# Constraining the Samurai: Rebellion and Taxation in Early Modern Japan

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**Abstract:** On the eve of the Meiji Restoration in 1868, the nearly 300 semi- autonomous domains across Japan had widely varying tax rates. Some handed over 70 percent of their rice yield to the samurai ruler of the domain, while others provided 15 percent. This variation existed in spite of the similar fiscal demands that the domain rulers faced within the Tokugawa regime—the feudal system that governed Japan between 1603 and 1868. This period was remarkably stable; Japan saw no foreign or domestic wars. This allows us to focus on the impact of pressure from below on taxation. We study the extent to which peasant-led rebellions and collective desertion (``flight'') lowered the subsequent tax rate imposed by samurai rulers. Using newly compiled data on different types of peasant-led political mobilization—from petitions to insurrections—we find an association between, on the one hand, large- scale rebellions and flight and, on the other, lower tax rates. We interpret the results as evidence of rebellious or mobile peasants' ability to constrain their rulers; the more complacent fail to win concessions. Our findings suggest that peasant mobilization played a role in restricting state growth in early modern Japan through tax concessions.

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## 1. Introduction

On the eve of the Meiji Restoration in 1868, the 267 semi-autonomous domains across Japan had widely varying tax rates. Some villages had to hand over 70 percent of their rice yield to the ruler of the domain, while others had to provide only 15 percent. This variation existed in spite of the similar fiscal demands that the samurai rulers (*daimyo*) of the domains faced within the Tokugawa regime—the feudal system headed by a shogun that governed Japan between 1603 and 1868.[1] The daimyo were free to set their own tax rates, and to send their retainers (lower-ranked samurai) to collect revenue from the peasants in their realms. If each ruler aims to maximize extraction (Levi, 1988), what explains such wide variation in rates of taxation at the end of the Tokugawa regime?

Relative to Western Europe, the Tokugawa regime was more stable. It lacked both internal and external wars, and even the threat of such conflicts, until the mid-19th century. This setting allows us to consider which domestic factors influenced extraction.[2] Specifically, we ask whether and to what extent peasants were able to constrain rulers' taxation through rebellion and desertion. As Levi (1988 19) explains, the rulers' imperative is to maximize revenue extraction while avoiding "fight or flight" of the taxed, or they will lose not only resources, but also potentially the ability to govern.

In the case of Tokugawa Japan, we know that rulers did face these threats. Historical records indicate that peasants banded together and rebelled (in some form) 1,787 times across the domains between 1603 and 1868, when the regime collapsed. According to Aoki (1971), 497 of those instances specifically involved resistance to taxation. Peasants collectively fled 35 times to avoid complying with a tax, out of 161 total collective desertions.[3] The structure

[1] The regime was also known as the Edo *bakufu*. Here we follow Ikegami (1995, 179), who argues that "...Tokugawa society can be regarded as a version of feudalism from almost every angle, but [...] it still differs from the ideal types generated by the European medieval experience—particularly in its political structure." We return to these structural differences below.

[2] Mares and Queralt (2015) make a similar point regarding their study of the origins of income tax in 19th-century Germany.

[3] As we explain below, collective desertions were different from typical migration. In Tokugawa Japan, it was a sanctioned form of resistance that involved entire villages abandoning land to avoid working it temporarily, thereby denying tax payments to the ruler. For shorthand, we refer to this as "flight."

of village life and collective taxation fostered collective action. But was it effective? Were rebellious and mobile villagers able to win tax concessions from their rulers? Or did rulers repress in these domains? In other words, do we observe lower tax rates where peasants proved able to engage in fight or flight? Furthermore, were larger scale rebellions more successful, or was frequency of resistance more effective? Our study finds that peasants who organized large-scale insurrections, and those who deserted their villages collectively, were indeed able to gain tax relief.

Our findings are consistent with theoretical models that allow for the possibility of commoners to influence extraction. A classic model theorizes that autocrats determine an optimal tax rate so that they can maximize their payoff in the long run. That is, they allow their subjects to retain necessary resources for continued economic activity into the future. In this framework, rulers avoid over-extraction because they enjoy sufficient information to calculate the point at which the tax rate becomes harmful to the economy (McGuire and Olson 1996).[4] Citizens generally have little influence over rulers' decisions on revenue and spending, partly because autocrats have overwhelming coercive power relative to citizens, and partly because citizens face a collective action problem (see Olson 1971). However, if citizens can overcome collective action problems and rebel—or threaten to rebel—against high tax rates, then they can also influence the tax rate (See also Acemoglu and Robinson 2006; Besley and Persson 2009).[5] We find that this collective action threshold is high: only only large-scale insurrections

[4] See also Besley and Persson (2008) for their evolutionary political economic model of taxation.

[5] Another stream of literature focuses on the comparison between autocrats and rulers in representative institutions. The latter experience a more efficient allocation of resources and economic growth (Lake 1992), better mobilize popular support for war (Reiter and Stam 2002), convert mass mobilization for war into progressive taxation (Scheve and Stasavage 2010), and deliver more successful public policies (Bueno de Mesquita, Morrow, Siverson, and Smith 1999). They also have easier access to credit and are able to finance prolonged wars, as they are more likely to be credible in repaying debt (Schultz and Weingast 2003). Here, we restrict the discussion to variation among autocracies. Slater (2010) ties rebellion and urban unrest to taxation (and regime type) within autocracies, depending on the extent to which the disorder incentivizes elites to tax themselves. As we explain below, the forms of rebellion we study were not aimed at overthrow of the regime, so did not trigger new progressive tax schemes among elites. We focus on the narrower question of the effect peasant resistance had on taxation of the peasants.

and collective desertions are associated with lower tax rates.

Our findings also contribute to an effort to account for variation in levels and forms of taxation across and within autocratic regimes (Cheibub 1998). Though we find many examples of tax rebellions over time and across countries (see, for example, Kiser and Linton (2002) on France, Bush (1991) on Tudor England, and Rapoport (2004) on 14th-century Egypt under Mamluk rule), we have less systematic evidence of their impact on tax rates. Te Brake (1998, 8) notes that in early modern Europe, resistance to tax increases was "widespread and predictable," and could "bend and shape public policy in significant ways [...]." In this article, we aim to test this claim by focusing on taxation and exploiting sub-national variation in peasant rebellions and migrations in Japan. This systematic data allows us to analyze if peasants constrained their powerful samurai rulers' taxation.

We consider each domain within the shogunate as an independent observation in a large-N empirical exercise, given the high levels of autonomy that each domain enjoyed. Migration—distinct from mass flight—was also restricted between domains, undermining a key driver of tax convergence (Mares and Queralt 2015). By disaggregating rebellion types, from petitions to large-scale mobilization, we also attempt to identify more nuanced conditions under which rebellions result in concession rather than repression. Our analyses find that domains with more widespread peasant-led protests and mass flight against tax rates achieve lower tax rates than more pacific domains by 1868. In addition, less intense forms of resistance, such as official requests for tax forgiveness—no matter how numerous over time—were unsuccessful in winning lower tax rates. The results hold even when controlling for the autocrats' largest fiscal expenditure, stipends for samurai in the domain. We interpret these results as evidence that peasants were able to constrain their samurai rulers through rebellions and mass desertions. The substantive effect is not negligible—for example, we find that domains that experienced insurrections saw tax rates that were roughly five percent lower, on average, than similar domains.

This article has four remaining sections. The next section provides background on the governance structure of Tokugawa-era Japan and describes the spatial variation in taxation and rebellions during the period. Sections three and four describe the dataset we constructed based on historical materials and our empirical approach. Section five presents the analysis and discusses the main findings and caveats. Section six concludes.

## 2. Governance, Taxation, and Rebellions in Tokugawa Japan

The governance structure in Tokugawa Japan, as well as taxation and rebellions during the period, are comparable across domains. This section serves as historical background, an introduction to the relevant scope conditions that apply to the Tokugawa setting, and as a foundation for the inferences that we draw in our quantitative analyses.

### 2.1 Governance

#### 2.1.1 The Structure of the Shogunate

The Edo Period[6] began when Ieyasu Tokugawa, himself a powerful daimyo, defeated his main rival and unified the country under his rule as shogun at the turn of the 17th century. Tokugawa established his dynastic rule in Edo (present-day Tokyo) and stripped the Emperor and royal court in Kyoto of their authority and wealth. The shogunate lasted for nearly 300 years before the regime was toppled in a coup d'état followed by the Boshin War (1868-1869), a civil war that ushered in the period known as the Meiji Restoration (because the emperor's authority was restored). The Tokugawa regime comprised nearly 300 domains, each of which featured similar governance structures. All domain rulers were members of the samurai class. The shogun was the most powerful daimyo, and other daimyo were the most powerful samurai in their respective domains, known as han.[7] In effect, the shogunate was similar to 14th and 15th-century European rule, in which "The difference between the overlord and the others was ... one of degree; he was *primus inter pares*" (Schumpeter, 1991 (1918, 102)).[8]

The shogun imposed key rules over the daimyo: they could not conduct any foreign relations on their own, engage in warfare with each other, or even communicate directly with one another (Jansen, 1995, 349).[9] These rules led to the internal stability and isolation that marked the shogunate. To enforce these tenets, the shogun required daimyo to staff sufficient armed forces (i.e., samurai retainers), in the event that he would order them to send their forces into action against recalcitrant daimyo. The shogun also mandated daimyo to maintain two

[6] Tokugawa Japan and "Edo Period" are synonymous.

[7] A note on terminology: we use daimyo and ruler, and han and domain, interchangeably.

[8] Semi-formal rules outlined in the *buke-sho-hatto*, first in 1615 and again in 1635, established the authority of the shogunate.

[9] The shogun forbade daimyo from engaging in any alliance formation, which included a ban on strategic marriages among daimyos' children and siblings.

estates: one in Edo, and one in their domain, each staffed with numerous samurai. (The pageantry required was perhaps similar to that expected of nobles in early modern Europe (Braun 1975, 254).) The estate in Edo was essential, because the shogun forced daimyo to engage in "alternate attendance" (*sankinkotai*) between Edo and their domains. When the daimyo were not living in Edo, wives and children remained in the capital as hostages. If a daimyo were to challenge the shogun in any way, his wives, children, and retainers in the capital would all be slaughtered. This policy seems to have kept daimyo in check. Jansen (1995, 44) estimates that the expenses associated with running the estates, including staffing by samurai, accounted for roughly two thirds of the revenue collected by the daimyo in 19th century Tosa domain. Though the daimyo did not pay direct taxes to the shogunate (Hall 1995, 178), these policies amounted to indirect taxation.[10]

In addition to these rules, han were also required to be "well-governed" (Bolitho 1995*b*, 213), and had to enforce controls on Christianity (Jansen 1995, 6). All daimyo had to submit to inspections and reviews of their justice-related decisions. They were also prohibited from preventing travel through their han, or from erecting barriers or collecting tolls. When the shogun traveled, he could request costly accompaniment by daimyos' samurai and lavish accommodations. When emergencies occurred in other han, the shogun could require daimyo to send assistance (Bolitho 1995*b*, 231).

