

Land Tax Reforms and Peasant Revolts: Evidence from Imperial Qing China *

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Abstract

Fiscal capacity and tax systems are crucial for social stability. This paper examines the effects of "Tan Ding Ru Mu" reform, which eliminated the historically regressive poll tax and introduced a more progressive land tax, on social conflicts. Aiming at reducing monitoring costs and streamlining tax collection, the reform was an exogenous shock as it followed immediately after Emperor Yongzheng's unexpected ascension to the throne in 1723. By comparing changes in peasant revolts in counties more exposed to the reform with those less exposed, before and after, we find that more progressive land tax reform increases social conflicts. We find suggestive evidence that the rise in conflicts is attributed to the increased tax incidence on tenants and the emergence of large landowners displacing small-to-medium landowners.

Keywords: Peasant Revolts, Property Tax, Poll Tax, Imperial Qing China

JEL Codes: N25, N35, N45

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1 Introduction

The ability to generate revenue through taxation is fundamental to state power and capacity (Tilly, 1990; Besley and Persson, 2011b). The technical efficiency of the tax system is crucial, as taxes influence private agents' decisions, leading them to minimize tax liabilities. Taxes also impose enforcement costs on governments and compliance costs on taxpayers (Sokoloff and Zolt, 2007). Previous research shows the importance of fiscal capacity in the 18th century for explaining the divergence between Eastern and Western industrialization (Sng and Moriguchi, 2014; Bonney, 1999). Thus, understanding the effects of different tax systems from historical events, especially during the 18th century, is essential and can shed light on modern policies that promote long-term economic growth, improve living standards, and ensure social stability.

In this paper, we empirically examine one of the most influential national tax reforms in 18th century Imperial China, which eliminated the highly regressive poll tax and shifted the revenue source to land by implementing a more progressive land tax, and its impact on social stability. The Imperial Qing dynasty is an important period for evaluating the design of tax systems, not only because it precedes the great divergence of China from the Western world but also because it marks the peak of its authoritarian power. Despite this, it was a fiscal outlier, with historically low levels, in both horizontal comparisons with its major early modern competitors, such as Japan, Western European states, and Central Asian empires, and vertical comparisons to other Chinese dynasties (Zhang, 2022).

Theoretically, transitioning from a highly regressive poll tax to a more progressive land tax in an agrarian society at first sight positively impacts social stability, favoring a stronger state and better economic outcomes. For example, this transformation redistributes the economic burden from a uniform fee, which disproportionately affects individuals regardless of their wealth or income, to a system based on land. This change significantly alleviates financial strain on peasants, who typically own no land, thereby promoting social equity. Additionally, by altering the tax base from movable individuals to immovable land, the reform reduces incentives for tax evasion, potentially leading to higher compliance rates (Besley, Jensen and Persson, 2023). Furthermore, the transition enhances state capacity by establishing a more stable and predictable revenue stream. It also simplifies the administrative processes of tracking and updating individuals, thus improving administrative efficiency. Moreover, the shift to a land tax could decrease the potential for local corruption in tax collection, as land transactions are

slower and more transparent than changes in individual status, making them easier to monitor and regulate. Lastly, the strengthened state capacity is crucial for funding public goods and services that benefit the entire society, including peasants. These improvements enable peasants to sustain livelihoods above subsistence levels, thereby reducing motivations for revolts driven by economic distress (Redding, 2000; Burg, 2004). Previous literature also shows that a more regressive tax increases social conflicts instead (Acemoglu, 2005).

However, on the other hand, the transition to a land tax might elevate the risk of peasant revolts for several reasons. First, contractually employed tenants may find themselves shouldering the tax burden as landlords pass these costs down, which also depends on the relative elasticity of labor supply. This situation forces tenants into a difficult decision: avoid employment to escape the tax or accept the additional financial burden. Furthermore, collusion between local officials and large landowners becomes more likely with such a tax transition, providing incentives for them to conspire in evading taxes (Li et al., 1991). This not only undermines the system's fairness but also its redistributive objectives, rendering it ineffective. Moreover, the impact of land taxes can become overwhelming for small-to-medium landowners, driving them toward economic difficulty and potentially resulting in the loss of their land, leading to more large landowners and land merging activities. This added stress on a vital part of the rural economy contributes to the grievances that ignite peasant unrest. So it remains an empirical question whether such a progressive tax increases or decreases social conflicts.

The challenge of empirical identification arises from two primary concerns. Firstly, the issue of reverse causality is notable, as governments might adjust tax collection strategies in response to social conflicts and the financial demands of warfare. This adjustment could, in turn, affect the populace's tolerance for heavier tax burdens (Rodriguez-Franco, 2016; Akitoby, Honda and Primus, 2020). Secondly, the analysis is further complicated by the potential for omitted variable bias. For instance, natural disasters, perceived as legitimacy shocks to rulers believed to be "appointed" by Heaven, may escalate social conflicts and prompt caution, encouraging emperors to act more judiciously (Bai, 2023).

To address this identification problem, we leverage the "Tan Ding Ru Mu" tax reform, one of the most significant national tax reforms implemented in 18th-century China. This reform serves as an exogenous shock, considering its enactment occurred merely one year after Emperor Yongzheng's ascension to the imperial throne. He was selected from among seven candidates, none of whom had been pre-appointed, following the sudden death of Emperor Kangxi in 1722, who had presided over a

prosperous Imperial China for decades. This selection process, essentially a random historical event, highlights the reform as an unplanned experiment, providing a unique opportunity to study its impacts. The reform completely abolished the historically prevalent poll taxes and introduced a higher per-acre land tax. The primary goals of this tax reform were to reduce monitoring costs, streamline tax collection procedures, minimize tax evasion, and improve the accuracy of measurements (Li et al., 1991).

The implementation of this tax transition varied across provinces. For example, provinces such as Zhili and Shandong used a provincial-wide apportionment method, meaning that the total amount of poll tax revenue per province was evenly allocated to the land tax per acre in the province, with a unified apportionment rule implemented throughout the province (Yang et al., 2021). Based on this, we derive Equation (1), which we refer to as the revenue equivalent measurement, to measure a county’s tax change within a province, thus determining the treatment intensity. This equation shows that the increase in tax paid after the reform is positively related to the amount of agricultural land and negatively related to the population size. Therefore, we present our results using two measurements: the land-to-population ratio and the revenue equivalent measurement. We restrict our sample to Zhili and Shandong provinces, which employ this method, and we control for province by year fixed effects to explore within province variation across counties.

