

CQH Working Paper Series

No. 0018

2026

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Centralized tax administration with top-down monitoring is regarded as a key element of the modern fiscal state. However, centralized administration can also introduce new agency problems for the monitors and create distortions across levels of the bureaucratic hierarchy. This paper studies how a fiscal administration reform aimed at monitoring local taxation can have unintended consequences on state capacity in late 18th-century China, using a novel dataset on tax collection constructed from administrative archives. We exploit predetermined variation across counties in exposure to the reform, which imposed formal oversight on county taxation by provincial treasuries. We find that the reform had a negative effect on tax collection. The decline in tax collection can be explained by a top-down encroachment mechanism: the reform created greater scope for monitors to withhold and misappropriate county funds. Such intergovernmental fiscal encroachment undermined local tax enforcement capacity and distorted county bureaucrats' incentives to underreport and embezzle revenue. We provide a range of evidence consistent with these causal chains.

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April 24, 2025

Abstract

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Keywords: state capacity, fiscal capacity, tax administration, taxation, China

JEL Codes: H72, D73, H77, N45, P48

^{*}We are grateful to Ying Bai, Joy Chen, James Fenske, James Kung, Jin Li, Weijia Li, Cong Liu, Chicheng Ma, Tuan-Hwee Sng, Bin Xie, as well as seminar and conference participants in Jinan University, Manchester University, Peking University, University of Hong Kong, the Eighth Asia Historical Economics Conference, UCSD Young Scholars Conference, Zhejiang University HPE workshop, and Zhejiang University-UIBE joint Public Finance Workshop for helpful comments. Liu acknowledges funding support from the National Natural Science Foundation of China (Grant No. 72503216).

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1 Introduction

State capacity to raise taxes is a key driver for development (Besley and Persson, 2013; Dincecco and Katz, 2016; Acemoglu and Robinson, 2019). Throughout history and up to the present, weak-capacity countries collect less revenue and suffer from informal and fragmented fiscal arrangements (Olken and Singhal, 2011; Aman-Rana, Minaudier and Sukhtankar, 2023),¹ where lack of budgetary monitoring exacerbates agency problems, leading to corruption and revenue leakages. A growing literature has argued that formal and centralized tax administration helps improve fiscal monitoring (Vannutelli, 2021), efficiency of revenue management (Cantoni, Mohr and Weigand, 2024), and thus is essential for building state capacity and establishing a modern tax system (Dincecco, 2009; Kiser and Karceski, 2017; Jensen and Weigel, 2026).²

However, centralized tax monitoring also reconfigures the internal organization of bureaucracies. By altering the allocation of authority between agents at different layers of the organization, centralized tax administration can reduce the autonomy of local bureaucrats while simultaneously generating new agency problems for the *higher-level* supervisors (Bandiera et al., 2021). These changes can create unintended distortions in the behaviors of lower-level bureaucrats. When local taxation falls under the oversight of higher levels, those higher levels gain greater opportunities to encroach on the local revenues (Weingast, 2009). Such encroachment may weaken local government’s fiscal stance and further distort the behavior of lower-level bureaucrats, rendering the centralization ineffective or even detrimental to state capacity.

This paper examines how centralized tax administration can generate distortions across different layers of government and produce unintended consequences on state capacity. We study this question in the context of late eighteenth-century imperial China and leverage a reform that introduced centralized administration of county funds. We find that the reform led to a decline in tax collection. We provide evidence that the negative impact is driven by indirect distortionary effects of the encroachment on county revenues by the provincial government, which gained monitoring authority after the reform. The encroachment harmed local enforcement capacity, and induced local bureaucrats to underreport and embezzle revenue, ultimately reducing total tax collection. Our results suggest a new explanation for the puzzle of weak fiscal capacity of imperial China as a part of the “Great

¹ In such arrangements, taxation and spending are managed locally by state agents but outside the formal budget process. See, e.g., Aman-Rana, Minaudier and Sukhtankar (2023) for informal fiscal systems in South Asia that rely on local bureaucrats to personally fund public services from collecting bribes.

² Kiser and Karceski (2017) highlight centralized bureaucratic administration as a key feature of modern tax states. Also see Brewer (1989) and Yun-Casalilla, O’Brien and Comín (2012) for historical qualitative accounts for Europe.

Reversal” between Europe and China (Greif, Mokyr and Tabellini, 2025).

As a large, multi-layered bureaucratic state marked with weak fiscal capacity, late imperial China provides an ideal setting to examine the impact of centralized tax administration. The reform under study was a nationwide policy adopted in 1785, with an explicit aim of strengthening the monitoring of county-level taxation. As the lowest layer of government, county governments were responsible for raising revenues for the central state. They also collected a local land tax surcharge (henceforth, LLT) as their main source of revenue for financing county spending (called *haoxian* or *huohao*).³ Prior to the reform, LLT was collected and spent locally at the discretion of county magistrates, with little formal supervision. Starting in 1785, a new decree introduced a centralized administration of county LLT, bringing county’s finance under the formal oversight of provincial governments. Under this new arrangement, LLT revenues were remitted directly to provincial treasuries, which centrally organized these revenues and disbursed *transfers* to counties to finance their operating spending. Non-compliant county magistrates would face disciplinary sanctions.

Several features make this setting attractive for empirical investigation. First, the reform did not alter the *de jure* division of spending responsibilities across government layers, and counties kept discretion over the use of LLT revenues after receiving the transfer. Second, the reform did not change the size of county budgets. Lastly, and crucially for our empirical strategy, the statutory amount of LLT earmarked for each county was predetermined by the central government. Exploiting the pre-reform variation in LLT across counties as the measure of exposure to the reform, we implement a difference-in-differences design, comparing counties with varying exposure intensity. To validate this design, we show the absence of differential pre-trends in outcomes across counties with varying LLT. Moreover, we exploit the fact that the initial assignment of LLT was based on a classification of regional governance complexity and we further control for this treatment determinant variable in a time-varying manner.

This paper is based on a large data collection effort to construct a novel county-year panel dataset on tax collection between 1750 and 1834, based on administrative records of the *Ministry of Finance Archives*. Because the collection of land taxes was governed by a fixed revenue quota system, successfully meeting the revenue quota left no archival trace. We use an indicator variable for tax shortfall to measure a county’s fiscal (under)performance, recording whether the county failed to achieve its preassigned land tax collection target. We validate that this measure is consistent with the revenue data available at the provincial and national levels. To explore the underlying mechanism, we draw on *Ministry of Personnel*

³ Counties also received a small share of central land tax revenues, but they had no discretion over their use, which was strictly governed by the central budgetary plan.

Archives, Ministry of Justice Archives, text data of correspondences from provinces to the central administration, and other sources to collect rich information on law enforcement outcomes, public goods provision, tax deferral, local disasters, and official disciplinary records. Complementing these data, we also collect exhaustive data on county fiscal, political, and geographical characteristics.

First, we study the impacts of centralized tax administration on fiscal capacity. We find the reform had a significant negative effect on tax collection. The result shows a large *increase* in the shortfall of central tax among counties with higher exposure to the reform. A one standard deviation increase in *log LLT* increases the probability of central tax shortfall by 2.7 percentage points after the reform, a magnitude equivalent to a 75% increase from the mean probability. Breaking down the effect by tax category, we find a similar increase in shortfalls for both central land tax and grain tribute—the two major revenue sources of the central government. Event-study results provide evidence in support of the common trends assumption.

Why did a centralized tax administration aimed at monitoring county finance lead to a decline in central tax collection? We argue that increasing monitoring authority over county taxation creates new agency issues for the monitor (i.e., provincial governments) ([Bandiera et al., 2021](#)), making it easier for monitors to encroach on county funds by diverting, withholding, and misappropriating. In particular, such top-down encroachment generates two downstream distortionary effects which could reduce tax collections. First, the extraction of county funds weakened the fiscal position of local governments, undermining their coercive and law enforcement capacity, and thereby leading to lower tax collection. Second, county bureaucrats could underreport real crop yield and hence tax revenues, embezzle, and misappropriate central tax revenues to compensate for their lost income due to the monitor’s encroachment, resulting in “tax leakage.”

We provide rich evidence in favor of the top-down encroachment mechanism. We begin by showing that the impact on central tax shortfall is particularly strong in provinces with a higher reported frequency of diverting LLT revenue. The effects are also more pronounced for counties where provincial leaders had direct personnel control, in line with the greater influence of monitors making them especially prone to provincial encroachment.

We proceed to investigate the causal chains and show results consistent with two plausible distortionary effects that explain the decline in tax collection. First, we examine the cross-sectional heterogeneity and find a stronger treatment effect in counties with higher difficulty in tax collection, consistent with a deterioration in enforcement capacity. As more direct evidence, we show that the reform led to more tax resistance, more uncleared crime cases overdue, and fewer crime convictions, indicating a negative effect on overall law

enforcement capacity. Second, we provide indirect evidence of tax misreporting. Using the text data from the official correspondence with the crown, we find that counties with higher reform exposure reported more incidents of natural disasters. This is despite the fact that meteorological data indicates no change in the occurrence of actual disasters or extreme weather. These results are in line with our hypothesis that county bureaucrats embezzled and pocketed the revenues by overreporting disasters, underreporting agricultural output, and falsifying records of tax delinquents. Consistent with this explanation, we find a substantial increase in disaster-induced tax deferrals granted to counties. These deferred taxes were rarely repaid and remitted to the central treasury in subsequent years, accumulating into massive arrears.

Related literature. This paper contributes to several strands of literature. First, we contribute to the literature on state capacity building. There is a rich literature on the impact of warfare (Besley and Persson, 2009; Gennaioli and Voth, 2015; Queralt, 2019; Fernández-Villaverde et al., 2023) and political representation (North and Weingast, 1989; Cox and Dincecco, 2021; Becker et al., 2025) on the development of state capacity. Our paper is closely related to a strand of recent empirical work on the impacts of administrative reforms (Chiovelli et al., 2023; Chambru, Henry and Marx, 2024), and centralized fiscal institutions (Dincecco, 2009; Cantoni, Mohr and Weigand, 2024; Jensen and Weigel, 2026), with a regional focus on Europe. While prior work documents how successful fiscal centralization improves state capacity,⁴ very little is known about whether and how similar reform attempts failed in other contexts. We add to this literature by showing the *negative spillover* effects of tax administrative reform on fiscal capacity in China. This paper offers a new explanation based on the top-down encroachment and distortions within the state apparatus (Ma and Rubin, 2019; Li, Roland and Xie, 2022).⁵ Our findings enrich our understanding of weak fiscal capacity in late imperial China compared to that of Western Europe (Sng and Moriguchi, 2014; Vries, 2015; Johnson and Koyama, 2017), helping to explain the long-run trajectory of declining fiscal capacity during the 19th century and indicating the ultimate failure of centralizing the fragmented fiscal arrangement in Qing China (Kaske and Lin, 2022).

We also relate to research on fiscal legibility and state informational capacity (Scott, 1998;

⁴ For instance, Dincecco (2009) shows that administrative reforms of centralized tax institutions in European countries over the 15th-19th centuries were associated with higher revenues. Cantoni, Mohr and Weigand (2024) show the impacts of centralized fiscal administration on state consolidation in the Holy Roman Empire.

⁵ In a theoretical paper, Ma and Rubin (2019) show that “weak fiscal capacity-weak monitoring” can be a suboptimal equilibrium because the ruler with perfect information cannot commit to refraining from confiscation from agents. Our findings are in line with this work in the sense that the centralization increased transparency of local land tax, leading to the commitment problem of “confiscation” of revenues. Relatedly, Li, Roland and Xie (2022) theoretically show how erosion of the ruler’s power and corruption can make weak fiscal capacity persistent.

Sánchez de la Sierra, 2020; Garfias and Sellars, 2022; Mayshar, Moav and Pascali, 2022). Our findings that the centralization reform led to local agents misreporting and revenue leakages indicate that informational capacity can be endogenous to the organizational structure of the state. The ruler's effort to strengthen fiscal transparency may disrupt the informal fiscal arrangement as an equilibrium between the ruler and agent (Aman-Rana, Minaudier and Sukhtankar, 2023), and can even backfire by creating unintended distortions.

Second, our paper speaks to the literature on the organizational economics of the state (Finan, Olken and Pande, 2017; Besley et al., 2022). Existing studies mainly focus on personnel policies, including incentives, recruitment, and allocation of bureaucrats (e.g., Dal Bó, Finan and Rossi, 2013; Bertrand et al., 2020; Colonnelli, Prem and Teso, 2020; Moreira and Pérez, 2024; Aneja and Xu, 2024). From an organizational perspective, the reform under study imposed an intermediate fiscal monitor between the principal and the agents (county bureaucrats). Our findings indicate that, in a multi-layered organization, monitors can also have their own agency issues and might act in their own interest at the expense of agents and the principal. In this sense, we contribute to the growing literature that highlights the role of organizational structure of state (Bandiera et al., 2021; Fenske, Haseeb and Kala, 2023) and the importance of monitoring effectiveness for state capacity (Vannutelli, 2021; Mastrococco and Teso, 2023). Our findings are in line with Bandiera et al. (2021), who show experimental evidence that shifting authority from monitors to frontline procurement officers improves performance if their monitors themselves are extractive or corrupt. We complement their findings in two ways. First, we study the effects of increasing the authority of monitors, where centralization makes monitors more prone to encroach on local funds, ultimately worsening fiscal capacity. Second, the reform we study was not aimed at tax extraction capacity. Nevertheless, we show that it produced *indirect* distortionary effects on tax collection through the monitor's top-down encroachment.

Finally, we contribute to the literature on incentives and moral hazard problems in fiscal federalism. A classic moral hazard problem in decentralized public finance is the debt accumulation and overspending of local governments with the expectation of bailouts by higher-level government—so-called soft budget constraints (Kornai, Maskin and Roland, 2003). A strand of literature has focused on the agency problem of *lower levels* (Rodden, 2002; Pettersson-Lidbom, 2010; Yared, 2019; Dovis and Kirpalani, 2020; Piguillem and Riboni, 2021) and how to enforce local fiscal discipline using monitoring and fiscal rule (Grembi, Nannicini and Troiano, 2016; Carreri and Martinez, 2022; Vannutelli, 2021; Fremerey, Lichter and Löffler, 2025). However, the incentive problems faced by those *high levels* have received little attention. We contribute to this literature by empirically showing a distortionary

mechanism arising from a different type of intergovernmental moral hazard problem. Centralizing fiscal administration aimed at correcting *lower levels'* agency problems can simultaneously create opportunities for top-down encroachment by *higher levels*. If the higher-level supervisors cannot commit not to grab the lower levels, centralized monitoring can undermine local government performance and distort local agents' behavior.