Tokugawa Japan shares some features of European feudalism, defined by the exchange of services between rulers and subjects in a fief (Ikegami 1995). Ikegami (2003 126-7) characterizes the shogunate as "neo-feudal," because there was no direct oversight of landed properties and villages, and as a result, no aristocratic notion of property developed in Japan as it did in Europe. Landholders, the high-ranking samurai, were required to live in castle towns rather than near their holdings and vassals. Also, Japan did not have competing sources of authority within its territory, such as religious organizations, and forms of association among Japanese commoners did not exist (Ikegami 1995, 179-81).[11] Tokugawa bureaucracy was functionally similar to the Western early modern bureaucracy, but rooted in vassalage (Ikegami 1995, 184); daimyo were "courtier-vassals" (Ikegami 1995, 158). Only samurai were members

[10] Interestingly, while the shogunate increased its authority vis-a-vis the daimyo over time, it did not centralize (White, 1988*b*, 11).

[11] Shintoism was important, but did not establish the same kind of public institutions as Christianity in Europe. The symbolic head of Shintoism, the emperor, was sidelined by the shogun.

of the political class, and they alone could become bureaucrats. One implication of these key differences is stability. In contrast with Europe, commoners in Japan could not exploit divisions within the ruling class to form alliances (te Brake 1998). As a result, revolts in Japan aimed to constrain rulers rather than overthrow them.

### 2.1.2 Domain governance

Though ultimately beholden to the shogun, daimyo "presided over most of Japan's wealth and garnered most of its taxes" (White 1995, 202).[12] The daimyo were the lords over their own domains. The domains were semi-autonomous states within the broader shogunate; the daimyos' autonomy allowed them to amass armies, set the tax rate, and collect taxes. The daimyo also had independent judicial systems (Ikegami 1995, 160). Bolitho (1995*b* 16) affirms that the daimyo were *de facto* independent, and that the only governance the majority of Japanese knew was the han. In addition, after the 17th century, the shogun effectively guaranteed daimyos' position— removing any threats to their hereditary position. While they served at the shogun's pleasure, and could be removed at any time, such interventions by the shogunate declined over time: after the mid-17th century, daimyo removal happened less frequently than once a year (Bolitho 1995*a*, 227). [13]

In addition to the estates in Edo, the expenses of running domains were substantial, primarily because of the samurai retainers. Ravina (1999) notes that samurai stipends and personal expenses of the daimyo consumed most of the domains' revenues. Samurai were quite powerful relative to commoners, because they were the only group that could legally carry weapons or own property. However, samurai lost authority relative to the daimyo when the

[12] Daimyo were further divided into three classes, dating back to Ieyasu, the first shogun: *fudai*, who allied with Ieyasu; *shimpan*, or houses related to the Tokugawa house; and *tozama*, or "outside" houses that did not ally with Ieyasu and located in peripheral regions of the country. Regardless of these distinctions, han governance did not vary by daimyo class, and by the late 17th century, there was no discrimination against the tozama daimyo by the shogunate (Bolitho 1995*b*, 206). Furthermore, only tozama and fudai domains remained by the 18th century (White 1995, 169).

[13] In the early stages of the Tokugawa regime, the shogun relocated and abolished various domains, but these practices were largely discontinued by the mid-18th century; we look at different rebellion time periods below to test whether the relationship between mobilization and tax rate stays robust across these cut-offs.

shogun relocated them to castle towns, where the daimyo surveillance networks could more easily monitor them (Brown 1988). The five higher-ranking samurai classes earned from the lands they oversaw, as well as a salary depending on their position in the administration.[14] The three lowest samurai ranks received stipends from the daimyo's rice warehouse (Jansen 1995, 26). In theory, the samurai provided security for the han, but given the extended period of stability within Japan for roughly two and a half centuries, it was not clear that samurai were so much providing security as living off of peasants' provisions (Jansen 1995).[15] Other than samurai stipends, public spending was minimal; domains did not provide services beyond rudimentary mechanisms for dispute resolution within and among villages in the han.

### 2.1.3 Village life

After the samurai were relocated to castle towns, "villages became self-governing to a degree that had previously been unknown" (Saxonhouse 1995, 744). At the same time, Ikegami (1995, 167) observes: "Unlike medieval villages, the villages of Tokugawa Japan were subject to much more intense scrutiny and control from their samurai overlords." All village inhabitants were listed in family registries and belonged to five-family units (*goningumi*), which were "responsible for providing one another with surveillance and mutual assistance – paying taxes, disciplining and prosecuting criminal behavior, and the like" (Ikegami 1995, 167).[16] This system made rural migration among han for land-holding peasants exceedingly difficult: families were tied to their communities and could not easily become members of new ones. Additionally, land-holding peasants were barred from selling land (since it was not formally theirs), even though this was not always enforced (Ikegami 1995, 167, fn5). The village leaders, the *shoya*, were "the lowest unit of han control," though they were not formally of the ruling class (Jansen 1995, 30-1).[17] The position was usually hereditary, though district magistrates officially appointed them. The shoya adjudicated disputes within the village and issued verdicts

[14] From time to time, these groups also received supplemental grants (Jansen 1995, 25, fn 32).

[15] Several scholars echo Jansen (1995, 48), who writes that after centuries without military conflicts, the upper samurai in particular were "men grown soft and overconfident in their security, slothful and limited in ability, totally devoid of imagination and resourcefulness."

[16] Although there was regional variation (for example in the number of families in each unit), the basic structure and goals were consistent across domains.

[17] Other titles for village leader include *nanushi* or *kimoiri*, and depended on the region; we use the most common term, *shoya*.

on all but the most serious offenses. In addition, they were responsible for distributing the tax burden among the *goningumi*, and for collecting the rice tax.

### 2.1 Taxation

In-kind rice taxes, *nengu*, were the primary source of revenue for both the domains and the shogunate. In theory, each han monitored productivity by assessing villages on a yearly basis.[18] The han government issued a *menjo* to each village, which announced the assessed yield and the percentage required for that year (Smith 1958, 4). As such, rulers faced a variation of the typical taxation problem: the challenge was to set a tax rate, given incentives for *groups* not to comply (as opposed to individuals [Slemrod 1990]), and their ability to organize. The shoya assigned each *goningumi* their portion of the tax burden (Smith 1958, 4). Given the clearly defined social hierarchy, it appears that there was little room for shoya to manipulate tax rates arbitrarily (see Oga 2004).[19] Both the shogunate and the daimyos' tax revenues were mainly paid in rice, part of which was then sold for cash in the market (White 1995, 41).

Because nengu was the proportion of rice produced by a village, it was essential for the administration to estimate how much rice each village would produce. However, after the mid-18th century, land surveys were infrequent (Hall 1995, 191).[20] One reason for the lack of regular or accurate land assessments is the relocation of the upper samurai to the castle towns, which prevented samurai from having regular contact with and information from villages, and

[18] Domain productivity was measured in terms of *koku* per acre, or the kokudaka (Smith 1958, 4). One koku was roughly equivalent to one quarter of an acre, which in theory produced 5 bushels of rice annually—the amount needed to feed one person for a year (Jansen 1995, 23). No domain was "smaller" than 10,000 koku (White 1995, 174).

[19] The shogunate collected taxes in its territories the same way that daimyo did. The bakufu also taxed commercial activities in the urban centers that it gradually claimed from the daimyo whose rule officially encompassed those cities (Hall 1995, 171).

[20] The most important and comprehensive land survey, the Taiko land survey, was in 1588, before the Tokugawa era began (under Hideyoshi). This was also the year of the Sword Hunt Edict, which led to the confiscation of all weapons from non-samurai classes. The survey evaluated the productive capacity of each village, and became the building block in the construction of the Tokugawa shogunate system of dominion (Ikegami 1995, 153).

limited the transferal of skills to conduct surveys (Brown 1987).[21] Jansen (1995, 11) writes that actual rice yield "...was frequently estimated to be double the formal estimate of [rice bushels (*koku*)] with which the Tokugawa vassals were credited. Despite this, the official tax rates failed to rise proportionately." Subsequently, radical land reform during the Meiji Restoration—featuring the privatization of property—was accompanied by a new tax system, in which assessments were based on property size rather than estimated productivity, and payments were monetary. Taxes collected increased substantially (White 1995, 46).[22]

Across Japan, expenditures outpaced revenue beginning in the 18th century (White 1988a, 63), indicating that tax rates did not meet fiscal demands. One tactic to address revenue shortfalls was land reclamation, meaning the conversion of previously unused land to rice production. In fact, land under production doubled during the Tokugawa period—though the majority of these reclamations went unreported to the bakufu (Smith 1958). While this tactic increased revenues through about 1710, they declined after that (Bolitho 1995*b*).

*Komononari* were taxes on everything besides rice, which were considerably less and uneven (Smith 1958, 4). Taxes related to cereals ("dry crops" other than rice) and housing were typically paid in cash (Bolitho 1995*a*, 232). Other forms of taxes from mines (Roppongi 2002; Sugiyama 2012) and non-agricultural commodities (Tanaka 2009, 2010, 2011) were raised, but these were also rare.

Daimyo informally taxed merchants by demanding loans, defaulting on them, and cancelling the debts. Sometimes daimyo defaulted on their loans, and ordered their debts canceled. The daimyo also exchanged rice revenue for cash in Osaka and Edo. Merchants involved in these transactions paid their dues indirectly, by charging exchange rates favorable to the daimyo (Sugiyama 2012). Rulers also tried to exploit commerce and proto-industry for

[21] Lower samurai, though more likely to be based in the countryside, had no authority in the han administrations (Jansen 1995, 30).

[22] Ikegami (2003, 131) writes of the reforms: "The result was a series of rural revolts: 56 in 1873, 21 in 1874, 19 in 1875, 28 in 1876 and 48 in 1877 [...]" which "forced the government to institute significant reductions in national and local tax rates." Nevertheless, tax revenue increased: in 1870, revenue from land tax was 8.2 million yen; after the tax reform in 1873, revenue "rose to over 60 million yen, which constituted 90% of all taxes and 70% of the government's total income" (Ikegami 2003, 131). Following this change in the property structure, tax reforms, and the introduction of mass conscription, people became more active in the political process (Ikegami 2003, 132).

revenue, but were largely unsuccessful (White 1988*a*, 37). Alternatively, some han took a longer-term approach and diversified their economic bases. Satsuma domain, for example, created the sugar monopoly (Bolitho 1995*b*, 18), and Tosa sold lumber from its forests (Jansen 1995, 42-4).[23] These alternatives to raising taxes, however, remained the exceptions rather than the norm. Due to industrial underdevelopment, the only source of tax revenue that the government could increase was the agricultural sector, even by the end of the Tokugawa period (Ikegami 2003, 131).[24] According to Saxonhouse (1995), the two most common reactions by daimyo to revenue shortfalls were to change the tax rate (or make a piecemeal adjustment), or to reduce samurai stipends.[25]

### 2.2 Rebellions in Tokugawa Japan

Raising the tax rate was risky in some domains, because it could spark protests and even insurrection. Though peasants were structurally disadvantaged, fight and flight were two ways that they could 'bargain' with or constrain the samurai rulers (White 1995, 191). Insurrections that disrupted internal order were particularly costly and potentially threatening to the ruler: such a rebellion could threaten the ability to govern or retain power. Alternatively, collective desertion by a village would deprive the ruler of revenue. Rebellion was not only costly to rulers, but also to peasants because of the repression that would follow. Collective desertion was costly to the peasants because it implied the abandonment of land already prepared for agriculture for an uncertain alternative elsewhere. Importantly, and similar to tax rebellions in early modern Europe, "[...] resistance was not always expressed in open revolt and most tax revolts did not result in revolutionary transformations of power" (te Brake 1998, 8).[26]

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[23] Jansen (1995, 42-4) discusses measures that the peripheral domains took to diversify their economic bases.

