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Taxation and Public Goods Provision in China and Japan before 1850

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Tuan-Hwee Sng and Chiaki Moriguchi*

February 17, 2013

Abstract

We develop a principal-agent model to study fiscal capacity in pre-modern China and Japan. Before 1850, both nations were ruled by stable dictators who relied on bureaucrats to govern their domains. We hypothesize that agency problems increase with the geographic size of a domain. In a large domain, the ruler's inability to closely monitor bureaucrats creates opportunities for the bureaucrats to exploit taxpayers. To prevent overexploitation, the ruler has to keep taxes low and government small. Our dynamic model shows that while economic expansion improves the ruler's finances in a small domain, it could lead to lower tax revenues in a large domain as it exacerbates bureaucratic expropriation. To test these implications, we assemble comparable quantitative data from primary and secondary sources. We find that the state taxed less and provided fewer local public goods per capita in China than in Japan. Furthermore, while the Tokugawa shogunate's tax revenue grew in tandem with demographic trends, Qing China underwent fiscal contraction after 1750 despite demographic expansion. We conjecture that a greater state capacity might have prepared Japan better for the arrival of the West after 1850.

Key words: Comparative Institutional Analysis, Principal-Agent Problem, Dictatorships

JEL Codes: D73, N15, N40, O43, P52

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1 Introduction

Why was Japan the first non-Western nation to industrialize? Why did China, historically the most culturally and technologically advanced country in East Asia, take longer to modernize? Traditionally, many observers believe that the answer lies with the Meiji Restoration. According to this view, Qing China (1644-1911) and Tokugawa Japan (1600-1868) were both governed by despotic rulers who were uninterested in promoting economic growth.[1] Their paths diverged only after 1868, when the Tokugawa regime was overthrown and the new Meiji government introduced drastic reforms that transformed Japan. As Beasley (1972) put it,

> During the middle decades of the nineteenth century China and Japan both faced pressure from an intrusive, expanding West [...] Emotionally and intellectually, Chinese and Japanese reacted to the threat in similar ways [...] Yet they differed greatly in the kind of actions that this response induced [...] The Meiji Restoration is at the heart of this contrast, since it was the process by which Japan acquired a leadership committed to reform and able to enforce it. For Japan, therefore, the Restoration has something of the significance that the English Revolution has for England or the French Revolution for France; it is the point from which modern history can be said to begin.

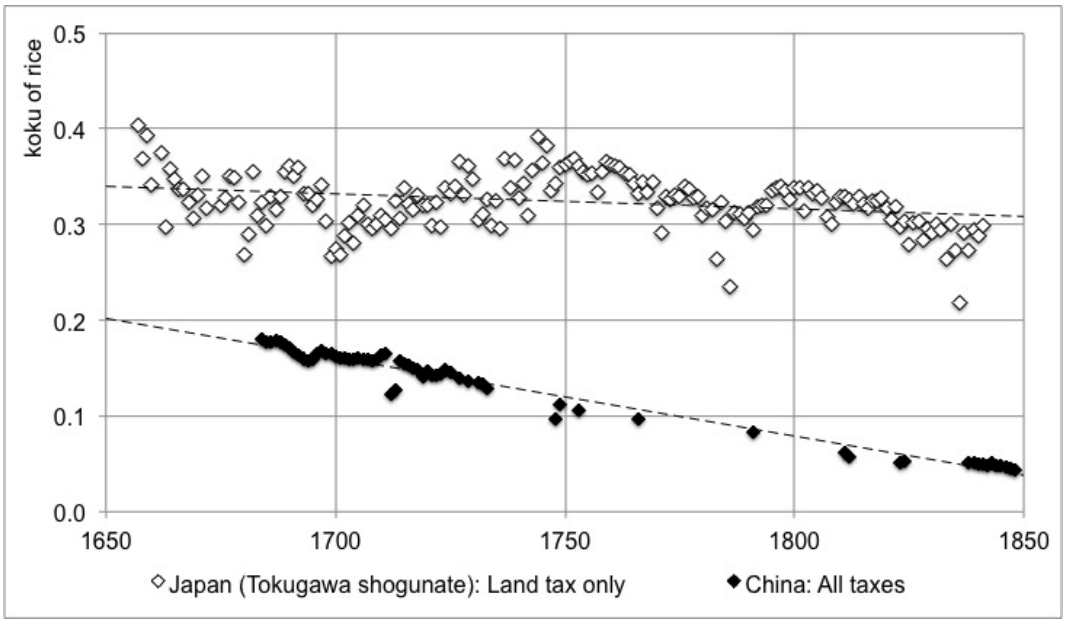
Recent reassessments have put the Chinese and Japanese economies on the eve of the modern age in better standing. They have shown that, like Western Europe, China and Japan experienced widespread commercialization and proto-industrialization during the early modern period (Pomeranz, 2000). However, the revisionist view, too, tend to play down the differences between pre-1850 China and Japan, and focus instead on their similarities.

Indeed, early modern China and Japan shared much in common. Both depended heavily on small-scale, labor intensive, and rice-based agriculture. Both were ruled by stable and sophisticated governments long before the arrival of the West. Furthermore, they shared a common cultural, institutional, and technological heritage. As a result of active cultural borrowing from China, Tokugawa Japan was also deeply influenced by

[1] See, for example, Wittfogel (1957) and Balazs (1964) on China; Alcock (1863) and Reischauer (1970) on Japan.

Confucianism. Chinese administrative codes played an important role in shaping the way that the Tokugawa shogunate was run (Jansen, 1992).

Figure 1: Per Capita Tax Revenue in China and Japan



Sources: Shogunate's land tax from Ohno (1996); Japan's population estimates from Hayami and Miyamoto (1988); China's tax revenues from Sng (2010); China's population estimates from Perkins (1969).

We point to an important empirical observation that fits neither traditional nor revisionist perspectives, however. As Figure 1 illustrates, from 1650 to 1850, tax revenue per capita was significantly higher in Tokugawa Japan than in Qing China, and the gap was widening over time.[2] On the eve of the Opium War (1839-42), the Chinese state's

[2]Japanese estimates in Figure 1 are for the domain of the Tokugawa shogun only. Per capita tax revenues for other local lords in Japan were generally higher (see Section 4.2). For the shogunate's tax revenue, we include only the land tax to provide a lower bound estimate. For the shogunate's population, we assume 15% of the Japanese population lived in the shogunate domain throughout this period. For China's tax revenue, we include not only the land tax but also the salt tax, customs duties, and miscellaneous taxes to provide an upper bound estimate. For comparison purpose, we convert per capital tax revenues in both regimes into *koku* of rice (180.4 liters of rice), defined historically in Japan as the amount necessary to feed an adult man for a year. We did not consider corvee levies, which was effectively phased out in Qing China but remained a component of the peasant's obligations to their lords in Tokugawa Japan. Therefore, the actual difference in per capita tax revenue between China and Japan is likely to be bigger than what Figure 1 suggests.

annual revenue was equivalent to 2% of its national income at the maximum, while the comparable number for the Tokugawa shogunate was more than 15%.[3]

What were the reasons for the diverging revenue trends between China and Japan? It is our hypothesis that geography was a primary factor. China was a sprawling land empire with vast inner frontiers, while Japan was a small island nation. We propose that the difference in their geographic size and heterogeneity led to a much more acute problem of political control in the former than in the latter. In pursuing our research, we follow the methodology of comparative and historical institutional analysis proposed by Greif (1998, 2006). That is, we first develop a context-specific model based on historical details to theoretically examine the nature of the problems that the rulers in China and Japan faced and then empirically test its implications using comparative historical evidence.

Between 1650 and 1850, both nations were ruled by stable dictatorships. Following Olson (1993), we model stable dictators as "stationary bandits" who understand that excessive exaction in the short run would be counter-productive in the long run.[4] However, the ruler's encompassing interest is by itself insufficient to guarantee good governance. Because dictators cannot rule alone and have to rely on agents to govern, a principal-agent problem is inherent in dictatorships.[5] Unless the interests of the ruler and the agents are well-aligned, in the absence of perfect monitoring, the agents tend to pursue their self-interest at the ruler's expense. For example, they may extort the taxpayers and thereby increase the likelihood of rebellion.

We hypothesize that in a stable dictatorship, agency problems increase with its geographic size and heterogeneity. Given pre-modern information technologies, it is costly for the ruler of a large domain to monitor the agents closely. This gives the agents strong incentives to extort the taxpayers. To prevent overexploitation that could foment rebellion, the ruler has to keep taxes low and government small. By contrast, in a smaller domain, lower monitoring costs allow the ruler to impose heavier taxes without risking popular resistance.

[3]We assume an annual subsistence consumption of 345 liters of grain per capita in both China and Japan (Huang, 2003, p. 158). Multiplying this by population produces lower bound estimates of national income, which in turn generate the upper bound tax-to-national-income estimates presented above.

[4]In contrast, unstable dictators behave like "roving bandits" due to their short time horizons.

[5]In Levi's words (1988, 14), "absolute monarchs are rulers who possess a virtual monopoly over coercive capacity but not necessarily a perfect monitoring capacity." See Kiser and Tong (1992); Ma (2010); Sng (2010) for more discussions on agency problems in imperial China.

If the sole purpose of taxation is to support the consumption of the ruling class, whether it enriches the ruler or his agents will not matter to the taxpayers. However, unlike corruption, taxation is rarely a pure rent seeking activity. The ruler, as the owner of his domain, may use the tax receipts to invest in public goods to keep his property productive. If so, the competition between the ruler and the agents over the economic surplus may have an impact on social welfare, especially in the long run.

To formalize our hypothesis, we build a dynamic principal-agent model and analyze optimal taxation and public goods provision in a stable dictatorship. The ruler taxes the peasants through agents and invests part of the tax revenue in a local public good that protects the economy from exogenous shocks (e.g. natural disasters). If the ruler under-invests in the public good, the risk that a large shock destroys the economy increases.

The static predictions of the model are straightforward: Holding monitoring technology constant, as the geographic size of the ruler's domain increases, bureaucratic expropriation worsens and per capita tax revenue falls due to managerial diseconomies of scale.

New insights come from the dynamic implications. While one may expect economic expansion to generate more tax revenues and higher public good investments, this is not always the case. The model predicts that economic expansion could actually hurt the ruler because it also exacerbates agency problems. When monitoring cost is sufficiently high, bureaucratic expropriation will outpace economic expansion. It is only when monitoring cost is low that economic change is likely to bring net benefits to the ruler as well as the population.

Our model provides a potential explanation for the tax revenue dynamics in China and Japan documented in Figure 1. To further test its implications, we examine the provision of local public goods (coinage, transportation network, urban management, forest protection, famine relief) in the two regimes. In line with the model's prediction, we find that, compared to the Chinese emperor, the Tokugawa shogun displayed a greater capability to provide these public goods over a longer period of time.

We take the size of domains in China and Japan as exogenous in our analysis. Given the high agency costs, one may ask if China's vast size was ever optimal. In a broader framework, such as Alesina and Spolaore (1997), the ruler determines the size of his domain by balancing the accompanying costs and benefits, where agency costs are just one such factor. In the case of China, we conjecture that the benefits of

political integration—peace among contiguous regions—outweighed high agency costs (Rosenthal and Wong, 2011), thereby justifying its size. We do not model this, however, to keep the scope of our analysis manageable.

This paper is intrinsically linked to the literature on state capacity. Traditionally, economists see a strong state that taxes too much as the main threat to economic growth. More recently, Acemoglu (2005) and Besley and Persson (2009) have argued that a weak state that provides too little public goods also creates distortions.

Sng (2010) shows that Qing China was one such weak state despite its autocratic nature and finds that tax rates and the number of counties per square area declined with geographic distance from the capital. This paper builds on his work and extends it by providing a comparative analysis of China and Japan. We also explicitly incorporate public goods in our analysis.

Two other recent papers also examine the causal link between geographic size and the quality of governance. According to Stasavage (2010), in pre-industrial Europe, high communication and travel costs prevented representative assemblies in large polities to convene regularly and function effectively. Olsson and Hansson (2011) detect strong negative effects of country size on the rule of law using contemporary data of 127 countries. Importantly, these studies show that geographic size is a challenge to good governance not only in pre-modern dictatorships in Asia, but also in historical Europe as well as in many developing countries today.

The rest of the paper is organized as follows. Section 2 provides the historical background. Section 3 presents the model and derives predictions. Section 4 provides comparative historical evidence. Section 5 concludes.

2 Historical Background

In this section, we compare the geography, administrative structure, and system of tax collection in Qing China and Tokugawa Japan to motivate our theoretical model.

