than 10,000 *koku* each. There were over 200 such domains, called *han*.

During the first half the 17th century, the newly established *bakufu* government frequently relied on revocation of fiefs and forcible relocation to keep *daimyo* barons cowed, especially those of *tozama* origin. These tactics were later abandoned, however, as the *bakufu* gained more confidence and displaced *samurai* warriors proved disruptive of social order. As a result, *daimyo* barons were practically assured a permanent hereditary tenure over their domains. They could internally manage their fiefs as autocrats, generation after generation, so long as they maintained their external loyalty to the *shogun*.

The central *bakufu* government directly controlled the still vast remaining realm, to be managed by semi-hereditary retainers (*hatamoto* and *gokenin*) or non-hereditary officials (*daikan*). When the system was more or less fully established by the end of the reign of the third *shogun* Iemitsu (1604-1651), the *bakufu* government found itself in control of more than 7 million *koku*, or about a quarter of land and other productive resources of the whole country.

In contrast to lasting tenures of *daimyo* barons, household vassals of the *bakufu*, *hatamoto*,

⁵One *koku* roughly corresponds to 180 liters.

gokenin, daikan officials, and even some of the lesser fudai daimyo were subjected to frequent reposting and punitive revocation of lands in their charge. With little exaggeration, one may say that they were moved about as mere pawns on the chessboard of the bakufu's direct domain. As a result, their average tenure on a given domain was drastically shorter than that of daimyo, and also more uncertain.

The empirical analysis of the paper is to focus on this contrast in governance systems in different regions of feudal Japan. It is a clear possibility that household retainers and officials of the bakufu lacked incentives to promote long-term growth and stability in their domain, if it meant sacrificing short-term gains for themselves or the bakufu treasury. Compared to daimyo, did they resort to harsher taxation? Did they avoid committing to irrigation and land reclamation projects that might not begin to yield benefits during their tenure? The relatively small size of domains under their charge may also have meant inability to benefit from public projects with large economies of scale or involving thorny coordination problems. Quite frequently, more than one vassal was put in charge of a single village in a practice called aikyū, which may have aggravated these problems. All these considerations point to the possibility that the governance system in the bakufu-held domains retarded economic, and hence population growth there, to be contrasted against more prosperous daimyo domains.

3 Data

Japan is admirably endowed with well-kept historical records, population records among them. The empirical analysis in the paper focuses on national population surveys conducted in every sixth year beginning from 1721.⁶ Many Japanese historians have studied the records, but, to my best knowledge, never in relation to inter-regional differences in political governance systems. Interested readers are referred to Hanley and Yamamura (1977) for an English account of the studies.

In total, 22 such surveys were conducted until 1846. The bakufu government ordered

⁶The second survey was conducted five years later in 1726. All the subsequent surveys abided by the six-year interval.

daimyo as well as its own household vassals to report the population of their domain.⁷ To make regional population counts comparable over time, the standard practice is to rearrange the numbers based on the ancient classification of 68 administrative districts, or *kuni*.⁸ 12 surveys have been rearranged so far in this way by Japanese scholars. Usually added to this list is the survey of 1872, also rearranged in the same way. While the 1872 survey was conducted by the new government after the Restoration in 1868, it is considered as giving the regional population counts for the last years of the Edo period. Hayami (1993) provides a convenient compilation of the 13 survey results, which this paper borrows gratefully.

The available survey years are: 1721, 1750, 1756, 1786, 1792, 1798, 1804, 1822, 1828, 1834, 1840, 1846, and 1872. Population growth rates between adjacent years for each *kuni* are the dependent variable in the subsequent empirical analysis. To make up for uneven intervals, implicit average rates of change for a six-year period are calculated as follows: $PGR_{s,t} = e^{\frac{6}{t-s}(\log POP_t - \log POP_s)} - 1$, where $PGR_{s,t}$ is the implicit 6-year population growth rate between years s and t , POP_s and POP_t *kuni* population of the corresponding years.