Our findings on the unintended distortions of fiscal monitoring highlight the importance of institutional arrangements and the rule of law governing the relationship between vertical levels of government (Weingast, 2009, 2014). Although our empirical setting is historical China, the mechanism we identified is also relevant in contemporary developing countries. Similar tension and encroachment between different levels of government can generally apply to other contexts where there is uncertainty over the (*de facto*) division of decision-making authority and spending responsibilities across levels of the government, and weak institutions hinder the proper enforcement of fiscal power sharing. For example, Kresch (2020) shows that the uncertainty in the shared mandate of public goods provision leads to a threat of takeover between Brazilian municipal and state governments, deterring public investment in water and sanitation.

2 Historical Background

2.1 China's fiscal system in the Qing Dynasty

Imperial China in the Qing dynasty (1644-1911) was a unitary bureaucratic state with multiple layers of administrative units governing a vast territory, which resembled the hierarchical structure of nowadays China. It was divided into 18 provinces, 250 prefectures, and over 1,600 counties. While the Qing government had a high administrative capacity in terms of a well-established professional bureaucracy staffed by centrally recruited and appointed officials, the fiscal capacity was much weaker than that of its European counterparts (Vries, 2015). In the early eighteenth century, the annual tax burden per capita was equivalent to only two days' wages for an unskilled worker. Measured in grams of silver, per capita revenue of the leading European states (France, Spain, England, and Dutch Republic) were 6–22 times higher than that of Qing China (Brandt, Ma and Rawski, 2014).

A specialized and central institution, the Ministry of Finance (MOF), was in charge of fiscal administration. The MOF oversaw the allocation, collection, and remittance of various taxes across provinces based on the *Comprehensive Book of Tax and Corvee* (*Fuyiquanshu*), which functioned as a revenue and expenditure budget plan, enabling quantified and centralized management of the state finance. Most of the taxes were collected by local

governments, but nearly 80% of revenues accrued to the central finance, with subnational governments retaining only a small portion (Chen, 2013). The spending of these locally retained revenues was also tightly governed by the MOF's budgetary and accounting plan (Zelin, 1984).

Until the late nineteenth century, Qing dynasty China's fiscal system relied heavily on agricultural taxes, accounting for more than 70% of the central revenues. The most important revenue source for the central government was land tax (so-called *didinyin*). A key feature of land tax was its fixed region-based quota system: each county was assigned a predetermined tax quota that served as its revenue target for the corresponding county government. The Qing government allocated the land tax quota based on cadastral registers from its Ming Dynasty predecessors (1368–1644) (Wang, 1973; Lamouroux and von Glahn, 2022).⁶ By the mid-18th century, the total central land tax quota amounted to roughly 30 million taels of silver. The central government also collected grain tribute (so-called *caoliang*) subject to a similar fixed quota system, which was paid in kind and had a total quota of about 4 million *shi* (roughly equivalent to 6 million silver taels). Other major revenue sources included salt tax and custom duties collected by specialized agencies, which together amounted to 10 million silver taels (Ni, 2013).⁷

The collection of central land tax and grain tribute was among the most important functions of local governments (Ch'u, 1962). County governments were directly in charge of yield assessment, tax collection, and remittance. Collected revenues were to be remitted to provincial treasuries in due course, which would then either remit the revenues to the central treasury or disburse them under the directives of the MOF. As the tax agent of the state, the county magistrate was subject to a detailed performance evaluation. Failure to meet the revenue target shall result in disciplinary actions, according to the specific shortfall rate relative to the tax quota (Ni, 2013). The provincial government was a key intermediate layer of fiscal oversight between counties and the MOF. Each province had a Provincial Financial Commissioner in charge of fiscal administration, monitoring tax collection and remittance, and making consolidated accounting for reporting to the Ministry of Finance.

⁶ The land tax quota was permanently frozen in 1712 by the Kangxi Emperor's decree. By 1772, the Qing state had formally halted the household registration survey. Historians refer to this institution as the "immobile fiscal system" (Lamouroux and von Glahn, 2022).

⁷ The Qing ruler also established the independent Imperial Household Department (*Neiwufu*) to manage the affairs and finances of the imperial family. It generated approximately 1.6 million taels from various commercial and financial sources (Lai, 2016).

2.2 Local public finance in mid-18th century

While subnational governments shared a small proportion (20%) of central land tax revenues, expenditures from these funds were controlled by the Ministry of Finance. Therefore, these funds were in fact unavailable for local expenses.⁸ Instead, local government spending was largely financed by a local land tax surcharge (henceforth, LLT for short) (so-called *haoxian* or *huohao*). These revenues amounted to 4.5 million taels of silver in total and were shared between provincial and county governments.⁹

Provincial governments were the foremost decisive authority of subnational governments. Each province was headed by a governor or viceroy, who was appointed by the central state and served as the top political and fiscal authority within the province. Provincial expenditure was financed by a share of LLT revenue.¹⁰ Initially, provinces had considerable autonomy over the use of these funds. After the announcement of *The Charter of Land Tax Surcharge (Haoxianzhangcheng)* in 1750, they became partially subject to centralized budgetary control by the Ministry of Finance (Zelin, 1984). Provincial governments should use these funds through an apply-and-approve procedure.

As the basic administrative unit and the lowest level of government in Qing China, county governments were directly responsible for a range of state functions, including tax collection, law and order, judicial matters, and local public goods provision. The county government served as the primary arm of the state. County bureaucrats made up 74% of all formal bureaucrats within subnational governments.¹¹ Each county had a magistrate, the chief administrator appointed by the central state or provincial leaders. A typical county government hired 100 public employees, including clerks, police forces, and tax collectors, etc (Ch'ü, 1962). The operation of county government was largely financed by LLT. The statutory amount of LLT allocated to each county was determined by the central government in *The Charter of Land Tax Surcharge*, ranging from 400 to 1,800 silver taels. If a balance remained after operating expenses, counties could allocate the surplus for local public goods, such as schools, charities, and granaries.

In stark contrast to the centralized budget administration of central finance, county public finance was characterized by informal and fragmented arrangements. County governments retained their share of LLT revenues before remitting the rest of the provincial portion of LLT to provincial treasuries. Counties had full discretion over the use of their

⁸ They were narrowly earmarked for officials' basic salaries, and the operating expenditures of two nationwide public goods: military garrisons and national postal road system (Zelin, 1984).

⁹ Authors' calculation based on *The Charter of Land Tax Surcharge (Haoxian Zhangcheng)*.

¹⁰ The operating expense of other small regional offices (e.g., prefecture government) was also financed from the provincial shared local land tax.

¹¹ Calculation based on *Roster of Government Personnel 1766*.

own LLT shares. Both collection and expenditure were managed locally outside the formal budgetary regulation and free from any evaluation or monitoring by higher authorities. This opacity made it difficult for the central government to know the actual fiscal situation of county governments. As one inspector in the late Qing period observed, “*Regarding the income and expenditure of counties, even the provincial governor is difficult to audit in detail. This situation is no different from thousands of small independent countries*” (Iwai, 2011, p. 45). The central government became increasingly concerned about corruption and neglect of duty in LLT collection, since its delinquency and shortfall would also threaten the funding for the other local government offices that relied on LLT.

2.3 The centralized tax administration in 1785

In 1785, the central government introduced a reform that established a more centralized administration of local land tax, with the aim of strengthening oversight of county finances. The imperial decree stipulated in August 1785 (Chinese lunar calendar):

“Although Haoxian (local land tax surcharge) is different from the central land tax, it is unacceptable that central land tax could be fully collected while only the Haoxian was left in arrears (...). Local land tax surcharge is levied to fund the operations of local governments. However, the current practice of county officers retaining and spending these revenues on their own leads to malpractice of corruption and embezzlement. Henceforth, this practice should be prohibited. All local land tax revenues shall be collected and directly remitted to the provincial treasuries. Unified disbursements of county funds should then be made from the provincial treasuries. Provincial governors should report to the Ministry of Finance for verification and annual accounting.” (Veritable Records of Qing, August 5, 1785, see Appendix Figure B1 for the original pages of the decree)

The new system enhanced top-down monitoring and brought the LLT under the formal oversight of provincial treasuries. Under the new systems, counties lost their autonomy in LLT collection. Provincial treasuries were granted the power to oversee and evaluate the collection and remittance of LLT, as well as the central disbursement from this source. Non-compliant county magistrates would face disciplinary sanctions. Besides the change in formal power, the shift to the centralized funding method of county funds by transfer disbursement significantly increased the practical authority of the provinces relative to counties.

Several features of this reform are also worth mentioning. First, centralization replaced the self-collect-self-spend revenues with equivalent transfers, according to the statutory

amount of LLT earmarked for each county. Therefore, the reform in principle did not change the size of county budgets. Second, it did not change the current *de jure* division of expenditure responsibilities between provincial and county governments. In addition, counties kept discretion in how to use their revenues.

2.4 The aftermath of the 1785 decree

Finally, we discuss relevant historical observations and narratives that motivate our empirical investigation of the consequences of the 1785 decree.

Withholding and diverting county funds. An implicit commitment in the new centralized tax administration was that provincial treasuries would fully disburse the transfer of county funds to the counties. However, the centralization reform unintentionally created a new agency issue for provincial governments, rendering such commitment less credible. Before the reform, provinces occasionally asked their subordinate counties to divert their LLT to some ad hoc provincial expenses. Lack of information on county finance made such diversion not very feasible. However, the centralized administration of LLT made it much easier for the provinces to do so because (1) they were formally empowered to oversee county finances; and (2) all LLT revenues were physically shipped to the provincial treasuries. Now the provinces could simply withhold and misappropriate them for other purposes. Around the onset of the 19th century, incidents of provincial treasuries withholding and diverting county funds became very frequent (Iwai, 2011; Zhou, 2020). Such top-down fiscal encroachment became widespread across provinces. As a county magistrate noted in the 1850s, “the robbery by the provincial treasury is even more ruthless than bandits” (Zhou, 2012).

Tax shortfall and arrears. Starting in the early nineteenth century, China experienced a gradual but substantial decline in tax revenue collection. This downward trend began much earlier than the major shock of wars with Western countries (e.g., the First Opium War in 1840) and the catastrophic Taiping Rebellion (1850). Figure 1 plots revenue estimates for 10 data points spanning the 19th century.¹² Central land tax revenues declined from 29 million silver taels per year in 1800 to 27.5 million taels by 1831. Yearly revenues continued to decrease, reaching 26.6 million taels around 1840, representing a shortfall rate of 11.3% relative to the total tax quota (30 million taels). Grain tribute collection exhibited a similar downward trend.

¹² Revenue is estimated as the fixed target quota minus the average annual tax shortfall, derived from ten episodes of universal exemption of accumulated uncleared tax arrears during the 19th century. These are conservative estimates of the actual tax shortfall. Data on the amount of universal tax exemptions are drawn from Li (2024, p. 151).

The primary direct driver was the tax deferrals due to disasters. Accumulated tax deferrals were rarely repaid in subsequent years, but rather rolling over year after year (Li, 2024).¹³ In 1820, the Daoguang Emperor complained that “*tax arrears have accumulated extensively across the provinces, and year after year their payment has been deferred. This is truly unreasonable*” (Li, 2024, p. 175). As part of the disaster relief policy, the Qing government routinely granted tax deferrals or exemptions in proportion to the severity of calamities (Will, 1990). Historical discussions suggest prevalent episodes of fraud, misreporting, and corruption related to tax referrals and exemptions, which emerged as new phenomena in the 19th century. A prominent form of misconduct was underreporting crop harvests and fabricating disasters to obtain tax deferrals.¹⁴ The governor of Jiangsu Hongzhang Li acknowledged the long-standing practice of misreporting disaster: “*there was no year without disaster, no county without tax deferrals in Jiangsu (...). The reason is county governments fabricating disaster*” (Zhou, 2020, p. 130). Local bureaucrats often collected more taxes than reported and falsified records of taxpayer delinquency, thereby embezzling revenues for other purposes or private rents, as extensively documented (Ni, 2013; Li, 2024).¹⁵ By manipulating tax deferrals and exemptions, tax collectors could even demand bribes and illegal fees from taxpayers in exchange for proof of tax waivers, a practice known as “selling disaster” (Li, 2024).

3 Data

3.1 Tax collection records

We construct a novel county-year level panel data on tax collection between 1750 and 1834. We derive the universe of the *Ministry of Finance Archives* (*Huketiben*, MOF Archives henceforth) from the catalogue of the First Historical Archives of China, with a total of 225,519 pieces of records covering the entire Qing Dynasty. The MOF Archives correspond to the original administrative records related to all fiscal matters routinely sent by Ministers of Finance and senior local officials to the central administration (the emperor and the cabinet).

For our purpose of analyzing fiscal capacity—county governments’ performance as tax

¹³ The repayment rate of deferred taxes owed was very low. For instance, in Shandong province, the repayment rate from 1818 to 1822 was around only 0.4-1.6% (Li, 2024, p. 194).

¹⁴ In 1819, Shandong province reported accumulated arrears of 8.6 million silver taels, entirely attributed to taxpayer delinquency. A special investigation revealed that the actual delinquency accounted for only 2 million taels, while the remaining 6.6 million taels resulted from embezzlement by officials (Li, 2024, p. 267).

¹⁵ A typical method of embezzlement was deliberately delaying or concealing announcements of tax exemptions and deferrals, leaving taxpayers unaware, while bureaucrats collected taxes as usual (Zhou, 2020, pp. 213–226).

agents for the central state, we focus on records reporting the collection and remittance of tax revenues. As we have noted in the background section, the collection of formal taxes was governed by a fixed revenue target quota system. While a county's fully achieving the revenue target would usually not leave any specific records, the MOF Archives contain detailed records of local governments' *tax shortfall* in collection and remittance relative to their revenue targets, which county bureaucrats were required to collect and remit to the state treasury. Given that the title of each record is a consolidated summary of the report following a standardized format, we can identify and retrieve these tax collection records using keywords approach based on the title text. As a result, we retrieve a total of 8,321 pieces of tax collection records between 1750 and 1834. To our knowledge, we are the first to assemble and systematically use these data at scale for research.