2.1 Geography

Tokugawa Japan was an archipelago comprising three main islands,[6] while China was a continental empire (Figure 2). At its peak, China under the Qing dynasty (1644-1911) controlled a landmass larger than China or the United States today. Even if we disregard the thinly populated regions north and west of the Great Wall, the region known as China proper was 12 times Tokugawa Japan.

If information transmission posed any challenge to effective public administration, this challenge was clearly more acute in China than in Japan. In 1853, when the Taiping rebels captured Wuchang, a major Middle Yangzi city about 1200 kilometers from Beijing, the news took 8 days to reach the capital. To send an official report of the highest priority between Beijing and Shanghai through the imperial postal relay stations would take 10 days (Xie, 2002). By contrast, a similar trip between Japan's two biggest cities, Edo (Tokyo) and Osaka, about 520 kilometers apart, would only require 4 days (Nakane and Oishi, 1990). It is also worth noting that no one in Japan lived more than 120 kilometers from the sea, which offered a cheap mode of transportation in an age before railroads.

2.2 Administrative Structure

Both China and Japan were ruled by a succession of stable dictators between 1650 and 1850. However, while China was ruled by one dictator—the emperor of the Qing dynasty—during this period, multiple dictatorships coexisted in Japan.

Nominally, Japan was led by the shogun of the Tokugawa house, who controlled 15% of the arable land (Figure 3). The bulk of the remaining land was divided into 260-odd mutually exclusive domains, each headed by a daimyo (territorial lord).[7] While a daimyo had to swear allegiance to the shogun and subject himself to a system of controls aimed to prevent dissent, he retained virtually complete autonomy over his domain.[8] As such, instead of treating Tokugawa Japan as a unified but decentralized

[6]During the Tokugawa period, Hokkaido was populated by the indigenous Ainu people and Japan's control was restricted to the southern tip of the island.

[7]The size of domains varied widely. The shogunate was rated at 4 million koku, but most domains were much smaller. The average size of a domain was only about 100,000 koku.

[8]The position of the shogun in relation to other daimyo could be seen as one of "first among equals". He could order a daimyo to provide military and logistical support or to make contributions to public projects (e.g. castles, roads, and bridges). However, he had no right to tax daimyo lands. An important mechanism imposed by the shogun to ensure daimyo subservience was *sankin kotai*.

Figure 2: Early Modern China and Japan

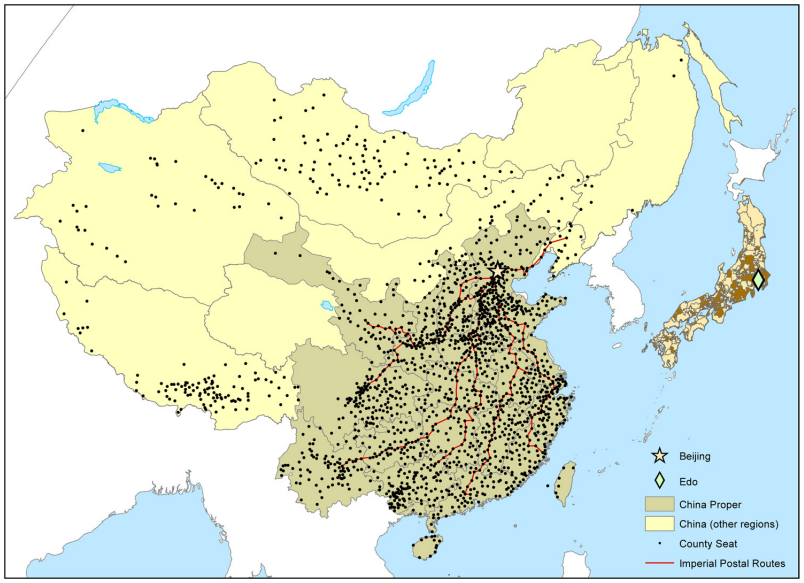
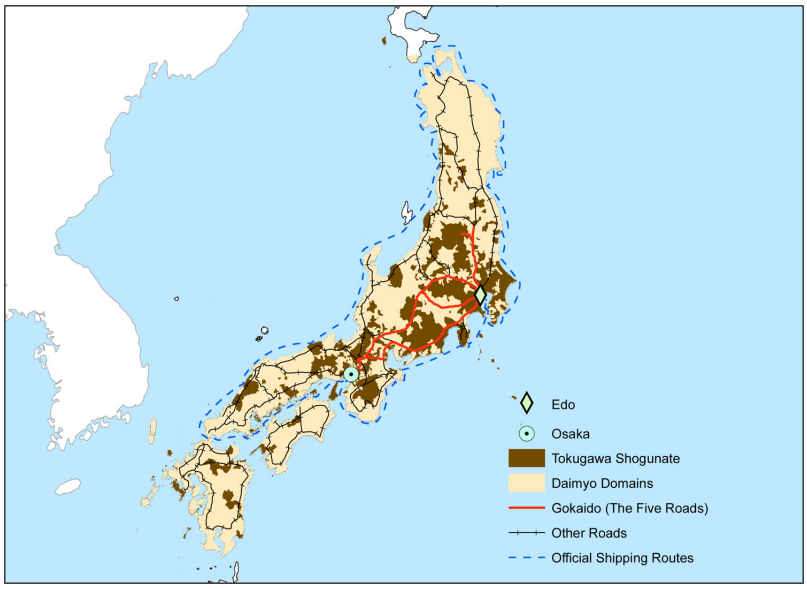


Figure 3: Tokugawa Japan in 1664



Sources: CHGIS, Version 4, Cambridge: Harvard Yenching Institute, January 2007 (http://www.fas.harvard.edu/ chgis/); China Historical GIS Project,"Tokugawa Japan GIS, Demo Version." Feb 2004 (http://www.fas.harvard.edu/ chgis/japan/)

Essentially a hostage system, it required a daimyo to maintain two residences—one in the daimyo domain and the other in Edo—and to spend alternate years at each place. When the daimyo was absent from Edo, his wife and heir were required to stay there as hostages. This and other measures helped maintain an extended period of peace known as Pax Tokugawa.

empire, we interpret it as a league of dictatorships and treat each daimyo as a dictator.[9] We focus primarily on the shogunate and compare it with China proper.[10]

The systems of territorial administration in China proper and the shogunate were broadly similar. To administer his domain, the Qing emperor structured his bureaucracy into four layers (center–province–prefecture–local). China proper was organized into 18 provinces, each province was then divided into several prefectures, and each prefecture into several counties. The responsibility of local administration fell on the county, which sat at the bottom of the bureaucratic hierarchy. Each county was headed by a magistrate, whose term was usually limited to three years (Ch'u, 1962).

In the Tokugawa shogunate, local administration was also carried out by non-hereditary magistrates (*daikan*). Like his Chinese counterpart, the shogunate magistrate was subjected to rotation.[11] They also shared similar scope of responsibilities. In both regimes, the magistrate was expected to focus on two tasks: collection of taxes and adjudication of disputes (Wang, 1890; Totman, 1967).

There were only two layers of government (center–local) in the shogunate. At any one time, 40 to 50 magistrates reported directly to the shogun's cabinet (Totman, 1967). By contrast, there were about 1500 county-level jurisdictions and hence 1500 magistrates in Qing China.

2.3 Monitoring System

Because China proper was almost 90 times bigger than the shogunate domain, it had a greater number of administrative officials and a longer bureaucratic chain of command. This implies that unless the Chinese emperor possessed superior monitoring technologies, it would be more difficult for him than for the shogun to monitor local officials. There is little evidence to suggest that monitoring technologies were better

[9] An analogy can be found in the theory of the firm, which equates ownership to a firm with the control of residual rights to its assets (Grossman and Hart, 1986). Since a daimyo was the residual claimant to the fiscal resources of his domain, he, not the shogun, owned the domain.

[10] Due to the shogunate's strong political and economic influences, the institutional features of local domains shared much in common with those of the shogunate domain (Nakabayashi, 2012). However, due to data limitations, we leave a detailed analysis of other domains to future work.

[11] In the early years of the shogunate, the daikan office was hereditary and was often filled by a gentry member with strong local connections. In 1680, the shogun Tsunayoshi initiated administrative reforms and replaced the hereditary system with a more meritocratic system. After the reforms, a typical daikan would serve in 2.54 locations in his lifetime and spend 5.7 years per location (Nishizawa, 1998).

in China, however. In fact, the two regimes instituted similar monitoring systems that combined top-down, parallel, and bottom-up monitoring.

In top-down monitoring, local officials were supervised by higher-ranking officials within the same bureaucratic hierarchy. In the shogunate, the magistrate's office was periodically audited by the Finance Office in Edo (Totman, 1967, 76). In China, the administration conducted a grand review once in every three years to evaluate the magistrate's performance and mete out reward or punishment accordingly (Watt, 1977).

Top-down monitoring, however, could be ineffective in the presence of bureaucratic patronage networks. To prevent this, the Chinese emperor established an independent surveillance agency to investigate and impeach shirkers and wrongdoers. Known as the Censorate, it was the duty of this agency to detect bureaucratic malpractices and report them to the emperor (Feuerwerker, 1976). Likewise, the shogun sent out censors to keep an eye on the quality of local administration (Totman, 1967; Nakane and Oishi, 1990).

Finally, to carry out bottom-up monitoring, both regimes adopted petition systems. The system had a long tradition in China, where it was in place since the 7th century (Ocko, 1988; Fang, 2009). In Japan, it was not until 1720 that the shogun set up petition boxes in major cities and permitted the public to make suggestions for better governance or to report misconducts and abuse of power by shogunate officials. The petitions were sent directly to the shogun and to be reviewed by himself. Over 75% of large local domains instituted similar systems (Ohira, 2003).

In both cases, the petition system was costly to implement, as it typically generated a large number of petitions including irrelevant requests and false accusations. In the Tokugawa shogunate, each petition was investigated and a petitioner was punished for misstatement. The system functioned reasonably well and was maintained till the end of the Tokugawa period (Ohira, 2003).[12]

By contrast, the sheer size of the Chinese population made it extremely costly for the Qing rulers to verify the authenticity of every petition. Both the emperors Qianlong (r. 1736-1795) and Jiaqing (r. 1796-1820) initially encouraged petitions from their subjects, but quickly reversed their policies after receiving a flood of complaints that they could not possibly deal with (Fang, 2009). The system did not function as intended, and some complainants resorted to extreme measures, such as committing suicide outside

[12]In addition to exposing corruption, petitions also contributed to the creation of fire brigades and the establishment of a hospital for the poor in Edo (Roberts, 1994).

the palace gates, to attract the emperor's attention to their grievances. In other words, although both China and Japan used similar systems of bottom-up monitoring to check corruption, it was less effective in China due to its much greater size and population.

The rulers in China and Japan were concerned about the well-being and grievances of their subjects for both ideological and practical reasons. Because Confucianism demanded a ruler to treat his subjects benevolently, it legitimized popular resistance against an oppressive ruler.[13] This fear of a violent rebellion served as a constraint on dictators in both China and Japan, and provided them an incentive to prevent the overexploitation of their subjects.

2.4 The System of Tax Collection

Land taxation was the most important source of government revenue in Qing China as well as in Tokugawa Japan. Both economies depended heavily on small-scale, labor intensive agriculture. In Japan, the fiscal base was measured in rice, the primary staple crop nationwide. Fields, forests, residential lands, mines, and fishing grounds were also assessed and taxed in terms of rice (Nishikawa, 1985, 23-24). If rice were not the main crop cultivated, then part of the tax would be levied in cash at a conversion rate set by the lord.

By contrast, regional diversity necessitated the denomination and collection of taxes in a variety of crops and metals in China. While most taxes had been monetized by the 17th century, Chinese peasants still paid part of their land taxes in kind, which, depending on the region, could be rice, wheat, millet, barley, sorghum, beans, or other staple crops. Furthermore, it was common for the portion of the land tax denominated in silver to be paid in copper coins when and where silver was scarce (Ch'u, 1962). In such cases, commutation rates were set by magistrates based on local conditions. This high heterogeneity created great difficulties for the imperial court to monitor the over-collection of taxes by local state agents (Ch'u, 1962; Zelin, 1984).