The key explanatory variable is the ratio of the number of villages under *bakufu* control over all villages for each *kuni*. Data necessary for the calculation of this variable are found in Murakami (1985). This is a republication of a *bakufu* treasury official's recordings in 1800, and is counted among first-rate historical data sources for *bakufu*'s finance. Fortunately for our purpose, the book gives, for each *kuni*, (a) the number of all villages, (b) the number

⁷One may wonder about the reliability of the data. After all, population counting is no trivial task. Note the recent controversy in the U.S. concerning the introduction of supplementary statistical methods for the counting of urban population. It is important to note in this regard that Japan had accumulated much experience in the art of census by the beginning of the 18th century. From the 1630s on, every year all Japanese were required to register with local Buddhist temples or Shinto shrines, in an attempt to stamp out Christianity. Local lords or officials simply needed to add up population counts from temples and shrines within their jurisdiction to respond to a national census. Many of these local registers have survived, allowing historical demographers an unusually deep look into population dynamics at village or even family levels. Study of these registers remains an area of remarkably active research. See Hayami (1997) and Kito (2000).

⁸*kuni* is roughly comparable to prefecture of modern times.

of villages under daimyo rule, (c) the number of villages under hatamoto or gokenin control, bakufu's household vassals, and (d) the number of villages under daikan control, bakufu officers. I define the variable "bakufu control" as follows: $bakufu\ control = 100 \frac{(c)+(d)}{(a)}$.

For instance, the kuni of Setsu, roughly corresponding to present-day Kobe and its surroundings, had 870 villages in all, and among them 439 villages under daimyo rule, 68 under hatamoto or gokenin rule, and 363 under direct daikan rule. "Bakufu control" is then $49.5 = 100 \frac{68+363}{870}$. For reference, across the whole country, daimyo controlled 44,051 villages, hatamoto and gokenin 8805, and daikain officials 11,762. Thus the average of the variable bakufu control is $31.8 = 100 \frac{8,805+11,762}{8,805+11,762+44,051}$. This ratio runs the whole gamut from 0 to 100, as some kuni were entirely under the rule of an individual daimyo, while others were entirely controlled by the bakufu.

A couple of comments are in order regarding this definition. First, the village counts in Murakami (1985) give the numbers of villages at a single point in time circa 1800 and the bakufu control variable defined above is thus time-invariant. As a matter of historical description for our data period, this is not a serious problem. Bakufu and daimyo domains were practically fixed since the mid 17th century, even as the individual occupants of bakufu domains were frequently changed, as a result of internal bakufu politics or for disciplinary purposes. However, the time invariant nature of our key explanatory variable precludes implementation of interesting panel estimation techniques, such as fixed effects and first-differenced estimators. Thus I am unable to control for a possible correlation between individual kuni effects and the bakufu control variable in empirical analysis. There are some reasons to believe that this inability probably leads to underestimation of the impact of the political control variable, as will be noted later.

Second, the bakufu control ratio understates the true extent of bakufu influence in a given kuni. Fudai daimyo, especially those of low standings and correspondingly small holdings, say less than 20,000 koku, shared the same fate as bakufu's household vassals and mere officials, as they were also subjected to frequent reposting and threats of disciplinary revocation. Unfortunately, the data source does not allow further disaggregation of villages under daimyo rule. A proper reclassification of areas is likely to strengthen our estimates reported below.

Figure 1 shows the location of 68 kuni. For a reason to be explained shortly, the figure

shows the kuni grouped into 9 regions, according to their proximity to the two major urban centers of the Edo period. Of the two metropolitan centers, one was to develop into modern Kyoto and Osaka (Kinai), and another to develop into modern Tokyo (Tokyo and satellites). The former had been and still was the seat of the imperial court, and the latter the newly established capital of the bakufu government. The two regions also served as the commercial, industrial, and cultural centers of West and East Japan, respectively. Next comes a ring-like region surrounding Kinai (Kinai satellites), under strong influence from the vibrant commercial center of Kyoto-Osaka. The southwestern strip of the main island of Honshu (Honshu Southwest) and the lump interceding the two urban centers (Honshu Central) stood probably a little bit removed from the two urban centers. Still further removed were two islands to the southwest (Shikoku and Kyushu), and outermost strips to the north (Sea-of-Japan Shoreline) to the northeast (Honshu Northeast).