[24] The shogun and daimyo also occasionally imposed corvées for public works (White 1995, 41).

[25] Though it seems that samurai would be in a powerful position to revolt when their stipends were reduced, we did not find any evidence of the stipend decrease (see Jansen 1995; Yamamura 1971, 44).

[26] Barkey (1991) finds that French peasants were able to mount large-scale revolts by allying with disgruntled nobles, while Ottoman peasants were unable to forge alliances that would sustain

A variety of factors enabled peasants to mount resistance through either rebelling or fleeing, in spite of the costs involved. Mechanisms to manage discontent dated to before the Tokugawa period (Keirstead 1990, 357). The bakufu formalized peasants' rights to a certain extent in 1603, which included the possibility for peasants to either lodge formal complaints or collectively abandon their village or han in protest until they reached a compromise with the ruler (Bolitho 1995*a*, 235). If the village could not collect the required amount of rice, for example, leaders could organize a petition (or appeal) to the daimyo for tax forgiveness.[27] If villagers abandoned their fields, they could request to resettle in the new domain unless their demands were met, but the receiving daimyo could turn them back.[28] Without a compromise, no rice would be planted or harvested, depriving the ruler of any revenue. The collective desertions resembled modern strikes in this way. Once peasants reached a compromise with their ruler, they were expected to return to their village. An example of petitions and flight comes from Oga (2008): in September 1690, after the daimyo rejected peasants' appeal for lower taxes, about 1,418 peasants in Nobeoka domain (located in Kyushu) fled to a neighboring domain, Takanabe. Through the Takanabe daimyo, the peasants negotiated with their daimyo for ten months, which ended with the Nobeoka domain accepting all of the peasants' demands, including reprieve from heavy taxes. The peasants returned to their original village as a result. Though legal channels of petition and flight became outlawed later in the period, peasants continued to use these forms of protest until the fall of the Tokugawa regime (White 1988*a*, 19-20).

In addition to these traditional mechanisms, commoners occasionally mounted larger-scale rebellions. These could involve thousands of peasants across many villages, who sometimes used farm implements as weapons and destroyed property. The village leaders, the shoya, usually organized the resistance (though White (1988*a* 53, 62) estimates that their

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such revolts. In Japan, the structure of society differed: no aristocratic class existed independently of the ruling class. As such, peasants' potential allies—and the reach of their revolts—were limited.

[27] Not all appeals related to taxation: leaders could also file a complaint with the shogunate reporting the daimyo for poor governance or abuse of power.

[28] Although *chosen* (flight) involved migration, rural labor was not generally mobile in Japan across different domains during this time period, as we noted above. By definition, *chosen* in Japanese is an act by peasants to demonstrate their discontent to their ruler.

involvement declined from 85 percent of the revolts between 1726 and 1825, to only 50 percent between 1826 and 1867). Even though the shoya were officially part of the han system, we consider these revolts to be conflicts between peasants and rulers, rather than among elites. Ikegami (1995, 167) explains that prior to the Tokugawa period, the *dogo*—wealthy land holders in a village—were typically the leaders of revolts against samurai. At the outset of the Tokugawa era, though, many of these *dogo* purchased their way into the samurai class. As a result, the nature of revolts changed from intra-elite to peasant-elite: "As the landed samurai-like wealthy farmers had always formed the core of village-based resistance to feudal military lords, the decline of the dogo in the villages secured the daimyo's domination over them" (Ikegami 1995, 167). Rebellions from then on were decidedly peasant-led.

The ideology of the shogunate as well as the structure of its villages also facilitated collective action. White (1988a, 23) observes: "[...the shogunate] was bound by its own ideology (and the cold rationality of a regime dependent on a land tax) to enable the peasants to survive. The term "peasant" (hyakusho) did not include everyone on the land, but only landholders; but they possessed a status granted them back at the very beginning of the era, by the state, which entitled them to economic viability under official policy."[29] This entitlement is similar to Scott's (1975) "right to subsistence" where peasants are most likely to rebel when and where the ruler threatens this right. Taxes that were especially onerous were violations of this entitlement, and legitimately challenged as a result.

The social hierarchy within villages also facilitated collective action. As noted above, peasants were members of *goningumi*, in which they were responsible for enforcing rules among their neighbors, and denouncing those who violated them. Further, the existence of clear village leaders—the shoya— also helped to solve collective action problems: "When new taxes and monopolies threatened the pattern they had developed and maintained, it was usually the village leaders who organized the protest and, if it failed, the resistance to the feudal overlords" (Jansen 1995, 11).[30] In addition, the collective tax system gave villagers a

[29] O'Brien (1988) argues that in Britain between 1660 and 1815, taxpayers tolerated high taxation because the taxes were on non-essential commodities. By contrast, during the Edo period in Japan, the heaviest taxation was on the most important commodity – rice.

[30] Some resistance may relate to perceived inequality within villages, or unfair distribution of the tax burden assigned by the shoya. However, such resistance is more likely to take the form of less confrontational forms of smaller magnitude than the cross-village rebellions we focus on: it is unlikely that villages would simultaneously organize to protest their own internal allocation of

common interest: because they were assessed together, they mobilized together (White 1995, 54).[31] Vlastos (1986, 11) argues that class and ethnic homogeneity within villages, in addition to shared communal tasks, also allowed peasants to organize as well. Finally, villagers also seemed to have increasing opportunities (Tarrow 1996) to launch protests over the period, which may have emerged as a result of an accumulation of past rebellions and concessions.

In response to peasant rebellion or desertion, a ruler could concede to peasants' demands, or repress them and forcibly extract the amount demanded. The daimyo reaction was usually twofold: pacify the protesters, and punish the leaders (White 1988*a*).[32] Leaders and "ring-leaders" were almost always executed, regardless of whether or not a petition, desertion, or insurrection led to a concession in the tax rate. Though appeals (*shuso*) and collective desertion were "approved" channels by which villagers could resist, even they were not without severe consequences. In 1816, for example, a severe storm hit villages in Kakegawa domain, to the south of Tokyo. The storm ruined most crops, and villagers decided to protest against the ruler to demand a tax cut. Since the protests were widespread across the domain, the ruler agreed to reduce the tax rate. Yet the villagers were not satisfied with the extent of the initial compromise and demanded a further concession. The ruler eventually yielded, but ordered that the village leaders be executed as punishment (Shimada 1968, 568-71).[33]

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the tax burden.

[31] Rapoport (2004) describes a similar tax system in Mamluk-ruled Egypt. Taxes were levied on entire villages, and were paid in-kind in grains. Large-scale revolts led by Arab tribesmen against the Mamluk rulers were at least partly linked to taxation resistance.

[32] This double reaction, also evident in Europe (te Brake 1998, 118), is in contrast to what Besley and Persson (2010) expect in their model, which links threats to internal order and an increased extractive capacity with the provision of public goods. It is possible that internal disorder in Tokugawa Japan was, though costly, not an equivalent threat to order that contemporary insurgencies represent. As such, we expect rebellions to increase peasants' bargaining power vis-a-vis the rulers, rather than incentivize rulers to enhance their extractive capacities. Furthermore, when security is not at stake, as it was not during the Tokugawa era, the value of a ruler's extraction becomes more questionable (Tilly 1985). We argue that this circumstance puts more pressure on rulers to concede as well as repress.

[33] The Kakegawa example shows that external factors, such as natural disasters, also contribute to tax rates. As discussed below we introduce a set of geographic controls to address this issue.

White (1988*a*, 63) suggests that peasant resistance was effective: beginning in the 18th century, "there followed a never-ending contest between the extractive efforts of the government and the resistance of the people"—and, he claims, it became clear that the rulers could not increase their taxes. In the next section, we systematically test the extent to which peasant mobilizations were successful in limiting rulers' extraction by comparing rebellions and tax rates on the most important tax—the rice tax—across all Tokugawa-era domains. Our analysis draws on the description of the Tokugawa regime from this section as the basis for our inferences. The domains were comparable in terms of their governance structure, their capacity to extract, assess, and repress, and they had autonomously set tax rates in a setting without wars or competing sources of authority. (In the next section, we control for sources of variation among domains that we could identify.) This setting allows us to focus on whether or not peasant rebellion and flight contributed to the differences in tax rates that we observe across the domains at the end of the Tokugawa period.

## 3. Empirical Strategy

To test if "fight or flight" is associated with lower tax rates, we compare tax rates across domains in 1868, just before the end of the Edo period in Japan. (Between 1869 and 1871, the Meiji Restoration transformed Japan's feudal system.) By focusing on the Edo period, we take advantage of the country's domains as semi-autonomous states with their own fiscal policies and armies. While it would be ideal to have a full panel series dataset on domains over the Tokugawa period, the tax data only exist for 1868.[34] Accordingly, we rely on the tax rates in 1868 to test our hypothesis, and we reason that the tax rate for each domain is an outcome of bargaining over the period between peasants and rulers. Since we do not have information on the time trends of tax rates in each domain, we run a pooled estimation and observe whether different types of rebellions over this period had any effect on tax rates *on average* in 1868.

We compare the tax rates with variation in rebellions using a dataset we created based on a historian's records (Aoki 1971), which compiles different types of rebellions between 1590 and 1878 across Japan. We restrict the sample to rebellions between 1603 and 1868, when the Edo period begins and ends. We assume that rebellions within domains were independent events. Though multiple villages *within* domains could be part of a wide-scale protest or

[34] We looked for additional tax records to reconstruct time-series of tax rates, but were unsuccessful.

insurrection, we find only one case of a rebellion across domains (in Nanokaichi, Takasaki, and Yoshii in 1764). This is consistent with our assumption of the independence of our units of analysis, and our understanding of collective action against extraction: because domain rulers did not coordinate on their tax rates, there was no motivation for peasants to coordinate rebellions across domains.[35]

## 4. Data

### 4.1 Dependent Variable: Taxation

Our dependent variable is taxation in 1868 (*nengu*), which we collected from Kodama and Kitajima (1977). The variable is constructed by dividing daimyos' reported rice revenue (*shunodaka*) by assessed rice output (*uchidaka*) in the domain, multiplied by 100. In other words, *nengu* represents the effective tax rate—the proportion of rice output a daimyo extracted from peasants, aggregated across villages in the domain. Figure 1 provides a distribution of tax rates in Japan as of 1868, and confirms that it follows a normal distribution without outliers. To provide an example, the tax rate in Kuwana domain, in Ise province, was 38.7 percent in 1868, very close to the average tax rate across domains, 38.8 percent. According to Kodama and Kitajima (1977), the actual tax collection (shunodaka) in the domain was 23,450 koku, while uchidaka, the assessed total rice output, was 60,560 koku. As we explained above, the nengu was the most important source of revenue for the daimyo during the Tokugawa era.