In addition, the use of the village contract system (*murauke*) in Japan further reduced agency costs for its rulers. Under this system, the ruler levied the land tax on each village based on the village's total assessed yield. Village leaders were in charge of

[13] In the words of Mencius, "If a prince treats his subjects as his hands and feet, they will treat him as their belly and heart. lf he treats them as his horses and hounds, they will treat him as a mere fellow-countryman. If he treats them as mud and weeds, they will treat him as an enemy" (Mencius, 2004).

assigning and collecting taxes from individual households and transfer the sum to the magistrate. Moreover, households in the same village were made collectively responsible for the payment of taxes. This arrangement reduced the frequency of contact between the magistrate and individual peasants, and therefore limited the opportunities for tax officials to abuse power. Indeed, the magistrate rarely showed up in the villages except during the annual inspections, and villages retained a high degree of autonomy in running their affairs (Walthall, 1991).

For such a system to work, it is necessary that village communities remained tightly knit to facilitate mutual monitoring and discourage free riding. To restrict geographic mobility, the shogunate mandated villages to keep household registry and required its subjects to obtain permission before changing residency or traveling.

In Qing China, the primary unit of taxation was the household instead of the village. Every land-owning household had to pay taxes that were computed based on the size and grade of the land that it owned. According to the Qing statutes, the magistrate was supposed to set up tax chests at the county seat during the tax collection period, and invite taxpayers to deposit their taxes into these chests in exchange for official receipts. In practice, however, magistrates often sent their underlings to solicit payments from individual households, or allowed local strongmen to act as tax farmers (Ch'u, 1962; Zelin, 1984).

We do not model the village contract system in Japan in the next section as doing so would further reduce the monitoring costs for the Japanese rulers and strengthen our main results. It should be noted, however, that the village contract system was not a uniquely Japanese system. In fact, China had instituted a similar system during the early years of the Ming dynasty (1368-1644). The system eventually unraveled, however, as the potential for migration given China's vast inner frontiers made it difficult to maintain tightly-knit communities that were necessary to implement collective responsibility.[14]

[14]As in Tokugawa Japan, the primary unit of land taxation in Ming China was the village (Huang, 1974). Within each village, tax assignment was to be sorted out by the village members without interference from officials. The Ming state also restricted domestic traveling. Travelers were required to obtain travel documents, and foreign traveling was banned outright. However, in the 16th century, a rising trend of the wealthy migrating into urban centers as well as large-scale population movements to inner frontiers put this rigid system under increasing pressure. The migration of a household implies that its neighbors had to shoulder the extra corvee responsibilities that it left behind. This in turn increased the incentives for others to migrate, and set off a chain reaction that caused the system to unravel (Liang, 1957; Heijdra, 1998; Fei, 2007). By the 17th century, tax liabilities had to be switched

3 The Model

Motivated by the historical observations, in this section, we develop a formal model to study the impact of geographic size on a ruler's capacity to collect taxes and provide public goods.

Consider a discrete-time, infinite-horizon game with three types of players: Ruler, Tax Agents, and Peasants. As a stable dictator with dynastic succession, the Ruler is assumed to live infinitely long, while the Agents and the Peasants are assumed to be short-lived.

For analytical simplicity, we assume that the dictatorship consists of S homogenous regions and that S is exogenously given to the Ruler.[15] We let the number of regions S represent the geographic size of the dictatorship and take a region as the unit of analysis. In other words, when comparing large and small dictatorships, we assume that the two regimes differ only in the number of regions they encompass and that all regions in the two regimes are "identical".

3.1 The Basic Setup

We first describe a basic single-period game in a representative region. Assume that the region is populated by N Peasants who engage in agricultural production.[16] Let Y denote the agricultural output in the region and assume that it increases with labor inputs at a diminishing rate: $Y = Y(N)$, where $N > 0$, $Y(0) = 0$, $Y'(\cdot) > 0$, and $Y''(\cdot) < 0$. In other words, the aggregate output increases with population, and hence population growth and economic growth are synonyms in our model.

In each region, the Ruler sets a tax rate τ and sends a fixed number of Agents to collect taxes from the Peasants, where each Agent is assigned to a single jurisdiction.[17] When collecting taxes, the representative Agent may demand extralegal surcharge of

from community-based to household-based. The Qing state inherited the new arrangement when it conquered China in 1644.

[15] In historical terms, in the case of Qing China, a region corresponds to a province and thus $S = 18$; in the case of Tokugawa Japan, the entire Shogunate domain can be seen as just one region and thus $S = 1$.

[16] For simplicity, we assume away commercial production, but it can be incorporated without changing main results.

[17] In historical terms, 18 regions were divided into approximately 1500 jurisdictions in in Qing China (83 tax agents per region), and one region consisted of approximately 50 jurisdictions in the Shogunate domain in Japan (50 tax agents per region).

rate θ from the Peasants, in addition to the official tax rate τ, for his private benefit. As a result, the effective expropriation rate for the Peasants is $\tau + \theta$, creating a potential wedge between what the Ruler receives and what the Peasants pay.

When the Agent announces $\tau + \theta$, the Peasants pay the portion of their outputs to the Agent as demanded.[18] If $\tau + \theta$ is within an exogenously given rate of r, then the Peasants consider it acceptable and stay put. However, if it exceeds r, then the Peasants deem this "unjust" and revolt. We assume that the Ruler is adversely affected by peasant rebellion while the Agents are effectively unaffected, as explained below.

To discourage the Agents from engaging in extralegal expropriation, the Ruler employs the following monitoring mechanism. First, the Ruler conducts audits in randomly selected regions after the Agents finished tax collection. Let $A(S)$ denote the probability of the representative region receiving audits where $0 \leq A(S) \leq 1$. Due to the Ruler's resource constraints, we assume that the probability of audits decreases with the number of regions in a dictatorship: $A'(\cdot) < 0$.[19] In other words, in the absence of modern information technologies, the Ruler faces managerial diseconomies of scale.

Next, when an Agent is indicted of misconduct in the auditing process, the Ruler punishes the Agent by imposing a fine X. Audits, however, detect misconducts only imperfectly with probability $D(\theta)$ where $0 \leq D(\theta) \leq 1$ and $D(0) = 0$. We assume that the detection probability increases with the rate of surcharge θ at an increasing rate, but that the marginal rate of detection is concave in θ: $D'(\cdot) > 0$, $D''(\cdot) > 0$, and $D'''(\cdot) \leq 0$.[20] A simple example would be a quadratic function: $D(\theta) = \theta^2$.

[18]We assume that the tax unit is an individual. Incorporating the village contract system in Tokugawa Japan in the model would further reduce the monitoring costs for Japanese rulers and strengthen our results.

[19]For simplicity, we use $A(\cdot)$ as the reduced form representation of the Ruler's auditing strategy. To endogenize A, suppose the Ruler is free to select the fraction of S regions to audit, but audits are costly as they consume his time and attention. If the cost of audits is increasing in $A \cdot S$, the total amount of audits conducted, at an increasing rate, and if an interior solution is assumed, then $A'(\cdot) < 0$ follows.

[20]For simplicity, we use $D(\cdot)$ and X as the reduced form representation of the Ruler's monitoring strategy and directly impose assumptions. The above assumptions, however, can be justified as follows. Suppose that when the Agent collects a surcharge of θ then an audit will reveal a signal $\hat{\theta}$ drawn from a normal distribution $N(\theta, \sigma^2)$ bounded between 0 and 1 (i.e., truncated normal distribution). Suppose that the Ruler punishes the Agent whenever $\hat{\theta}$ is greater than some threshold value h. This delivers the properties $D(0) > 0$ and $D'(\cdot) > 0$. Ignoring corner solutions, it can be further verified that the Agent will never set θ beyond the threshold h, which in turn implies that we can focus on the values of θ that correspond to $D''(\cdot) > 0$. Moreover, it can be shown that if σ is large enough (i.e., if the Ruler's information is sufficiently noisy), then $D'''(\cdot) \leq 0$. Finally, even though the Ruler can choose a level of fine from a range of possible values, in equilibrium the Ruler will always choose the maximum level of fine that is consistent with the Agent's individual rationality constraint, which gives X in our

To summarize, the timing of events in the basic single-period game in the representative region is as follows: (1) The Ruler sets a tax rate τ to maximize tax revenue. (2) The representative Agent selects θ to maximizes his expected payoff and proceeds to collect taxes. (3) The Peasants pay $\tau + \theta$ of their outputs to the Agents and decide whether or not to revolt. (4) The Ruler conducts randomized audits and punishes the Agents if the audits uncover misconducts.

The Representative Agent. To provide benchmark results, we derive the equilibrium of the single-period game. First, consider the optimization problem of the representative Agent. The Agent chooses a rate of extralegal surcharge θ to maximize his expected payoff, given the monitoring mechanism, $A(\cdot), D(\cdot)$, and X:

$$\max_{0 \leq \theta \leq 1} \; v^A = \theta \cdot Y(N) - A(S) \cdot D(\theta) \cdot X \tag{3.1}$$

The optimal rate of surcharge θ^* is given by the following condition:

$$Y(N) = A(S) \cdot D'(\theta^*) \cdot X \tag{3.2}$$

The Ruler. The Ruler chooses a tax rate to maximize tax revenue. In doing so, however, we assume that, unlike the Agents, the Ruler is deeply concerned about peasant rebellion and thus constrained by the no-revolt condition: $\tau + \theta \leq r$. There are two main reasons why the Ruler is bound by the no-revolt condition while the Agents are not. First, because peasant rebellion destructs productive capacity and affects future agricultural outputs, it hurts the long-lived Ruler much more than the short-lived Agents. Second, a rebellion could cause damages also to surrounding jurisdictions. Since the Agents are unable to coordinate their actions across jurisdictions, even if revolts hurt them, it is individually rational for each Agent to ignore the no-revolt condition in setting θ. By contrast, as the sole dictator governing the entire domain, the Ruler internalizes externalities across both time and space.

Formally, the Ruler's maximization problem can be written as:

$$\begin{aligned} & \max_{0 \leq \tau \leq 1} v^R = \tau \cdot Y(N) \\ s.t. \quad & \tau + \theta \leq r \end{aligned} \tag{3.3}$$

model.

Anticipating the responses by the Agents and the Peasants, the Ruler sets a tax rate given the optimality condition (3.2) and the no-revolt condition. It is simple to show that there is a unique equilibrium in the single-period game in which τ^* and θ^* are determined by $Y(N) = A(S) \cdot D'(\theta^*) \cdot X$ and $\tau^* + \theta^* = r$.

Comparative Statics. To examine the effects of the size of a dictatorship on the optimal tax and corruption rates, we perform comparative statics with respect to the number of regions S. From the optimality condition $Y(N) = A(S) \cdot D'(\theta^*) \cdot X$ and the assumptions $A'(S) < 0$ and $D''(\theta) > 0$, we obtain the following result:

Result 1. *The equilibrium corruption rate θ^* is higher in a larger dictatorship: $\frac{d\theta^*}{dS} > 0$.*

From $\tau^* + \theta^* = r$, it also follows that:

Result 2. *The equilibrium tax rate τ^* is lower in a larger dictatorship: $\frac{d\tau^*}{dS} < 0$.*

In other words, assuming that production and monitoring technologies are identical across comparable regions in the two dictatorships, the model predicts lower official tax rates and higher extralegal expropriation rates in Qing China than in Tokugawa Japan. These results are driven solely by the assumption of managerial diseconomies of scale, $A'(S) < 0$.

3.2 The Dynamic Setup

We now consider a dynamic game ($t = 1, 2, 3...$) and introduce two additional features. First, to provide a link between tax revenue and the economy, we allow the Ruler to spend part of the revenue on a local public good. Second, to study dynamic implications, we endogenize population and permit the economy to grow.

If the Ruler spends entire tax revenue on non-productive purposes, such as private consumption or arms race, then from an economic point of view, there is little difference between taxation and corruption. Suppose, however, that the Ruler may spend part of the tax revenue on public goods in each region. For simplicity, assume that a random shock (e.g., natural disaster) hits the representative region at the end of every period. Assume also that, the Ruler can invest in a public good in the beginning of every period to prepare for the possible disaster. We consider a local public good (as opposed to a pure public good) that is non-excludable but rivalrous *within* the region and has no

spillover effects on other regions. Most infrastructure investments, such as roads, flood control, fire protection, and famine relief, satisfy these conditions and must be provided on the regional basis.