4 Cities, political governance, and population

The consensus view among the Japanese historical demographers divides the whole Edo period into three distinct phases in terms of changes in population: a dramatic increase in population from 1600 till the 1720s, stagnation during the following 100 years or so, and finally a resumed growth continuing into the 20th century. Some estimates based on studies of temple registers put the increase during the first phase at as high as three-fold.⁹ Population stagnation during the intervening period is documented best, due to the existence of national surveys.

More recently, historical demographers have been calling attention to significant shifts in regional distribution of population. Even during the stagnant 100-year period, regional population underwent dramatic changes. The most prominent pattern is to be found in the surprising reduction of population in and around the metropolitan centers of feudal Japan, namely Edo (modern Tokyo) in the east and Kyo (modern Kyoto) and Osaka in the west.

The leading explanation for the phenomenon, it seems, is that large cities in the Edo

⁹Part of this increase was due to the trend for landowners to shift from managing the labor themselves to parceling out their land to tenants, who were then free to marry. See Hanley (1991).

period worked as population drainages.¹⁰ Population density in urban centers was unusually high according to some authoritative estimates.¹¹ Inadequate hygiene meant fatal susceptibility to epidemic waves.¹² In addition, urban centers teemed with young males from rural areas resulting in highly unbalanced gender ratios, which was clearly a factor in reducing urban birth rates. In one renowned Japanese historical demographer's metaphor, urban centers were a doodlebug's pit, where hapless victims from rural Japan were inexorably sucked in never to get out alive again.¹³

The evidence in Table 1 is compatible with the conventional view. For each of the nine regions, the table gives the average population growth rate for the 6-year unit period for *kuni* located in the region. With the single exception of Honshu Northeast, the regions with the lowest population growth rates are either urban centers themselves (Kinai and Tokyo and satellites) or regions bordering on them (Kinai satellites and Honshu central).

As it happens, the four regions noted above all have high concentrations of *bakufu* domains. Thus the pattern shown in Table 1 is also compatible with the hypothesis based on political economy that household vassals and officials of *bakufu* had poor incentives to pursue growth-friendly economic policy and, as a result, population grew at a lower rate in areas under their charge.

Figures 2 and 3 show the degree of *bakufu* control (bold-faced figure above) and the rate of population change for the 1721-1872 period (figure below) for each *kuni*, Figure 2 for West Japan and Figure 3 for East Japan. Indeed, the five *kuni* in the Kinai region (Kyoto-Osaka)

¹⁰See Hayami (1997).

¹¹One such puts the population density of commoners' quarters (*shitamachi*) of historical Edo at over 60,000 people per square kilometers. In comparison, the most densely populated city in the metropolitan Tokyo area in the present-day Japan is Warabi, with its density at about 16,000 per square kilometers. See Kito (2000).

¹²Hanley (1991) notes that the standard of public hygiene was higher in Japan than in Europe, and that the Japanese cities were thus less susceptible to epidemic waves.

¹³See Hayami (1997).

and the five kuni in the Tokyo area and vicinity all have very high penetration of bakufu control. Thus population decreases in the two most highly urbanized regions noted by the Japanese historical demographers could be due to the city effect or due to the factors of political economy or both.

To see whether political economy plays a role apart from what coincides with the city effect, the next section employs two empirical strategies. First, recall that the 9 regions are defined in terms of degrees of proximity to the two urban centers. The first strategy is then to look at the relationship between within-region differences in bakufu control and population changes, controlling for regions. The effectiveness of this strategy depends on the extent to which kuni within a region share the city effect to the same degree. If, within a region, kuni under stronger bakufu control were also under stronger influence from the urban centers, the coefficient estimate for the bakufu control variable would be still contaminated with the city effect. The second strategy is to directly control for city effects by using population density for each kuni. To muster corroborating circumstantial evidence, the section also examines the incidences of organized civil unrest (*ikki*) and the increase in productive capacity as measured by *kokudaka* as a function of bakufu control, controlling for regions and population density.