We initiate our analysis by employing a standard difference-in-differences (DID) strategy, comparing the changes in rebellions, using data commonly referenced in existing studies such as Kung and Ma (2014) and Cao and Chen (2022), in counties with higher exposure to the tax reform to those in counties with lower exposure, both before and after the reform year. We find that counties significantly affected by the tax reform witnessed an increase in peasant rebellions. On average, the reform leads to a rise of 0.6 percentage points in the incidence of peasant revolts per million population for a one standard deviation increase in reform intensity. Our findings remain robust when including interactions of year dummies with pre-rebellion levels and various county-by-year covariates, such as natural disasters, extreme weather conditions, land ruggedness, and the introduction of new technologies. All these factors could affect peasants’ welfare and, consequently, their propensity to rebel.

Regarding the underlying mechanisms, we find suggestive evidence that the law is effective, with limited evidence of collusion between officials and taxpayers to avoid taxation. However, large landowners grow in influence, and the tax incidence is borne by tenants who supply more inelastic labor. We conduct heterogeneous analyses and examine the effects on outcomes that may indicate potential chan-

nels.

Specifically, to test heterogeneous effects, we explore how the impacts varied with changes in risk, collective action, labor supply elasticity, and thus tax incidence. To measure decreased risk, we use the introduction of sweet potatoes, which are drought-resistant and thus more adaptable to unpredictable climates, as a proxy. Our findings indicate that the reform’s effects are significantly more pronounced in counties that had not introduced this crop by the time the reform was enacted. One of the key characteristics of agriculture is its risk, and peasants are vulnerable to risks. Revolts typically concentrate in areas with high risk, especially among those who cannot meet subsistence needs. This can help distinguish between elite revolts and peasant revolts, given the lack of data on the revolt participants. [Ang, Madsen and Wang \(2021\)](#) propose that rice cultivation, due to its labor-intensive nature, acts as a collective-action mechanism that discourages democracy. By classifying counties based on their suitability for wheat versus rice cultivation, we observe that the reform’s effects are mainly seen in counties suited for wheat. This suggests despite the fact that rice cultivation serves as a collective mechanism that facilitates peasant revolts, labor demand in rice areas may be more elastic, making it difficult for landlords to shift the tax burden onto peasants.

Due to data limitations, we use province-level panel data spanning about two centuries, focusing on outcomes such as total land tax revenue, tax burden per acre, and the number of adult males above 15 (i.e. *ding*) collected from the book by [Liang \(2008\)](#) and proxies for land distribution to shed light on mechanisms by comparing the land-to-population ratio in larger provinces, which are more exposed to the national reform, versus those that are not, before and after the 1727 law. We find no evidence of collusion between local officials and landowners to avoid tax collection. Instead, regions that are more exposed experience higher tax revenue collected from land, and the tax burden per acre of land increases. We also do not see a significant change in the number of adult males who were responsible for paying poll taxes before the reform, despite the elimination of these taxes.

To proxy for the presence of large landowners, we aggregate individual-level data into province-year panel data on the number of *jinshi* from [Chen, Kung and Ma \(2020\)](#). The local gentry class in the Qing dynasty often consisted of large landowners. This class was composed of scholars and officials who had passed the imperial examinations and held degrees, such as the so-called *jinshi*. The wealth and status of the gentry were typically tied to land ownership, as land was the primary source of wealth and social influence during this period. Large landowners within the gentry class often played significant roles in

local administration and were influential in both economic and political spheres (Sng, 2014; Fairbank, 1986). We find that the number of jinshi increases, suggesting a mechanism where large landowners crowd out small and medium-sized landowners and grow in power.

We control for one major historical event that could affect peasant revolts. A significant policy during Emperor Yongzheng’s reign from 1723 to 1735 was the implementation of "huohao" centralization, a form of fiscal centralization. This policy aimed at consolidating all informal levies to enhance the efficiency of local government tax collection and included pledges of financial support to local governments. The introduction of "huohao" centralization represents a potential confounding factor for our study’s identification strategy. To address this, our analysis incorporates an interaction between the baseline "huohao" rate at the county level and a post-reform dummy, allowing us to differentiate the effects of fiscal centralization from those of the tax reform. Our results indicate that the fiscal centralization under "huohao" does not significantly affect our findings. Other major events that may increase conflicts, such as the closure of the Grand Canal (1826), the First Opium War (1840-1842), and the Taiping Rebellion (1851-1864), all occurred after 1800. Throughout this paper, we restrict our analysis to rebellions before 1800. Therefore, it is unlikely that these later events contaminate the causal interpretation of our findings.

Our research contributes to two significant areas of literature. First, it addresses studies on the factors leading to civil conflicts. Existing research suggests that economic growth can mitigate civil conflicts (Miguel, Satyanath and Sergenti, 2004), while factors such as food aid (Nunn and Qian, 2014), ethno-linguistic fractionalization (Collier and Hoeffler, 1998), fragmented political institutions (Besley and Persson, 2011a), the disruption of trade routes (Cao and Chen, 2022), and climate shocks (Jia, 2014) may exacerbate them. Additionally, Acemoglu (2005) discuss how regressive tax systems can lead to increased social conflicts by disproportionately burdening the lower-income population and heightening economic disparities. We expand upon this body of literature by exploiting a historical random event that helps identify whether transitioning from a poll tax to a property tax increases peasant revolts, and provide suggestive evidence for possible mechanisms.

Second, our paper contributes to the literature on tax reforms and fiscal capacity. The Qing dynasty, which ruled China from 1644 to 1912, faced significant challenges in developing fiscal capacity and keeping pace with the Western world. Wong (1997) argues that the Qing state’s fiscal capacity was weak due to its reliance on land taxes and limited bureaucratic infrastructure. ? highlights how

regional disparities in tax collection hindered a cohesive fiscal system. [Pomeranz \(2000\)](#) attributes the lag in China’s economic development to institutional factors, including a lack of strong fiscal systems. He argues that the Qing state’s failure to modernize its fiscal and administrative systems contributed to economic stagnation. [Rosenthal and Wong \(2011\)](#) compare the fiscal and economic histories of China and Europe, arguing that centralized fiscal institutions in Europe facilitated growth, while the fragmented system in Qing China hindered progress. Our research connects these literatures by empirically examining how the Qing dynasty’s progressive land tax reform affects social stability and, consequently, state capacity. By shedding light on potential mechanisms, we also illustrate why fiscal capacity could not be expanded.