Let γ_t be the level of public good the Ruler provides in period t. Unless the level of public good investment is sufficiently large relative to the size of the shock, the shock destroys the region's economy and terminates the game at the end of period t. Let $G(\gamma_t)$ denote the probability that the region survives the shock and the game continues into period $t+1$ given the investment γ_t. We assume that the continuation probability increases with γ_t but at a diminishing rate: $G(0) = 0$, $G'(\cdot) > 0$, and $G''(\cdot) < 0$.[21] In other words, the Ruler now has an incentive to invest in the public good to protect the regional economy from the random shock to secure future tax revenue.[22]

Next, we model consumption and reproduction decisions of a representative Peasant. Assume that the Peasant lives for just one period, earns income from agricultural production, and spend his after-tax income on consumption and reproduction to maximize his utility. Let $u(c_t, n_{t+1})$ represent the utility the Peasant receives from the consumption c_t and the number of offspring n_{t+1} produced in period t. Collectively, n_{t+1} gives total population in the next period N_{t+1}, namely, $N_{t+1} = N_t \cdot n_{t+1}$. Following Hansen and Prescott (2002), we assume that the two goods are complements and are subject to diminishing marginal utility: $u_1(.) > 0$, $u_2(.) > 0$, $u_{11}(.) < 0$, $u_{22}(.) < 0$, $u_{12}(.) > 0$.

The timing of events in the dynamic game in period t ($t = 1, 2, 3...$) is as follows: (1) The Ruler sets a tax rate τ_t and public good investment γ_t. (2) The Representative Agent selects a rate of extralegal expropriation θ_t. (3) The Representative Peasant pays $\tau_t + \theta_t$ of his income to the Agent, makes consumption and reproductive decisions (c_t, n_{t+1}), and revolts if $\tau_t + \theta_t > r$. (4) The Ruler conducts randomized audits and fines the Agents if misconducts are detected. (5) Exogenous shock hits the region and destroys the economy unless γ_t is sufficiently large; the game continues to the next

[21] For example, let W_t denote the realization of the shock in period t and assume that the shock destroys the economy if $\gamma_t < W_t$. Suppose that W_t is the absolute value of a normally distributed random variable with mean 0 and variance σ^2. Then, it follows that $G(\gamma_t) = F(\gamma_t; 0, \sigma^2) - F(-\gamma_t; 0, \sigma^2)$ and thus $G(0) = 0$, $G'(\cdot) > 0$, and $G''(\cdot) < 0$.

[22] More generally, the Ruler may invest in public goods that directly increase the agricultural output Y in the region. In our model, we consider public goods that only affect the continuation probability as it immeasurably simplifies the analysis. It is also consistent with the historical observation that the primary objective of a premodern state was to maintain political and social order but not to promote economic growth per se.

period with probability $G(\gamma_t)$.

The Representative Peasant. We derive an equilibrium of the dynamic game by backward induction.

First, the optimization problem of the representative Peasant in period t is given by:

$$\max_{c_t, n_{t+1}>0} u_t = u(c_t, n_{t+1}) \tag{3.4}$$

$$s.t. \quad c_t + n_{t+1} \leq [1 - \tau_t - \theta_t] \cdot y_t \tag{3.5}$$

where individual income is defined by $y_t = \frac{Y(N_t)}{N_t}$. Note that y_t is exogenous to the Peasant even though $N_t = N_{t-1} \cdot n_t$, because n_t is a decision variable of the previous generation. From the first order condition and the assumption $u_{12}(.) > 0$, it can be shown that the optimal number of offspring n_t^* is an increasing function of net individual income $(1 - \tau_t - \theta_t) \cdot y_t$.

The Representative Agent. The representative Agent is assumed to be short-lived, as tax agents are subject to regular rotations. As a result, the maximization problem of the representative Agent is essentially the same as in the single-period game, and thus the optimal rate of extralegal expropriation in period t is given by:

$$Y(N_t) = A(S) \cdot D'(\theta_t^*) \cdot X \tag{3.6}$$

The Ruler. The Ruler is assumed to live for infinitely many periods. He sets the current and future values of (τ, γ) to maximize the expected discounted value of tax revenue stream. In doing so, we again assume that the Ruler is bound by the no-revolt condition in every period. Let V_t^R represent the Ruler's present value of future revenue stream in period t. His maximization problem in period t is given by:

$$\max_{0 \leq \tau_{t+j} \leq 1, \gamma_{t+j} \geq 0} V_t^R = \quad \tau_t \cdot Y(N_t) - \gamma_t + G(\gamma_t) \cdot V_{t+1}^R \tag{3.7}$$

$$s.t. \quad \tau_{t+j} + \theta_{t+j} \leq r \qquad \forall \quad j = 0, 1, 2...$$

The optimal level of public good investment γ_t is given by the following condition:

$$G'(\gamma_t^*) \cdot V_{t+1}^{R*} = 1 \tag{3.8}$$

In other words, the Ruler invests in the public good up to the level where the marginal return from the investment equals its marginal cost. The higher is the present value of his future revenue stream V_{t+1}^{R*}, the more willing the Ruler is to invest in the public good to increase the continuation probability.

The Ruler sets an optimal tax rate, taking the Agent's optimality condition (3.6) and the Peasant's no-revolt condition as given. Because these conditions are the same as before, the equilibrium tax and corruption rates (τ_t^*, θ_t^*) in the dynamic game are again determined by $Y(N) = A(S) \cdot D'(\theta_t^*) \cdot X$ and $\tau_t^* + \theta_t^* = r$ $(t = 1, 2, 3...)$.

Population Dynamics. We now turn to equilibrium population dynamics. Because the Peasant's net income is $(1 - r) \cdot y_t$ in the equilibrium and r is a constant, the optimal number of offspring can be expressed as $n_{t+1}^* = n_{t+1}^*(y_t)$, where $n_{t+1}^*(\cdot)$ is strictly increasing in y_t. This, in turn, provides the population dynamics, because by definition:

$$n_{t+1}^*(y_t) = \frac{N_t^* \cdot n_{t+1}^*}{N_t^*} = \frac{N_{t+1}^*}{N_t^*} \tag{3.9}$$

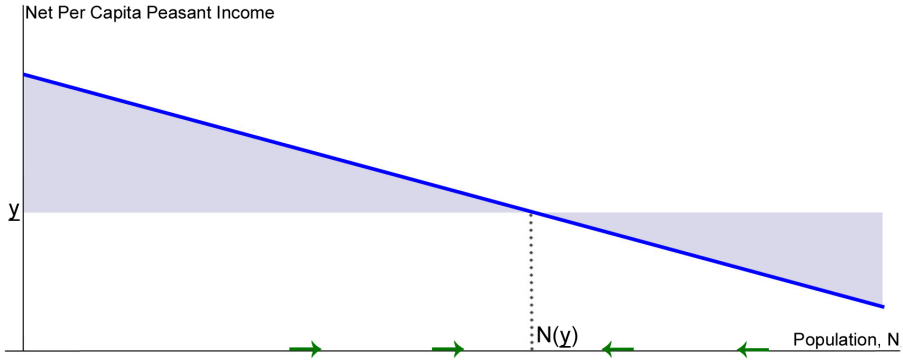
In the spirit of Malthus, Condition (3.9) implies that the direction and rate of population growth depends on the Peasant's per capita income.[23] Let $\underline{y}$ denote the level of income defined by $n_{t+1}^*(\underline{y}) = \frac{N_{t+1}^*}{N_t^*} = 1$. If $y_t > \underline{y}$ then $N_{t+1} > N_t$ or population will expand; if $y_t < \underline{y}$ instead then population will contract. Either way, in the long run, the region's population will converge to a stationary level $N(\underline{y})$ associated with the steady-state per capita income $\underline{y}$ (see Figure 4).

3.2.1 Comparative Statics.

We compare the two dictatorships that differ only in the number of regions that they encompass. In particular, we assume the same initial populations in the representative

[23] In our model, when making reproduction decisions, individual Peasants do not take into consideration the negative externalities of producing offspring today on the living standard of the next generation. We assume that even if each Peasant cares about the well-being of his offspring in the next period, Peasants in the region are unable to act collectively to regulate population growth to attain a socially optimal level of income. As such, individual Peasants take N_{t+1} and thus y_{t+1} as exogenous and beyond their control.

Figure 4: Converging to the Steady State Population Level



regions in the two dictatorships. Recall that the optimal tax rate is higher in a smaller dictatorship in every period (Result 2). However, since population growth depends not on the official tax rate (τ) alone, but on the effective expropriation rate ($\tau + \theta$), the two representative regions will be identical in population size in every period.

Result 3. *A larger dictatorship invests less in the public good per region:* $\frac{d\gamma_t^*}{dS} < 0 \ \forall \ t$.

Proof. Suppose that the result does not hold; at some t, $\gamma_t^*(S_{large}) \geq \gamma_t^*(S_{small})$, where $S_{large} > S_{small}$. Let $\{\gamma_{t+j}^*(S_{large})\}_1^\infty$ represent the sequence of public good provision that maximizes $V_{t+1}^R(S_{large})$ at t. Given Result 2, this sequence is financially feasible for the Ruler of the smaller dictatorship to adopt. Let U represent the value of $V_{t+1}^R(S_{small})$ when he implements this sequence. Let $V_{t+1}^{R*}(S_{small})$ represent the maximum attainable value of $V_{t+1}^R(S_{small})$. By definition, $V_{t+1}^{R*}(S_{small}) \geq U$.

Result 2 implies that $U > V_{t+1}^{R*}(S_{large})$. Therefore, $V_{t+1}^{R*}(S_{small}) > V_{t+1}^{R*}(S_{large})$ must hold. The Ruler's optimality condition (3.8) and the assumption $G''(\cdot) < 0$ then imply that $\gamma_t^*(S_{large}) < \gamma_t^*(S_{small})$. This completes the proof by contradiction. □

The intuition is straightforward. When the agency problem is more severe and hence the continuation payoff V_{t+1}^{R*} is lower, then the Ruler has less incentive to invest in the future of the region. For ease of exposition, we assume that the agency problem exists only in tax collection but not in public goods provision. Historically, however, the agency problem in the provision of public goods was a serious concern as shown in the next section. Relaxing this assumption will only strengthen Result 3.

Next, we explore dynamic implications. We focus on the case where the size of initial population in the region is below the stationary level $N(\underline{y})$. According to the equilibrium population dynamics, population will grow until it reaches the steady state unless interrupted by external shocks. Because aggregate output $Y(N)$ increases with population, one may expect that the Ruler's tax revenue also increases with population. The next result, however, establishes that the Ruler's revenue first rises and then falls as the population expands.

Result 4. *For any given S, there exists a unique threshold population $\hat{N}(S)$ such that the Ruler's period tax revenue v_t^{R*} increases with N if $N < \hat{N}(S)$, and decreases with N if $N > \hat{N}(S)$. Moreover, the threshold population $\hat{N}(S)$ is smaller in a larger dictatorship: $\frac{d\hat{N}(S)}{dS} < 0$.*

Proof. From the Agent's optimality condition $Y(N) = A(S) \cdot D'(\theta^*) \cdot X$ and the assumptions $Y(\cdot) > 0, Y'(\cdot) > 0, D'(\cdot) > 0$, and $D''(\cdot) > 0$, it follows that:

$$\frac{d\theta^*}{dN} = \frac{Y'(N)}{A(S) \cdot X \cdot D''(\theta^*)} = \frac{D'(\theta^*) \cdot Y'(N)}{D''(\theta^*) \cdot Y(N)} > 0 \tag{3.10}$$

which implies that the equilibrium corruption rate is strictly increasing in population. Recall that the Ruler's period tax revenue is given by $v^{R*} = \tau^* \cdot Y(N)$. Note that $\tau_t^* + \theta_t^* = r$ implies $\frac{d\tau^*}{dN} = -\frac{d\theta^*}{dN}$. Then it follows that:

$$\begin{aligned} \frac{dv^{R*}}{dN} &= \tau^* \cdot Y'(N) + \frac{d\tau^*}{dN} \cdot Y(N) \\ &= [\tau^* - \frac{D'(\theta^*)}{D''(\theta^*)}] \cdot Y'(N) \end{aligned} \tag{3.11}$$

From $\frac{d\theta^*}{dN} > 0$, $D''(\cdot) > 0$ and $D'''(\cdot) \leq 0$, $\frac{D'(\theta^*)}{D''(\theta^*)}$ is strictly increasing in N.[24] Because $\frac{d\tau^*}{dN} < 0$, $\tau^* - \frac{D'(\theta^*)}{D''(\theta^*)}$ is a strictly decreasing function of N. Since $Y'(\cdot) > 0$, the sign of $\frac{dv^{R*}}{dN}$ is determined by the sign of $\tau^* - \frac{D'(\theta^*)}{D''(\theta^*)}$. Let $\hat{N}(S)$ be the population level at which $\tau^* - \frac{D'(\theta^*)}{D''(\theta^*)} = 0$. It is simple to verify that $\frac{dv^{R*}}{dN} > 0$ if population is below $\hat{N}(S)$, and $\frac{dv^{R*}}{dN} < 0$ if population is above $\hat{N}(S)$.