The raw data are available at a highly granular level. For each *tax shortfall* record, the MOF Archives provide information on a county's tax shortfall for a specific tax category in a given year. It also includes the name of the responsible county magistrate.¹⁶ See Appendix Table A1 for examples of these records. We first geolocate each record to a county and assign it to the corresponding year. Then we group them into separate tax margin categories: central land tax, grain tribute.¹⁷

We use these tax collection records to construct a panel dataset at the county-year level from 1750—1834. While the information on the amount of tax revenues is unavailable, this dataset allows us to concretely measure the presence of *tax shortfall relative to the revenue target*. In our empirical analysis, we use an indicator variable *Tax Shortfall* of central tax to measure a county's fiscal (under)performance, which takes the value one if the county fails to fully achieve its preassigned tax collection target for the year.

Data validation. One might be concerned about the representativeness and potential selection bias in our measurement of tax collection using an indicator of tax shortfall relative to the target. As this measure is constructed from granular MOF Archives records, this could be biased due to missing archives. Additionally, the binary indicator of tax shortfall may not fully capture the continuous variation in revenue collection. Although systematic revenue collection data at the county-year level are scarce, we can compare our tax shortfall data with revenue data directly from official sources, which are available only at the provincial level for a limited period. We draw on province-year-level central land tax revenue data overlapping our sample period (1821–1834) from (Ni, 2013, pp. 91–96)).¹⁸

¹⁶ For an example of the record, it was titled “Report on Matter of Disciplinary Action for the Magistrate of Gaotai County in Gansu Province, Zhu Shigu’s Shortfall in Land Taxes for the Qianlong 10th Year (1745).”

¹⁷ We refer to central land tax and grain tribute collectively as “central tax.”

¹⁸ The underlying data source is the original official records of provincial annual fiscal accounting (*Zouxiao chaodang*) during the Daoguang period (1821–1850), compiled by Xianglong Tang, a pioneer Chinese economic

Intuitively, the presence of tax shortfall should be negatively associated with revenue collected, particularly considering fixed revenue targets. We validate the effectiveness of tax shortfall measure in two ways. First, we compute the average shortfall rate of central land tax, aggregated at the national level.¹⁹ Figure A1 compares total land tax revenue (right y-axis) with the average likelihood of tax shortfall (left y-axis, reversed scale) over time. Reassuringly, we observe a strong negative correlation between the yearly trends in tax shortfall and total tax revenue. Second, we aggregate the tax shortfall data at the provincial level and find a tight negative relationship between average tax shortfall likelihood and tax revenue collection in the province-year panel data. Appendix Figure A2 visualizes this correlation in binned scatter plots.²⁰ Similarly, Appendix Figure A3 further corroborates this validity using revenue collection as a share of the revenue target.

3.2 Other data

Local land tax. The main explanatory variable is the total amount of LLT earmarked for each county (so-called *yanglianyin*). Our empirical analysis uses its spatial variation to measure the exposure of each county to the centralization policy. Data on county LLT is drawn from the *Handbook of Statutes and Precedents of the Qing* (*Qing Huidian Shili*). Appendix Figure A4 illustrates an example of this source. We also complement and cross-validate this data source with the *Roster of Government Personnel* (*Jinshenlu*) of 1766. Figure 3 shows the regional distribution of county LLT, showing substantial variation across counties.

Diverting local land taxes. To measure the top-down fiscal encroachment activities by provincial governments, we exploit correspondence text data between provinces and the emperor (known as Palace Memorials, *zouzhe*). According to the fiscal regulations, provincial leaders were required to send a report to the emperor to request permission for any irregular use of LLT revenues. We search for relevant keywords in the title of these memorials to identify the memorials about diverting or withholding LLT revenues. Appendix Figure A5 shows an example of a complete memorial sent by the Governor of Henan. Such incidents typically involved the withholding of county funds disbursement for multiple counties within a province (Zhou, 2020). Since the precise amounts diverted or withheld are unobservable, we construct an indicator variable at the provincial level that

historian.

¹⁹ To account for the fact that tax shortfall by counties with higher land tax targets tends to result in larger declines in revenue collection, we weight the average tax shortfall likelihood based on the county's central land tax target. The pattern is similar using unweighted data (Appendix Figure 2).

²⁰ We can gauge the magnitude of the correlation using the coefficient from a simple province-year level regression, controlling for total tax target: a 10-percentage-point increase in a province's average tax shortfall likelihood is associated with a reduction of 0.277 million silver taels. This represents a 21% increase relative to the sample mean (1.288 million silver taels).

equals one if the provincial government reported withholding or diverting LLT in a year.

Law enforcement outcomes. We collect several variables to measure local coercive capacity and law enforcement. First, we collect information on the records of serious crime cases uncleared beyond the stipulated time limit (i.e., cases in which the offender was not identified and remained at large for over six months) from the *Ministry of Personnel Archives* (*Liketiben*). These records were originally generated from regular performance evaluations of local bureaucrats (Ch’u, 1962). Second, we digitize the *Ministry of Justice Archives* to collect data on crime case clearance. The data contain the universe of convictions of serious crime cases.²¹ We identify the location of each case and aggregate the number of solved cases to the county-year level. Third, we collect the data on incidents of tax resistance from the *Veritable Records of Qing* (*Qingshilu*), a comprehensive chronicle documenting important events on a daily basis. We focus on protests and social unrest explicitly documented as being against tax collection.

Disaster and weather data. For the occurrence of the disaster, we rely on A Compendium of Chinese Meteorological Records of the Last 3000 Years, a series of volumes edited by (Zhang, 2004). This source provides a record of various types of natural disasters in historical China, including droughts, floods, plagues, locust infestations, hurricanes, earthquakes, and snowstorms. Most of the underlying sources are local gazetteers (rather than official government reports). Moreover, this data includes information on whether the government provided any relief in each disaster incident. We complement this data source with meteorological data from the Chinese Academy of Meteorological Sciences (1981). The data provide an annual precipitation index for 120 “observation stations,” each covering one to three prefectures. The raw data include a five-level index measuring the extent to which the rainfall deviates from long-average normal levels in the harvest season (May to September): extreme rain (1), moderate rain (2), normal (3), moderate drought (4), and extreme drought (5).²²

We also collect a set of additional variables to supplement our mechanism analysis. First, we collect data on comprehensive records of tax deferrals and exemptions from (Chen, Xiao and Xiong, 2012). The underlying source is the *Veritable Records of Qing*. We use the information on the timing of each record and pin down the location at the county level. To measure the provision of local public goods, we also collect data on disaster relief from the same data source. Second, we use the text data from official correspondence (Palace

²¹ In Qing China, county court’s decisions on all criminal cases involving death or resulting in sentences of banishment or death were submitted to the “Supreme Court” (i.e., the Ministry of Justice) for review, which would then certify or overrule the decision (Zheng, 2022, p. 44).

²² Levels 1 and 5: above or below the normal rainfall by 1.17 standard deviations; levels 2 and 4: above or below the normal rainfall by 0.33 s.d.; level 3: within 0.33 s.d. from the normal rainfall.

Memorials) to construct a proxy for disaster reporting to the central government at the county-year level. To explore the incidents of corrupt income, we extract cases from Palace Memorials that county bureaucrats were charged or investigated for collecting bribes or imposing unlawful fees. Finally, we also collect exhaustive information about county fiscal, political, and geographical characteristics from various sources. Appendix A provides detailed definitions and sources of those additional variables.

4 Centralization and tax collection

4.1 Empirical Strategy

To investigate how the centralized tax administration affected fiscal capacity, we exploit regional variation in county LLT as the measure of exposure to the centralization in a difference-in-differences (DID) strategy. Intuitively, the reform had a larger impact on counties with higher LLT funds to remit to the provincial treasuries under centralized administration.

Our research design compares the change in our outcomes of interest before and after the introduction of the reform in 1785, between counties with different exposure to the centralized tax administration. Our sample covers 1,546 counties. For county i in year t , we estimate the following specification:

$$Y_{it} = \beta \times \log \text{LLT}_i \times \text{Post}_t + \theta_t + \lambda_i + X'_{it}\gamma + \epsilon_{it} \quad (1)$$

where the treatment variable, $\log \text{LLT}_i$, is the logged amount of county LLT. Post_t is a dummy variable indicating the year after the reform, which equals 1 for the years after 1785. We include county fixed effects λ_i to capture all time-invariant confounding factors. θ_t are year fixed effects capturing the common shocks over time that affect all counties. Finally, X'_{it} denotes a set of control variables. standard errors ϵ_{it} are clustered at the prefecture level. The coefficient β estimates the average differential change of outcomes before and after the centralization in counties with high LLT relative to counties with low LLT.

The main identification concern is that reform exposure is not randomly determined. Although the inclusion of county fixed effects controls for time-invariant differences across counties, some of these differences may still affect the outcome in a time-varying way. Table 1 shows results from cross-sectional regressions correlating county LLT and a range of predetermined characteristics. Column 3 shows that counties with higher LLT appear to have higher populations, larger areas, more river access, and closer proximity to the provincial capital.

To further address the potential time-varying confounding factors due to cross-sectional differences across counties with varying LLT, we leverage the fact that the initial assignment of county LLT was largely based on a five-tier classification of regional complexity ratings ranging from 0 to 4 (Chen, 2009).²³ Appendix Figure B2 shows that the amount of county LLT positively correlates with regional complexity rating. We can explicitly control for the exposure determinants by including the complexity rating interacted with year fixed effects in X'_{it} . In favor of this approach, column 4 of Table 1 shows that, conditional on the inclusion of complexity rating fixed effects, county characteristics are much more balanced across counties with higher or lower LLT. Only three variables (rice suitability, distance to provincial capital, and number of officers) are significantly correlated with county LLT. As robustness, we would also flexibly control for these characteristics interacted with year fixed effects.

A key identification assumption for causal identification is that outcomes in counties with varying exposure would have evolved similarly in the absence of the reform. If this assumption holds, we should observe no systematic difference in trends across counties with higher or lower exposure before the reform. To assess the common trends assumption, we will also estimate an event-study specification to track the dynamic effect relative to the period just before the reform:

$$Y_{it} = \sum_d \beta_d \times \log LLT_i \times \delta_d + \theta_t + \lambda_i + X'_{it}\gamma + \epsilon_{it} \quad (2)$$

Where δ_d is an indicator for each 5 years bin. If the coefficients β_d corresponding to pre-reform periods are close to zero, this suggests that the parallel trends assumption is satisfied.

4.2 Main results

Before we conduct the formal empirical examination, we provide preliminary descriptive evidence using the raw data on central tax shortfall. In Figure 4, we plot the average shortfall ratio for any central taxes (i.e., central land tax or grain tribute) across two groups of counties in 5-year periods: counties with LLT above the median (high reform exposure) vs. counties with LLT below the median (low reform exposure). Before 1785, the two groups show no difference in the likelihood of tax shortfall, with an average ratio of below 3%. However, after the introduction of reform, both groups experienced an increase in

²³ The classification of regional complexity ratings (ranging from 0 to 4) was based on an overall assessment of governance features in each jurisdiction regarding transportation, administrative burden, difficulty in taxing, and crime (*chong, fan, pi, nan*) (Liu, 1993; Hu, 2022).

tax shortfall likelihood. More importantly, the tax shortfall ratio surged more sharply to a higher level (around 10%) in counties with higher LLT. The gap between the two groups remained large throughout the post-reform period. This diverging pattern in the raw data suggests that, after the centralization reform, county governments performed worse in tax collection, indicating a decline in fiscal capacity.

Figure 5 displays the event-study results on estimates of β_d along with the 95% confidence intervals from equation 2. The outcome is an indicator variable equal to one if the county undergoes a central tax shortfall relative to the revenue target (panel A). The results show that all pre-reform coefficients are close to zero prior to the introduction of fiscal centralization. The absence of differential pre-trends provides supporting evidence for the validity of our identification assumption. After the reform, there is a significant increase in the likelihood of central tax shortfall in counties with high exposure to the reform. Moreover, the effects grow over time and remain persistently positive. These results are consistent with the raw data pattern in Figure 4. The coefficients of event-study results show that doubling county LLT is associated with a persistent increase in the likelihood of central tax shortfall of more than 10 percentage points. Decomposing the combined measure of tax shortfall into central land tax and grain tribute, we find similar dynamic patterns in the likelihood of shortfall for both tax margins (panels B and C).

Table 2 reports the corresponding point estimates resulting from estimating equation 1. The dependent variable is an indicator of tax shortfall for central tax (columns 1–2), central land tax (columns 3–4), and grain tribute (columns 5–6). Column 2 includes the regional complexity rating fixed effects interacted with year dummies. The coefficient of estimate remains virtually unchanged. This suggests that our results are unlikely to be confounded by differences across county characteristics relevant to reform exposure. Based on the estimate in column 2, a one standard deviation increase in $\log LLT$ (0.312) increases the probability of shortfall in any central tax by 2.7 percentage points (p.p.) after the reform. This is equivalent to a 75% increase with respect to the mean probability of tax shortfall. Estimates in columns 4 and 6 imply that a one standard deviation increase in reform exposure is associated with a 69% (2.03 p.p.) increase in shortfall probability for central land tax and a 78% (0.94 p.p.) increase in shortfall probability for grain tribute.

Robustness checks. In the Appendix, we show that our results are robust to a range of robustness checks. First, we include additional controls to account for the three county characteristics variables correlated with reform exposure in the balance check in Table 1. Our results are robust to including year fixed effects interacted with these three county characteristics (Appendix Table B1). Second, one might be concerned that our estimate is confounded by price change and inflation, making tax payments in silver taels difficult

for peasants. In Appendix Table B2, we use the grain price data from Wang (2014) to construct several variables to control for price changes. The results remain unchanged when adding these controls. Third, our results are robust to a range of alternative sample compositions, such as excluding provincial capitals, prefecture-level counties (*Zhilizhou*), or regions affected by the White Lotus Rebellion (Appendix Table B3). The results also hold when only using regions with a positive grain tribute burden.