[FIGURE 1 HERE]

### 4.2 Independent Variables

Our key independent variables are various types of rebellions, and collective desertions. We collected the data from the book Hyakusho Ikki Sogo Nenpyo, a chronicle of peasant rebellions between 1590 and 1876, originally compiled by Japanese historian Koji Aoki (1971). During the Edo Period, there were 1,787 events, which include rebellions of varying intensity,

[35] Though the original data include rebellions in bakufu-controlled areas, we exclude those cases because bakufu-controlled territories are not equivalent to domains in terms of fiscal demands and tax rate assessments. The size of the territories was much larger than any domain, and they were non-contiguous within Japan. Additionally, we do not have tax rate data from bakufu areas in 1868.

collective desertion, and different types of "appeals," or petitions.

Among different types of resistance, the most intense is the *hanran*, a large-scale rebellion usually involving thousands of peasants. The next is *hoki*, a widespread insurrection of a large number of commoners. Its urban analogue is the *uchikowashi*, a destructive riot, most often sparked by an increase in the price of rice. We include uchikowashi as a control variable, but do not expect it to have an effect on tax rate, since urban commoners did not pay *nengu*; only peasants did. We aggregate *hanran* and *hoki*, because we think the level of bargaining power they imply is comparable given their similar magnitude, and should have a similar effect on the tax rate.[36] We call this variable *insurrections*. *Fuon*, or *protests*, were less drastic, and ranged from a disorderly rally to minor violence.[37] Finally, *collective desertions* were known as *chosen*. *Chosen* is a direct measure of peasants' collective "flight."

[FIGURE 2 HERE]

Between 1603 and 1867, the span of the Edo period, peasants rebelled or fled 497 times for tax reduction purposes. The original data collect rebellion incidents at the district level (a smaller administration level than domain). Since our unit of analysis is the domain, where daimyo ruled and collected taxes, we aggregate the district-level data to the domain level. We code 1 for each type of rebellion that occurs within each domain in a given year and 0 otherwise.[38] Figure 2 illustrates the variation in our rebellion and flight variables at the domain level.[39]

Figure 2 presents rebellions related to the tax rate itself, as coded by Aoki (1971), who records it for each rebellion based on the available primary and secondary sources. If we found taxes listed anywhere, for example in the body of the appeal, then we coded the event as tax-

[36] We also run the analyses with the completely disaggregated types and find that the results remain robust.

[37] The original data include one more type, *Soujo* or *unrests* mostly in urban areas, but our dataset does not include this type of rebellions since there was no such event during the period of our observation.

[38] Even if multiple villages within a domain experience the same type of rebellion in the same year, we only count this as one instance of that type of rebellion for that year, in order to avoid the possibility of double-counting what was in fact one rebellion that spread across more than one village in a domain.

[39] Figure A in the Appendix shows the distributions of other tax-induced rebellion types.

induced.[40] These are the types of rebellions of interest here: if peasants were not requesting a tax rate reduction, we do not expect the ruler would offer one. We construct a dummy variable: 1 if Aoki reports that at least one motivation for the rebellion was tax-related, and 0 otherwise.

Other more minor forms of resistance may have constrained the daimyo as well. The *goso* is a "coercive appeal," meaning a petition accompanied by some sort of threat to protest, or to abandon the village. In contrast, the *osso* was a deferential overture—typically not to the daimyo, but rather to the shogunate. The *shuso* was also a petition but most commonly addressed to the closest governmental office, and was the legally approved mechanism to express discontent. Finally, there was also the possibility of lodging a secret appeal, or *hariso*, to a governmental leader, seen as the least aggressive approach. We leave *goso* as its own variable—*coercive appeal*—but aggregate *osso*, *shuso* and *hariso* into one variable called *appeals*.

In addition, as coercion theory predicts (Drezner 2003), the *threat* to rebel as well as foiled attempts may work to achieve desired outcomes. This means that if we only analyze observed rebellions, we may underestimate the actual impact of rebellions on the dependent variable. To reduce this concern, we use both actual rebellions and attempted rebellions, which are also documented by Aoki. Although Aoki did not clearly state how he coded attempted rebellions, they appear to be ones uncovered by the authorities prior to actual rebellions.

### 4.3 Controls

We also include additional variables that could contribute to variation in tax rates. As an indicator of each domain's level of fiscal needs, we include the number of samurai in each domain in 1868 (Kodama and Kitajima 1977). All things equal, a greater number of samurai should lead to higher levels of taxes collected since more samurai mean greater demand for resources from the peasants to cover their stipends.[41] The daimyo kept an average of 1,600 samurai in the domain. To control for the size of the domain, we divide the number of samurai

[40] Research assistants (native Japanese speakers) transferred the data to electronic spreadsheets, and coded event motivation. One of the authors, a native Japanese speaker, then checked a random sample of the entries.

[41] The bakufu required each domain to retain a fixed number of samurai, though the policy was relaxed in the late Tokugawa period (Yamamura 1971, 383). Thus, we expect the concern for reverse causality is minimal.

by assessed rice output and the following analyses use the *relative size of samurai class* variable.[42]

A possible alternative mechanism for explaining the variation in tax rate may be productivity growth. Higher productivity in rice production is likely to lead to stable or lower tax rates, because revenue would increase even without changing the rate (White 1988*a*, 20). To test this argument, we include the long-term increase in rice production for each domain (*ln(rice production increase)).*[43] If this alternative is plausible, we should observe that higher levels of rice production growth are correlated with lower levels of tax, all things equal.

White (1988*b*) and Saxonhouse (1995) present another possible source of variation in taxation: the changing economy, rather than rebellions, leads to lower taxes. As the economy shifted from agrarian labor to "proto-markets," the argument goes, the daimyo left the tax rate alone while seeking new ways to extract resources. Presumably rulers of such domains would be more likely to concede to peasants' demands than rulers that could only draw on peasants' productivity. If this argument is correct, we would expect to observe that domains with more alternative resources would have lower tax rates. To test this hypothesis, we identify the domains with waystations along the *sankinkotai* routes that became prominent towns due to the annual processions of daimyo. As described above, *sankinkotai*, or alternate residence duty, demanded that the daimyo alternate his residence between Edo and his own domain. The towns along the routes to Edo became centers of commerce, catering to the needs of the daimyo, their families and retainers. The commercial activities in turn likely provided revenues for the daimyo in addition to those from rice production. Many of these towns were also located along the coast, and became trading outposts with neighboring countries and merchants from the West. We have identified the locations of these towns from the Edo-era trade route map presented in Frederic (2002), and matched them to respective daimyo to create an indicator for domains with these towns along the routes.[44] The following analyses call this variable *Trade center*.

[42] We have also run the analyses with the absolute number of samurai, and the results hold.

[43] We account for the increase in rice production by looking at the difference in the assessed rice production between 1603 and 1868, the two years for which we have available data.

[44] We focus on the domains outside the shogun's direct control. The identified domains that contain the major towns along the sankin kotai routes include Akita, Hirosaki, Fukushima, Hirado, Hiroshima, Satsuma, Tosa, Yodo, Nagaoka, Shoni, Izushi, Chofu, Suwa, and Utsunomiya.

Next, we include a dummy variable (*Core emperor supporters*) flagging if a domain participated in the *Boshin War*—the civil war that led to the regime's collapse in 1868-1869—as a supporter of the emperor.[45] We include this indicator variable to control for rebellion-driven factors that potentially influenced the domain tax rate –perhaps those planning to rebel would levy more taxes.

Different daimyo classes may also face different incentives to raise taxes or concede to peasant demands. *Tozama* daimyo were those who surrendered to Tokugawa Ieyasu after the Battle of Sekigahara in 1600—the decisive battle that led Tokugawa to establish the shogunate. The shogunate monitored Tozama daimyos' behavior closely for signs of rebellion, and would sometimes take their lands to punish them. From the Tozamas' perspective, they had an incentive to repress possible rebellions or accept peasant's demands before the shogunate could intervene. To our knowledge, a full list of Tozama daimyo is unknown. However, since we do know which domains had *Fudai* daimyo (another class of daimyo who could take important positions in the Tokugawa shogunate administration),[46] and which were *Gosanke* (three most important branches of the Tokugawa clan: Mito, Owari, and Kii), we can assume that the remaining domains were mostly ruled by Tozama daimyo (Miyake 2014). In our analyses, then, we use both Fudai and Gosanke variables to capture this.

We also include rebellions that were not coded as tax-induced. The majority of non-tax rebellions are those that White (1995, 142) terms "social conflict," which involve disputes among peasants, rather than directed at the daimyo. In his typology, White (1995) finds that 53 percent of the rebellions were social in nature. He elaborates:

> Social ostracism, demands, meetings and plots, unneighborly squabbles of all sorts, tenant disputes, accusations leveled at community officials, arguments about shrine membership and religious prerogative and privilege, conflicts over social and political status, disagreements over village elections – all pitted some members of the community against others, in contravention of the ideal of community

[45] The domains include the four prominent domains (Tosa, Choshu, Satsuma, and Hizen) and others (Hikone, Hiroshima, Kanazawa, Kurobane, Matsushiro, Ogaki, Okayama, Omura, Sadowara, Tottori, and Tsu).

[46] Following Miyake (2014)'s list, we include Hikone, Koriyama, Matsumoto, Kuwana, Tatebayashi, Utsunomiya, Takato, Taira, Kokura, Tanaka, Nagaoka, Sakura, Amagasaki, Yoshida (Mikawa province), Okazaki, Nishio, Himeji, Nakatsu, Akashi, Ogaki, Kano, Kariya, Shonai, Suwa, Matsushiro, and Murakami as Fudai daimyo.

solidarity (White 1995, 142).

Such disputes are unlikely, we reason, to lead the daimyo to lower tax rates, and may even prompt him to raise them as a punitive measure or to increase repression. As a result, we may see either no effect on the tax rate, or a positive correlation with such "social rebellions" and the tax rate. We aggregate all the nontax-induced rebellions and construct the Nontax-induced rebellions variable.

We also include the mean province population in 1720 (Hayami 1992).[47] Larger populations may induce changes in tax rates in a number of ways: it can lead to higher rates levied on the agricultural sector if the bulk of the population live in urban areas where taxation was not possible; or lower rates to capture the same level of revenue from higher agricultural yields as a result of more labor in the countryside. In the absence of domain-level socio-economic indicators during this time period, we choose the provincial-level population figures of the earliest year from the available data (1720 to 1846), as a control for the initial conditions of the han.

Finally, we include geographic variables, including the mean elevation and its standard deviation, as well as geographic coordinates, to further capture local variations in terrain and climate suitability for agriculture. We also include natural disaster variables.[48] Natural disasters likely affect taxes collected in two ways. First, the affected domains could receive tax relief if crops were destroyed, which would depress the need for higher tax rates. Second, non-affected domains could see taxes increase because the bakufu required the daimyo to provide assistance to other han after disasters (Bolitho 1995*b*). Data on natural disasters are from Saito (1966). We code the total number of natural disasters by type within each prefecture between 1840 and 1868.[49] The variables include flood, famine, as well as tsunami, earthquakes, and other natural disasters. Storms and floods are the two kinds of natural disasters that the average domain faced most frequently in the mid-19th century, followed by draughts and earthquakes. The rarest disaster type is tsunami, which usually "skips a generation," but is nonetheless the most damaging in many cases.