The rest of the paper is structured as follows: Section 2 provides background information. Section 3 describes the data and measurements used. In Section 4, we outline our empirical strategy and present our findings. Section 5 explores potential confounding factors that could challenge our causal interpretation. Finally, Section 6 offers our conclusions.

2 Institutional Background

The Ming Dynasty (1368-1644) laid the foundation for China’s fiscal system, which included the poll tax (dingfu) and the land tax (tianfu). The poll tax was levied on adult males and was a significant source of revenue, but it was also highly regressive, disproportionately affecting the lower-income population ([Huang, 1998](#)). The land tax, on the other hand, was based on the amount of land owned and was relatively more equitable. In the late 16th century, Grand Secretary Zhang Juzheng implemented the "Single Whip" tax reform (yitiao bianfa) to address fiscal inefficiencies and corruption. This reform sought to simplify the complex tax system by consolidating various levies and labor obligations into a single monetary payment based on land holdings ([Huang, 1974](#)). While initially successful in boosting revenue and reducing administrative costs, the "Single Whip" reform ultimately faced significant passive resistance from local elites who manipulated tax records, underreported land holdings, and engaged in tax evasion to avoid increased tax burdens ([Brook, 1993](#)). This widespread resistance, combined with the lack of strong enforcement mechanisms and changing economic conditions, led to the eventual cancellation of the reform in the early 17th century, shortly after Zhang’s death in 1582 ([Huang, 1974](#); [Brook, 1993](#)).

During the transition from the Ming to the Qing Dynasty, the Qing rulers initially maintained the existing tax system. The early Qing emperors, including Kangxi (r. 1661-1722), focused on consolidating power, stabilizing the empire, and fostering economic growth after the turbulence of the Ming-Qing transition (Rowe, 2009). The continuity of the Ming tax system under Qing rule was driven by the need for fiscal stability and the challenges associated with overhauling an entrenched system. Kangxi's long reign saw significant territorial expansion and consolidation of Qing rule, which required maintaining stable revenue streams.

Emperor Kangxi is notable for his policies regarding taxation, particularly his opposition to increasing the poll tax. In 1712, Kangxi issued a decree that formally suspended the increase of the poll tax, reinforcing his long-standing stance that had been propagated throughout his reign. He recognized its regressive nature and the discontent it caused among the lower-income population (Spence, 1974). Kangxi chose not to implement major tax reforms due to several factors: the need for fiscal stability, the risk of disrupting the delicate balance of social and political order, and the immense administrative challenge of reforming an entrenched system (Rowe, 2009).

In 1722, the Qing Dynasty witnessed the conclusion of Emperor Kangxi's flourishing reign, which ended following a three-month illness. On his deathbed, Emperor Kangxi convened seven of his sons along with Longkodo, the General Commandant of Beijing, and designated Yongzheng as the imperial successor (Spence, 1974).

In the inaugural year of his reign, 1723, Emperor Yongzheng promulgated an imperial edict that, starting from the subsequent year, would reallocate the revenue previously collected through the poll tax (dingfu) across the land within each province, signaling a notable policy shift (Zelin, 1984). This reform intended to streamline tax collection (Wang, 1973) by reducing the complexity of monitoring and collecting taxes from a mobile population. Furthermore, the reform was designed to enhance the central government's fiscal control, reduce corruption among local tax collectors, and improve overall administrative efficiency by creating a more straightforward and transparent tax system. By 1727, the transition to the land tax had been implemented in nearly all provinces, leading to the formation of a unified national tax collection system (Rowe, 2009).

The implementation of this tax transition varied across provinces. For example, provinces such as Zhili and Shandong used a provincial-wide apportionment method, meaning that the total amount of poll tax revenue per province was evenly allocated to the land tax per acre in the province, with a

unified apportionment rule implemented throughout the province (Li, 1991).

3 Data and Measurement

Our primary outcome of interest is the annual number of conflicts in each county during the Qing Dynasty (1636-1911). This variable covers 262 years of the Qing Dynasty, focusing specifically on counties in six provinces—Zhili, Shandong, Henan, Anhui, Jiangsu, and Zhejiang—chosen for their warm plains and fertile soil, ideal for agricultural production, especially wheat and rice. Collectively, these provinces contributed more than half (57.53%) of the entire Qing Dynasty’s tax revenue (Li et al., 1991), as shown in Appendix Table A1. Given the relatively brief period of the tax reform rollout and the varying start dates across the provinces in our sample from 1723 to 1727, we use 1727 as the beginning of the tax reform and concentrate on its long-term effects. The summary statistics with their sources are presented in Table 1.

3.1 Rebellions

The dependent variable, peasant rebellions, is measured by the number of uprisings that reportedly occurred in a county on a yearly basis, as shown in Table 1. The information comes from Qing Shilu (Veritable Records of the Qing Emperors), the official record of imperial edicts and official memorials about events of national significance. According to Chinese historians, Qing Shilu is a unique source that provides the most reliable and comprehensive information on social unrest during the Qing Dynasty. The same data source has been used in existing studies on peasant revolts, such as Kung and Ma (2014) and Cao and Chen (2022).

We normalize the count of rebellions by the population size measured in 1600, marking the onset of our focused period. Similar to the approach of Cao and Chen (2022), we estimate the population of a county in 1600 by allocating the prefecture’s (a higher administrative level) population for that year based on the distribution of households within the prefecture in 1546. Given that the majority of observations are zero, we apply an inverse hyperbolic sine transformation to the outcome. This transformation prevents the outcome from being perfectly collinear with the explanatory variables when both sides are normalized by the population size. The spatial distribution is depicted in Appendix Figure A1, where Panel (A) displays the county-specific inverse hyperbolic sine-transformed rebellions

per million population, and Panel (B) illustrates agricultural land areas normalized by the baseline population size.

3.2 Treatment Intensities

For our baseline analysis, we construct two measures of treatment intensity. Here, we explain the rationale behind creating these county-specific intensity measurements. Based on this, we derive Equation (1), which we refer to as the revenue equivalent measurement, to measure a county's tax change within a province, thus determining the treatment intensity. This equation shows that the increase in tax paid after the reform is positively related to the amount of agricultural land and negatively related to the population size. Therefore, we present our results using two measurements: the land-to-population ratio and the revenue equivalent measurement. We restrict our sample to Zhili and Shandong provinces, which employ this method, and we control for province by year fixed effects to explore within-province variation across counties.