5 Mechanisms

Why did a reform aimed at establishing centralized oversight of county finance lead to a decline in the collection of central tax? Now we investigate the possible underlying mechanism. In this section, our analysis proceeds in three steps. First, we propose our hypothesis that centralized administration resulting in top-down fiscal encroachment was an important driver and empirically show that the effects are associated with the presence and potential of such encroachment. Second, we examine two specific channels through which the distortionary effects of encroachment can decrease tax collection: weakening enforcement capacity and inducing tax underreporting. Finally, we discuss other alternative mechanisms.

5.1 Top-down fiscal encroachment and its distortion

From an organizational perspective, the centralization reform in 1785 imposed an intermediate monitor (the province) between the principal (the central government) and the agents (county bureaucrats). However, monitors have their own agency issues. They are also prone to acting in their own interest at the expense of agents and the principal (Faure-Grimaud, Laffont and Martimort, 2003; Bandiera et al., 2021). In our context, increasing the monitoring authority of provincial governments over county LLT simultaneously created a new incentive problem for the provinces, by making it much simpler to encroach on county government finance. While the 1785 decree stipulated provincial treasuries should fully distribute the transfer of county funds from the centralized LLT revenues to the counties, provincial leaders could easily withhold disbursements and misappropriate these funds. Through the centralized administration of the collection, remittance, and spending of LLT, the reform significantly decreased the cost of such top-down encroachment.²⁴

The top-down encroachment can have two distortionary effects which might lead to

²⁴ This can be considered a commitment problem between two parties with asymmetric political power (Acemoglu, Johnson and Robinson, 2005). From the perspective of county bureaucrats, the superior authority of provincial governments implies that they cannot commit to not holding up county finance ex post.

a decline in tax collection: (1) the loss of revenue directly weakens the fiscal condition of county governments, undermining local coercive and law enforcement capacity; (2) through a more indirect channel, the loss of current revenue and the anticipated risk of future encroachment incentivize county bureaucrats to underreport crop harvest and tax collection, hence to embezzle and misappropriate revenue as compensation, resulting in “tax leakage.”

We first present evidence consistent with the rise of top-down encroachment. There were extensive narratives and observations that widespread incidents of misappropriation and withholding of county funds emerged around the turn of the 19th century (Li, 2024), coinciding with the timing of LLT centralization reform. For example, in Shanxi province, withholding expenses from LLT amounted to 17,227 silver taels in 1785. This figure rose drastically to 82,384 taels in 1820 (Zhou, 2012). Although systematic data documenting the incidence and size of fiscal encroachment for each county are unavailable, we can measure the presence of top-down encroachment at the provincial level, using correspondence memorials text that provincial leaders reported the use of LLT revenues to the central government. Appendix Figure B3 displays a substantial increase after the 1785 reform in the counts of memorials on withholding and diverting LLT revenues, consistent with the historical accounts.

Frequency of encroachment. If the increased top-down encroachment is an important mechanism explaining the decline in tax collection, we expect the treatment effect to be larger for regions with a higher frequency of encroachment. Table 3 investigates this heterogeneity by including an interaction term with an indicator for provinces where the number of memorials on diverting or withholding LLT revenue is above the top quartile. In columns 1 and 2, we find that the effect on central tax shortfall is indeed significantly larger in provinces that more actively engaged in fiscal encroachment. The effect magnitude is 62% larger in high encroachment regions. Figure 6 further corroborates this finding by showing event-study results separately estimated for the sample with high and low encroachment frequency.²⁵ As another complementary suggestive evidence, Appendix Table B5 shows that both current and accumulated encroachment are significantly correlated with the probability of tax shortfall.

Personnel control. Another intuitive prediction is that counties are more prone to encroachment if the provincial leaders have greater influence and personal connections with county bureaucrats. To test this prediction, we leverage a unique personnel institution in

²⁵ Appendix Table B4 shows that this heterogeneous effect is also robust to using time-varying measures of provincial top-down encroachment. We find a significant effect for interaction with an indicator *Encroach* (p, t) equal to one if there were any memorials of diverting or withholding LLT revenue in province p and year t . We find similar results using the measure in year $t-1$ and the average of *Encroach* from year t to $t-5$.

Qing China’s bureaucracy where county magistrate positions were either directly appointed by the central state or delegated to provincial leaders. Counties under the personnel control of provincial governments were more compliant with top-down encroachment. This allows us to examine the potential feasibility of fiscal encroachment across counties, at a more granular level relative to the previous test. Table 3, columns 3 and 4 test this hypothesis. We find that the increase in central tax shortfall is significantly stronger in counties under provincial personnel control.

5.1.1 Enforcement capacity

Now we turn to explore the subsequent channels through which top-down encroachment can affect tax collection. Encroachment directly impairs county governments’ fiscal health. The loss of revenue could decrease their operating spending and affect the functioning of county governments, weakening local capacity to enforce tax collection. This is particularly relevant in our context of land tax collection under pre-modern technology conditions, which relied on hiring and deploying tax collectors to rural communities. Moreover, pre-modern states seldom had “quasi-voluntary” compliance among citizens and had to heavily rely on coercive power to raise revenues (Levi, 1988). This made the sufficient funding of local governments critical for tax capacity.

Coercive capacity and law enforcement outcomes. We test the implications for coercive and law enforcement capacities in Table 4. First, since raising revenues heavily relied on coercion, a weakened coercive capacity would induce peasants more likely to engage in passive tax evasion or, in extreme cases, blatant resistance against tax collection. We examine whether it is the case using the incidence of tax resistance actions as the outcome variable. Column 1 reports the results using the specification of equation 1. Figure 7, panel A, reports the event-study estimates. The dependent variable is an indicator for the presence of tax resistance incidents in the county (rescaled by 100 for legibility). We find the reform has a significant positive impact on the probability of tax resistance, and we do not observe marked differential pre-trends. This is consistent with the historical evidence that villagers engaged in collective violent resistance against taxation when they perceived government force as weak (Qiu, 2021).²⁶

Second, we study other outcomes to shed light on changes in coercive and law enforcement capacities. County governments were responsible for maintaining public security

²⁶ As documented by a county magistrate in the mid-19th century, many villages dared to resist taxation by violence. Taxes could be collected only when the authority’s coercive forces were strong enough to overpower villagers and local elites. For the most defiant villages, the government resorted to deploying troops. Yet if the soldiers failed to break into the village, “not a single cash could be expected in tax payments” (Qiu, 2021, pp. 317–335).

and judicial functions. Their effectiveness in capturing serious offenders in time was also included in the performance evaluation scheme. We test the impacts on law enforcement in the rest of Table 4. Using the bureaucratic evaluation records from the *Ministry of Personnel Archives*, we construct a proxy for crime clearance based on the records that serious crime cases remained uncaptured and uncleared beyond the time limit (six months).²⁷ Column 2 shows the result where the dependent variable is the number of crime cases overdue in a county and year, and column 3 uses the indicator variable for the presence of such cases. We find a significant and sizable increase in uncleared crime cases beyond the ordinary investigation time limit. The estimate in column 2 implies that increasing log LLT by one standard deviation leads to a 56% increase in the number of such cases relative to the mean. Panel B of Figure 7 plots the corresponding event-study results. The figure shows an evident pattern that counties with high reform exposure saw a sharp and persistent increase in uncleared crimes right after the timing of centralization reform, suggesting a worsened capacity to maintain law and order. This result suggests that the reform had a negative effect on local law enforcement capacity, in line with the positive effect on tax resistance documented above.

Moreover, as shown in column 4, we find a negative effect on solved crime cases, measured by the number of convictions.²⁸ Since we find an increase in uncleared crimes, this is unlikely to be driven by decreased real crime occurrence. Instead, we interpret that this result plausibly reflects a decrease in overall judicial effectiveness, possibly due to prolonged investigations and judgments, uncaptured criminals, or reduced coverage of crimes in the formal judicial process. As a complementary test, we find suggestive evidence that the reform decreased the provision of disaster relief (Appendix Table B6), indicating that encroachment decreased public goods provision, consistent with deteriorated local fiscal conditions.

Heterogeneity by enforcement cost. We complement the above evidence by exploring cross-sectional heterogeneity. If weakened enforcement capacity is an important driver of decreased performance in tax collection, we expect the effects to be stronger in regions with higher tax enforcement costs. To test this, we exploit the regional complexity rating developed by the Qing government and look at the designation for whether a county was featured as difficult to fulfill tax collection task. Supporting the use of the tax difficulty designation, we observe that counties with this designation had a higher likelihood of undergoing tax shortfall in the pre-reform period (Appendix Figure B4). Columns 1 and 2 of Table 5 show that the treatment effect is twice as large in counties with this designation

²⁷ These crimes include robberies with a loss value over 100 silver taels and homicides (Ch’u, 1962).

²⁸ This variable covers all criminal cases involving death or resulting in sentences of banishment or death.

of tax difficulty. This is consistent with the notion that these counties with higher collection costs are especially sensitive to reduced enforcement capacity. In columns 3 and 4, we corroborate this finding using an alternative proxy for tax enforcement difficulty. We employ an indicator *Pre-shortfall* measuring the presence of any central tax shortfall in a county before the reform. We find similar heterogeneous results.

5.1.2 Underreporting and embezzlement

Besides the decrease in ability to *collect* taxes, it is also likely that the centralization reform led county bureaucrats to *report* lower crop harvests and the associated tax liability for remittance. The central government had a regularized policy to grant deferral and exemption of tax to regions suffering crop failure due to disasters. Bureaucrats might manipulate this policy, underreport harvests by fabricating disasters or exaggerating disaster severity, and hence obtain tax deferrals and exemptions. The reform could distort their incentives to engage in such manipulation, to make up for the lost revenues due to top-down fiscal encroachment. The lost and the anticipated risk of future encroachment can make them more likely to underreport (and under-remitt) taxes than actual collection, and embezzle the revenue in the gap. This, in turn, could explain why tax collection declined.

We present indirect empirical evidence consistent with this hypothesis. First, while comprehensive data on crop yield assessment and reporting are unavailable, we look at the effect on disaster reporting. We exploit official correspondence (so-called palace memorial) to construct a proxy for disaster reporting for whether the county is mentioned in correspondence reporting disasters in a year. Column 1 of Table 6 shows that log LLT is associated with a significant increase in disaster reporting probability. However, this is despite no change in real disaster occurrence from meteorological data. Panel A of Figure 8 plots that the aggregate likelihood of weather shocks remains stable before and after the reform. Using disaster occurrence and weather shock as dependent variables in columns 2–4 of Table 6, we find that the reform did not lead to a positive impact on actual disaster occurrence or weather shocks. If anything, the result shows a small and negative effect on severe weather shock (column 4).

Then we study the change in deferrals of central tax, an important variable linking misreporting and tax collection. In contrast to the steady pattern in disaster occurrence, the share of counties with disaster-induced tax deferral increased drastically after the centralization reform in 1785, as shown in Panel B of Figure 8. The aggregate pattern is also confirmed by the DID estimate. The coefficient from column 5 shows that a one standard deviation increase in *log LLT* is associated with a 2.9 p.p. increase in tax deferral probability after the reform, representing a 27% increase relative to the mean probability.

Taken together, these results provide indicative evidence on the fraudulent practice of underreporting crop harvests by misreporting disasters. As we have discussed in the background section, these deferred taxes owed were rarely repaid but kept rolling over, and translated into long-term arrears (Li, 2024). This is consistent with extensive historical accounts of the link between disaster misreporting, corruption, and central tax arrears.

These results are consistent with the explanation that county bureaucrats had greater incentives to embezzle central tax revenues under the centralized tax administration. After the reform, frequent encroachment on county funds forced county bureaucrats to find *compensating* sources to finance operating expenses as well as personal income. They were more likely to embezzle and misappropriate revenue, pocketing tax payments into counties' funds or officials' private income.²⁹ In fact, insufficient operating funds due to withheld county funds by provincial treasuries was the main reason (excuse) cited by bureaucrats for shortfalls in central land tax.³⁰

To sum up, the results above provide supporting evidence that top-down fiscal encroachment is likely to play a key role in explaining the decrease in tax collection. Sections 5.1.1 and 5.1.2 show that both weakened enforcement capacity and increased misconduct in tax underreporting are important drivers of the overall effects.

5.2 Alternative mechanisms

In this section, we discuss other potential alternative channels that could explain the decrease in tax collection.

Change in tax base and agricultural production. The reform might change the crop production and hence affect the tax base. Although we cannot explicitly rule out this channel since we do not have reliable crop production data at this period, this seems unlikely to be the major explanation for the increase in tax shortfall. First, we can indirectly examine the likelihood of crop failure using grain price data, to the extent that significant crop failure can usually lead to a surge in grain price in affected regions. We test this possibility in Appendix Table B8. However, we find no economically or statistically significant effect on either the price level or an indicator of abnormal price growth, suggesting that the reform had no meaningful impact on crop production. Second, our results are robust to controlling for grain price surge and weather shock (Appendix Table B9).

²⁹ As another piece of suggestive evidence in line with compensating motives, we find a significant increase in the cases of alleged bribes and unlawful fees being collected by county bureaucrats (Appendix Table B7).

³⁰ For example, the Minister of Finance, Yinghe noted in 1820, “recently, many counties underwent tax shortfall and collected bribes from commoners. They tended to use the excuse of insufficient operating funds and salaries. The most popular excuse is withholding and misappropriating county funds by provinces” (Zhou, 2020, p. 39).

Change in the monitoring of central tax collection. The reform required provincial governments to oversee and evaluate the collection and remittance of LLT, as well as the centralized disbursement from this source. This newly added monitoring task might divert their attention and affect their supervision of the collection of central tax. First, if a change in monitoring is at play, we should expect the effects on tax shortfall to be stronger in counties with higher monitoring costs. But we find this was not the case. In Appendix Table B10, column 1, we find that counties with a longer distance to the provincial capital did not experience a larger effect. The estimate of the interaction term, if anything, is negative and insignificant. Second, we look at the disciplinary records of county magistrates as a measure of overall monitoring intensity in columns 2–4. The results show that magistrates did not undergo changes in disciplinary punishment, and the reform had null effect on the probability of punishment removal or demotion. These results suggest that shirking in monitoring is unlikely to constitute a major mechanism.