5 Results

Table 2 presents the main results. The dependent variable in the pooled regressions is the rate of population increase for each kuni between two survey years, converted for the 6-year unit interval. The key explanatory variable is bakufu control, the ratio of the number of villages under bakufu control over all villages in each kuni.¹⁴ As different kuni have differ-

¹⁴13 surveys for 68 kuni yield 816 population growth rates (12 times 68). Following directions in Hayami (1993), suspect population counts are dismissed. Eliminating the entire series for the kuni of Izu leaves me with 804 observation points. Two observation points for Mikawa for 1786-1792 period and 1792-1798, four points for Shimousa for 1804-1822, 1822-1828, 1828-1834, two points for Suruga for 1721-1750 and 1750-1756, and 1834-1840 periods, and two points for Tsushima for 1750-1756 and 1756-1786 are further removed, 10 observation points in total. Hence 794 observations for the regressions.

ing population bases in different periods, for efficient weighted least squares estimation the regressions take *kuni* population in the beginning year of corresponding periods as weights.

Model 1 presents the result of a simple regression of the population growth rates on *bakufu* control. Model 2 controls for period effects but not regions, Model 3 for regions but not periods, Model 4 for both periods and regions, and finally Model 5 employs the most extensive list of controls in the form of interactions terms between period and region dummies. Coefficient estimates for *bakufu* control are roughly comparable across models. In the preferred Model 5, *bakufu* control is still significant at the usual 5% level, even though it is smaller than the estimate from the simple regression in Model 1.

For one 6-year unit interval, the estimate suggests that *kuni* entirely under *bakufu* control will see its population decrease by about 1% relative to *kuni* under *daimyo* rule, other things being equal. The cumulative erosion in population for the sample period would then be about 22%. If a *kuni* has 50% of its area under *bakufu* control, then the comparable cumulative erosion would be about 12%.¹⁵ The implied reduction in population due to *bakufu* control is then not only statistically significant, but also substantial in impact, given the magnitude of population changes as shown in the figures 2 and 3. Most places that lost population during the 1721-1872 period would have gained in population, if it had not been for the political effect of *bakufu*.

In Table 3, regressions now include population density on the right-hand side, on top of all the variables in the previous table.¹⁶ Inclusion of population density is meant to directly control for city effects. The results do suggest that more densely populated areas were placed at a disadvantage for subsequent population growth. At the same time, the results also confirm that incentive effects of *bakufu*'s control operate side by side with city effects. The coefficient estimates for the coefficient of *bakufu* control remain largely unchanged.

Table 4 reports the results from random effects estimation. Compared with WLS results, the random effects coefficient estimates are slightly smaller in magnitude, and their standard errors are also slightly larger. Overall, however, the choice between WLS and random effects

¹⁵ $(1 - 0.01)^{25} = 0.78$. $(1 - 0.005)^{25} = 0.88$.

¹⁶Land areas for *kuni*, necessary to calculate population density, are taken from Sekiyama (1968).

estimation does not seem to affect our results in any significant way. Regressions reported in Table 5 add population density as an explanatory variable to the OLS regressions. Again, the addition does not affect the results in any notable manner.

Even though our data is longitudinal, we cannot implement the standard panel estimation methods, such as fixed effects or first-differenced, since the key explanatory variable, *bakufu* control, is time-invariant. Thus our estimates may be biased due to a potential correlation between individual region (*kuni*) effects and the *bakufu* control variable. There are a couple of reasons to believe that the potential bias leads to underestimation of the true impact. The *bakufu* government had conducted a thorough and extensive survey of land and people before deciding which domains to keep and which domains to distribute as feudal fiefdoms. It is highly unlikely that the *bakufu* gave out lands with higher growth potential. Second, the *bakufu* government instituted the intricate "alternate attendance" system, in which lords and large numbers of retainers moved between domain castle towns and Edo every year, and wives, heirs, and suitable numbers of attendants lived in Edo permanently. Expenses required for the alternate attendance obligation accounted for a substantial chunk of domainal outlay, and these expenses were naturally the larger for more remote provinces, where most large domains were located. Indeed, it is well known that agricultural tax rates were generally higher in feudal domains than in *bakufu* domains. Presumably, this put feudal domains at a further disadvantage for growth.