Table 1 presents summary statistics, first showing the percentage of total rice

[47] There are on average 4.2 domains contained within a province, and 6.4 domains in a prefecture.

[48] Original shapefiles for the domains come from Nishizawa (2010).

[49] The data are only available at the prefecture level. By using the shapefiles above, we assigned values to each corresponding domain.

production collected by the daimyo as tax from peasants. On average, about 39 percent of the total assessed rice production was collected as tax. Between 1603 and 1868, the total number of incidents combined in Aoki's (1971) data was 1,787. As explained in the section above, we disaggregate and classify protest incidents into six different types, depending on the severity, the size, and the type of the event. We further divided these incidents based on whether they were coded as tax-induced according to Aoki (1971). The summary statistics show that the majority of these incidents appear to have stemmed from reasons other than tax, and that most took the form of appeals. On average, domains experienced one appeal from peasants for tax reasons during the time period, but three appeals due to other issues. In fact, the average number of tax-induced incidents is smaller than non-tax induced for every type, regardless of whether attempted ones are taken into account or not.

Table 1: Summary Statistics

| | (1) N | (2) mean | (3) sd | (4) min | (5) max |
|---|---|---|---|---|---|
| **Dependent variables, 1868** | | | | | |
| Nengu | 231 | 38.75 | 11.33 | 15.60 | 70.50 |
| **Political mobilization, 1603-1868** | | | | | |
| Tax-induced insurrections, 1603-1868 (excl. attempts) | 267 | 0.0637 | 0.245 | 0 | 1 |
| Tax-induced protests, 1603-1868 (excl. attempts) | 267 | 0.131 | 0.492 | 0 | 5 |
| Tax-induced collective desertions, 1603-1868 (excl. attempts) | 267 | 0.127 | 0.512 | 0 | 4 |
| Tax-induced coercive appeal, 1603-1868 (excl. attempts) | 267 | 0.584 | 1.475 | 0 | 18 |
| Tax-induced appeals, 1603-1868 (excl. attempts) | 267 | 0.693 | 1.776 | 0 | 20 |
| Tax-induced destructive riots, 1603-1868 (excl. attempts) | 267 | 0.180 | 0.456 | 0 | 2 |
| Tax-induced insurrections, 1603-1868 | 267 | 0.0637 | 0.245 | 0 | 1 |
| Tax-induced protests, 1603-1868 | 267 | 0.131 | 0.492 | 0 | 5 |
| Tax-induced collective desertions, 1603-1868 | 267 | 0.131 | 0.514 | 0 | 4 |
| Tax-induced coercive appeal, 1603-1868 | 267 | 0.625 | 1.515 | 0 | 18 |
| Tax-induced appeals, 1603-1868 | 267 | 0.704 | 1.787 | 0 | 20 |
| Tax-induced destructive riots, 1603-1868 | 267 | 0.180 | 0.456 | 0 | 2 |
| Nontax-induced rebellions (excl. attempts) | 267 | 3.861 | 6.375 | 0 | 47 |
| Nontax-induced rebellions | 267 | 4.610 | 7.875 | 0 | 52 |
| **Variable for Samurai** | | | | | |
| Relative size of samurai class | 230 | 0.130 | 0.290 | 0.0070 | 3.538 |
| **Variables for alternative hypotheses** | | | | | |
| ln(total assessed rice production in 1868) | 232 | 10.63 | 1.129 | 9.165 | 14.12 |
| ln(rice production increase) | 204 | 8.415 | 1.947 | 1.946 | 13.34 |
| Provincial population (1000's) in 1721 | 251 | 509.0 | 346.1 | 16.47 | 1,963 |
| Trade center | 267 | 0.0524 | 0.223 | 0 | 1 |
| Core emperor supporters | 267 | 0.0561 | 0.230 | 0 | 1 |
| Fudai | 279 | 0.0932 | 0.291 | 0 | 1 |
| Tokugawa Gosanke | 279 | 0.0108 | 0.103 | 0 | 1 |
| **Geography controls** | | | | | |
| Mean elevation (in m) | 267 | 168.5 | 175.2 | 7.322 | 1,054 |
| Std. Dev elevation (in m) | 267 | 99.32 | 71.10 | 2.937 | 457.4 |
| Longitude | 267 | 136.4 | 3.318 | 128.8 | 141.5 |
| Latitude | 267 | 35.48 | 1.684 | 31.60 | 41.43 |
| **Natural disaster controls** | | | | | |
| Earthquakes in Prefecture, 1840-1868 | 267 | 1.543 | 1.428 | 0 | 6 |
| Tsunamis in Prefecture, 1840-1868 | 267 | 0.120 | 0.337 | 0 | 2 |
| Draughts in Prefecture, 1840-1868 | 267 | 1.543 | 1.467 | 0 | 5 |
| Poor harvests in Prefecture, 1840-1868 | 267 | 0.775 | 1.402 | 0 | 8 |

| | | | | | |
|---|---|---|---|---|---|
| Pests in Prefecture, 1840-1868 | 267 | 0.0749 | 0.264 | 0 | 1 |
| Fires in Prefecture, 1840-1868 | 267 | 0.749 | 1.355 | 0 | 9 |
| Floods in Prefecture, 1840-1868 | 267 | 5.273 | 3.698 | 0 | 13 |
| Heavy snows in Prefecture, 1840-1868 | 267 | 0.307 | 0.645 | 0 | 5 |
| Heavy rains in Prefecture, 1840-1868 | 267 | 0.543 | 0.962 | 0 | 6 |
| Storms in Prefecture, 1840-1868 | 267 | 5.539 | 3.992 | 0 | 15 |
| Epidemics in Prefecture, 1840-1868 | 267 | 0.397 | 0.917 | 0 | 5 |

## 5. Results

In this section, we first discuss the results of our analyses before considering caveats. As a first cut at the analysis, we run a simple set of regressions of political mobilization on the tax rate. Here, we use an aggregate political mobilization variable, which includes any incident involving insurrections, riots, protests, desertions or appeals, including attempted ones. The base results in Columns 1 and 2 of Table 2 show that the coefficient value for the aggregate political mobilization variable is positive and at least initially weakly significant. This statistical significance disappears, however, when the set of controls described above are included. In columns 3 and 4, we separate tax-induced rebellions from those that are driven by other causes. The two types of incident counts again do not appear to be correlated with the overall tax imposed (except for the non-tax political mobilization variable in column 3).

Table 2: Tax Rates and Political Mobilization, 1603-1868

| VARIABLES | (1) nengu | (2) nengu | (3) nengu | (4) nengu |
|---|---|---|---|---|
| Political Mobilization, 1603-1868 | 0.116* | 0.148 | | |
| | (0.070) | (0.100) | | |
| Tax-induced political mobilization 1603-1868 | | | -0.316 | 0.055 |
| | | | (0.331) | (0.411) |
| Nontax-induced political mobilization 1603- | | | 0.270** | 0.177 |
| | | | (0.124) | (0.159) |
| Constant | 37.940*** | 293.308*** | 38.000*** | 291.912*** |
| | (0.852) | (51.715) | (0.851) | (52.194) |
| Observations | 231 | 186 | 231 | 186 |
| R-squared | 0.013 | 0.433 | 0.021 | 0.432 |
| Relative size of samurai control | N | Y | N | Y |
| Alternative hypotheses controls | N | Y | N | Y |
| Geography controls | N | Y | N | Y |
| Natural disaster controls | N | Y | N | Y |

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

*Note*: Alternative hypotheses controls include agricultural productivity growth, the mean provincial population in 1720, indicators for core Emperor supporters, Fudai daimyo, and Gosanke. Geography controls include the mean elevation and standard deviation, latitude and longitude of the han centroid location. Natural disaster controls include the number of each of the disasters between 1840 and 1868 listed in Table 1.

To further investigate whether different types of rebellions have more nuanced effects on the tax rate, we next disaggregate this incident count data into the six different types. In Table 3, we take a simple pooled approach, regressing the tax rate in 1868 on our fight and flight count variables (insurrections, protests, and collective desertions) between 1603 and 1868. Our outcome variable is the same in Table 2. Standard control variables include the relative size of samurai, as well as agricultural productivity growth. In addition to these controls, in some specifications, we

include provincial population, the dummy variable flagging whether a domain was a trade center, core Emperor supporter, Fudai and Gosanke daimyo, geography and natural disasters controls.

The main results show that the number of insurrections between 1603 and 1868 are negatively correlated with the tax rate in 1868. In total, 17 daimyo experienced one or more insurrections over the time period. The result under Column 5 of Table 3 for example suggests that a domain experiencing an additional insurrection is likely to end up with about a 4.7 percent decrease in the tax rate. To interpret the substantive effect of rebellions on tax rate, we return to the example of Kuwana domain. Recall that the tax rate there was 38.7 percent. As we explain above, the two main uses of revenue were to pay samurai stipends, and to maintain the daimyo's estates and personal wealth. The total amount of samurai salary (*chigyo*) was 12,356 in 1868 for the domain (Kodama and Kitajima, 1977), and the daimyo expected to receive 11,094 koku, or 47 percent of the tax revenue, which was 23,450 koku for himself. Suppose that the ruler decided to reduce the tax rate from 38.7 to 34 (a 4.7 percent reduction) due to an insurrection, and the reduction was split evenly between the samurai and the daimyo. The samurai salary would have decreased from 12,356 to 10,919 koku, or a 12 percent decrease, and the amount for the daimyo would have decreased from 11,094 to 9,682 koku or a decrease of 13 percent.[50]

The regression results also show that more benign forms of fight and flight incidents (tax-induced protests and collective desertions) also lead to a reduction in tax by similar magnitudes, although tax-induced protests are not statistically significant at the 10% level. Additional protests and collective desertions reduce the tax rate by around 3.3 to 3.4 percent. Appeals of any kind, on the other hand, have a positive but non-significant influence on the tax rate. While more prevalent than other forms of resistance,[51] they were not the most effective means of protest against the daimyo. In addition, there are 40 domains that experienced destructive urban riot(s), but these riots have no significant relationship with tax rates. This finding is consistent with our expectations, as these urban riots should not have an impact on rice-based taxes, because town residents did not pay rice taxes—only peasants did so.

[50] Salary per capita would have also declined from 9.33 koku to 8.24. As 1.825 koku is the lowest annual salary for samurai, a decrease of 1.09 koku could be a huge amount for samurai (Kodama and Kitajima 1977).

[51] More than half of the domains—138—experienced one or more appeals during this period. Twenty-two domains experienced one or more collective desertions, and 25 domains experienced protests during the same time period.

Turning to the issue of potential selection bias, Table 4 runs the same regressions as in Tables 3, but includes incidents that were attempted, but failed. The effect overall remains similar to Table 3, suggesting that regardless of the actual outcome, the act of fight or flight due to high tax had a strong, negative influence on the subsequent tax rate.

Another explanation for the variation in tax rates may be that daimyo with high agricultural production capacity naturally faced less pressure to raise taxes, and that in such a context of abundant rice production, political resistance would then play only a minor role in tax rates. It appears that while growth in agricultural production does have a significant and negative influence on tax, this effect largely disappears when the number of natural disasters is controlled for (in Column 5 of Table 4). Furthermore, the statistical significance of fight or flight on reducing the tax rate remains robust to the growth in rice production. Next, while we find that the *sankinkotai* town indicator has a negative (but statistically insignificant) association with the tax rate in general, we also find that our main results remain robust to the inclusion of this variable. In addition, daimyo class controls are mostly insignificant, and in particular, those who supported the emperor during the Meiji Restoration period tend to have lower tax rates, which is consistent with our alternative hypothesis, but the relationship is not statistically significant.