[24] $D'''(\cdot) \leq 0$ is the key assumption (i.e., a sufficient condition) for Results 4 and 5. As shown in the microfoundation provided in footnote 20, it is satisfied when Ruler's information is sufficiently noisy.

Finally, note that $\tau^* - \frac{D'(\theta^*)}{D''(\theta^*)} = \tau^* - \frac{Y(\hat{N})}{D''(\theta^*)\cdot A(S)\cdot X} = 0$. This and $\frac{d\tau^*}{dS} < 0$ (Result 2) and the assumptions $Y'(\cdot) > 0$, $D'''(\cdot) \leq 0$, and $A'(\cdot) < 0$ together imply that $\frac{d\hat{N}(S)}{dS} < 0$. □

The above analysis makes it clear that population growth and the resulting economic expansion has two opposing effects on the Ruler's tax revenue (see equation 3.11). On one hand, it enlarges the tax base. On the other hand, it increases the rate of extralegal expropriation and reduces the fraction of the economic surplus that goes to the Ruler. Result 4 shows that the latter effect begins to dominate the former once the population in the region crosses the threshold. What is more, it shows that, the larger is the dictatorship, the earlier the tipping point where the negative effect of economic growth dominates the positive effect arrives.

More generally, the following result holds:

Result 5. *For any given N, economic expansion is less beneficial to the Ruler in a larger dictatorship: $\frac{d}{dS}\left(\frac{dv^{R*}}{dN}\right) < 0$.*

Proof. It follows from the equation (3.11), $\frac{d\theta^*}{dS} > 0$ (Result 1) and $\frac{d\tau^*}{dS} < 0$ (Result 2), and the assumptions $D''(\cdot) > 0$ and $D'''(\cdot) \leq 0$. □

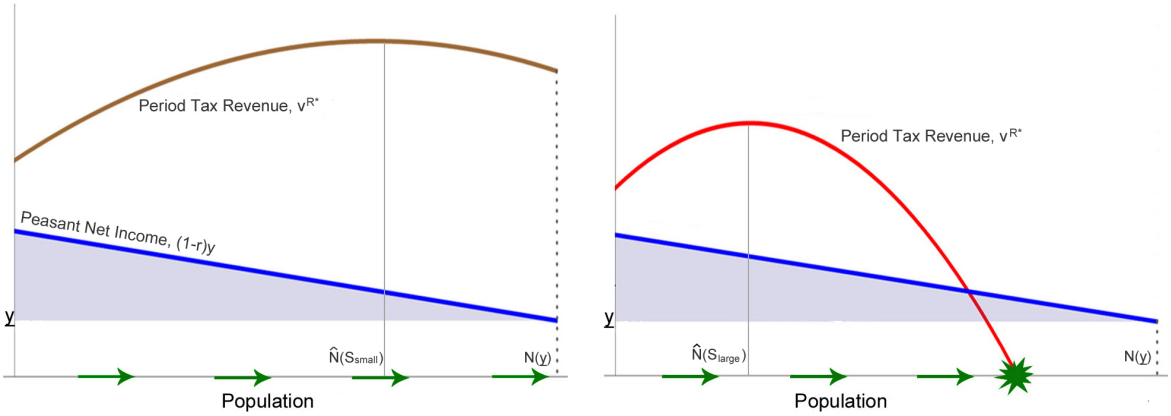
According to Result 5, at every population level N, the positive effect of economic growth on the Ruler's revenue is always larger and the negative effect always smaller in a smaller dictatorship. In other words, the Ruler in a larger dictatorship gains consistently less from the economic growth due to greater agency costs.

Two Dynamic Outcomes. For two dictatorships that differ significantly in size, the model predicts two distinctive outcomes.

In the case of the small dictatorship, as its Ruler is capable of capturing a significant portion of the economic surplus consistently (Results 2 and 5), he will invest relatively heavily in the public good (Result 3) to protect the economy from periodic external shocks. In the absence of extraordinarily large shocks to disrupt the process, population in every region that he governs will expand until per-capita income falls to $\underline{y}$. At this point, the economy enters the steady state and will stay there unless large exogenous shock knocks it out of that state (Figure 5a).

The picture is different in the large dictatorship. In this case, the Ruler's revenue begins to fall early while the economy still expands. As fiscal condition worsens, the

Figure 5: Two Dynamic Outcomes



(a) Representative Region in Small Dictatorship (b) Representative Region in Big Dictatorship

Ruler cuts his investment in the public good. His regime could even go bankrupt before the economy enters the steady state. Here, we observe a clear pattern of dynastic rise and fall. The establishment of the dynasty brings order and stability initially, which allows economic expansion to take place. However, in a paradoxical manner, the regime finds itself increasingly incapable of managing the prosperity that it has helped create (Figure 5b).

Our results affirm the conjecture in Usher (1989) that a society under despotic rule could either evolve into a stationary state or into a dynastic cycle. We show in the next section that the Tokugawa patterns match the stationary state scenario. The Japanese population grew steadily between 1600 and the early 1700s, and stayed almost constant from then on until 1850. The shogunate's revenue followed a similar path. By contrast, China saw an almost uninterrupted population expansion from the 1680s right up to 1850. Yet the fiscal capacity of the Qing state began to contract in the first half of the 1700s, in a manner that is consistent with the predictions of the second scenario.

4 Empirical Evidence

Assuming that pre-modern China and Japan used similar production and monitoring technologies, our model predicts lower rates of corruption (Result 1), higher tax rates (Result 2), and higher levels of public goods provision per region (Result 3) in Tokugawa Japan than in Qing China. The model also predicts that, with economic expansion,

the fiscal revenue in the shogunate would likely reach a steady state, while the revenue in China would hit its peak and begin to fall (Results 4 and 5).

In what follows, we assemble comparable quantitative data from primary and secondary sources to test these predictions. We first discuss the issue of corruption in China and Japan with respect to Result 1. We then provide further evidence that Results 2, 4, and 5 are consistent with the fiscal and population patterns observed historically. Finally, we evaluate Result 3 by comparing the provision of key local public goods.

4.1 Corruption

Corruption, by its very nature, is difficult to measure. However, historical accounts by contemporary observers suggest that corruption was pervasive and worrisome even in 18th-century China, when Qing power was at its peak, and the problem worsened in the 19th century (Mann and Kuhn, 1978; Park, 1997). As noted earlier, high geographic heterogeneity and multiple commutation rates made it difficult for the Chinese emperor to monitor local officials.

In the land tax collection process, over-collection (*fu-shou*) by magistrates and their underlings appeared to be endemic (Feng, 1876; Ch'u, 1962; Zelin, 1984). A popular form of *fushou* involved the manipulation of commutation rates between silver and copper coins. It was observed that magistrates often demanded taxpayers to pay taxes in copper coins instead of the officially stipulated silver or grain. These officials would then set the commutation rate at a level higher than the prevailing market rate (Ch'u, 1962, 142).[25]

According to Zhang (1962, 32), in early 19th-century China, a magistrate would typically fetch 30,000 silver taels (7,140 koku of rice) a year through extralegal channels. By this estimate, the extralegal incomes of the 1500 magistrates (45 million taels) would have exceeded the annual amount of tax silver that entered the state coffers (40 million

[25]To be sure, not all tax surcharges were illegal as some form of over-collection was necessary to cover the costs of tax collection. The Kangxi emperor (r. 1662-1722) once mentioned in private that he would consider a magistrate who imposed a 10% surcharge an honest official (Ch'u, 1962). His son, the Yongzheng emperor (r. 1723-35), legalized the collection of a "silver meltage fee" on top of the regular land tax to help pay for the cost of regional and local administrations. The sanctioned rates averaged about 12% nationwide (Zelin, 1984). Likewise in Japan, magistrates were initially allowed to collect a 3% surcharge on the rice tax to finance personnel and other expenses. During the 1720s, the shogun Yoshimune instituted reforms to incorporate these expenses into the official budget.

taels in the 1840s).

While bureaucratic graft and corruption was a topic that attracted immense attention in Qing official and scholarly discourse, it was not the case in Japan. Thomas Smith's classic on the land tax in Tokugawa Japan spent only one paragraph discussing corruption, where he noted that "bribes and gifts to tax officials were the main form of illegal exaction, but it is doubtful that they bulked large in the total economic burden of the village" (Smith, 1958, 9). Political and intellectual elites in Tokugawa Japan appear to be more concerned with other issues such as the rise of the merchant class and the declining economic status of the ruling samurai class (Totman, 1993).

In one of the worst corruption cases in the Tokugawa period, 3 magistrate assistants were found to have collected 3000 ryo of bribes, or 8.2% of the total output, from taxpayers in Tanimura of Koshu in the 1830s (Nishizawa, 2004).[26] More generally, Teranishi Takamoto, a magistrate during Tokugawa times, observed in the 1790s that for a 50,000 koku territory, the peasants' non-tax burden was typically about 600 ryo, or 1.2% of the output.[27] By comparison, Ni and Van (2006) have estimated that corruption consumed 22% of China's agricultural output in 1873.

4.2 Tax Rate

The model predicts a lower tax rate in the larger dictatorship (Result 2). It further predicts that tax rates will decline with population growth, but at a faster rate in the larger dictatorship. Assuming that per capita output was comparable between China and Japan, per capita tax revenue is a proxy for tax rate. As shown in Figure 1, per capita tax revenue was consistently higher in the Tokugawa shogunate than in China. Furthermore, per capita tax revenue fell over time in both regimes, but at a faster rate in China.

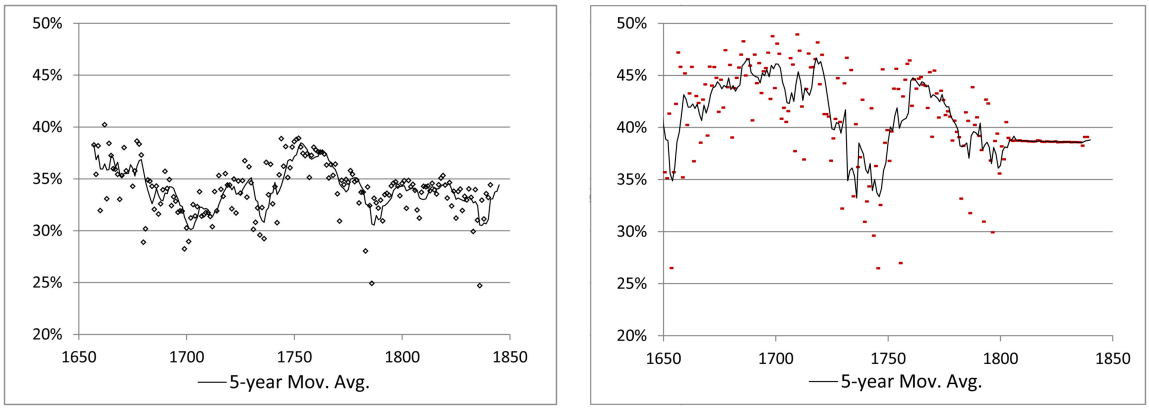
Intra-country comparisons within China as well as within Japan provide further evidence in support of Result 2. Sng (2010) has shown that the Qing state collected more

[26]The Koshu area had a assessed output of 222,000 koku and was governed by 3-5 magistrates. Assuming that there were 5 magistrates each governing an identical subregion, Tanimura's assessed output would be 44,400 koku. The official conversion rate of rice-to-gold was 1.1 in 1835 (Iwahashi, 1981).

[27]This is an upper-bound estimate of the corruption-to-output ratio: Takamoto estimated that out of the surcharges of 500-600 ryo, 100-200 ryo would be spent on paying for maintaining and repairing the local office, and the remaining 400 ryo on bribing or entertaining local officials (Nishizawa, 2004). The official conversion rate was 1 ryo-koku in 1794 (Iwahashi, 1981).

taxes in regions closer to the capital where the imperial court could monitor the tax officials better. Although fiscal information on the smaller Japanese domains is fragmented, existing evidence suggests that tax rates were higher outside the shogunate (Nakabayashi, 2012). Compared to an average tax rate of 34% in the Tokugawa shogunate, the lord of Aizu taxed his peasants at 50-55% between 1637 and 1764 (Furushima, 1963). In Choshu domain, agricultural outputs were taxed at an average rate of 40% in 1840 (Nishikawa, 1985). As Figure 6 illustrates, tax rates in Kumamoto were also higher than those in the shogunate (Miyamoto, 2004; Hosokawa Hanseishi Kenkyuukai, 1974).