Table 6 looks for some other signs of the effect of political incentives. Results in columns 1 and 2 negatively relate *bakufu* control to percent increase in *kokudaka*, or productive capacity measured in terms of the *koku* unit of rice output.¹⁷ Lower growth in *bakufu*-controlled area is consistent with the hypothesis that officials or household vassals of *bakufu*, with their short and uncertain tenure, lacked incentives to invest in long-term projects that might be beneficial in the long run, but unlikely to yield benefits under their watch. Alternatively, harsh taxation might discourage productive investment on the part of peasants.

Columns 3 and 4 look at the effects of *bakufu* control on the incidence of organized civil protests, or *ikki*, in each *kuni*. In a typical *ikki*, unarmed peasants would organize a sit-

¹⁷Both the data on *kokudaka* and the following civil unrests come from Iwanami (1999).

in in front of the headquarters castle of their local lord. It was important to bring out an overwhelming number of peasants, usually in thousands, lest their action be crushed before their complaint got a hearing by the authorities in charge. Civil protests were not something to lightly to take up during the Edo period. To discourage frivolous protests, the *bakufu* would mete out stern, oftentimes capital, punishment to the leaders, regardless of the reasonableness of the peasant demands. Thus the number of *ikki* unrests in an area is expected to be a reasonably good proxy of harsh and detrimental economic policies of the local baron. In a year of famine, for instance, *daimyo* barons might realize that reducing the tax and saving the peasants for the future better serve their long-term interest. In a similar situation, *bakufu* officials might be more concerned about current revenue, either because they want to enrich themselves or because they need to impress their supervisors before their next posting. With region controls or without, Table 5 shows that areas with more *bakufu* domains experienced civil unrest more frequently.

6 Concluding Remarks

During the feudal Edo period, the shogunate government directly ruled about one quarter of the whole country through its officials and household vassals, relegating the remainder to the rule by hereditary *daimyo* barons. Since the mid 17th century, the latter enjoyed practically permanent tenure assured on their domains, while the tenure of the former was much shorter and uncertain. Using publicly available data, the paper shows that areas under direct *bakufu* control were associated with higher incidences of civil unrest, lower growth of productive capacity, and lower population growth.

On the front of economic history, the paper proposes and tests a hypothesis that complements the conventional view among historical demographers in Japan regarding regional differences in population growth during the Edo period. The Japanese historical demographers have emphasized the population-reducing role of urban centers with their susceptibility to epidemic waves and unbalanced gender ratios. The findings in the paper suggest that regional differences in governance systems also played a substantial role in the regional demographic shifts. Even after controlling for population density, the effects of the variable

measuring the extent of bakufu control remain largely intact.

Presumably, shogun after shogun tried their utmost to better control the conduct of their officials and household vassals with the help of best minds of the times. Remarkably, their best efforts were not enough to match the enduring self-interest of hereditary daimyo lords, who ruled over their lands as private property. This evidence is compatible with Mancur Olson's thesis that autocrats and even bandits will be guided by their "encompassing interest" to provide a surprisingly growth-friendly policy, as long as they are assured a stable long-term tenure.

The first shogun Ieyasu, presumably reluctantly, granted hereditary fiefs to some of his former rivals or even enemies. It is unlikely that he knowingly gave them regions with greater growth potential. It is interesting to note that the realms ruled by these daimyo lords grew in terms of population and economic might relative to the shogun's bakufu domain, and eventually provided the military mettle to topple the bakufu government for the Meiji Restoration in 1868. Just possibly, the political system that lasted Japan through more than 250 years was bound to crumble without the external shocks.