Let's denote the land size in County A as L_A and in other counties within the same province as L_O . Similarly, denote the total population in County A as P_A and in the others as P_O . The pre-reform land tax rate per acre is represented by x and the poll tax rate by y . The post-reform land tax rate per acre is denoted as $\tilde{x}$, which satisfies the following condition:

$$x(L_A + L_O) + y(P_A + P_O) = \tilde{x}(L_A + L_O) \quad (1)$$

Equation (1) illustrates that the total amount of poll tax revenue per province was evenly allocated to the land tax per acre in the province, with a unified apportionment rule implemented throughout the province (Yang et al., 2021). Consequently, we have $\tilde{x} = x + y \frac{P_A + P_O}{L_A + L_O}$, indicating the change in tax paid in County A, denoted as Δ_A , can be formulated as:

$$\Delta_A = \tilde{x}L_A - (xL_A + yP_A) = y \frac{L_AP_O - L_OP_A}{L_A + L_O} \quad (2)$$

Given that $\frac{\partial \Delta}{\partial L_A} > 0$ and $\frac{\partial \Delta}{\partial P_A} < 0$, it follows that the increase in tax paid after the reform is positively related to the land size and negatively related to the population size. Furthermore, the change in reform exposure Δ is influenced by both the baseline total land in a province and the baseline distribution of land and population. In our empirical analysis, we account for province by year fixed effects to ensure

consistency within province standards.

After explaining the rationale for constructing treatment intensity, we now formally introduce our two measures. Our first measure utilizes a basic metric based on the agricultural land to population ratio, where we collect from [Liang \(2008\)](#). Our second measure explores the direct equation from (1), which throughout the paper we call *Revenue Equivalent Treatment*.

For our baseline results, we restrict the sample to the provinces of Zhili and Shandong to explore the revenue-equivalent measurement. However, due to a lack of data to explore mechanisms in detail, we combine all the provinces in the sample and conduct the analysis using province-panel data.

3.3 Proxies for Risk, Collective Device, Labor Supply Elasticity

[Scott \(1977\)](#) illustrates that under the fixed tenancy system, where peasants pay a fixed amount to work for landlords and keep the yield for themselves, peasants bear the full risk from season to season ([Li et al., 1991](#)). This situation makes them more susceptible to falling below subsistence needs and more likely to opt for collective rebellion from peasants.

[Jia \(2014\)](#) shows that sweet potatoes can survive bad weather better than wheat and rice and provide more calories per unit of land, implying that farmers were better insured in the sense that they could reduce downside risk in bad times and increase yields in good times. More importantly, the adoption of sweet potatoes was relatively exogenous. They were brought into China in the mid-seventeenth century and the timing of province-specific adoption took centuries and was closely related to the distance from the Chinese region where sweet potatoes were firstly adopted. We use the introduction of sweet potatoes to proxy for the decreased risk facing the peasants to add evidence on the rebellion body.

We develop a rice-to-wheat suitability ratio akin to the one presented by [Ang, Madsen and Wang \(2021\)](#), categorizing counties with a ratio above 0.5 as better suited for rice cultivation, while others are deemed more appropriate for wheat. According to [Ang, Madsen and Wang \(2021\)](#), rice cultivation requires more labor (indicating a lower elasticity of labor demand relative to supply) and acts as a communal mechanism that inhibits democratic tendencies. Furthermore, [Scott \(1977\)](#) illustrates that the scale of collective action is significantly influenced by the number of individuals concurrently impacted, with organizational obstacles in villages hindering peasant revolts. We analyze the pronouncedness of these effects in regions dedicated to wheat or rice cultivation to determine whether the elasticity of labor

supply or the communal mechanism plays a more significant role. Should a less elastic labor supply enable landlords to shift tax burdens onto landless farmers, the implications would be more marked in wheat-growing areas. Conversely, if the communal mechanism is more influential, a greater impact would be observed in rice-cultivating regions.

4 Empirical Identification and Results

To identify the impact of eliminating the poll tax and increasing the land tax on peasant revolts, we adopt a difference-in-differences (DID) approach that uses variation in the area of agricultural land and the baseline population size to compare pre and post differences in the outcome.

4.1 Empirical Identification

Difference-in-differences Specification The DID strategy is as follows:

$$Y_{ct} = \beta Treatment_c * Post_t + \gamma X_{ct} + \gamma_c + \gamma_t + \epsilon_{ct} \quad (3)$$

where $Treatment_c$ measures the exposure of a county c to the transformation from poll tax to land tax. As discussed in Section 3.2, we use two variables to measure treatment intensity in a county and we denote them as "Land/Pop" and "Revenue Equivalent Treatment" respectively. $Post_t$ is a dummy variable that equals one for any year t after the land tax reform of 1727. The equation also has county fixed effects γ_c and year fixed effects γ_t that absorb any time-invariant county characteristics such as the distance to the first adopter of sweet potatoes and geographic-invariant aggregate shocks such as the emperor in office. ϵ_{ct} is the random error that is clustered at the county level to allow for serial correlation within counties. The dependent variable Y_{ct} is the frequency of rebellions normalized by population, calculated as the inverse hyperbolic sine of the value.

X_{ct} is a series of county-year covariates, including flooding and drought events which may generate negative income shocks which may increase the likelihood of peasant rebellion. X_{ct} also includes the introduction of new technologies proxied by the introduction of maize and sweet potatoes during the late Ming and Qing dynasties, as they produce more calories and are resistant to extreme weather which in turn may reduce peasant rebellions in bad times. Land slope using rugged index is also included to compare counties within similarly arable conditions. In addition, X_{ct} includes province by year fixed

effects to take into account the differences at the implementation stage where different land tax rates were imposed due to the various pre-reform poll tax collected. On top of the baseline specification, we include pre-reform rebelliousness times year dummies to allow for the possibility that counties prone to social unrest may have differential responses to the tax reform.

The coefficient of interest in Equation (3) is β , the estimated impact of the tax reform on the frequency of rebellions and the sign of the coefficient is an empirical question. Our identification assumptions are that there are no events beyond those we have controlled that coincide with both the tax reform and the level of rebelliousness. There was one important fiscal centralization reform that aimed to eliminate invisible tax and alleviate farmers' burden, implemented by the same emperor at around the same time. Although the lack of a central commitment made the reform end when the next emperor took power, it may bias our estimates if farmers protested against such a breach of promise. We address this concern in more detail in Section 5.