6 Conclusions

Centralized fiscal administration by professional bureaucracies played a crucial role in the transition from fragile states to effective fiscal states (Brewer, 1989; Tilly, 1990; Dincecco, 2009; Kiser and Karceski, 2017; Cantoni, Mohr and Weigand, 2024). In this paper, we study how centralized fiscal administration aimed at monitoring county taxation affected fiscal capacity in imperial China in the late 18th century. The centralization reform in 1785 imposed provincial governments as intermediate-layer monitors between the central government and county governments. Using a novel dataset on tax collection constructed from administrative archival data at the county-year level between 1750 to 1834, we compare counties with varying exposure to the reform in a difference-in-differences strategy. Our empirical results uncover the causal chain connecting centralized tax administration, to the encroachment on county funds, to decreased central tax collection. We document an unintended consequence of centralized tax administration—a decline in central land tax collection.

We argue that the decline in fiscal capacity can be explained by a top-down encroachment mechanism: the reform created greater scope for monitors to misappropriate, divert, and withhold county funds. Such intergovernmental fiscal encroachment has two downstream channels driving the decline in tax collection. First, the weakened fiscal condition of counties undermined local coercive and law enforcement capacities. Second, the loss of current revenue and the anticipated risk of encroachment incentivized county bureaucrats to underreport and embezzle revenue as a compensating source and private income.

We find a range of evidence indicating that both weakened enforcement capacity and underreporting are important drivers behind the decline in fiscal capacity.

Our findings indicate that, in multi-layer organizations like governments, shifting authority to a higher level intended to correct *lower levels'* agency problems can meanwhile generate incentive problems for *higher levels*. In the context of public finance and fiscal federalism, when local taxations become under the oversight of higher levels, those higher levels would be tempted to encroach on lower levels' revenues (Weingast, 2014). If the higher levels cannot refrain from such encroachment, the centralization policy could create multiple unintended distortions and go against the initial policy goal.

While this paper focuses on China, such tension and conflict between different levels of government could also exist in other settings (especially in unitary state forms) where there is uncertainty about the allocation of spending responsibilities or revenues and the *de facto* division of decision-making rights. Our results are therefore most relevant in countries where weak institutions hinder the enforcement of fiscal discipline. From a policy perspective, centralization reforms with top-down formal monitoring require careful consideration of the strategic response of both the lower and intermediate monitoring levels in the organization. Taken together, our findings demonstrate and explain a failed attempt to build centralized tax administration. This also highlights the importance of fiscal constitutions in fiscal federalism governing the relationship between vertical levels of government.

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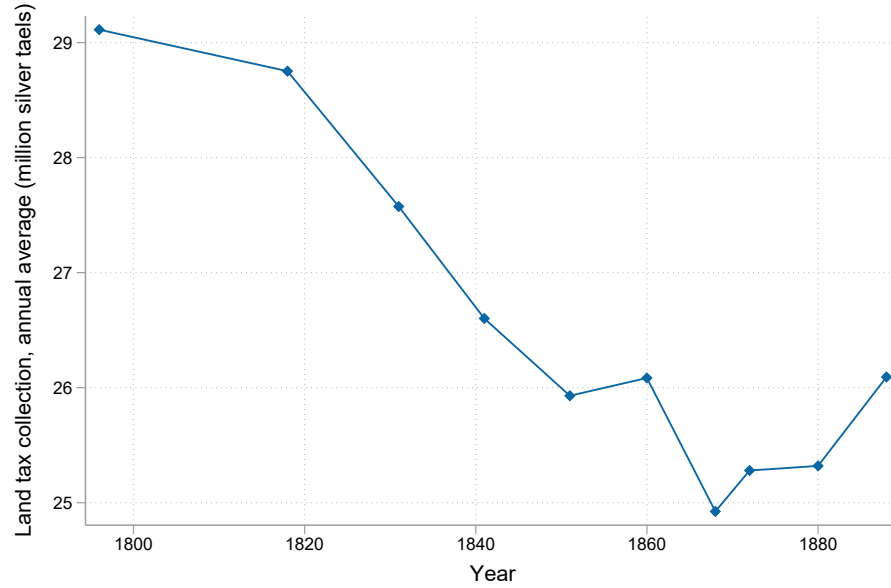
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Figures and tables

Figure 1. Average annual tax collection estimates in the 19th century

(a) Central land tax (target quota: 30 million taels)

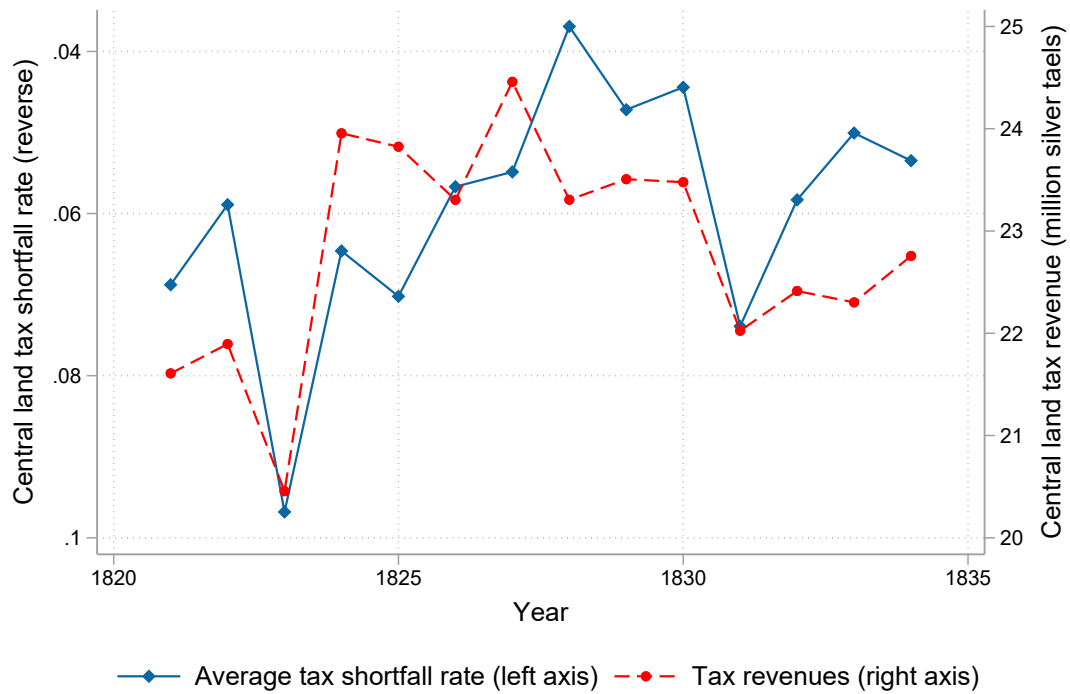


(b) Grain tribute (target quota: 4 million *shi*)



Notes: This figure plots estimates of average annual revenue collection for central land tax (panel A) and grain tribute (panel B). Revenue is estimated as the fixed tax target quota minus the average annual tax shortfall, based on 10 episodes of universal exemption of accumulated uncleared tax arrears during the 19th century. Data on the amount of universal tax exemptions is drawn from [Li \(2024, p. 151\)](#).

Figure 2. Data validation: comparing total land tax revenue collection and average tax shortfall rate



Notes: This figure compares the evolution over time of total central land tax (CLT) revenue in the right axis and that of the average CLT shortfall likelihood (indicator for any shortfall of collected revenue relative to revenue targets) in the left axis, weighted by the county's central land tax target quota. We reverse the left y-axis scale so that smaller values appear at the top. The sample period is 1820–1834 when revenue collection data is available at the provincial level from [Ni \(2013\)](#).

Figure 3. Spatial distribution of reform exposure: county local land tax

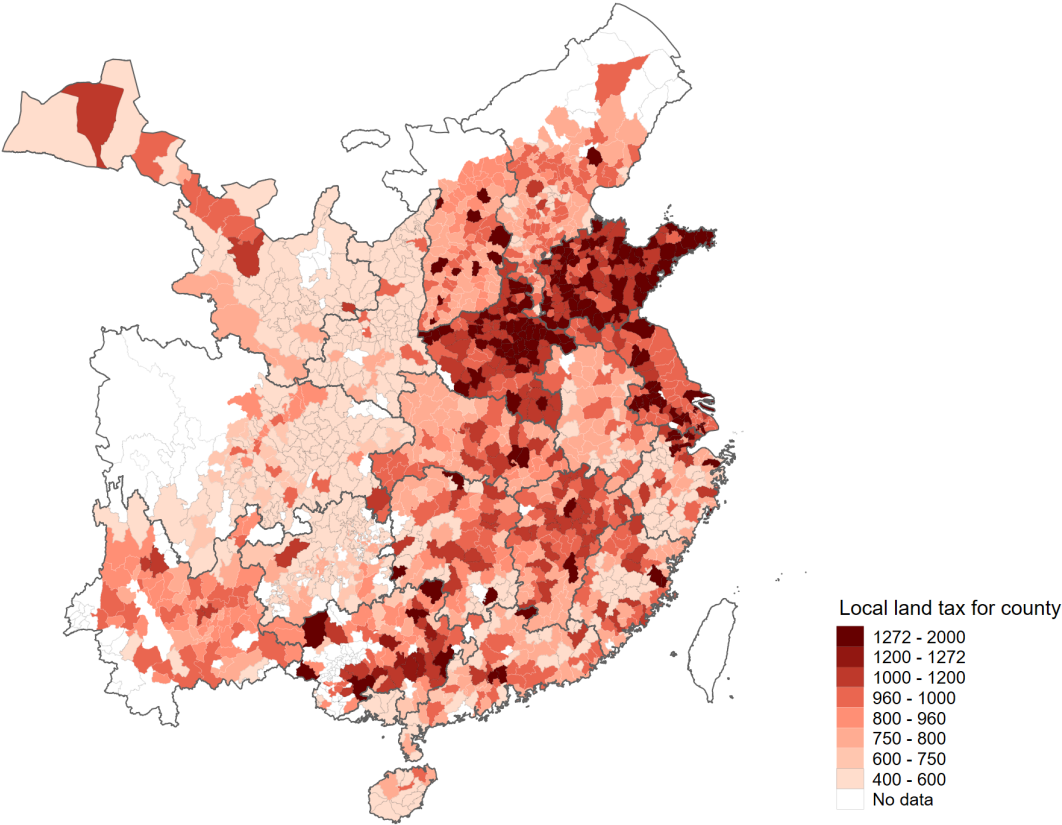
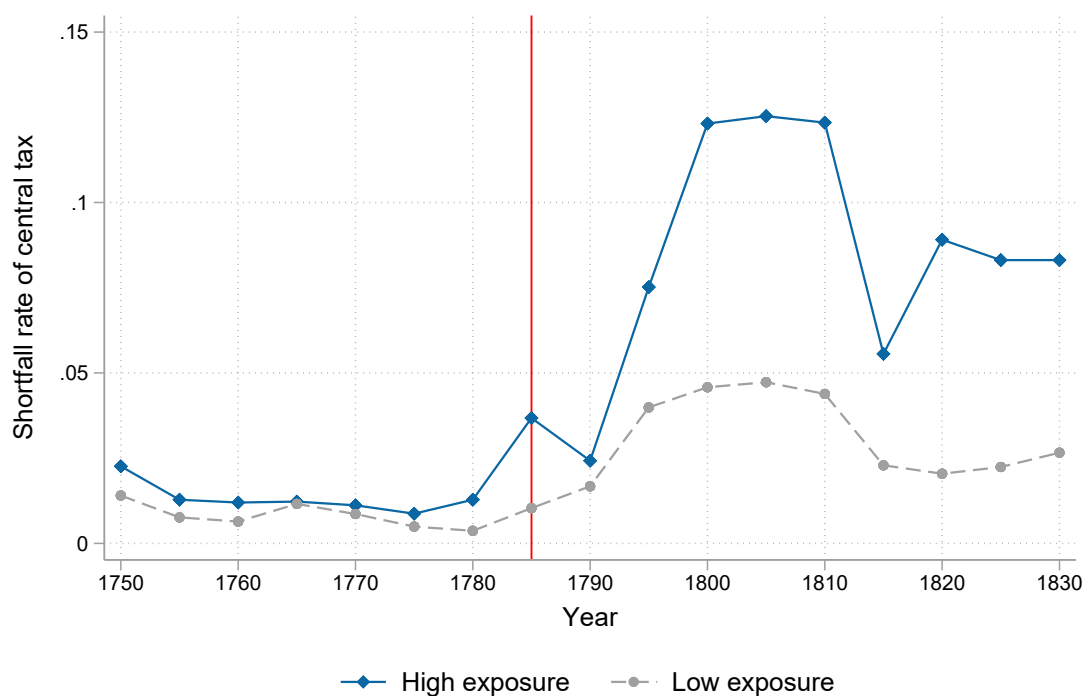


Figure 4. Average shortfall rate of central tax by reform exposure



Notes: This figure plots the evolution of average central tax shortfall likelihood (the share of counties with a shortfall of collected revenue relative to revenue targets) in groups of high and low exposure to the centralization policy. The high exposure group corresponds to counties that had local land tax above the median value.