The findings may also help explain why it was Japan, instead of China for instance, that pioneered modernization in East Asia. In contrast to the feudal system of government in Japan, Chinese dynasties traditionally relied on a system of peripatetic officials with limited tenure to rule the provinces. A potential linkage between feudalism and modernization has been noted by historians. According to Peter Duus, "it was in the most feudalized areas of northwestern Europe — England, the Low Countries, and northern France — that many of the features of modern society emerged ... of all the societies outside the West, Japan was the first to construct a modern state structure, the first to industrialize, and the first to adopt representative institutions".¹⁸ Interestingly, one prominent Edo-period thinker in the person of Ogyū Sorai forcefully argued how Japan more closely embodied the Confucian ideals with its feudal system where "the feudal lords and their senior retainers rule over their lands as their own property"¹⁹, and how China began its deterioration when it ditched its

¹⁸Duus (1993), *Feudalism in Japan*, p.12.

¹⁹J. R. McEwan (1962), *The Political Writings of Ogyū Sorai*, p.21, re-quoted from Totman (1996), *Early*

own ancient feudal system.

Obviously, this paper does not advocate feudalistic government as a condition for economic development. McGuire and Olson (1996) point out that a governing coalition in a representative democracy is likely to possess an even greater "encompassing interest" in better governance than an autocrat with unlimited tenure. Ndulu and O'Connell (1999) document how in sub-Saharan Africa multi-party systems outperformed in terms of economic growth over military oligarchies and one-party systems, ever widening the gap in real GDP. If self-perceived tenure of autocrats and oligarchs is short and uncertain, then they may be expected to more closely resemble Olson's roving bandits. De Long and Shleifer (1993)

The author intends to work on two possible extensions of the current paper. The first is to draw on village-level population studies by historical demographers and examine whether Olson's thesis is borne out at a more disaggregated level. The second is to explore concrete differences in economic policies between the alternative governing regimes.

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Table 1. Changes in Population by Periods and by Regions**A. Population Changes by Periods**

Periods	Average % change for a unit 6-year-period	Standard deviation	# Observations
1721-1750	0.27	1.76	67
1750-1756	0.85	4.98	66
1756-1786	-0.38	1.63	67
1786-1792	-0.57	3.71	66
1792-1798	2.39	3.42	66
1798-1804	0.53	2.48	67
1804-1822	1.66	1.62	65
1822-1828	1.22	3.47	65
1828-1834	0.54	3.16	65
1834-1840	-4.23	4.87	66
1840-1846	3.40	2.51	67
1846-1872	4.76	4.39	67
Overall	0.87	3.97	794

B. Population Changes by Regions

Regions	Average % change for a unit 6-year-period	Standard deviation	# Observations
Osaka-Kyoto-Nara	-0.22	3.83	60
Tokyo and Satellites	0.35	3.23	56
O-K-N Satellites	0.08	2.95	96
Honshu Southwest	1.25	3.86	84
Honshu Central	0.87	3.42	90
Shikoku	1.77	2.96	60
Shore Sea-of-Japan	1.44	4.53	168
Honshu Northeast	-0.44	4.29	48
Kyushu	1.29	4.62	132
Total	0.87	3.97	794

Table 2. Population Change: WLS Regressions (12 periods; 9 regions)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Bakufu Control $*10^{-2}$	-0.0147** (0.0044)	-0.0147** (0.0034)	-0.0104 (0.0066)	-0.0098* (0.0056)	-0.0102** (0.0050)
Period Controls	NO	YES	NO	YES	YES
Region Controls	NO	NO	YES	YES	YES
Interactions	NO	NO	NO	NO	YES
R squared		0.399			0.593
	0.014		0.027	0.428	
No. of obs.		794			794
	794		794	794	
Degree of freedom		781			684
	792		783	772	

Note: Dependent variable is the standardized rate of population change. Regressions use population for each *kuni* in corresponding years as weights. Numbers within the parentheses show standard errors. ** significant at the level of 5%. * significant at the level of 10%.