Yet another explanation may be that domains with a large number of samurai are more likely to have a higher tax rate to pay the stipends. However, we see that the relative size of samurai, controlling for other variables, does not explain variation in tax in 1868.

Table 3: Tax Rate and Rebellion Types excluding Attempted Ones, 1603-1868

| VARIABLES | (1) nengu | (2) nengu | (3) nengu | (4) nengu | (5) nengu |
|---|---|---|---|---|---|
| Tax-induced insurrections, 1603-1868 | -2.521 | -4.229 | -3.896 | -4.686* | -4.737** |
| | (2.855) | (2.751) | (2.745) | (2.451) | (2.362) |
| Tax-induced protests, 1603-1868 | -3.628* | -3.873* | -3.183 | -2.145 | -3.334 |
| | (2.158) | (1.996) | (2.125) | (2.313) | (2.102) |
| Tax-induced collective desertions, 1603- | -0.865 | -1.523 | -1.641 | -1.434 | -3.452* |
| | (1.750) | (1.875) | (1.942) | (1.974) | (1.816) |
| Tax-induced coercive appeal, 1603-1868 | -0.298 | 0.143 | 0.164 | 0.520 | 0.401 |
| | (0.576) | (0.883) | (0.900) | (0.852) | (0.827) |
| Tax-induced appeals, 1603-1868 | 0.115 | 0.227 | 0.089 | 0.708 | 0.215 |
| | (0.418) | (0.724) | (0.754) | (0.728) | (0.643) |
| Tax-induced destructive riots, 1603-1868 | -0.134 | 0.170 | 0.196 | 0.202 | 0.248 |
| | (1.856) | (1.849) | (1.843) | (1.668) | (1.574) |
| Nontax-induced rebellions | 0.502** | 0.572** | 0.597** | 0.404* | 0.597*** |
| | (0.244) | (0.245) | (0.244) | (0.241) | (0.222) |
| Relative size of samurai class | 2.359 | 1.068 | 2.159 | 0.765 | -1.199 |
| | (3.443) | (3.148) | (3.646) | (2.774) | (2.801) |
| ln(rice production increase) | -0.744* | -0.603 | -0.519 | -1.144*** | -0.595* |
| | (0.396) | (0.394) | (0.413) | (0.370) | (0.346) |
| Provincial population (1000's) in 1721 | | -0.005 | -0.005 | -0.001 | -0.001 |
| | | (0.003) | (0.003) | (0.003) | (0.002) |
| Trade center | | | 0.511 | 0.542 | 1.289 |
| | | | (3.166) | (3.314) | (3.257) |
| Core emperor supporters | | | -4.446 | -4.234 | -1.919 |
| | | | (4.640) | (4.027) | (4.904) |
| Fudai | | | -0.367 | 2.940 | 1.636 |
| | | | (2.023) | (1.779) | (1.728) |
| Tokugawa Gosanke | | | -1.981 | 3.421 | 4.628 |
| | | | (2.822) | (2.547) | (3.414) |
| Constant | 43.013*** | 44.206*** | 43.537*** | 293.700*** | 289.550*** |
| | (3.194) | (3.416) | (3.518) | (36.112) | (54.887) |
| Observations | 201 | 186 | 186 | 186 | 186 |
| R-squared | 0.060 | 0.087 | 0.094 | 0.328 | 0.472 |
| Geography controls | N | N | N | Y | Y |
| Natural disaster controls | N | N | N | N | Y |

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

*Note*: Geography controls include the mean elevation and standard deviation, latitude and longitude of the han centroid location. Natural disaster controls include the number of each of the disasters between 1840 and 1868 listed in Table 1.

Table 4: Tax Rate and Rebellion Types including Attempted Ones, 1603-1868

| VARIABLES | (1) nengu | (2) nengu | (3) nengu | (4) nengu | (5) nengu |
|---|---|---|---|---|---|
| Tax-induced insurrections, 1603-1868 | -2.066 | -3.647 | -3.297 | -4.289* | -4.281* |
| | (2.897) | (2.787) | (2.766) | (2.436) | (2.395) |
| Tax-induced protests, 1603-1868 | -3.650* | -3.631* | -2.952 | -1.927 | -3.079 |
| | (2.203) | (2.072) | (2.189) | (2.336) | (2.078) |
| Tax-induced collective desertions, 1603- | -2.363 | -2.287 | -2.415 | -1.911 | -4.303** |
| | (2.123) | (2.254) | (2.314) | (2.260) | (2.069) |
| Tax-induced coercive appeal, 1603-1868 | -0.250 | 0.159 | 0.165 | 0.496 | 0.325 |
| | (0.519) | (0.825) | (0.842) | (0.804) | (0.797) |
| Tax-induced appeals, 1603-1868 | 0.135 | 0.429 | 0.310 | 0.887 | 0.356 |
| | (0.405) | (0.715) | (0.751) | (0.736) | (0.655) |
| Tax-induced destructive riots, 1603-1868 | -0.118 | 0.194 | 0.223 | 0.201 | 0.249 |
| | (1.870) | (1.858) | (1.857) | (1.690) | (1.602) |
| Nontax-induced rebellions | 0.444** | 0.449** | 0.467** | 0.307 | 0.489** |
| | (0.210) | (0.218) | (0.222) | (0.217) | (0.189) |
| Relative size of samurai class | 1.736 | 0.679 | 1.700 | 0.530 | -1.548 |
| | (3.706) | (3.459) | (3.917) | (2.944) | (2.902) |
| ln(rice production increase) | -0.698* | -0.575 | -0.498 | -1.140*** | -0.569 |
| | (0.400) | (0.399) | (0.420) | (0.374) | (0.350) |
| Provincial population (1000's) in 1721 | | -0.005 | -0.005 | -0.001 | -0.002 |
| | | (0.003) | (0.003) | (0.003) | (0.002) |
| Trade center | | | 0.530 | 0.507 | 1.018 |
| | | | (3.208) | (3.277) | (3.139) |
| Core emperor supporters | | | -4.248 | -3.988 | -1.692 |
| | | | (4.567) | (3.969) | (4.865) |
| Fudai | | | -0.218 | 3.075* | 1.652 |
| | | | (2.009) | (1.777) | (1.736) |
| Tokugawa Gosanke | | | -1.704 | 3.599 | 4.710 |
| | | | (2.962) | (2.623) | (3.438) |
| Constant | 42.661*** | 44.064*** | 43.457*** | 294.822** | 293.286** |
| | (3.216) | (3.439) | (3.550) | (35.956) | (54.299) |
| Observations | 201 | 186 | 186 | 186 | 186 |
| R-squared | 0.064 | 0.086 | 0.093 | 0.329 | 0.474 |
| Observations | 201 | 186 | 186 | 186 | 186 |
| R-squared | 0.064 | 0.086 | 0.093 | 0.329 | 0.474 |
| Geography controls | N | N | N | Y | Y |
| Natural disaster controls | N | N | N | N | Y |

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

*Note*: Geography controls include the mean elevation and standard deviation, latitude and longitude of the han centroid location. Natural disaster controls include the number of each of the disasters between 1840 and 1868 listed in Table 1

In sum, this section provides evidence that peasants can indeed win tax concessions from rulers by rebelling on a large scale or deserting. By looking at the disaggregated incidents and appeals, we showed that small-scale resistance-even if frequent—does not lead to concessions by autocrats. However, we found that insurrections and collective desertions were more likely to lead to tax concessions by rulers. The effect remained significant and consistent even with a set of controls that include proxies for alternative hypotheses.

Our data also reveal a relationship between political mobilization that is unrelated to taxation and an increase in the tax rate (especially in the case of protests). Both Tables 3 and 4 show that non tax-induced incidents generally have a positive (and opposite) effect on the tax rate from tax-induced incidents. We could interpret this result as indicative of repression of unruly populations, which required more resources, and therefore a higher tax rate. Alternatively, the higher extraction rates might also have provoked more incidents of social unrest by increasing competition for scarce resources and stoking grievances among neighbors and villages. While this article does not provide a theory on what explains this empirical pattern, the result nonetheless offers an interesting contrast to the main finding, and suggests that regardless of motivations, political mobilizations are associated with a change in the tax rate.[52] It is important to note that only tax-induced incidents succeed in extracting concessions from the ruler, while those motivated by other grievances seem to provoke increases in tax extraction. Such an increase in taxes could plausibly be linked to punishment for mobilization, or increased investment in repression. Given its statistical significance, this finding warrants further research, which we leave for future work.

### 5.1 Caveats and Alternatives

In spite of the controls that we include in the empirical analysis above, there are a number of issues that potentially undermine our interpretation. First and foremost, we are not able to directly address a potential endogeneity problem, in that lower taxes may correlate with fewer rebellions because peasants are less aggrieved, or because the ruler is unable to effectively repress them. Although our account of various rebellions up until 1868 are events that occurred before the tax data in 1868, a reverse causal inference problem still exists if tax rates remained stable in the later Tokugawa period. That is, the tax rates in 1868 are likely

[52] In Table A of the Appendix, we conduct the analysis only with nontax-induced rebellion variable, and find that there is a positive association between nontax-induced rebellions and tax rates.

serially correlated with previous levels, and may not avoid the inconsistency problems associated with simultaneity. However, we do not have reason to believe that there is a reinforcing mechanism from lower taxes to more rebellions, which would bias our result by inflating the magnitude of the mobilization effect. On the contrary, lower taxes would most likely appease farmers and reduce tax-motivated rebellions, and bias the magnitude of mobilization effect downward. The empirical results shown above therefore can be interpreted as a conservative estimate of the true impact of mobilization on tax rates.

A related potential concern about the reliance on tax data from a single year, 1868, is that this year also marks the end of the Tokugawa regime. The period may have been an aberration from the rest of the Edo period, because the Boshin War that led to the fall of the Tokugawa era started, and daimyo may have altered their local tax rates as a result. We were unable to find any evidence that this was the case in our review of the secondary historical sources.

A third concern is the extent of interdependence among daimyo, and potential errors that could result from our assumption that they are independent units. In our analysis, we attempt to control for potential factors that may cluster certain daimyo together from the rest, such as location, geography, and political ties (Core emperor supporters and Fudai as well as Gosanke). But actions such as collective desertion may have consequences on neighboring daimyo as well, since the deserters could move to their territories. To our knowledge, deserters did not choose destination domains based on repression or extraction, but rather on their proximity; in addition, it was understood that the deserters would eventually return to their own domains. These demonstrations were rather akin to temporary strikes, in which residents refused to work the land for a time, to punish the daimyo by limiting the revenue he could collect, but did not involve severing ties and taking up permanent residence in other han. Finally, it is unclear how desertion from one han would influence either tax-related rebellions, or the tax rate in another domain.