4.2 Empirical Results

Table 2 presents the baseline results examining the effects of the transformation from poll tax to land tax on peasant revolts. The dependent variable in all specifications is the number of rebellions, transformed using the inverse hyperbolic sine method to normalize the data. The analysis is restricted to the provinces of Zhili and Shandong, reflecting the province allocation-based implementation of the tax reform. The treatment variables are standardized for ease of interpretation ¹.

In Columns (1) and (2), the variable of interest is the interaction between the agricultural land-to-population ratio at baseline and the post-reform period ($\text{Land/Pop} \times \text{Post}$). The coefficient for $\text{Land/Pop} \times \text{Post}$ is positive and statistically significant at the 1% level in both specifications, indicating that an increase in the land-to-population ratio leads to a higher number of rebellions after the tax reform. Specifically, a one standard deviation increase in the land-to-population ratio results in a 0.6 percentage point increase in the number of rebellions.

Columns (3) and (4) introduce the interaction between the revenue equivalent treatment and the post-reform period ($\text{Revenue Equivalent Treatment} \times \text{Post}$). The coefficients for this interaction are also positive and statistically significant at the 5% and 1% levels, respectively, with magnitudes similar

¹Appendix Table A2 uses county-level area instead of prefectural-level agricultural land as a measurement, yielding consistent results.

to those found for the Land/Pop $\times$ Post interaction.

The empirical specifications control for various fixed effects and covariates to account for potential confounding factors. Specifically, all models include county-year covariates such as flooding, droughts, ruggedness index, and the introduction of maize and sweet potatoes. Additionally, County fixed effects and Year fixed effects are included to control for time-invariant county characteristics and common temporal shocks, respectively. Columns (2) and (4) further control for province-by-year fixed effects and the interactions of year dummies with pre-reform rebelliousness levels, enhancing the robustness of the results.

4.3 Suggestive Mechanisms

Heterogeneity Table 3 presents the results of the heterogeneity to shed light on mechanisms. Same as that in Table 2, the dependent variable in all specifications is the number of rebellions, transformed using the inverse hyperbolic sine method to deal with many zeros. The analysis is restricted to the provinces of Zhili and Shandong, and treatment variables are standardized for interpretation.

Panel A investigates the impact of the tax reform in counties that had and had not adopted sweet potatoes before 1727. The adoption of sweet potatoes is used as a proxy for decreased risk faced by the peasants. Historically, peasants have been very sensitive to weather-imposed risks due to their heavy reliance on agriculture. Given the severe repercussions of rebellion, peasants often rebelled when they were unable to meet their basic needs.

Columns (1) and (2) show the results for counties that did not adopt sweet potatoes by 1727. In these counties, both treatment measures yield significant effects on the level of rebellions. In contrast, Columns (3) and (4) present the results for counties that had adopted sweet potatoes. The adoption of sweet potatoes, which are drought-resistant, helps peasants meet their basic needs and raises the thresholds for rebellion decisions. These results imply that adopting sweet potatoes as a risk mitigation strategy may have dampened the impact of the tax reform on rebellions. This supports the notion that decreased risk can lower the likelihood of rebellion among peasants.

Panel B explores the differential effects of the tax reform in counties more suitable for wheat versus those more suitable for rice cultivation. The rice-to-wheat suitability ratio categorizes counties with a ratio above 0.5 as better suited for rice cultivation, while others are deemed more appropriate for wheat. Rice is more labor-intensive and serves as a collective device, but its labor-intensive nature also makes

the labor supply relatively elastic, making it harder for landlords to pass tax incidence onto tenants.

Columns (1) and (2) display the results for counties suitable for wheat, while Columns (3) and (4) present the results for counties suitable for rice. Comparing Column (1) with Column (3), the effects in wheat-suitable regions are higher. Similarly, comparing Column (2) with Column (4) yields the same conclusion. This indicates that elasticity dominates the role of collective action. These findings shed light on the mechanism of labor supply being inelastic, which causes peasants to bear the tax incidence and rebel when they cannot make ends meet.

Other Outcomes Table 4 explores the mechanisms behind the tax reforms by examining province-level panel data spanning approximately two centuries. The focus is on outcomes such as total land tax revenue, tax burden per acre of land, and the number of ding (adult males above 15 who were responsible for paying poll taxes). This analysis aims to shed light on the mechanisms by comparing the land-to-population ratio in larger provinces, which are more exposed to the national reform, versus those that are not, before and after the 1727 law.

Column (1) shows the impact of the progressive tax reform on total land tax revenue collected. The coefficient is 0.702 and is statistically significant at the 1% level, indicating that regions with a one standard deviation higher land-to-population ratio experienced a significant increase of about 70% in land tax revenue after the reform. This suggests that the reform effectively increased tax collection from land in more exposed regions, proving its effectiveness. Consequently, there is no evidence to support the notion that landowners colluded with tax collectors to evade land tax.

Column (2) examines the tax burden per acre of land as the outcome and confirms the findings of Column (1). The coefficient for the land-to-population ratio post-reform is also positive and highly significant (0.615). This indicates that the tax burden per acre increased significantly in regions with a higher land-to-population ratio, reflecting the reform's impact on intensifying tax collection efforts on land.

Column (3) investigates the number of taxpayers (Ren ding) post-reform. The coefficient is positive but not statistically significant (0.150). This suggests that, despite the elimination of poll taxes, there was no significant change in the number of adult males above 15 who were supposed to pay taxes when poll taxes were collected. This finding is more complex because, after the reform, officials lacked the incentive to track adult males, making it likely that individuals moved around without registration. Therefore, I do not overinterpret this result.

Column (4) uses the number of Jinshi to represent the presence of large landowners. To measure this, we compiled individual-level data into province-year panel data on the number of *jinshi* from [Chen, Kung and Ma \(2020\)](#). In the Qing dynasty, the gentry class, which frequently included large landowners, often comprised individuals who had passed the imperial examinations and earned degrees like the *jinshi*. Their wealth and power were closely linked to land ownership, making them significant players in both the economic and political spheres ([Sng, 2014](#); [Fairbank, 1986](#)).

The analysis reveals a significant rise in the number of Jinshi, suggesting that large landowners were increasingly asserting their dominance and potentially displacing small and medium-sized landowners. The coefficient is considerable, indicating an approximate 54% increase in the number of Jinshi in provinces more affected by the tax reform. This implies that the reform may have promoted land consolidation, where large landowners expanded their estates, thereby contributing to social instability.