Figure 6: Tax Rate



(a) Tokugawa shogunate (b) Kumamoto domain

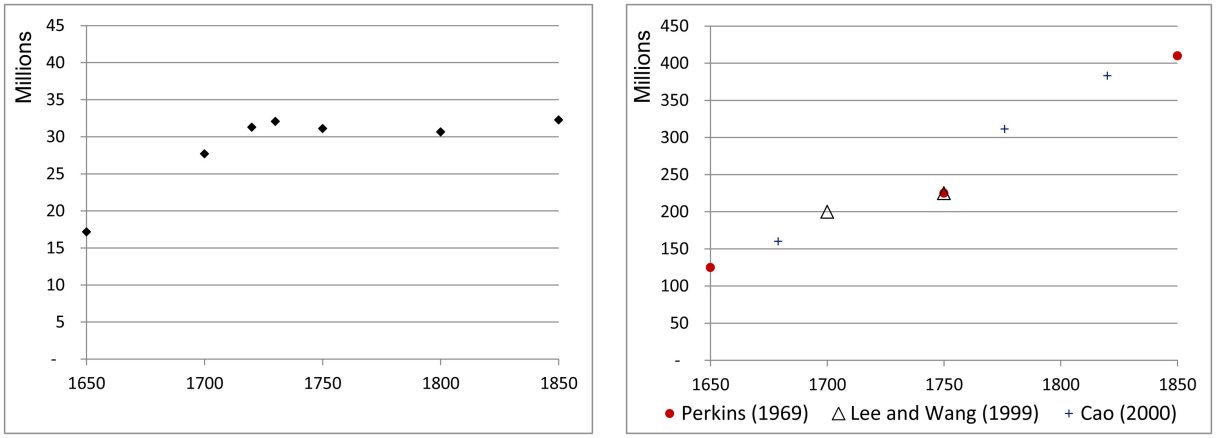
Sources: Ohno (1996); Miyamoto (2004); Hosokawa Hanseishi Kenkyuukai (1974).

Importantly, unlike the case in early modern Europe where "war made the state and the state made war" (Tilly, 1975), high tax rates in Japan were not driven by interstate competition. Tokugawa Japan was an extraordinary era of peace. In the two centuries after the Shimabara rebellion (1637-38), no major armed incident occurred. Until the West forced Japan to open up in the 1850s, tensions between the shogunate and local domains were never high enough to make war a real possibility.

4.3 Population Growth and Fiscal Change

According to demographic trends, the Tokugawa era can be divided into two subperiods. From 1600 to the early 1700s, population grew from 12 million to 30 million

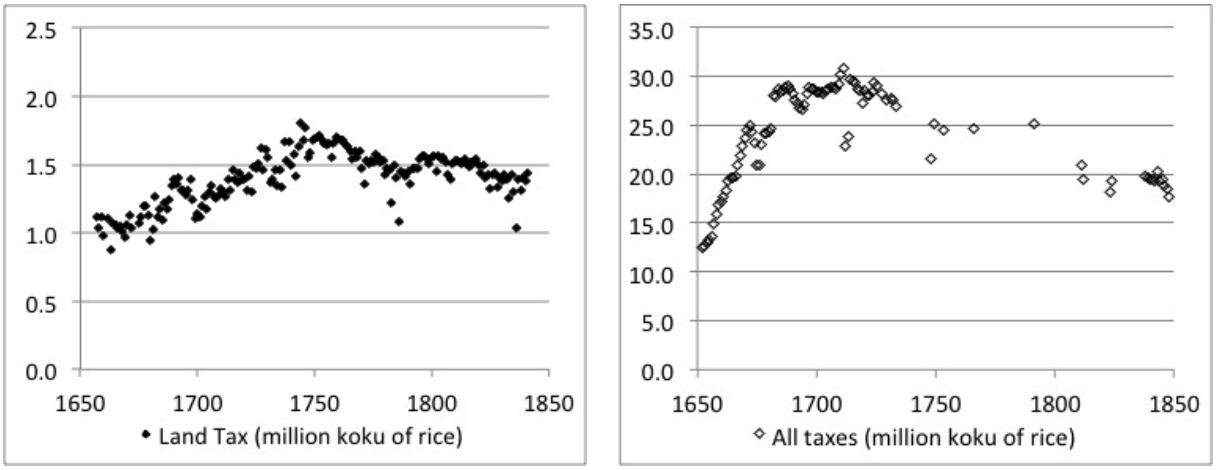
Figure 7: Population



(a) Japan (Entire country)

(b) China Proper

Figure 8: Aggregate Tax Revenue (Real)



(a) Japan (Tokugawa shogunate only)

(b) China Proper

Sources: See Figure 1.

and towns and cities proliferated. From 1700 to 1850, however, Japan's population stayed at around 30 million (Figure 7a). As Figure 8a shows, aggregate tax revenue of the shogunate evolved in tandem with population change: land tax revenues grew steadily before the early 18th century, and stayed more or less flat afterwards.

In China proper, the population expanded steadily from the late 1600s to around 1850 (Figure 7b). However, the Qing state's tax revenue peaked in the first half of the

18th century and tailed off from then on (Figure 8b). Ironically—but consistent with Result 4—the turning point occurred in the midst of the High Qing Period, when the Chinese economy was expanding steadily and interregional trade was flourishing (Shiue and Keller, 2007).

According to Figure 8, even though the Qing state collected less taxes per capita, its aggregate tax revenue remained far greater than that of the Tokugawa shogunate throughout the period. If we assume that a ruler maximizes aggregate tax revenue and not per capita revenue, then it might have been perfectly rational for the Qing emperor to prefer to govern a large empire.

4.4 Provision of Local Public Goods

Finally, we compare the provision of the following local public goods by the state in China and Japan: (1) coinage, (2) transportation network, (3) urban management, (4) forest protection, and (5) famine relief (Table 1). Note that these local public goods were non-excludable but rivalrous, and served a wide region. Unlike local public goods that serve local communities (e.g., small-scale irrigation projects), these goods must be provided and managed at the regional level. As informal institutions based on repeated interactions alone cannot sustain cooperation when the number of players is large (Kandori, 1992), there is a role for the state to play to ensure that these public goods are adequately provided.

Table 1: Public Goods Provision in Qing China and Tokugawa Japan

	China	Japan
(1) Coinage	Copper only	Gold, Silver, Copper
Annual Output of Copper Coins, aggregate	3,639,800k (1756-65)	1,096,000k (1764-88)
Annual Output of Copper Coins, per capita	15 (1756-65)	35 (1764-88)
(2) Length of Trunk Roads (km)	11,370 (Imperial Routes)	1,440 (Gokaido)
Length per '00 sq. km	0.26	0.51 or 3.37
(3) Urban Population (Urbanization Rate)	20.5m (5.8%)	5.1m (16.5%)
(4) Forest Cover (million ha)	18.5 (1700) → 9.6 (1850) (Lingnan region only)	27 (1600) → 25.5 (1850)
(5) Grain Stockpile per capita (husked rice, koku)	0.030 (1843)	0.046 (1843)

Sources: (1) Lin (2006) and Tsuchiya and Yamaguchi (1972); (2) DQHD (Yongzheng edition) and Vaporis (1994); (3) Rozman (1973, Table 5); (4) Saito (2009); (5) Eto (1970); Yoshida (1991); Wang (1890); Will and Wong (1991); Li and Jiang (2008).

4.4.1 Coinage

The circulation of good quality, standardized coins helps to reduce the cost of every day transactions. The Tokugawa shogunate produced gold, silver, and copper coins. The Chinese state minted copper coins only. In the absence of a reliable government-issued large-denomination currency, the Chinese used silver bullion and foreign denominated silver coins for large transactions. As Deng (2008) put it, "China's silver stock was made of a collage of pieces in just about all shapes, sizes and qualities under the sun".

Lin (2006) suggests that even in its heyday, the Qing state did not produce enough copper coins to satisfy the needs of its growing population. As a result, it had to tolerate the use of counterfeit coins to relieve currency scarcity. When the output of the Qing mints peaked between 1756 and 1765, national production reached 3640 million pieces annually, or 15 pieces of copper coins per head. By comparison, the shogunate produced 1096 million pieces of copper coins annually between 1764 and 1788, or 35 pieces per head (Table 1).[28]

4.4.2 Transportation Network

The Tokugawa period witnessed the development of an extensive road network nationwide. The shogunate built a system of five major highways (*Gokaido*), centered on Edo (Figure 3). Local lords, too, constructed roads and bridges to facilitate the flow of goods from rural areas to their castle towns (Yamamoto, 1993).[29]

The shogunate also built a coastal transportation network to bring personnel and goods to Edo (Yamamoto, 1993). Coastal waters were charted and lighthouses built to guide ships through the rocky coastline. In the 1670s, the shogunate established two shipping routes—the eastern sea circuit and the western sea circuit (Figure 3)—that together formed a complete loop surrounding the main island of Honshu and lowered transport costs (Nakai and McClain, 1998, 164-5).

[28]The shogunate monopolized coinage production in Japan. As such, we divide its coin output by the population of entire Japan instead of the shogunate's population only.

[29]Historical accounts suggest that the quality of these roads was high by the standards of its day. The Swedish doctor Charles Thunberg observed in 1776 that "the roads in this country are broad, and furnished with two ditches, to carry off the water, and [are] in good order all the year round". On the eve of Meiji Restoration, the Swiss envoy Aime Humbert commented that "compared with the great roads of Europe, the *Tokaido* is not the least bit inferior" (Vaporis, 1994, 39-44).

By contrast, the Chinese rulers did relatively little to improve its transport infrastructure. With the notable exception of trade along the Grand Canal, most long distance trade was carried out among regions either well served by natural inland waterways or along the coast. Schran (1978) observes that "as a rule, the rivers and lakes were not made more passable for boats by the removal of obstacles such as rocks, silt, and debris, by the dredging or marking of channels, by the construction of two paths, etc", and "the Chinese people adapted to this limited involvement of the government in communication by 'struggling' on their own (individually or in groups) against the natural elements as well as each other".

In Table 1, we use the length of trunk roads as a crude measure of state investment in land transportation. The Qing imperial postal system, which the imperial court relied on to maintain communications with the rest of the country, was about 13,770 km long, or eight times the length of the *Gokaido* (Figure 2). However, this implies a trunk road density (length divided by domain size, in km per 100 km^2) of only 0.26, compared to 3.37 in the shogunate if we assume that the *Gokaido* served only the shogunate domain. Even if we divide the length of the *Gokaido* by the whole of Japan, the resulting road density, at 0.51, would still be twice that of China.

4.4.3 Urban Management

The state played an active role in Japan's urban expansion. Local lords transformed their castles into towns as they strove to expand their tax base (McClain, 1980). As these castle towns grew, their rulers imposed detailed regulations and devised new systems of urban administration (Nakai and McClain, 1998). For example, after a big fire in 1657, the shogunate created open spaces in Edo to serve as fire breaks (Hanley, 1987). Professional fire-fighting units were set up and watch towers were built.[30] Measures were also taken to ensure that waste materials were properly recycled or disposed, and streets and waterways were kept clean and open in Edo as well as in the smaller towns and cities (Hanley, 1987).

Contrary to Max Weber's claim that a heavy state presence in Chinese cities stifled China's economic development, formal administration penetrated far less in Chinese cities than in Japanese ones (Rozman, 1973). Over 95% of the towns and cities in

[30]According to Engelbert Kaempfer, a German physician who visited Japan between 1690 and 1692, it was common to see fire police patrolling the streets and equipments such as water-filled buckets and fire axes being placed at prominent intervals in Japanese cities (Kaempfer and Beatrice, 1999).

early modern China did not have a permanent bureaucratic presence (Zelin, 2004). Furthermore, the Qing administration made no distinction between cities and rural areas. As a result, China had a less developed urban infrastructure than in Japan (Mosk, 2011). A Chinese scholar observed in the early 20th century that "the hundred and one undertakings, such as roads, streetlights, removal of rubbish, water supply, school system, police, fire protection, etc., which people of the West are accustomed to regard as functions of a municipal government are, with a few exceptions of recent date, never undertaken by the proper government officials" (Rowe, 1989, 135).

Rozman (1973) calculated that in 1800, Japan's urbanization rate (16.5%) was more than twice that of China (5.5%), and "the most urbanized province of China [Zhili] was considerably less urban than the least urbanized region of Japan [Tohoku]" (Table 1c). Some scholars have pointed out that conventional measures of urbanization may have underestimated China's true level of urbanization, for these measures overlook the proliferation of small market towns in early modern China (Li, 2000; Brandt et al., 2011). Our comparative analysis shows that the lack of state leadership in solving urban collective action problems may help to explain why, instead of seeing its largest cities growing, China's "urbanization" took such a unique path.