A fourth concern is that the bargaining power of peasants may be a function of labor scarcity (Ardanaz and Mares 2014). When labor is scarce, the peasants' capacity to influence tax policy should increase, and anticipating desertion, the daimyo may have an incentive to make tax concessions. However, rural labor does not appear to have been scarce during this period. According to Ikegami (1995, 175), the population increased from 12 million in 1600 to 31 million by 1720. Rural residents also migrated to cities, partly as a result of surplus laborers in the fields.[53] Ikegami (1995, 167, fn5) notes that even though authorities could not always

[53] Beginning in 1649, peasants were permitted to move to *cities* (White 1995, 192), and farmers

discourage migration, they "…also found that as long as the village collectively owed the responsibility of paying taxes, and arranged cultivators for the land, it would not do much damage to the daimyo's interest even if there was a turnover of the individuals who composed the labor force." In the absence of rural wage data, we cannot control for the possibility that the level of labor scarcity determined the peasants' bargaining power (only provincial-level population figures, and the absolute number of samurai in each domain are available as population controls). Also, given the population increase, we expect that mass desertions were likely less effective means of drawing concession from the ruler than insurrections, which we see in our empirical findings, in particular, in Table 3.

A fifth concern is that in our analysis, we do not directly control for each han's capacity to repress peasants, and its ability to assess and collect taxes. In the absence of data on assessment and shoyas' method of collection, we assume that extraction capacity was comparable across han. The secondary historical literature notes that while yearly assessments were important in theory, they do not seem to have been implemented. Bolitho (1995a) explains this lapse as stemming from the requirement that samurai reside in castle towns. Given that samurai in every domain were required to reside in castle towns, we assume that this rule affected assessment capacity similarly everywhere. In terms of tax collection, every village had a shoya who was responsible for collection, and each village organized into the *goningumi* (or equivalent institutions) as explained above, increasing oversight among families to pay their share of taxes. As every village was structured similarly, we think that our assumption of comparable extraction is reasonable. In terms of repressive capacity, during times of peace, more samurai did not necessarily mean greater capacity to repress.[54] Over the generations without any internal or external wars, samurai even started to lose their skills, according to Jansen (1995). Rather, samurai served to increase daimyos' fiscal demands.

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did move into untaxed sectors, such as trade (Bolitho 1995*b*, 32). However, migration was revoked by an edict issued in 1843 mandating that urban migrants return to their villages of origin (White 1995, 51). This change was issued in order to improve order within the cities, though, not to meet labor demands in the countryside.

[54] The literature suggests that the size of bureaucracy does not necessarily translate into state capacity and there may be a non-linear relationship between bureaucratic size and its effectiveness (Mann 1984; Soifer and vom Hau 2008). Table E in the Appendix examines whether there is an inverted U-shaped relationship between state capacity and tax rates. Although the coefficients of the square term show a negative sign, the results are not statistically significant in our full models, while our main variables of interest remain robust.

Finally, in pooling the data on rebellion, we assume continuity of domains throughout 1603-1878. This assumption may be problematic given that the shogun did relocate daimyo and abolish domains up until the mid-18th century. In order to address any potential bias arising from this issue, we created three different data sets. The first consists of the period from 1652 to 1868, which begins following the fall of Shogun Tokugawa Iemitsu. Iemitsu (and the two previous shoguns) relocated many daimyo to consolidate the Tokugawa regime by the end of his rule. The second period is from 1713 to 1868, after the early Tokugawa period, which is also marked by significantly fewer relocations (Fujino 1975; Oraisha 1980). The third is 1761 to 1868, the beginning of the Shogun Ieharu's reign, which is a more conservative measure than the first two. Tables B, C, and D in the Appendix replicate Tables 2, 3 and 4 results in which all the controls are included. In all three periods, we note that the main results from above hold, and suggest that regardless of the period of rebellions, we consider that the peasant mobilization effect on tax remains significant. In fact, the magnitude of certain types of political mobilization, such as tax-induced collective desertions, appears to increase by twofold or more. This increase is the most pronounced in the most recent period leading up to 1868 (1761 to 1868); while we are not able to determine how rigid the tax structure was before 1868, we find it reasonable that the most recent incidents of rebellions or desertions would have had the most impact on the tax rate.

## 6. Conclusion

Can peasants influence how much their powerful rulers tax them? In this paper, we take advantage of the early modern Japan case to isolate the impact of peasant mobilization on tax rates from potentially confounding factors such as domestic and foreign wars. While extensive scholarship exists on early modern Japan, this article is the first that we know of to systematically test the effect of organized peasant resistance on taxation. We present fine-grained data from 267 domains, and find that peasant insurrections and flight are associated with lower tax rates. These results provide evidence that rebellious and mobile peasants can extract concessions from autocrats, in this case samurai rulers, and are consistent with political economy models that predict such an influence (Levi 1988, McGuire and Olson 1996, Acemoglu and Robinson 2006). The findings hold when controlling for the relative number of samurai, natural disasters, and indicators of economic development. Insurrections and flight, we argue, also more plausibly account for the lower tax rates at the end of the period than the alternatives. We also uncover evidence that domains with unruly peasants who engage in conflict between and within villages, rather than directed at the ruler, are associated with higher levels of extraction. This finding merits further research.

We believe that large-scale peasant resistance in Tokugawa Japan had both short- and long-term impacts that can illuminate broader questions of civilian resistance and state-building in other settings and time periods. First, the relatively moderate demands of peasants in Tokugawa Japan may have contributed to the success of insurrections and collective desertions. In turn, these limited demands were likely the shaped by the lack of available allies to back more ambitious goals. This constraint also distinguishes the isolated Tokugawa peasants from their European counterparts. Crucially, the segmentation of authority differed in the two settings: in Japan, competing governance institutions such as the church were non-existent. The strict Confucian hierarchy of social groups further confined interactions within strata. The merchant class was also largely absent from state formation of early modern Japan, and urban settings did not play a pivotal role (Ikegami and Tilly 1994). So while in Europe, opposition coalitions could form by combining a broad base of popular mobilization with locally significant elite leadership, often bound by a common religious faith (te Brake 1998, 118), in Japan, alliances across social groups were not possible. Instead, "The common people resisted government pressures at every turn and forced it to expand, change, and occasionally acquiesce, but they had no aristocratic or clerical allies, no free-city sanctuaries, and no heretical or revolutionary ideological tradition, and thus they carried on alone" (White 1988*a*, 14). Regardless of the source of limited demands, we believe that moderation may lead to short-term successes for resistance movements that fall short of calling for regime overthrow in contemporary autocracies.

At the same time, we believe that the Japanese case indicates that these smaller gains by peasants over a longer period of time ultimately did contribute to larger-scale regime change and state-building. Though we do not find direct evidence that peasant rebellions prompted new institutions or alliances among elites, such as what Slater (2010) describes for Southeast Asia in the 20th century, we can hypothesize about their indirect influence on state-building. By lowering tax rates, peasants succeeded in restricting the aggregate fiscal capacity of the regime, which in turn left it unable to respond adequately to the threat posed by Western powers in the mid-19th century. The obvious technological superiority of Western ships and weapons eventually forged a consensus among the Japanese elite that major changes were necessary in the political structure of the state (Jansen 1995). The external threat precipitated regime change in Japan, and the precise shape that the new political institutions should take was a source of serious contention through the Meiji Restoration. However, we argue that without the internal conflict over taxation before the external threats, Japan would not have been able to accelerate modernization or centralization. In this sense, we believe that together with Slater (2010), the evidence from Tokugawa Japan provides further evidence for commoners' influence on the

trajectory of state formation. Over a long period of time, civilians' demands and rulers' concessions can delimit the set of possible institutional arrangements in the future. In addition to elite choices (Soifer 2015, Slater 2010), and capital accumulation (Tilly 1992), commoners' more modest claims can also contribute to institutional decisions in an indirect manner. This implication reminds us to take a long view of state formation, and to pay attention to seemingly more moderate forms of contention in contemporary autocracies – a point relevant for studies in regions where inter-state wars and threats have been less prevalent (Centeno 2002; Soifer 2015), as well as in the contemporary era of less frequent inter-state wars.

**Supplementary Materials:**

All the replication files are available at the International Studies Quarterly data archive on STATA format:

- Main data (isq2016_main.dta)
- Split sample data (isq2016_1653.dta, isq2016_1713.dta, isq2016_1761.dta)
- Do-file (isq2016_replication)

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# Appendix

[PUT FIGURE A HERE]

Table A: Tax Rate and Nontax-induced Rebellions excluding Attempted Ones, 1603-1868

| VARIABLES | (1) nengu | (2) nengu | (3) nengu | (4) nengu | (5) nengu |
|---|---|---|---|---|---|
| Nontax-induced rebellions | 0.266** | 0.294** | 0.372** | 0.323** | 0.326** |
| | (0.129) | (0.146) | (0.155) | (0.153) | (0.162) |
| Relative size of samurai class | 3.014 | 1.676 | 3.531 | 1.720 | 0.848 |
| | (3.164) | (2.761) | (3.296) | (2.268) | (2.400) |
| ln(rice production increase) | -0.740* | -0.604 | -0.504 | -1.080*** | -0.620* |
| | (0.391) | (0.388) | (0.399) | (0.354) | (0.340) |
| Provincial population (1000's) in 1721 | | -0.004 | -0.004 | -0.000 | -0.001 |
| | | (0.003) | (0.003) | (0.002) | (0.003) |
| Trade center | | | -0.269 | -0.980 | -0.433 |
| | | | (3.436) | (3.096) | (2.882) |
| Core emperor supporters | | | -6.604 | -6.214* | -4.302 |
| | | | (4.397) | (3.755) | (4.424) |
| Fudai | | | -0.056 | 3.005* | 2.163 |
| | | | (1.904) | (1.714) | (1.768) |
| Tokugawa Gosanke | | | -3.315 | 2.276 | 3.098 |
| | | | (2.584) | (2.174) | (3.251) |
| Constant | 43.001*** | 44.307*** | 43.372*** | 287.328*** | 283.202*** |
| | (3.156) | (3.310) | (3.365) | (34.813) | (52.365) |
| Observations | 201 | 186 | 186 | 186 | 186 |
| R-squared | 0.034 | 0.055 | 0.073 | 0.306 | 0.442 |
| Geography controls | N | N | N | Y | Y |
| Natural disaster controls | N | N | N | N | Y |

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

*Note*: Geography controls include the mean elevation and standard deviation, latitude and longitude of the han centroid location. Natural disaster controls include the number of each of the disasters between 1840 and 1868 listed in Table 1.