Overall, the findings rule out the possibility of collusion between local officials and landowners to avoid tax collection. Instead, they highlight the significant mechanisms of labor supply elasticity and land consolidation. The results provide suggestive evidence that a progressive tax can lead to higher social instability. By relieving peasants of the poll tax burden, the reform inadvertently placed a heavier burden on them, either through increased land tax or the loss of their lands to larger landowners. This led to greater economic concentration and potential social unrest.

5 Potential Confounding Factors

There are major historical events occurred during the sample period that demand discussion. The most important one is the Huohao fiscal centralization due to its timing near the tax reform we focus on.

Huohao Fiscal Centralization To fulfill tax collection duties, local governments, which normally did not bargain with the central government for transfer payments, instead raised various informal levies, known as huohao, on top of the visible formal taxes. This term originally referred to the surtax introduced to cover the physical wear of silver during the collection of silver taxes. The third Qing emperor, Yongzheng, introduced efforts to centralize fiscal control from 1723 to 1735. His nationwide reform aimed to grant the central government a dominant role in distributing fiscal resources without changing the total tax burden. However, Emperor Qianlong, Yongzheng’s son and successor, did not maintain this policy. In the eighth year of his reign (1744), Qianlong approved an appeal to make inter-

province transfers of huohao, and the appropriation of huohao gradually became common practice. Thus, the fiscal centralization reform was temporary (Chen, Fan and Hao, 2023; ?; Wang, 1971).

To address this issue, we collect the county-specific huohao rate at the baseline from "Da-Qing huidian," the largest judicial corpus on administrative matters compiled during the Qing period (1644-1911). This corpus describes the structure of each administrative institution of the central and local governments and provides rules for the administration of various issues regulated by the government. We then control for the interaction between the post-reform dummy and the county-level huohao rate, in addition to the specification in Equation (3). As shown in all columns of Table 5, the coefficients on the interaction between the huohao rate and the post-reform dummy are small in magnitude and statistically insignificant. This indicates that it is unlikely that the huohao rate correlates with the treatment intensity and thus causes bias in estimating the reform's effects on conflicts.

The Grand Canal, which ceased functioning in the 1840s, significantly impacted regional trade and job opportunities, leading to increased rebellions post-closure (Cao and Chen, 2022). The First Opium War, starting in 1840, and the Taiping Rebellion, beginning in 1851, also induced substantial social unrest. By limiting our sample to periods before 1800, we ensure that our findings are not influenced by these disruptions, allowing us to focus on the effects of the tax reform itself.

6 Conclusion

Our study sheds light on the critical role of fiscal capacity and tax systems in shaping social stability, particularly in the context of 18th-century Imperial Qing China, which is an important period to study per se. The "Tan Ding Ru Mu" reform, being one of the three biggest reforms in the entire history of Imperial China, completely replaced the regressive poll tax with a progressive land tax. Although the aim was to reduce monitoring costs and streamline tax collection to build a more capable state, it was also designed to achieve social equity. However, our empirical results indicate that this significant tax reform led to increased social conflicts, primarily due to the heightened economic burden on peasants and the rise of large landowners displacing small-to-medium landowners, rendering a more unequal society.

These results emphasize the complex dynamics between tax policy and social stability, highlighting how even well-intentioned reforms can have unintended consequences and offer important policy

implications. Understanding how contemporary tax policies can be designed to minimize adverse social impacts while enhancing fiscal capacity remains a crucial area for policymakers and scholars alike. Looking forward, future research could explore how different designs of progressive taxation can balance the need for increased fiscal capacity without exacerbating social tensions.

1 Figures and Tables

Variable	N	Mean	SD	Max	Min	Unit	Source
Peasant Revolts	150650	0.008	0.090	3	0	Number of rebellions	Qing shilu and Cao and Chen (2022)
Agricultural Land Area (in Zhili and Shandong prefecture-level) County Population 1600	31106	5469.674	3267.387	14500.000	434.303	km ²	Liang (2008)
Provincial Level Tian fu	2144	2560036	744808	3719942	1387596	person	Cao and Chen (2022)
Provincial Level Ren ding	2175	10100000	8311872	25300000	319866	person	Liang (2008)
Tax Burden per Acre	1740	4.492	0.986	6.1	3	person	Liang (2008)
Jinshi	58306	22.19056	13.39327	93	1	person	Chen, Kung and Ma (2020)
Ruggedness	150650	72.751	97.594	447.791	0.678	Ruggedness index	Nunn and Puga (2012)
Huohao Rate	150388	0.112	0.031	0.150	0.040	Huohao (informal tax) rate	Daqing huidian
Flooding	150650	0.074	0.262	1.000	0	Flooding event	Chen and sing Kung (2016)
Drought	150650	0.098	0.297	1.000	0	Drought event	Chen and sing Kung (2016)
Maize	147506	0.683	0.465	1.000	0	Year of Maize Adoption	Chen and sing Kung (2016)
Sweet Potatoes	60522	1755.013	51.126	1876.000	1608	Year of Sweet Potatoes Adoption	Chen and sing Kung (2016)
Wheat	150650	4793.006	1835.325	8360.419	0	Suitability Index for wheat	Food and of the United Nations (2012)
Rice	150650	3758.357	1230.632	6735.000	0	Suitability Index for wetland rice	Food and of the United Nations (2012)
Soldier	150650	0.588	1.052	4.242	0	Number of soldiers stationed	Luo (1984)

Table 1. Descriptive Statistics

	(1)	(2)	(3)	(4)
<i>Dependent Variable: Peasant Revolts</i>				
Land/Pop $\times$ Post	0.006*** (0.002)	0.006*** (0.002)		
Revenue Equivalent Treatment $\times$ Post			0.006** (0.002)	0.006*** (0.002)
Province by Year FE		✓		✓
Pre-rebellion Level * Year FE		✓		✓
County-Year Covariates	✓	✓	✓	✓
County FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
R-squared	0.025	0.126	0.025	0.126
Observation	29143	29143	29143	29143

Note: The empirical specifications in Columns (1) and (3) are based on Equation (1). County-year covariates include flooding, droughts, ruggedness index, the introduction of maize, and the introduction of sweet potato. Columns (2) and (4) further control for the interactions of year dummies with pre-reform rebelliousness and province-by-year fixed effects. Land/Pop represents the agricultural land-to-population ratio at baseline. Revenue Equivalent Treatment is constructed using Equation (1). Treatment variables are standardized for interpretation. Peasant revolts are subject to an inverse hyperbolic sine transformation. The sample is restricted to the provinces of Zhili and Shandong, where the implementation of the tax reform is based on province allocation. Significance levels: * 10%, ** 5%, *** 1%.