4.4.4 Forest Preservation

Population growth and urbanization brought about rapid deforestation in 17th-century Japan. By the mid-17th century, few prime forests were still in existence.

The shogun and local lords responded by issuing regulations to restrict entry into forests and clearance of woodland for cultivation. Over time, they created new administrative bodies (e.g. the Kinai Office of Erosion Control) and positions (e.g. forest magistrates) to enforce the regulations, demanded the compilation of forest registers to track illegal logging, set up inspection points along rivers and roads to detect smugglers, and implemented sumptuary rules to prohibit the use of precious timber on "wasteful" activities.[31] Attempts were also made to delineate the boundaries between domains as well as between villages to avoid "the tragedy of commons". Finally, the shogunate and some domains promoted reforestation programs actively (Totman, 1989).

Early modern China, too, experienced rapid deforestation (Elvin, 2004). Like the Japanese rulers, the Qing emperor was acutely aware of the problem. When flash floods

[31]For example, in 1706, the shogunate banned the use of large pine trees as New Year's decorations.

caused by excessive land reclamation plagued the upper-middle reaches of the Yangzi River in the second half of the 18th century, it intervened spontaneously. However, its efforts were thwarted by corruption and inefficient administration. Zhang (2006) observes that the government's attempt to issue regulations to guide dike management and throw resources at the problem was unsuccessful and "money was wasted on a top-heavy, inefficient, and corrupt bureaucracy" (p. 100).[32] According to McCaffrey (2003), the Qing state's inability to manage the rivalry among local communities in the region was a major contributing factor to the White Lotus Rebellion in 1796.

Saito (2009) provides a quantitative measure to compare environmental preservation outcomes in China and Japan. Between 1600 and 1850, the estimated woodland area in Japan fell from 27 million hectares to 25.5 million hectares, and the movement between the two time points followed a U-shaped trajectory: forest cover first contracted sharply before rebounding. In Lingnan, a region in South China that "share[d] much the same flora and climate" as Japan, forest-covered area almost halved from 18.3 million hectares in 1700 to 9.6 million hectares in 1850.

4.4.5 Famine Relief

For agrarian societies, crop failures could undermine social stability. To mitigate this threat, the Qing emperors built a nationwide system of public granaries known as the ever-normal granaries (*changpingcang*). Located in the provincial, prefectural, and county capitals, these granaries were managed by the local magistrates and were expected to perform two main functions: famine relief in natural disasters and price smoothing in normal times (buying low and selling high) (QSG, juan 121).

The size and frequency of the Qing state's granary operations reached a peak in the mid-18th century and by the 1780s the system was on a path of decline (Will and Wong, 1991). Corruption was considered to be a main factor. In 1781, a major embezzlement case was exposed in the northwestern province of Gansu, where provincial officials conspired to falsely report droughts and carry out phantom relief operations. In 1792, when Emperor Qianlong instructed the governor-general of Zhili to provide relief to famine-stricken areas, he found out that the province's reported grain reserve was grossly inflated and it had no capacity to execute his order (QSL, QL juan 1417).

[32]Similar situations were observed elsewhere. In the Hunan province, Perdue (1987) argues that it was not a lack of awareness of the problem but "the state's limited impact on the society" that doomed the Qing government's efforts to reverse the trend of ecological degradation there.

In Japan, the shogunate established a nationwide system of rice stockpile in 1633 in which a fixed amount of rice was stored in over 50 castles in various domains for military and emergency purposes (Yanagitani, 1985, 1989). During the Tenmei famine in 1732, the shogunate used this system to send a large volume of rice to disaster areas and successfully contained the damage (Yanagitani, 1985; Kikuchi, 1997). The same system, however, proved inadequate in coping with the much greater Tenmei famine in 1783-1786, which resulted in heavy casualties in northern domains and major riots in Osaka and Edo. Not to repeat the dismal experience, the shogunate set up a non-military granaries modeling after China and (1) ordered magistrates to create village granaries and store 0.1% of rice output (0.2% for other grains) throughout the shogunate domain; (2) established ever-normal granaries in major cities; and (3) ordered local lords to build granaries in their domains and store 2.5% of rice output (Ando, 2000).[33]

The new granaries complemented the existing ones and played a major role in mitigating the impacts of the Tempo famine in 1832-1837 especially in Edo (Yoshida, 1991; Kikuchi, 1997). Right after the famine, the shogunate ordered local lords to stock additional 2.5% of rice output in their granaries (Ando, 2000).

Although data are scarce, our estimates indicate that the amount of emergency reserve increased steadily from 1750 to 1850 in Japan, reflecting the successive reforms. In the shogunate domain, the amount of reserve, measured in husked rice, grew from less than 300,000 koku in 1751 to 368,000 koku in 1843, and to 555,000 koku in 1861; in per capita terms, it rose from less than 0.038 koku in 1751 to 0.046 koku in 1843, and to 0.068 koku in 1861.[34]

In China, the amount of grain stockpiles in public granaries increased initially from 14.7 million koku in 1751 to 17.0 million koku in 1782, but declined subsequently to

[33]Many local lords also instituted various forms of granaries on their own initiatives (Kikuchi, 1997).

[34]These estimates are derived using the following data and assumptions (complete descriptions are available from the authors upon request). The amount of rice reserves is a sum of (1) rice stockpiles in the shogunate domain (*bakuryo shirozume-mai*), (2) the shougnate- funded portion of village granaries (*gokura*), and (3) the city granaries (*machikaisho*) in Edo and Osaka funded primarily by the shogunate. Data for 1751 are based on Yanagitani (1985) and Iijima (2004). Data for 1843 are drawn from historical record, *Zenkoku Chokoku Aridaka*, reproduced in Eto (1970), and from Yoshida (1991). Data for 1861 comes from the historical document, *Okinginkome Aridaka Kakitsuke*, reproduced in Ohno (2008), as well as from Yoshida (1991) and Iijima (2004). To produce lower bound estimates, we assume that the rice reserves in the shogunate domain served not only the shogunate domain, but also the fiefs of his vassals (hatamoto). We further assume that the population of the shogunate domain and vassal territories made up 25% of the total population in Japan. Granaries were held in the form of husked rice (kome) as well as unhusked rice (momi), grains, and cash. We only include rice in our estimates to be conservative and use the standard rate of 0.5 to convert unhusked rice into husked rice.

11.9 million koku in 1843, and to 10.3 million koku in 1850. In per capita terms, it declined from 0.065 koku in 1751 to 0.060 koku in 1782, and fell further to 0.030 koku in 1843 and to 0.025 koku in 1850.[35]

In other words, while the Qing emperor had higher capacity to provide famine relief than the Tokugawa shogun in the mid-18th century, their positions were reversed by the mid-19th century, which is consistent with our theoretical predictions.[36]

5 Conclusion

In this paper, we provide a comparative and historical institutional analysis of state capacity in Qing China and Tokugawa Japan. Theoretically and empirically, we show that the extraordinary geographic size of China imposed increasingly insurmountable constraints on the regime's capacity to collect tax and provide essential local public goods as its economy expanded. It is our conjecture that this factor alone might have been sufficient in derailing China from a path of sustained economic growth even in the absence of Western imperialism.

In contrast, aided partly by its geographic compactness, the Tokugawa regime was able to perform basic functions and thereby maintained domestic peace for a much longer period than the Chinese regime did.[37] Our findings are much in line with new studies that show that financial conditions of the shogunate and other local lords in the late Tokugawa period were not as dire as many historians have believed (Ito, 2011; Nakabayashi, 2012).

It has long been argued that the development paths of China and Japan diverged

[35]We arrive at the estimates for China based on the following data and assumptions (complete descriptions are available upon request). The amount of grain reserves is the sum of grain stockpiled in (1) non-military state granaries outside Beijing, (2) state granaries in Beijing, and (3) military granaries. Data for (1) are drawn from Will and Wong (1991, Table A.2), and (2) from Li and Jiang (2008). For (3), due to the paucity of historical data, we derive our estimates based on the following assumptions: the Wenzhou standard of storing 2 shi of unhusked rice per soldier (Wang, 1890) was observed nationally; the Qing military stood at 800,000 soldiers throughout the period considered. Because rice was the most valuable grain, to obtain an upper bound estimate, we assume that all grains in the granaries were rice.

[36]Accounting for the likelihood that the 19th-century Chinese figures were over-reported by the local officials would only strengthen our result.

[37]Japan maintained 215 years of uninterrupted domestic peace between the suppression of the Shimabara Rebellion in 1638 and the arrival of the Black Ships in 1856. By contrast, domestic peace sustained for only 103 years in China between the Annexation of Taiwan in 1683 and the Lin Shuangwen Uprising in 1786.

after 1868 because of the rise of a more proactive government in Japan during the Meiji Restoration (Beasley, 1972; Ma, 2004). In this paper, we show that the original divergence of their state capacity occured before 1850, due to the much higher agency costs that China faced. We conjecture that Japan's greater state capacity might have prepared it better for the arrival of the West. In other words, we see the proactive Meiji government as a product of Japan's history, not a radical break from the past.

References

Acemoglu, D. (2005). Politics and economics in weak and strong states. *Journal of Monetary Economics 52*(7), 1199–1226.

Alcock, R. (1863). *The capital of the tycoon: a narrative of a three years' residence in Japan*. London: Longman, Green, Longman, Roberts & Green.

Alesina, A. and E. Spolaore (1997). On the number and size of nations. *The Quarterly Journal of Economics 112*(4), 1027–1056.

Ando, Y. (2000). *Kansei Kaikakuki no Toshi Seisaku [Urban Policies in the Kansei Reform Period]*. Tokyo: Azekura Shobo.

Balazs, E. (1964). *Chinese civilization and bureaucracy: variations on a theme*. New Haven: Yale University Press.

Beasley, W. G. (1972). *The Meiji Restoration*. Stanford: Stanford University Press.

Besley, T. and T. Persson (2009). The origins of state capacity: property rights, taxation, and politics. *American Economic Review 99*(4), 1218–44.

Brandt, L., D. Ma, and T. Rawski (2011). From Divergence to Convergence: Re-evaluating the History Behind China's Economic Boom. Working Paper.

Ch'u, T.-T. (1962). *Local government in China under the Ch'ing*. Harvard East Asian studies, 9. Cambridge: Harvard University Press.

Deng, K. (2008). Miracle or Mirage? Foreign Silver, China's Economy and Globalization from the Sixteenth to the Nineteenth Centuries. *Pacific Economic Review 13*(3), 320357.

DQHD (2006). *Da Qing wuchao huidian [Collected statutes of the Qing dynasty through five reigns]*. Reprint, Beijing: Thread-binding Books Publishing House.

Elvin, M. (2004). *The Retreat of the Elephants: An Environmental History of China*. New Haven: Yale University Press.

Eto, J. (Ed.) (1970). *Katsu Kaishu Zenshu [Complete Works of Kaishu Katsu], Volume 3*. Tokyo: Keiso Shobo.

Fang, Q. (2009). Hot Potatoes: Chinese Complaint Systems from Early Times to the Late Qing (1898). *The Journal of Asian Studies 68*(4), 1105–1135.

Fei, S. (2007). We Must be Taxed: A Case of Populist Urban Fiscal Reform In Ming Nanjing (13681644). *Late Imperial China 28*(2), 1–40.

Feng, G. (1967[1876]). *Xianzhitang Ji [Manuscripts of Feng Guifen]*. Taipei: Xuehai.

Feuerwerker, A. (1976). *State and society in eighteenth-century China: the Ch'ing Empire in its glory*. Ann Arbor: Center for Chinese Studies, University of Michigan.

Furushima, T. (1963). Shohin ryutsu no hatten to ryoshu keizai [The lord's economy and the development of commerce]. In S. Ienaga (Ed.), *Iwanami koza Nihon rekishi [Iwanami Lectures on Japanese History]*, Volume 12. Tokyo: Iwanami Shoten.

Greif, A. (1998). Historical and Comparative Institutional Analysis. *American Economic Review 88*(2), 80–4.

Greif, A. (2006). *Institutions and the path to the modern economy: lessons from medieval trade*. New York: Cambridge University Press.

Grossman, S. and O. Hart (1986). The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy 94*(4), 691–719.

Hanley, S. B. (1987). Urban Sanitation in Preindustrial Japan. *Journal of Interdisciplinary History 18*(1), 1–26.