Table B: Tax Rate and Rebellion

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | 1653-1868 | | 1713-1868 | | 1761-1868 | |
| Political Mobilization, 1603-1868 | 0.143 | | 0.204* | | 0.285* | |
| | (0.105) | | (0.114) | | (0.147) | |
| Tax-induced Political Mobilization, 1603-1868 | | -0.024 | | -0.130 | | 0.037 |
| | | (0.476) | | (0.547) | | (0.713) |
| Nontax-induced Political Mobilization, 1603- | | 0.196 | | 0.296* | | 0.343* |
| | | (0.170) | | (0.176) | | (0.207) |
| Constant | 293.763*** | 291.622*** | 290.218*** | 287.643*** | 292.230*** | 290.447*** |
| | (51.832) | (52.297) | (51.646) | (51.957) | (51.160) | (51.383) |
| Observations | 186 | 186 | 186 | 186 | 186 | 186 |
| R-squared | 0.431 | 0.431 | 0.437 | 0.439 | 0.437 | 0.438 |
| Relative size of samurai control | Y | Y | Y | Y | Y | Y |
| Provincial population controls | Y | Y | Y | Y | Y | Y |
| Daimyo class controls | Y | Y | Y | Y | Y | Y |
| Geography | Y | Y | Y | Y | Y | Y |
| Natural disaster controls | Y | Y | Y | Y | Y | Y |

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table C: Tax Rate and Rebellion, excluding Attempted Ones

| | (1) 1653-1868 | (2) 1713-1868 | (3) 1761-1868 |
|---|---|---|---|
| Tax-induced insurrections, 1603-1868 | -4.730* | -5.988*** | -5.866* |
| | (2.553) | (2.251) | (3.472) |
| Tax-induced protests, 1603-1868 | -3.200 | -4.847*** | -4.090* |
| | (2.241) | (1.813) | (2.382) |
| Tax-induced collective desertions, 1603- | -5.070* | -7.536*** | -7.421*** |
| | (2.578) | (2.304) | (2.477) |
| Tax-induced coercive appeal, 1603-1868 | 0.362 | 0.893 | -0.297 |
| | (0.884) | (0.763) | (1.198) |
| Tax-induced appeals, 1603-1868 | -0.111 | -0.423 | 0.983 |
| | (0.742) | (0.906) | (1.325) |
| Tax-induced destructive riots, 1603-1868 | -0.033 | 0.366 | 0.920 |
| | (1.561) | (1.567) | (1.845) |
| Nontax-induced rebellions | 0.671*** | 0.920*** | 0.958*** |
| | (0.250) | (0.198) | (0.285) |
| Relative size of samurai class | -1.376 | -3.237 | -2.183 |
| | (2.999) | (2.844) | (2.627) |
| ln(rice production increase) | -0.512 | -0.360 | -0.479 |
| | (0.350) | (0.350) | (0.355) |
| Provincial population (1000's) in 1721 | -0.001 | -0.001 | -0.001 |
| | (0.002) | (0.002) | (0.002) |
| Trade center | 0.513 | -0.071 | -1.063 |
| | (3.115) | (2.999) | (2.734) |
| Core emperor supporters | -2.176 | -1.267 | -2.416 |
| | (4.976) | (4.717) | (4.603) |
| Fudai | 1.201 | 0.780 | 1.421 |
| | (1.755) | (1.659) | (1.704) |
| Tokugawa Gosanke | 4.224 | 5.018 | 4.090 |
| | (3.435) | (3.337) | (3.218) |
| Constant | 289.988** | 280.378*** | 277.922*** |
| | (54.682) | (51.851) | (52.444) |
| Observations | 186 | 186 | 186 |
| R-squared | 0.471 | 0.511 | 0.486 |
| Geography controls | Y | Y | Y |
| Natural disaster controls | Y | Y | Y |

Robust standard errors in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$.

*Note*: Geography controls include the mean elevation and standard deviation, latitude and longitude of the han centroid location. Natural disaster controls include the number of each of the disasters between 1840 and 1868 listed in Table 1 summary statistics.

Table D: Tax Rate and Rebellion Types

| | (1) 1653-1868 | (2) 1713-1868 | (3) 1761-1868 |
|---|---|---|---|
| Tax-induced insurrections, 1603-1868 | -4.022 | -5.419** | -6.168* |
| | (2.601) | (2.168) | (3.454) |
| Tax-induced protests, 1603-1868 | -2.931 | -4.779*** | -4.009* |
| | (2.197) | (1.789) | (2.380) |
| Tax-induced collective desertions, 1603- | -6.018** | -9.401*** | -9.719*** |
| | (2.910) | (2.374) | (2.777) |
| Tax-induced coercive appeal, 1603-1868 | 0.252 | 0.731 | -0.498 |
| | (0.860) | (0.754) | (1.082) |
| Tax-induced appeals, 1603-1868 | 0.089 | -0.121 | 1.522 |
| | (0.757) | (0.892) | (1.348) |
| Tax-induced destructive riots, 1603-1868 | -0.014 | 0.473 | 1.101 |
| | (1.594) | (1.575) | (1.863) |
| Nontax-induced rebellions | 0.543** | 0.809*** | 0.854*** |
| | (0.210) | (0.159) | (0.238) |
| Relative size of samurai class | -1.871 | -4.656 | -3.448 |
| | (3.148) | (2.992) | (2.787) |
| ln(rice production increase) | -0.483 | -0.306 | -0.427 |
| | (0.357) | (0.358) | (0.363) |
| Provincial population (1000's) in 1721 | -0.002 | -0.001 | -0.001 |
| | (0.002) | (0.002) | (0.002) |
| Trade center | 0.369 | -0.225 | -1.104 |
| | (3.029) | (2.823) | (2.604) |
| Core emperor supporters | -1.788 | -0.505 | -2.125 |
| | (4.924) | (4.688) | (4.582) |
| Fudai | 1.292 | 0.898 | 1.475 |
| | (1.755) | (1.654) | (1.704) |
| Tokugawa Gosanke | 4.486 | 6.013* | 4.869 |
| | (3.488) | (3.423) | (3.311) |
| Constant | 293.095*** | 280.230*** | 278.730*** |
| | (54.243) | (51.679) | (52.316) |
| Observations | 186 | 186 | 186 |
| R-squared | 0.472 | 0.519 | 0.493 |
| Geography controls | Y | Y | Y |
| Natural disaster controls | Y | Y | Y |

Robust standard errors in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$.

*Note*: Geography controls include the mean elevation and standard deviation, latitude and longitude of the han centroid location. Natural disaster controls include the number of each of the disasters between 1840 and 1868 listed in Table 1 summary statistics.

Table E: Tax Rate and Rebellions excluding Attempted Ones, 1603-1868 - Non-linear Effect of Samurai Class

| VARIABLES | (1) nengu | (2) nengu | (3) nengu | (4) nengu | (5) nengu |
|---|---|---|---|---|---|
| Tax-induced insurrections, 1603-1868 | -3.988 | -5.405** | -5.233** | -5.159** | -5.100** |
| | (2.775) | (2.648) | (2.583) | (2.381) | (2.376) |
| Tax-induced protests, 1603-1868 | -3.554* | -3.815** | -2.870 | -2.058 | -3.151 |
| | (1.903) | (1.859) | (1.978) | (2.220) | (2.100) |
| Tax-induced collective desertions, 1603- | -1.626 | -1.969 | -2.184 | -1.746 | -3.573* |
| | (1.813) | (1.915) | (1.958) | (1.973) | (1.836) |
| Tax-induced coercive appeal, 1603-1868 | -0.014 | 0.379 | 0.462 | 0.656 | 0.451 |
| | (0.569) | (0.876) | (0.894) | (0.837) | (0.817) |
| Tax-induced appeals, 1603-1868 | 0.022 | 0.205 | 0.051 | 0.656 | 0.206 |
| | (0.409) | (0.696) | (0.716) | (0.718) | (0.639) |
| Tax-induced destructive riots, 1603-1868 | 0.090 | 0.317 | 0.316 | 0.335 | 0.354 |
| | (1.773) | (1.805) | (1.810) | (1.653) | (1.568) |
| Nontax-induced rebellions | 0.363 | 0.428* | 0.407* | 0.319 | 0.532** |
| | (0.235) | (0.232) | (0.232) | (0.241) | (0.239) |
| Relative size of samurai class | 24.068*** | 20.865*** | 26.195*** | 12.185 | 5.796 |
| | (6.972) | (6.581) | (7.406) | (7.751) | (9.566) |
| Relative size of samurai class (square term) | -6.867*** | -6.177*** | -7.312*** | -3.444* | -2.001 |
| | (1.871) | (1.746) | (1.890) | (2.033) | (2.348) |
| ln(rice production increase) | -1.473*** | -1.274*** | -1.263*** | -1.453*** | -0.764* |
| | (0.423) | (0.427) | (0.447) | (0.411) | (0.387) |
| Provincial population (1000's) in 1721 | | -0.004 | -0.004 | -0.001 | -0.001 |
| | | (0.003) | (0.003) | (0.003) | (0.002) |
| Trade center | | | 1.175 | 0.808 | 1.153 |
| | | | (2.951) | (3.268) | (3.325) |
| Core emperor supporters | | | -5.598 | -4.919 | -2.658 |
| | | | (4.605) | (4.041) | (5.051) |
| Fudai | | | -0.166 | 2.797 | 1.626 |
| | | | (2.000) | (1.796) | (1.739) |
| Tokugawa Gosanke | | | -12.369*** | -1.754 | 1.319 |
| | | | (3.819) | (4.055) | (5.740) |
| Constant | 47.602*** | 48.068*** | 47.736*** | 284.836*** | 290.420*** |
| | (3.301) | (3.458) | (3.532) | (36.671) | (54.080) |
| Observations | 201 | 186 | 186 | 186 | 186 |
| R-squared | 0.101 | 0.123 | 0.139 | 0.337 | 0.475 |
| Geography controls | N | N | N | Y | Y |
| Natural disaster controls | N | N | N | N | Y |

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

*Note*: Geography controls include the mean elevation and standard deviation, latitude and longitude of the han centroid location. Natural disaster controls include the number of each of the disasters between 1840 and 1868 listed in Table 1.

Figure 1: Distribution of tax rates in Japan as of 1868

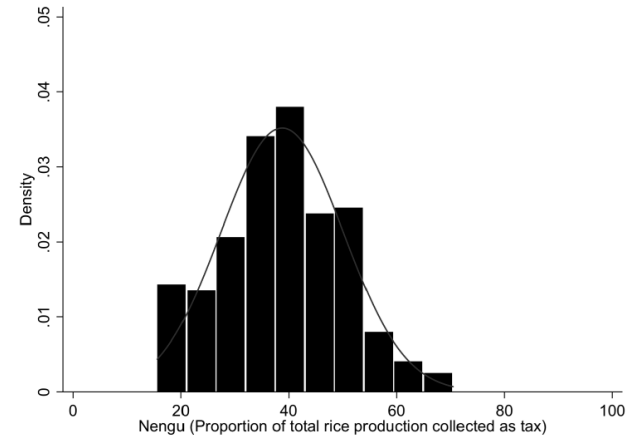


Figure 2: Fight and Flight during the Edo Period, 1603-1868

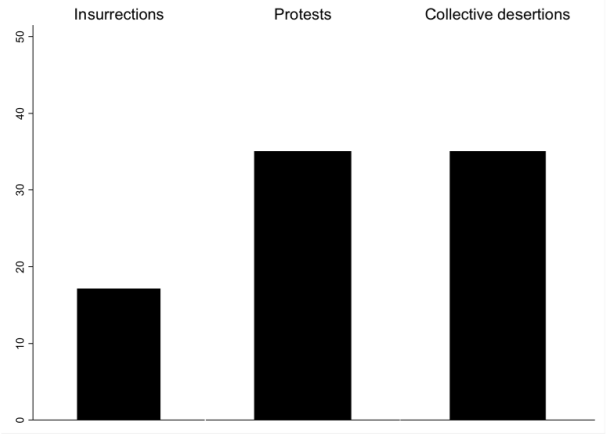

Figure A: Other types of rebellion during the Edo Period, 1603-1868