Table 3. Population Change: WLS Regressions (12 periods; 9 regions)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Bakufu Control *10 ⁻²	-0.0102** (0.0049)	-0.0106** (0.0038)	-0.0091 (0.0071)	-0.0087 (0.0056)	-0.0089* (0.0049)
Pop Density *10 ⁻⁶	-1.38** (0.65)	-1.26** (0.51)	-1.16 (0.77)	-0.97 (0.59)	-0.84 (0.53)
Period Controls	NO	YES	NO	YES	YES
Region Controls	NO	NO	YES	YES	YES
Interactions	NO	NO	NO	NO	YES
R squared	0.020	0.401	0.046	0.430	0.593
No. of obs.	794	794	794	794	794
Degree of freedom	791	781	783	772	684

Note: Dependent variable is the standardized rate of population change. Regressions use population for each *kuni* in the beginning year of the corresponding period years as weights. Numbers within the parentheses show standard errors. ** significant at the level of 5%. * significant at the level of 10%.

Table 4. Population Change: Random Effects (12 periods; 9 regions)

Variables	Model 1A	Model 2A	Model 3A	Model 4A	Model 5A
Bakufu Control $\times 10^{-2}$	-0.0130** (0.0046)	-0.0132** (0.0039)	-0.0086 (0.0069)	-0.0083 (0.0058)	-0.0089 (0.0054)
Period Controls	NO	YES	NO	YES	YES
Region Controls	NO	NO	YES	YES	YES
Interactions	NO	NO	NO	NO	YES
R squared	0.010	0.299	0.031	0.321	0.478
No. of obs.	794	794	794	794	794
Degree of freedom	792	781	783	772	683

Note: Dependent variable is the standardized rate of population change. Numbers within the parentheses show standard errors. ** significant at the level of 5%. * significant at the level of 10%.

Table 5. Population Change: Random Effects (12 periods; 9 regions)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Bakufu Control *10 ⁻²	-0.0103** (0.0048)	-0.0106** (0.0041)	-0.0094 (0.0069)	-0.0092 (0.0058)	-0.0091* (0.0055)
Pop Density *10 ⁻⁶	-1.92** (0.77)	-1.85** (0.65)	-1.46 (0.95)	-1.33* (0.80)	-1.13 (0.75)
Period Controls	NO	YES	NO	YES	YES
Region Controls	NO	NO	YES	YES	YES
Interactions	NO	NO	NO	NO	YES
R squared	0.019	0.310	0.034	0.326	0.477
No. of obs.	794	794	794	794	794
Degree of freedom	791	781	783	772	684

Note: Dependent variable is the standardized rate of population change. Numbers within the parentheses show standard errors. ** significant at the level of 5%. * significant at the level of 10%.

Table 6. Productive Capacity, Civil Unrest, and Bakufu-Control

Variables	$\Delta kokudaka(\%)$	$\Delta kokudaka(\%)$	<i>#ikki</i>	<i>#ikki</i>
Bakufu Control	-28.3** (13.9)	-27.1 (19.5)	11.9** (5.0)	16.0** (6.9)
Region Controls				
	NO	YES	NO	YES
R squared	0.079	0.260	0.079	0.311
No. of obs.	66	66	67	67
Degree of freedom	64	56	65	57

Note: $\Delta kokudaka(\%)$ measures the rate of increase in *kokudaka*, or productive capacity, for each *kuni*, between 1697 and 1834. *#ikki* counts the incidences of *ikki*, or civil unrest, in each *kuni*, between 1700 and 1871, normalized by the size of population. Numbers within the parentheses show standard errors. ** significant at the level of 5%. * significant at the level of 10%.

Figure 2. Bakufu control and Regional Population Changes : West Japan

Note : For each *kuni*, the number above refers to *Bakufu* control (percent of villages under *Bakufu* control among all the villages of the *kuni*) and the second number to rates of population change during the 1721-1872 period.