Hansen, G. and E. Prescott (2002). Malthus and Solow. *The American Economic Review 92*(4), 1205–1217.

Hayami, A. and M. Miyamoto (1988). *Nihon keizaishi: Keizai shaki no seiritsu—17-18 seiki [Emergence of economic society—17 and 18th Centuries]*. Tokyo: Iwanami Shoten.

Heijdra, M. (1998). The socio-economic development of rural China under the Ming. In D. Twitchett and F. W. Mote (Eds.), *The Cambridge History of China. Vol. 8: The Ming dynasty, 1368-1644*, pp. 417–578. Cambridge: Cambridge University Press.

Hosokawa Hanseishi Kenkyuukai (1974). *Kumamoto-han Nenpyo Ko*. [Kumamoto].

Huang, P. C. C. (2003). Further thoughts on eighteenth-century Britain and China: rejoinder to Pomeranz's response to my critique. *The Journal of Asian Studies 62*(1), 157–187.

Huang, R. (1974). *Taxation and governmental finance in sixteenth-century Ming China*. London; New York: Cambridge University Press.

Iijima, C. (2004). *Edo Bakufu Zaisei no Kenkyu [Research on Edo Bakufu Finance]*. Tokyo: Yoshikawa Kobunkan.

Ito, A. (2011). Hanzaisei ha Kyubo shite itanoka? [Were Local Domains in Financial Dire Straits?]. In Aratake and Watanabe (Eds.), *Kinsei Koki Daimyoke no Ryosei Kiko [Ruling Mechanisms of Daimyo in Late Tokugawa Japan]*. Tokyo: Iwata Shoin.

Iwahashi, M. (1981). *Kinsei Nihon bukkashi no kenkyû : kinsei beika no kôzô to hendô [Studies on Commodity Prices in Early Modern Japan: the Structure and Transformation of Early Modern Rice Prices]*. Tokyo: Ohara Shinseisha.

Jansen, M. B. (1992). *China in the Tokugawa World*. Cambridge: Harvard University Press.

Kaempfer, E. and M. B.-B. Beatrice (1999). *Kaempfer's Japan: Tokugawa Culture Observed*. Honolulu: University of Hawaii Press.

Kandori, M. (1992). Social norms and community enforcement. *The Review of Economic Studies 59*(1), 63–80.

Kikuchi, I. (1997). *Kinsei no Kikin [Famines in Pre-modern Japan]*. Tokyo: Yoshikawa Kobunkan.

Kiser, E. and X. Tong (1992). Determinants of the amount and type of corruption in state fiscal bureaucracies: an analysis of late imperial China. *Comparative Political Studies 25*(3), 300–331.

Levi, M. (1988). *Of Rule and Revenue*. Berkeley: University of California Press.

Li, B. (2000). *Jiangnan de zaoqi gongyehua (1550-1850) [Jiangnan's Early Industrialization, 1550-1820]*. Beijing: Social Sciences Documentation Press.

Li, W.-Z. and T.-X. Jiang (2008). *Qingdai Caoyun [The Canalage of Qing Dynasty]*. Beijing: Social Sciences Academic Press.

Liang, F. (1957). *Ming Dai Liang Zhang Zhi Du [The tax captain system in Ming China]*. Shanghai: Shanghai ren min chu ban she.

Lin, M.-H. (2006). *China Upside Down: Currency, Society, and Ideologies, 1808-1856*. Harvard East Asian monographs, 270. Cambridge: Harvard University Asia Center.

Ma, D. (2004). Why Japan, not China, was the first to develop in East Asia: lessons from sericulture, 1850-1937. *Economic Development and Cultural Change 52*(2), 369–394.

Ma, D. (2010). Rock, Scissors, Paper: the Problem of Incentives and Information in Traditional Chinese State and the Origin of Great Divergence. Working Paper.

Mann, S. and P. Kuhn (1978). Dynastic decline and the roots of rebellion. In J. K. Fairbank (Ed.), *The Cambridge History of China, Volume 10, Late Ch'ing 1800-1911*, pp. 107–162. Cambridge: Cambridge University Press.

McCaffrey, C. M. (2003). *Living through rebellion: a local history of the White Lotus Uprising in Hubei, China*. Dissertation, University of California, San Diego.

McClain, J. L. (1980). Castle Towns and Daimyo Authority: Kanazawa in the Years 1583-1630. *Journal of Japanese Studies 6*(2), 267–299.

Mencius (2004). *Mencius*. London: Penguin Books. Translated by D. C. Lau.

Miyamoto, M. (2004). Prices and Macroeconomics Dynamics. In A. Hayami, O. Saito, and R. Toby (Eds.), *Emergence of economic society in Japan, 1600-1870*, pp. 119–158. Oxford: Oxford University Press.

Mosk, C. (2011). *Traps Embraced or Escaped: Elites in the Economic Development of Modern Japan and China*. Singapore: World Scientific.

Nakabayashi, M. (2012). Rise of the Japanese Fiscal State. In B. Yun-Casalilla, P. O'Brien, and F. Comin Comin (Eds.), *The Rise of Fiscal States: A Global History, 1500-1914*, pp. 378–409. Cambridge: Cambridge University Press.

Nakai, N. and J. L. McClain (1998). Commercial change and urban growth in early modern Japan. In M. Smitka (Ed.), *The Japanese Economy in the Tokugawa Era*, pp. 131–207. New York: Garland Pub.

Nakane, C. and S. Oishi (1990). *Tokugawa Japan: The Social and Economic Antecedents of Modern Japan*. Tokyo: University of Tokyo Press.

Ni, S. and P. H. Van (2006). High corruption income in Ming and Qing China. *Journal of Development Economics 81*(2), 316–336.

Nishikawa, S. (1985). *Nihon keizai no seichoshi [History of the growth of the Japanese economy]*. Tokyo: Toyo Keizai.

Nishizawa, A. (1998). *Bakuryo Jinya to Daikan Shihai [Magistrates' Offices and Controls]*. Tokyo: Iwata Shoin.

Nishizawa, A. (2004). *Daikan no nichijo seikatsu [Everyday life of magistrates]*. Tokyo: Kodansha.

Ocko, J. (1988). I'll Take It All the Way to Beijing: Capital Appeals in the Qing. *The Journal of Asian Studies 47*(2), 291–315.

Ohira, Y. (2003). *Meyasubako no kenkyu [A Study of the Petition Box]*. Tokyo: Sobunsha.

Ohno, M. (1996). *Edo bakufu zaiseishi ron [Financial History of Edo Shogunate]*. Tokyo: Yosikawa Kobunkan.

Ohno, M. (2008). *Edo Bakufu Zaisei Shiryo Shusei [Collections of Historical Documents on the Tokugawa Shogunate Finance], Volume 1*. Tokyo: Yoshikawa Kobunkan.

Olson, M. (1993). Dictatorship, democracy, and development. *The American Political Science Review 87*(3), 567–576.

Olsson, O. and G. Hansson (2011). Country size and the rule of law: resuscitating Montesquieu. *European Economic Review 55*(5), 613–629.

Park, N. (1997). Corruption in eighteenth-century China. *The Journal of Asian Studies 56*(4), 967–1005.

Perdue, P. C. (1987). *Exhausting the earth: state and peasant in Hunan, 1500-1850*. Cambridge: Council on East Asian Studies Harvard University: Distributed by Harvard University Press.

Perkins, D. H. (1969). *Agricultural development in China, 1368-1968*. Chicago: Aldine.

Pomeranz, K. (2000). *The great divergence: China, Europe, and the making of the modern world economy*. Princeton, N.J.: Princeton University Press.

QSG (1976[1927]). *Qing shi gao [Draft History of the Qing]*. Beijing: Zhonghua shuju. Compiled by Zhao Erxun [1844-1927].

QSL (1986). *Qing shilu [Veritable records of the Qing dynasty]*. Reprint, Beijing: Zhonghua shuju.

Reischauer, E. (1970). *Japan: the story of a nation*. London: Duckworth.

Roberts, L. (1994). The Petition Box in Eighteenth-Century Tosa. *Journal of Japanese Studies 20*(2), 423–458.

Rosenthal, J.-L. and R. B. Wong (2011). *Before and Beyond Divergence: The Politics of Economic Change in China and Europe*. Cambridge: Harvard University Press.

Rowe, W. (1989). *Hankow: Conflict and Community in a Chinese City, 1796-1895*. Stanford: Stanford University Press.

Rozman, G. (1973). *Urban Networks in Ch'ing China and Tokugawa Japan*. Princeton, N.J.: Princeton University Press.

Saito, O. (2009). Forest history and the great divergence: China, Japan, and the West compared. *Journal of Global History 4*(3), 379–404.

Schran, P. (1978). A Reassessment of Inland Communications in Late Ch'ing China. *Ch'ing shih wen-t'i [Late Imperial China] 3*(10), 28–48.

Shiue, C. H. and W. Keller (2007). Markets in China and Europe on the eve of the Industrial Revolution. *American Economic Review 97*(4), 1189–1216.

Smith, T. (1958). The Land Tax in the Tokugawa Period. *The Journal of Asian Studies 18*(1), 3–19.

Sng, T.-H. (2010). Size and Dynastic Decline: The Principal-Agent Problem in Late Imperial China. Working Paper.

Stasavage, D. (2010). When distance mattered: geographic scale and the development of European representative assemblies. *American Political Science Review 104*(04), 625–643.

Tilly, C. (1975). Reflections on the History of European State-Making. In C. Tilly (Ed.), *The Formation of National States in Western Europe*, pp. 3–83. Princeton, N.J.: Princeton University Press.

Totman, C. (1989). *The green archipelago: forestry in preindustrial Japan*. Berkeley: University of California Press.

Totman, C. (1993). *Early modern Japan*. Berkeley: University of California Press.

Totman, C. D. (1967). *Politics in the Tokugawa bakufu, 1600-1843*. Harvard East Asian series 30. Cambridge: Harvard University Press.

Tsuchiya, T. and K. Yamaguchi (1972). *Zuroku Nihon No Kahei [Japanese Currency Illustrated]*. Tokyo: Toyo Keizai Shinposha.

Usher, D. (1989). The dynastic cycle and the stationary state. *The American Economic Review 79*(5), 1031–1044.

Vaporis, C. N. (1994). *Breaking Barriers: Travel and the State in Early Modern Japan*. Cambridge: Council on East Asian Studies, Harvard University.

Walthall, A. (1991). *Peasant uprisings in Japan: a critical anthology of peasant histories*. Chicago: University of Chicago Press.

Wang, Q. (1985[1890]). *Shiqu yu ji [Collection of Notes on Fiscal Matters of the Qing Dynasty]*. Beijing: Beijing Ancient Books Publishing House.

Watt, J. (1977). The yamen and urban administration. In G. W. Skinner (Ed.), *The city in late imperial China*, pp. 353–390. Stanford: Stanford University Press.

Will, P.-E. and R. B. Wong (1991). *Nourish the people: the state civilian granary system in China, 1650-1850*. Ann Arbor: Center for Chinese Studies, University of Michigan.

Wittfogel, K. A. (1957). *Oriental despotism: a comparative study of total power*. New Haven: Yale University Press.

Xie, J. (2002). Xinxi chuandi yu xinhai geming [information transmission and the revolution of 1911]. *Journal of East China Normal University (Philosophy and Social Sciences) 4*.

Yamamoto, H. (1993). *Technological Innovation and the Development of Transportation in Japan*. Tokyo: United Nations University Press.

Yanagitani, K. (1985). Edo bakuhu shirozumemai-sei no seiritsu [the establishment of tokugawa shogunates castle rice stockpile system]. *Nihon Rekishi* (444), 38–57.

Yanagitani, K. (1989). Edo bukuhu shirozumemai-sei no kino [the role of edo bakufu strategic rice provisions]. *Shigaku Zasshi* (69), 15–37.

Yoshida, N. (1991). *Kinsei Kyodai Toshi no Shakai Kozo [The Social Structure of Metropolises in Pre-modern Japan]*. Tokyo: Tokyo Daigaku Shuppan.

Zelin, M. (1984). *The magistrate's tael: rationalizing fiscal reform in eighteenth-century Ch'ing China*. Berkeley: University of California Press.

Zelin, M. (2004). Economic freedom in late imperial china. In W. C. Kirby (Ed.), *Realms of freedom in modern China*, pp. 57–83. Stanford: Stanford University Press.

Zhang, J. (2006). Water calamities and dike management in the Jianghan Plain in the Qing and the Republic. *Late Imperial China 27*(1), 66–108.

Zhang, Z. (1962). *The income of the Chinese gentry*. Seattle: University of Washington Press.