Table 2. Baseline Results: The Effects of Transformation from Poll Tax to Land Tax on Peasant Revolts

<i>Dependent Variable: Peasant Revolts</i>				
Panel A: Decreased Risk	Not Adopted Sweet Potatoes		Adopted Sweet Potatoes	
	(1)	(2)	(3)	(4)
Land/Pop $\times$ Post	0.005*** (0.002)		0.011 (0.012)	
Revenue Equivalent Treatment $\times$ Post		0.007*** (0.002)		0.006 (0.007)
R-squared	0.129	0.129	0.069	0.069
Observation	26727	26727	2416	2416
Panel B: Collective Device vs Elasticity	Suitable for Wheat		Suitable for Rice	
	(1)	(2)	(3)	(4)
Land/Pop $\times$ Post	0.008** (0.004)		0.005* (0.003)	
Revenue Equivalent Treatment $\times$ Post		0.022** (0.009)		0.006** (0.002)
R-squared	0.258	0.258	0.128	0.128
Observation	3473	3473	25670	25670
Province by Year FE	✓	✓	✓	✓
Pre-rebellion Level * Year FE	✓	✓	✓	✓
County FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Note: Adopted Sweet Potatoes refers to counties that had adopted sweet potatoes before 1727, using the adoption of sweet potatoes as a proxy for decreased risk facing the peasants. The rice-to-wheat suitability ratio categorizes counties with a ratio above 0.5 as better suited for rice cultivation, while others are deemed more appropriate for wheat. Rice is more labor-intensive, serving as a collective device, but its labor-intensive nature also makes the labor supply relatively elastic, making it harder for landlords to pass tax incidence onto tenants. The empirical specification controls only for county fixed effects, year fixed effects, the interactions of year dummies with pre-reform rebelliousness, and province-by-year fixed effects. County-year covariates such as flooding, droughts, ruggedness index, the introduction of maize, and the introduction of sweet potatoes are not controlled for in this specification. Treatment variables are standardized for interpretation. Peasant revolts are subject to an inverse hyperbolic sine transformation. The sample is restricted to the provinces of Zhili and Shandong, where the implementation of the tax reform is based on province allocation. Significance levels: * 10%, ** 5%, *** 1%.

Table 3. Heterogeneity and Mechanism

	Land Total Tax Revenue	Tax Burden per Acre	Ren ding	Number of Jinshi
	(1)	(2)	(3)	(4)
<i>Dependent Variable:</i>				
Land/Pop $\times$ Post	0.702*** (0.172)	0.615*** (0.084)	0.150 (0.099)	0.540*** (0.033)
R-squared	0.898	0.956	0.911	0.733
Observation	2144	1740	2175	58306
Province FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Note: The sample includes all six provinces: Zhili, Shandong, Henan, Anhui, Jiangsu, and Zhejiang, instead of only two provinces as in the previous analysis. Due to data limitations, mechanisms use provincial-year panel data for analysis and thus only use the land-to-population ratio instead of the province revenue equivalence formula. Land here refers to the total province area instead of agricultural land. Land Total Tax Revenue is the total revenue collected in a province; Tax Burden per Acre is the tax collected per acre of land in monetary value, with similar results obtained when using grain value. Ren ding includes individuals who are above age 15, referred to as Ding. To proxy for the presence of large landowners, we aggregate individual-level data into province-year panel data on the number of *jins* from [Chen, Kung and Ma \(2020\)](#). Treatment variables are standardized for interpretation. Peasant revolts are subject to an inverse hyperbolic sine transformation. Significance levels: * 10%, ** 5%, *** 1%.

Table 4. Mechanism

	(1)	(2)
<i>Dependent Variable: Peasant Revolts</i>		
Land/Pop $\times$ Post	0.005** (0.002)	
Revenue Equivalent Treatment $\times$ Post		0.005** (0.002)
Huohao rate $\times$ Post	-0.161 (0.115)	-0.123 (0.112)
County-Year Covariates	✓	✓
Province by Year FE	✓	✓
Pre-rebellion Level $\times$ Year FE	✓	✓
County FE	✓	✓
Year FE	✓	✓
R-squared	0.126	0.126
Observations	29143	29143

Note: The dependent variable is the inverse hyperbolic sine transformation of the number of rebellions normalized by the 1600 population. Huohao refers to all informal levies that local governments collected to maintain their offices and perform their duties. We collect county-specific huohao rates at baseline from "Da-Qing huidian", the largest judicial corpus on administrative matters compiled during the Qing period (1644-1911). It describes the structure of each administrative institution of the central and local governments and provides rules for the administration of each kind of issue regulated by the government. Significant at * 10%, ** 5%, *** 1%.