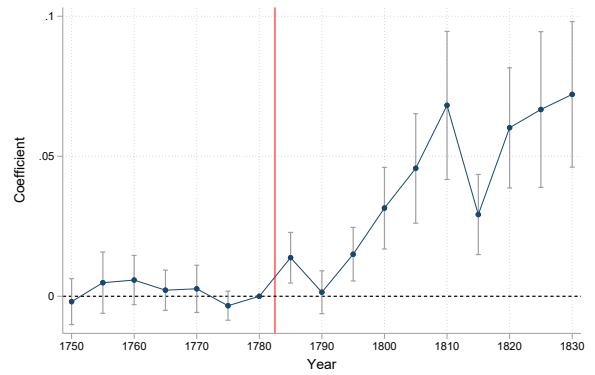
Figure 5. The effect on central tax collection: event study results
(a) Tax shortfall (0/1): central tax



(b) Shortfall for central land tax

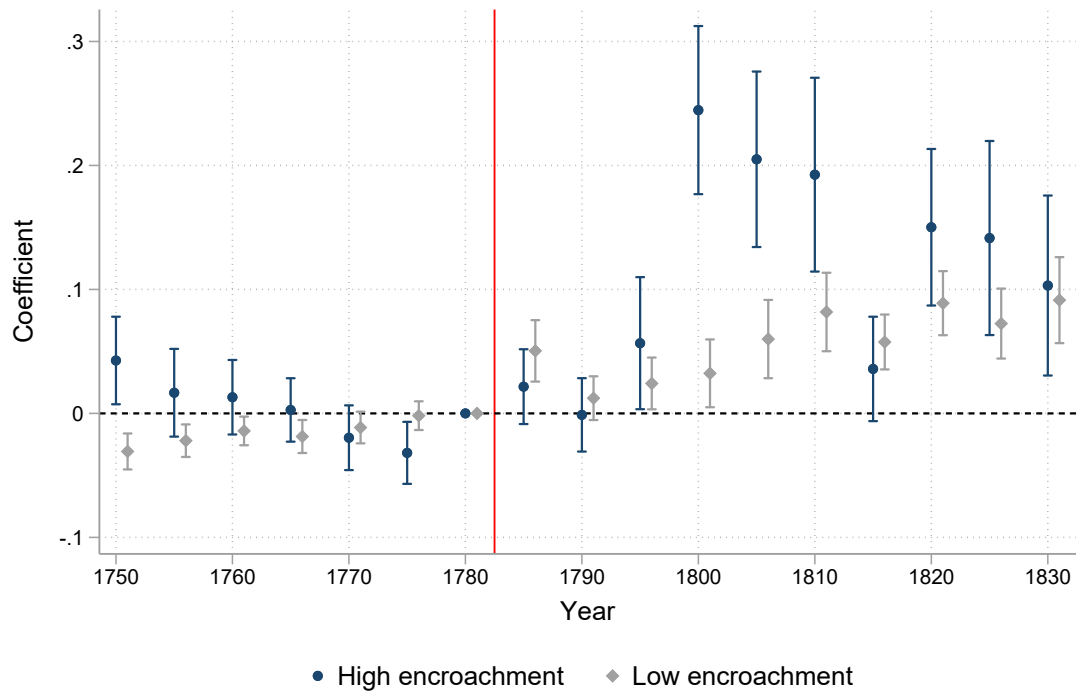


(c) Shortfall for grain tribute



Notes: This figure show the event-study results on tax collection from estimating equation (2), where the treatment effects can vary for each 5-year period. The dependent variable is an indicator equal to one if the county undergoes a shortfall relative to the revenue target for the central tax (panel A), central land tax (panel B), and grain tribute (panel C). The caps indicate 95% confidence intervals, with standard errors clustered at the county level.

Figure 6. Event study results on central tax collection: heterogeneity by provincial top-down encroachment



Notes: This figure shows the event-study results on tax collection from estimating equation (2), where the treatment effects can vary for each 5-year period. The results are separately estimated using a sample of high and low encroachment provinces, divided by the 75th percentile of the frequency of diverting or withholding local land tax revenue. The dependent variable is an indicator equal to one if the county undergoes any central tax shortfall relative to the revenue target. The caps indicate 95% confidence intervals, with standard errors clustered at the county level.

Figure 7. The effect on enforcement capacity: event study results
(a) tax resistance

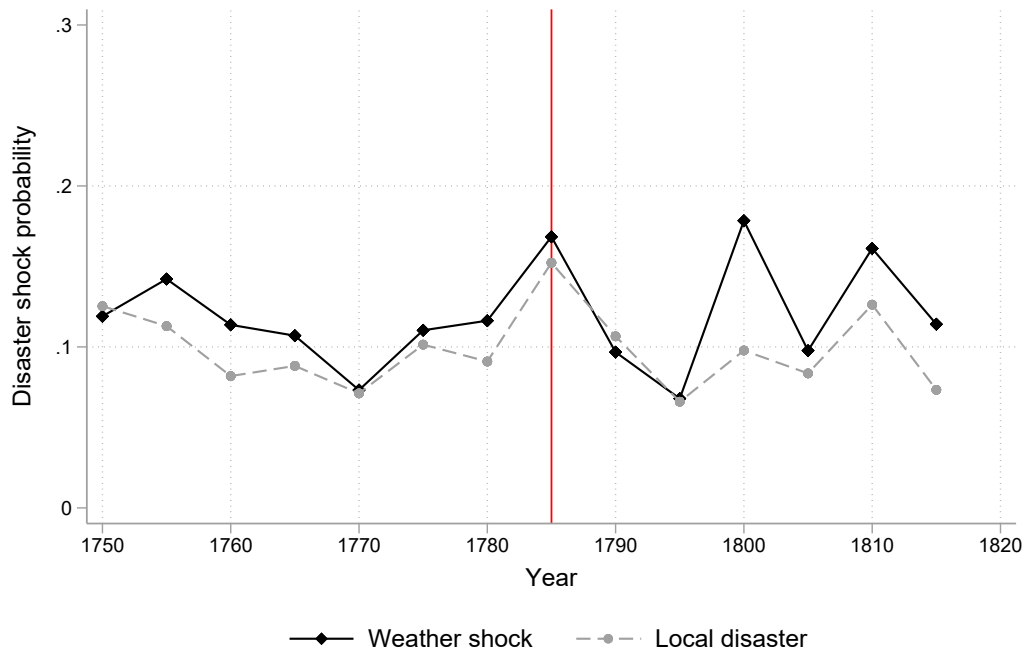


(b) uncleared crime cases overdue

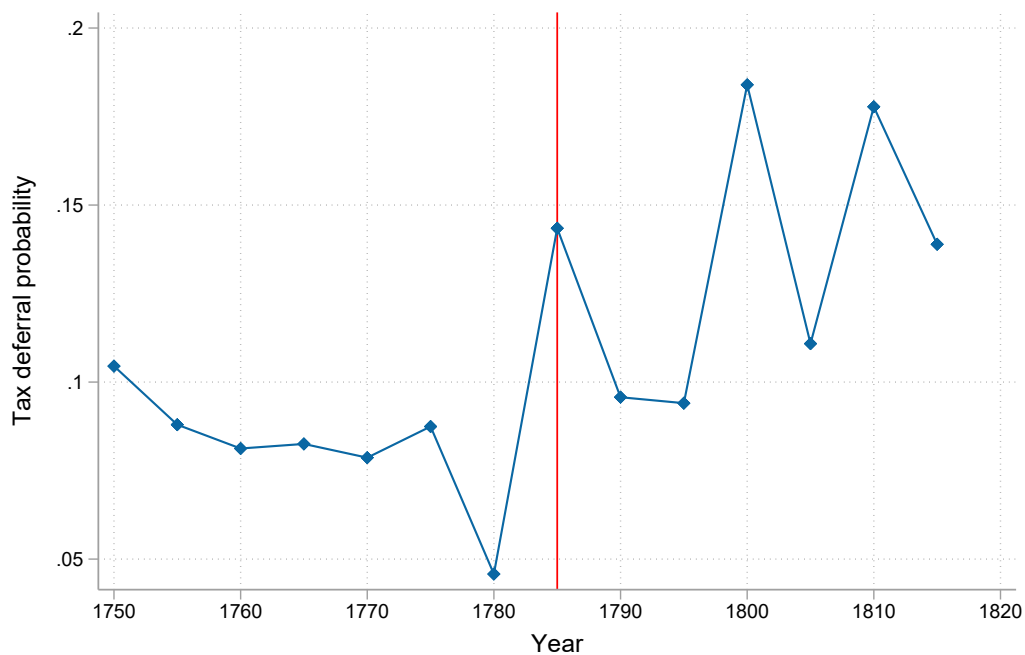


Notes: This figure show the event-study results on enforcement capacity from estimating equation (2), where the treatment effects can vary for each 5-year period. The dependent variable in panel A is an indicator for the presence of tax resistance incidents in the county, rescaled by 100. The dependent variable in panel B is an indicator of whether there are any serious crime cases uncleared beyond the stipulated time limit (i.e., cases in which the offender was not identified and remained at large for over six months). The caps indicate 95% confidence intervals, with standard errors clustered at the county level.

Figure 8. Probability of disaster shock and tax referral over time
(a) Extreme weather and local disaster



(b) Tax deferral



Notes: This figure shows the steady probability of disaster shock, i.e., the aggregate average likelihood of extreme weather shock (precipitation level 1 or 5) and local disaster occurrence (Panel A); and the increasing trend of tax deferral rate, i.e., the share of counties granted tax deferral (Panel b).

Table 1. Balance in county characteristics and exposure to centralization

	Mean	N	Coef. of LLT	
			Rating FE: N	Rating FE: Y
	(1)	(2)	(3)	(4)
Population (1,000)	197.88	1,522	97.676*** (15.649)	22.221 (17.169)
Log wheat suitability	5.31	1,522	-0.072 (0.223)	0.105 (0.252)
Log rice suitability	6.019	1,522	0.765*** (0.202)	0.523** (0.227)
Log maize suitability	5.085	1,522	0.034 (0.248)	0.235 (0.280)
Log sweet potato suitability	1.524	1,522	-0.092 (0.255)	0.174 (0.288)
Area	0.217	1,522	0.079*** (0.029)	0.019 (0.032)
Ruggedness	451.447	1,522	-66.214*** (16.516)	-16.043 (18.485)
Length of navigable river (km)	20.168	1,522	17.967*** (4.608)	6.995 (5.141)
Distance to coastline (km)	457.74	1,522	-7.454 (14.854)	10.035 (16.956)
Distance to capital (km)	1,108.16	1,522	-30.696* (16.996)	-24.252 (19.108)
Distance to prov. capital (km)	196.158	1,522	-62.419*** (13.821)	-39.741** (15.459)
Strength of clan (# genealogies)	0.55	1,546	0.851* (0.451)	0.742 (0.506)
Number of bureaucrats	5.182	1,439	2.723*** (0.287)	1.394*** (0.321)
Average grain price (1780-85)	149.834	1,546	2.952 (1.960)	-0.678 (2.187)
Occurrence rate of disaster (1750-85)	0.096	1,546	0.056*** (0.011)	0.02 (0.013)

Notes: This table reports the coefficients from balance tests estimating the correlation between county characteristics and the amount of county local land tax (LIT). Column 1 shows the sample mean of each variable. Column 3 shows point estimates and standard errors from univariate cross-sectional regressions of each variable on the log LIT, including province fixed effects. Column 4 shows the same results, additionally controlling for regional complexity rating fixed effects. ***, **, * denote significance at 1%, 5%, 10% level.

Table 2. Fiscal centralization and fiscal capacity

	Tax shortfall					
	Central tax		Central land tax		Grain tribute	
	(1)	(2)	(3)	(4)	(5)	(6)
log LLT × Post	0.094*** (0.007)	0.087*** (0.007)	0.065*** (0.005)	0.065*** (0.006)	0.039*** (0.006)	0.030*** (0.005)
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Year × Regional rating FE		Y		Y		Y
Mean of D.V.	0.036	0.036	0.029	0.029	0.012	0.012
Observations	131,410	131,410	131,410	131,410	131,410	131,410

Notes: The unit of observation is the county-year. The dependent variable is an indicator equal to one if the county undergoes a shortfall relative to the revenue target for the central tax (columns 1–2), central land tax (columns 3–4), and grain tribute (columns 5–6). log LLT is the log amount of local land tax earmarked for each county. All specifications include county and year fixed effects. In columns 2, 4, and 6, we also include year fixed effects interacted with regional complexity rating fixed effects. ***, **, * denote significance at 1%, 5%, 10% level.

Table 3. Effect on central tax collection: heterogeneity by provincial top-down encroachment and personnel control

	Central tax shortfall			
	(1)	(2)	(3)	(4)
log LLT × Post	0.071*** (0.009)	0.066*** (0.008)	0.075*** (0.007)	0.071*** (0.007)
log LLT × Post × High encroachment	0.040** (0.017)	0.041** (0.017)		
log LLT × Post × Personnel control			0.062*** (0.019)	0.062*** (0.020)
County FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Year-Regional rating FE		Y		Y
Mean of D.V.	0.036	0.036	0.036	0.036
Observations	131,410	131,410	131,410	131,410

Notes: The unit of observation is the county-year. The dependent variable is an indicator equal to one if the county undergoes any central tax shortfall relative to the revenue target. log LLT is the log amount of local land tax earmarked for each county. *High encroachment* is an indicator equal to one if the county belongs to a province where the frequency of diverting or withholding local land tax revenue is above the top quartile. *Personnel control* is an indicator for counties where the chief magistrate is appointed by the provincial governor (as opposed to direct appointment by the central Ministry of Personnel). Columns 2 and 4 include year fixed effects interacted with regional complexity rating fixed effects. All regressions include interactions between the log LLT and Post indicators with the relevant heterogeneity covariate. ***, **, * denote significance at 1%, 5%, 10% level.

Table 4. Effects on law enforcement capacity

	Tax resistance	Crimes uncleared overdue (#)	Crimes uncleared overdue (=1)	Crime cases solved
	(1)	(2)	(3)	(4)
log LLT × Post	0.299*** (0.088)	0.085*** (0.012)	0.053*** (0.006)	-0.324*** (0.053)
County FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Year-Regional rating FE	Y	Y	Y	Y
Mean of D.V.	0.274	0.048	0.034	1.177
Observations	131,410	131,410	131,410	131,410

Notes: The unit of observation is the county-year. In column 1, the dependent variable is an indicator for the presence of tax resistance incidents in the county, rescaled by 100 for legibility. In column 2, the dependent variable is the number of records of serious crime cases uncleared beyond the stipulated time limit (i.e., offender was not identified and remained at large). Column 3 uses a dummy variable whether the county reports any uncleared crime overdue. In column 4, the dependent variable is solved serious crimes, measured by the number of conviction cases. Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.