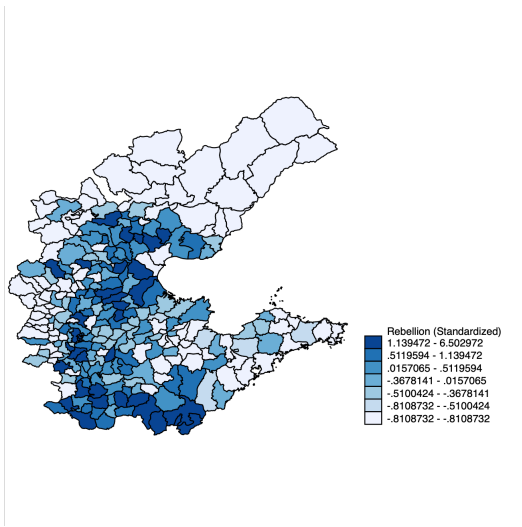
Table 5. Control for Competing Factors

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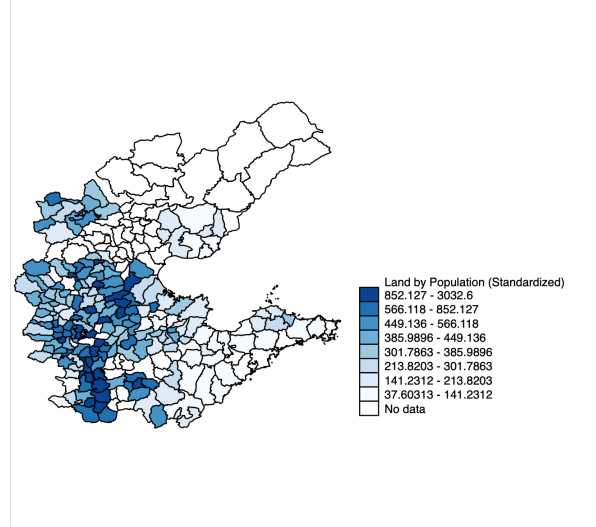
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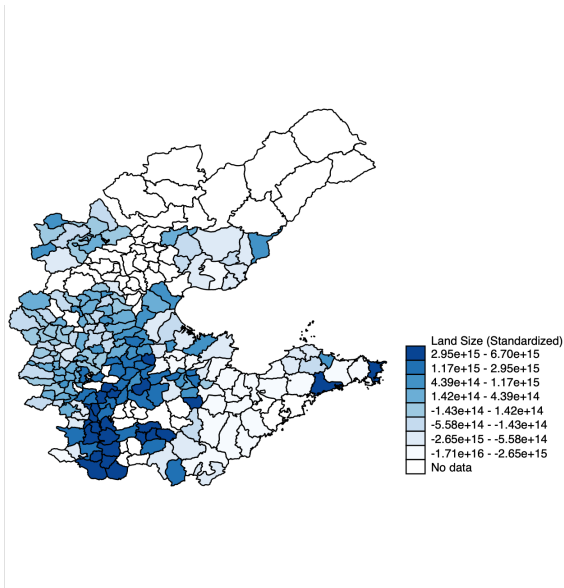
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(a) Panel A: Inverse hyperbolic sine transformation of rebellions per million population



(b) Panel B: Agricultural Land Area/Population



(c) Panel C: Revenue Equivalent Treatment

Note: These figures graph the geographical distribution of the inverse hyperbolic sine transformation of rebellions per million population in Panel A, and agricultural land area per population in Panel B. Sample comes from Zhili and Shandong provinces.

Figure A1. Geographical Distribution

Province	Reform Year	Tax Collection Conversion
Guangdong	1716	每地银一两摊丁银一钱六厘四毫不等
Sichuan	1722	每粮五升合至四石六斗不等算人丁一丁
Zhili	1723	每地赋银一两匀丁银二钱七厘有零，遇闰加七厘九毫四丝
Fujian	1724	每地银一两摊丁银五分二厘七毫至三钱一分三厘不等
Shandong	1724	每银一两摊丁银一钱一分五厘零
Yunnan	1725	分别田地科则每亩摊丁银三厘六毫至七厘六毫不等
Zhejiang	1726	每田赋银一两均摊丁银一钱四厘五毫有奇
Henan	1726	每地赋银一两摊丁银一分七厘六毫六丝至二钱七厘二零不等
Jiangsu, Anhui	1727	每亩摊丁银一厘一毫至六分二厘九毫不等
Jiangxi	1727	每地赋银一两征丁银一钱五厘六毫
Shanxi	1726	每地赋粮一石银一两摊丁银一钱五分三厘，遇闰加四厘
Hubei	1728	每地粮一石征丁银一毫四丝至八钱六分一厘不等
Gansu	1726	河东每粮银一两摊一钱五分九厘三毫，遇闰加一钱七分四厘八毫；河西每粮一石载丁银一分六毫
Hunan	1728	每地粮一石征丁银一毫四丝至八钱六分一厘不等
Guangxi	1728	每地赋银一两摊丁银一钱三分六厘零不等
Shanxi	1723	每粮一石合摊丁银一分八厘至二钱二分二厘，赋银一两摊丁银一钱四分七厘九毫至三钱三分八厘不等
Guizhou	1777	贵阳等二十九府厅州县每亩摊丁银五厘四毫四丝零
Shengjing	1841	无记载
Jilin	1883	每地银一两匀摊丁银三钱三分八厘六毫

Figure A2. Provincial Level Roll-out of Tax Reform and Land-Poll Tax Conversion

Notes: Data source from "The Draft History of Qing" (Qing Shi Gao)

(1)	(2)	(3)	(4)	(5)
Province	Di Ding Qian	Di Ding Liang	Total	Rank
Jiangsu	3,408,369	2,155,021	5,563,390	1
Zhejiang	2,830,346	1,130,481	3,960,827	2
Shandong	3,402,275	507,680	3,909,955	3
Henan	3,321,071	248,865	3,569,936	4
Shanxi	3,029,387	169,246	3,198,633	5
Jiangxi	1,884,713	899,632	2,784,345	6
Anhui	1,733,860	845,621	2,579,481	7
Capital(Zhili)	2,411,286	101,229	2,512,515	8
Shaanxi	1,601,333	168,453	1,769,786	9
Guangdong	1,259,163	348,095	1,607,258	10
Hubei	1,160,853	286,554	1,447,407	11
Hunan	1,166,311	277,641	1,443,952	12
Fujian	1,222,215	168,453	1,390,668	13
Gansu	286,298	503,476	789,774	14
Sichuan	659,175	14,329	673,504	15
Guangxi	391,113	130,375	521,488	16
Yunnan	198,724	230,848	429,572	17
Guizhou	100,156	154,590	254,746	18
Total	30,066,648	8,340,589	38,407,237	
Observations	17,107,207	4,988,897	22,096,104	

Notes: Data source from "The Draft History of Qing" (Qing Shi Gao)

Table A1. List of land coins and grains in various provinces in the Qing Dynasty

	(1)	(2)	(3)	(4)
<i>Dependent Variable: Peasant Revolts</i>				
Land/Pop $\times$ Post	0.006*** (0.002)	0.006* (0.003)		
Revenue Equivalent Treatment $\times$ Post			0.007*** (0.002)	0.007** (0.003)
Huohao Rate $\times$ Post		-0.046 (0.096)		-0.085 (0.104)
Province by Year FE		✓		✓
Pre-rebellion Level * Year FE		✓		✓
Prefecture Trends	✓	✓	✓	✓
County-Year Covariates	✓	✓	✓	✓
County FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
R-squared	0.132	0.132	0.132	0.132
Observation	29143	29143	29143	29143

Note: This table uses county-level area instead of prefecture-level agricultural land. This includes provinces Zhili and Shandong, and years from 1650-1911. Significance levels: * 10%, ** 5%, *** 1%.

Table A2. The Effects of Transformation from Poll Tax to Land Tax on Peasant Revolts using County-level Area to Measure Land