Table 5. Effect on central tax collection: heterogeneity by tax enforcement challenge

	Central tax shortfall			
	(1)	(2)	(3)	(4)
log LLT × Post	0.079*** (0.008)	0.076*** (0.008)	0.070*** (0.006)	0.064*** (0.006)
log LLT × Post × Difficulty in tax	0.067*** (0.020)	0.086*** (0.021)		
log LLT × Post × Pre-shortfall			0.089*** (0.022)	0.090*** (0.022)
County FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Year-Regional rating FE		Y		Y
Mean of D.V.	0.036	0.036	0.036	0.036
Observations	131,410	131,410	131,410	131,410

Notes: The unit of observation is the county-year. In columns 1–4, the dependent variable is an indicator equal to one if the county undergoes any central tax shortfall relative to the revenue target. *Difficulty in tax* is an indicator whether a county was labeled difficult to collect taxes, based on the central government assessment. *Pre-shortfall* is an indicator equal to one if there was any existing tax shortfall before 1785 in the county. All regressions include interactions between the log LLT and *Post* indicators with the relevant heterogeneity covariate. Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.

Table 6. Underreporting and embezzlement

	Disaster reporting	Disaster occurrence	Weather shock (mild)	Weather shock (severe)	Tax deferral
	(1)	(2)	(3)	(4)	(5)
log LLT $\times$ Post	0.554** (0.273)	0.003 (0.008)	-0.001 (0.011)	-0.030*** (0.006)	0.092*** (0.011)
County FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Year-Regional rating FE	Y	Y	Y	Y	Y
Mean of D.V.	1.047	0.099	0.325	0.12	0.107
Observations	109,766	109,766	109,766	109,766	109,766

Notes: The unit of observation is the county-year. The sample period is 1750-1820. In column 1, the dependent variable is an indicator equal to one if the county is mentioned in correspondence reporting disasters to the central government, rescaled by 100 for legibility. In columns 2–4, the dependent variable is an indicator equal to one if the county experiences real disaster incidents, mild abnormal weather shock (precipitation level 2 or 4), and severe abnormal weather shock (precipitation level 1 or 5), respectively. In column 5, the outcome is an indicator for any tax deferral granted to the county. log LLT is the log amount of local land tax earmarked for each county. Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.

Appendices

A Data appendix

A.1 Definition and sources of county characteristics

Agricultural suitability. We construct county's agricultural suitability using attainable yields for wheat, rice, sweet potato, and maize. We collect data from the Food and Agriculture Organization's 2012 Global Agro-Ecological Zones project (FAO, 2012) database, which assigns each $0.5^\circ \times 0.5^\circ$ grid cell a suitability index. We calculate county-level crop suitability for these four crops as the average index across all grid cells within a county.

Geography. Data on geographical features (area, Length of navigable river, distance to coast, provincial capital, and capital) are from China Historical GIS (2016). We calculate the terrain ruggedness by the amount of elevation difference between adjacent cells of a digital elevation grid using data provided by the United States Geographic Services (USGS).

Population. We use prefecture-level population in 1776 from Cao (2001). We impute county-level population data based on each county's area.

Strength of clan. To proxy for the strength of clans, we use the number of genealogies compiled in a prefecture. The data on genealogy are obtained from *A Comprehensive Catalogue on the Chinese Genealogy* (Shanghai Library, 2009).

County magistrate position information. We collect information on county government positions from the *Roster of Government Personnel (Jinshenlu) 1766*. The *Roster* was issued by the Department of Selection under the Ministry of Personnel (MOP), which lists all civil positions and officers in local and central government. To measure the personnel control of provinces, we also collect the information on the type of appointment (by MOP or by provincial government) from the *Roster*.

Regional complexity rating. For each county, we collect a five-tier classification of regional complexity rating ranging from 0 to 4 from *Roster of Government Personnel 1766*. We also use one of the designations for whether a county was featured as difficult to fulfill tax collection task (*Pi*, 疲).

Number of county bureaucrats. We collect the number of subordinate bureaucrats in county government from *Roster of Government Personnel 1766*.

A.2 Definition and sources of other outcome variables

Crime cases uncleared overdue. According to Qing China's regulation, for serious crimes of homicides and robberies with a loss value of over 100 silver taels, criminals should be arrested within six months. Exceeding this time limit would lead to a warning for the responsible bureaucrats, recorded by the Ministry of Personnel. A typical phrase in these records is “限满未获” [not yet arrested by the time limit]. We collected this information from the *Ministry of Personnel Archives (Liketiben)*. In total, we identify 6,496 pieces of records on crime cases uncleared overdue in our sample period (1750-1834) and aggregate them at the county-year level.

Crime cases solved. We measure crime clearance by the number of convictions for serious crimes in a county and a year (i.e., criminal cases involving death or resulting in sentences of banishment or death). The data source is the *Ministry of Justice Archives (Xingketiben)*. To avoid double counting, we exclude the cases of reversal and retrial.

Disaster reporting. We extract the information on disaster reporting from the official correspondence that senior local officials sent to the crown (Palace Memorials) from the catalog of the *First Historical Archives of China*. We identify memorials on disaster reports based on a list of keywords (see Appendix Table A2). Appendix Figure A6 shows an original sample page of disaster reporting memorials. We code the timing and location of disaster reports and aggregate them to the county-year level.

Bribes and unlawful fees. We construct a proxy variable for the incidents of county bureaucrats collecting bribes and unlawful rents from the commoners. We collect this information from the Palace Memorials. We identify memorials on the cases of county bureaucrats being charged or investigated with collecting bribes and unlawful fees, using a list of keywords (see Appendix Table A2).

Grain price. We draw grain price data from the *Database of Grain Price in Qing* constructed by (China Historical GIS, 2014) (<http://mhdb.mh.sinica.edu.tw/foodprice>). The data provide detailed monthly grain prices for each prefecture from 1736. In our analysis, we use the average price for each year.

Disciplinary record. We collect official information on officer misconduct and discipline records from the *Ministry of Personnel Archives*. This data contains the records of all kinds of disciplinary actions on officers processed by the Ministry of Personnel, including records of misconduct, impeachment charges, fines, suspensions, and dismissals, among other punishments.

Table A1. Examples of tax shortfall records from Ministry of Finance Archives

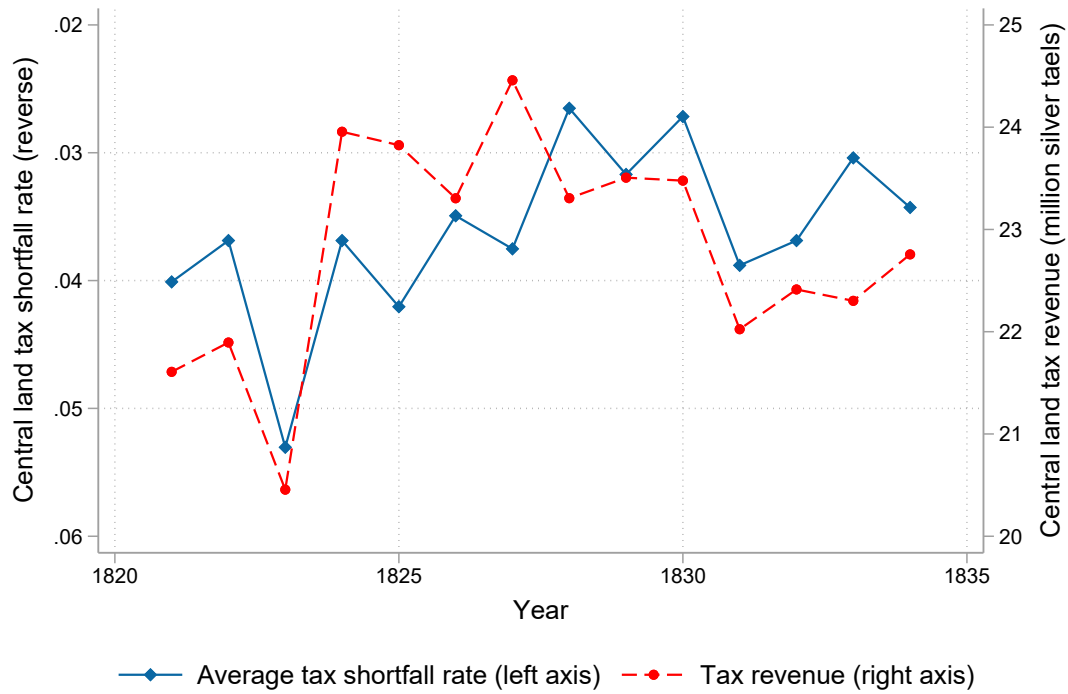
Archive id	Archive title
02-01-04-15901-011	题为察议江苏元和县知县周凤歧限满未完乾隆二十八年份漕项银两照例处分事 Translation: Report on Matter of Disciplinary Action for the Magistrate of Yuanhe County in Jiangsu Province, Zhou Fengqi's Shortfall in Grain tribute for the Qianlong 28th Year (1763)
02-01-04-13957-004	题为会议皖省歙县知县刘育杰未完乾隆六七两年地丁钱粮例应处分事 Translation: Report on Matter of Disciplinary Action for the Magistrate of She County in Anhui Province, Liu Yujie's Shortfall in Land Taxes for the Qianlong 6th and 7th Years (1741 and 1742)
02-01-04-14284-011	题为核议甘肃高台县知县朱式未完乾隆十年地丁钱粮处分事 Translation: Report on Matter of Disciplinary Action for the Magistrate of Gaotai County in Gansu Province, Zhu Shigu's Shortfall in Land Taxes for the Qianlong 10th Year (1745)

Source: the First Historical Archives of China

Table A2. Lists of key words for data construction

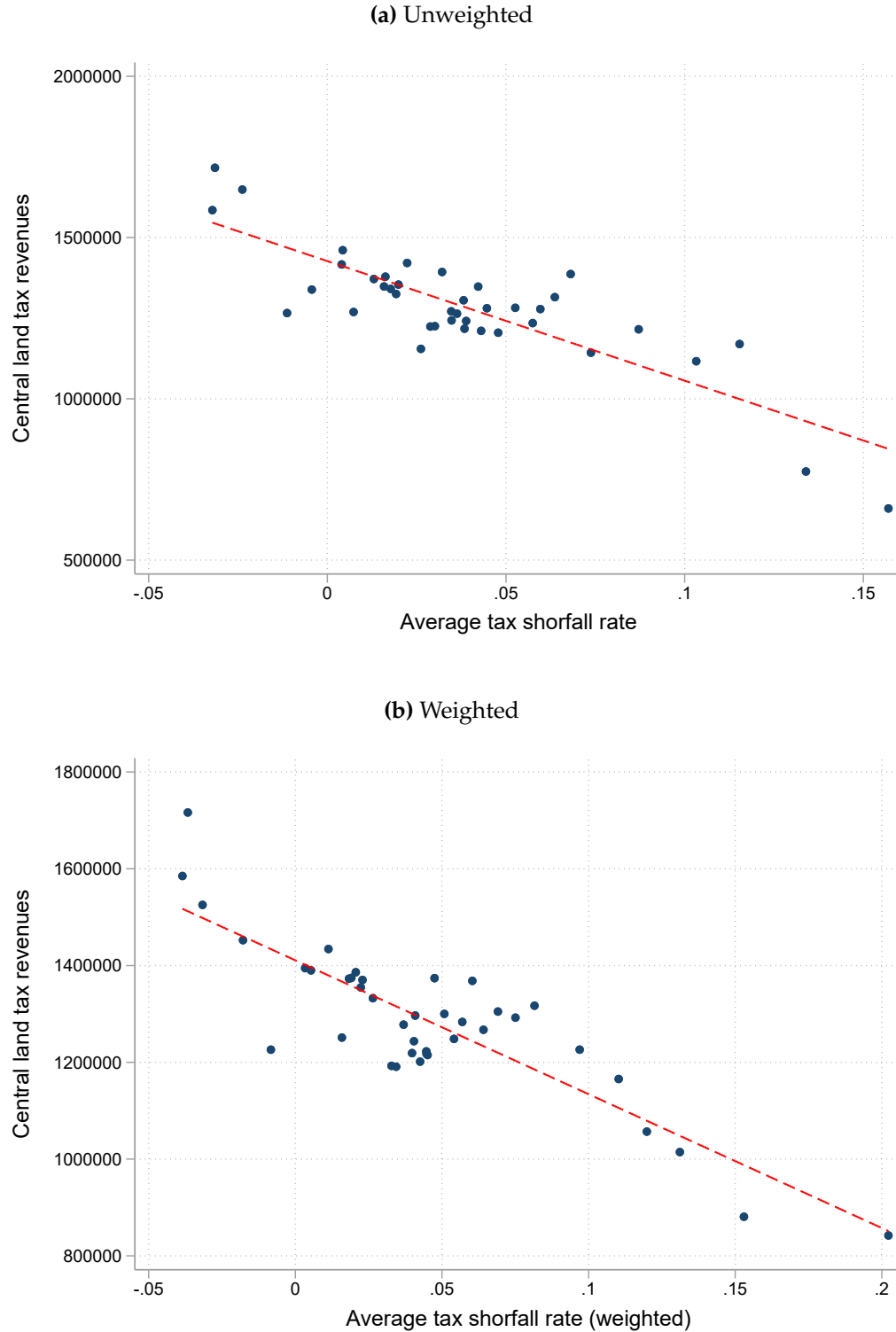
Variable	Source	Key wordings
Central land tax	<i>Ministry of Finance Archives</i>	正赋, 正项, 正银, 地银, 地丁, 丁地, 地丁银, 丁银, 钱粮, 地粮
Grain tribute	<i>Ministry of Finance Archives</i>	钱漕, 漕项, 漕粮, 漕米, 漕银, 漕截, 南粮, 南米, 粮石, 本折行粮, 粮米, 漕耗, 本色米石, 米豆, 征米, 米石, 白粮, 漕折银, 漕改折银
Disaster reporting	<i>Palace Memorials</i>	被灾, 遭灾, 成灾, 报灾, 查灾, 遇灾, 城灾, 偏灾, 水灾, 雨灾, 涝灾, 旱灾, 潮灾, 风灾, 雹灾, 霜灾, 震灾, 虫灾, 蝗灾, 冰灾, 雪灾, 荒灾, 受灾, 勘灾, 灾情, 灾分, 灾务, 灾荒, 灾区, 灾地, 灾属, 被水, 被旱, 被雹, 被潮, 被风, 被淹, 被虫, 被霜, 被冰, 被雨, 被雪, 被震, 被蝗, 因灾, 灾民, 灾田, 灾赈, 灾蠲, 灾递, 灾缓, 灾歉, 灾欠, 灾借
Diverting LLT	<i>Palace Memorials</i>	摊/扣/捐+ 养廉/廉银
Brides and unlawful fees	<i>Palace Memorials</i>	浮收, 勒折, 私派, 私征, 科派, 科敛, 苛派, 苛索, 滥派, 加征, 苛索

Figure A1. Data validation: comparing total land tax revenue collection and average tax shortfall rate (unweighted)



Notes: This figure compares the evolution over time of total central land tax (CLT) revenue in the right axis and that of the average CLT shortfall likelihood (indicator for any shortfall of collected revenue relative to revenue targets) in the left axis, weighted by the county's central land tax target quota. We reverse the left y-axis scale so that smaller values appear at the top. The sample period is 1820–1834 when revenue collection data is available at the provincial level from [Ni \(2013\)](#).

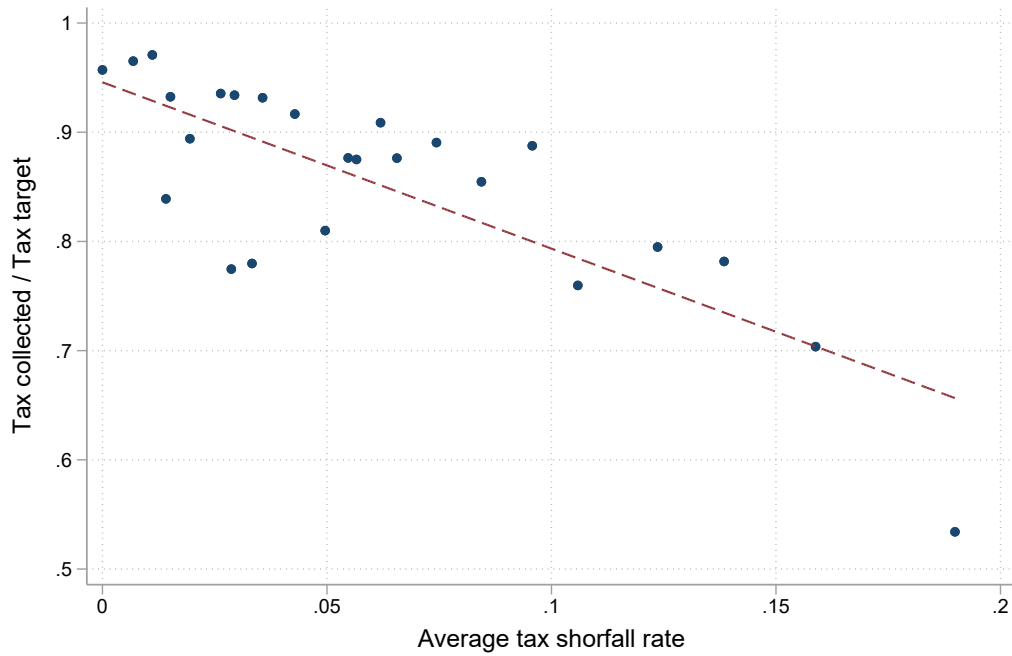
Figure A2. Data validation: comparing province-year level land tax revenues vs. average tax shortfall likelihood



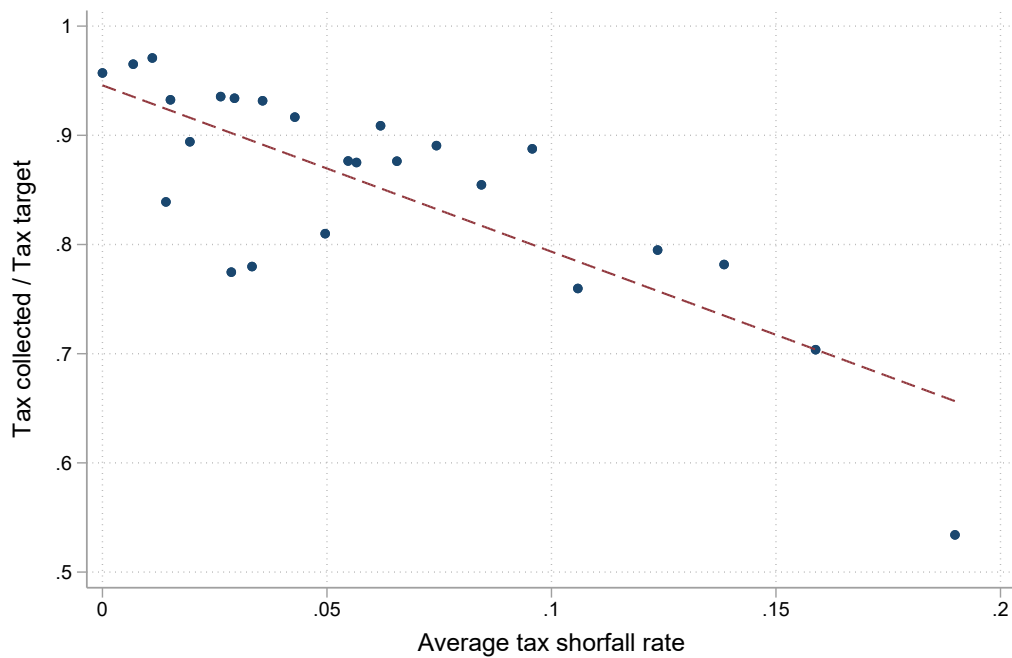
Notes: This figure shows the correlation between the total central land tax (CLT) revenues collected and the average likelihood of counties' CLT shortfall at the province-year level, in binned scatter plots. In Panel b, we use the weighted average tax shortfall rate based on county's central land tax target quota. The sample period is 1820–1834 when comprehensive revenue collection data is available at the provincial level from Ni (2013). The correlation is shown after residualizing the variables from the provincial total tax target.

Figure A3. Data validation: comparing province-year level land tax collection-target ratio vs. average tax shortfall likelihood

(a) Unweighted



(b) Weighted



Notes: This figure shows the correlation between the ratio of the CLT revenue collected to the tax target, and the average likelihood of counties' CLT shortfall at the province-year level, in binned scatter plots. In Panel b, we use the weighted average tax shortfall rate based on county's central land tax target quota. The sample period is 1820–1834 when comprehensive revenue collection data is available at the provincial level from Ni (2013).

Figure A4. Example data source for county local land tax

知蘇州太湖同知海門同知松江川沙同知	司理問經歷庫大使按察司經歷司獄各六同	寶應金山金壇桃源銅山宿遷陽湖金匱布政	昭文金山金壇桃源銅山宿遷陽湖金匱布政	丹徒丹陽江都甘泉武進各一千五百兩山陽	千兩各一知縣江甯上元長洲元和吳縣清河各	千兩餘各二知州高郵通州海州各二千兩	千兩餘各三知府江甯蘇州	道員江安糧道蘇州松糧道各知府江甯蘇州	雨萬二布政使蘇州布政使八千兩按察使八	史驛丞十各八○江蘇省兩江總督一萬八巡撫	靈寶關鄉國始縣丞各主簿十各六吏目巡檢典
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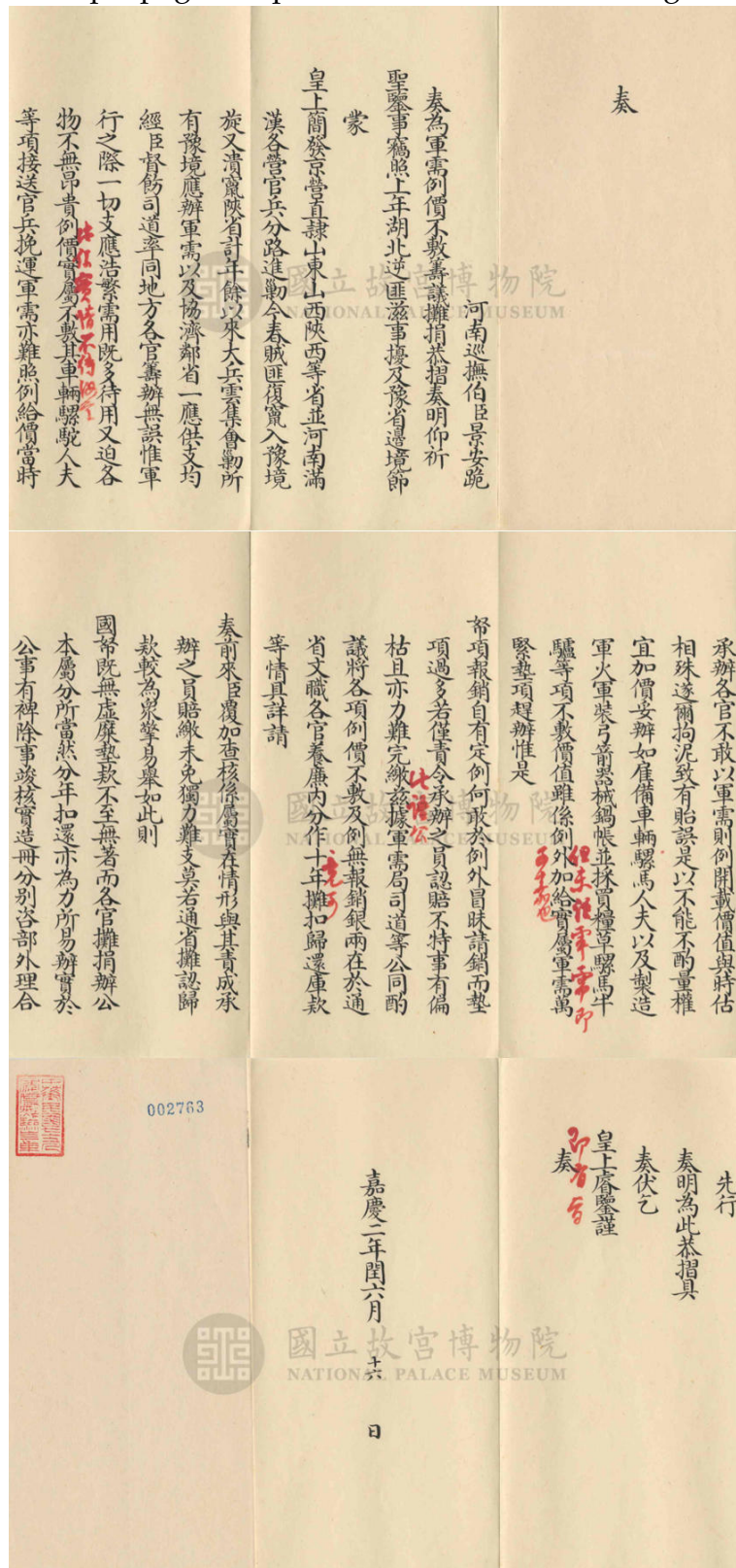
Province: Jiangsu

Counties: Jiangning, Shangyuan, Changzhou, Yuanhe, Wu, and Qinghe

LLT revenue: 1,800 silver taels

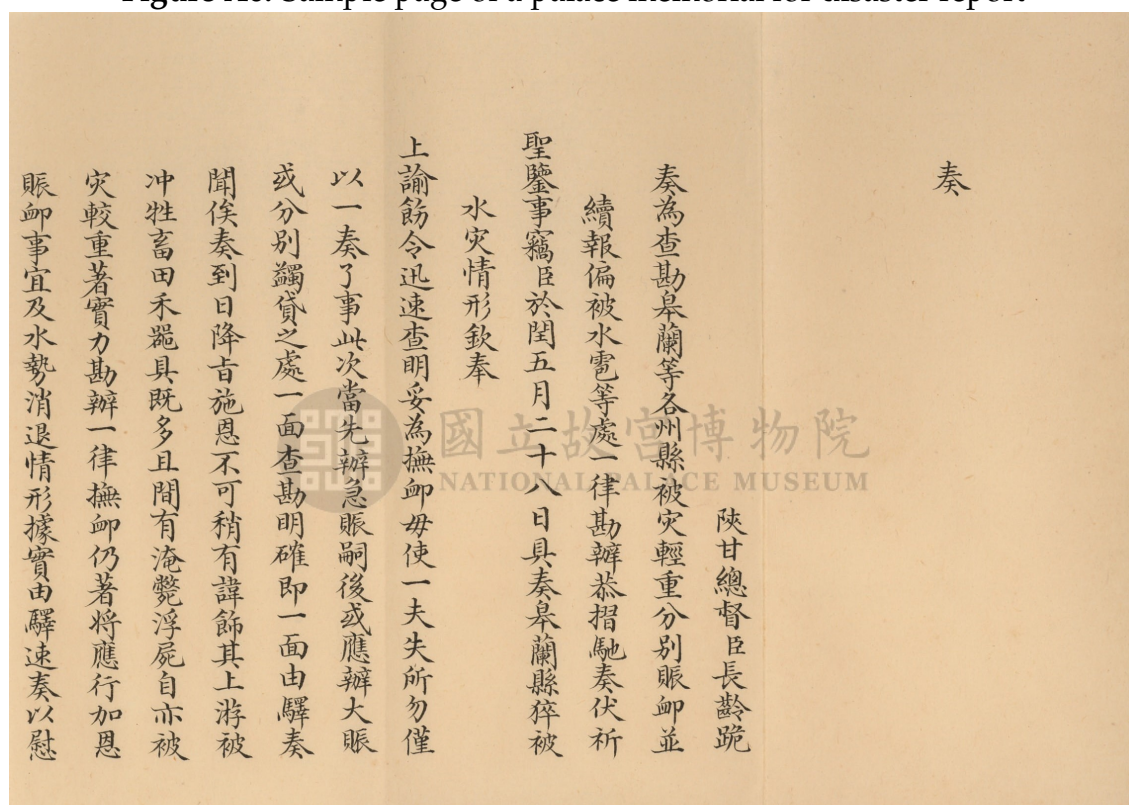
Source: Ministry of Finance, No. 110, in *Handbook of Statutes and Precedents of the Qing (Qing Huidian Shili)*, Volume 261, p. 1093. Beijing: Zhonghua Shuju.

Figure A5. Sample page of a palace memorial for diverting LLT revenues



Notes: This is an example of Palace Memorial in which a provincial governor reported to the crown about diverting LLT revenues to other expenditures. The title of this memorial is "Report on the Deliberation on Apportioning Contributions from LLT revenues to Address Military Provisioning in Henan Province", by Jing-an, the governor of Henan, 1797. Archive ID: 404002763.

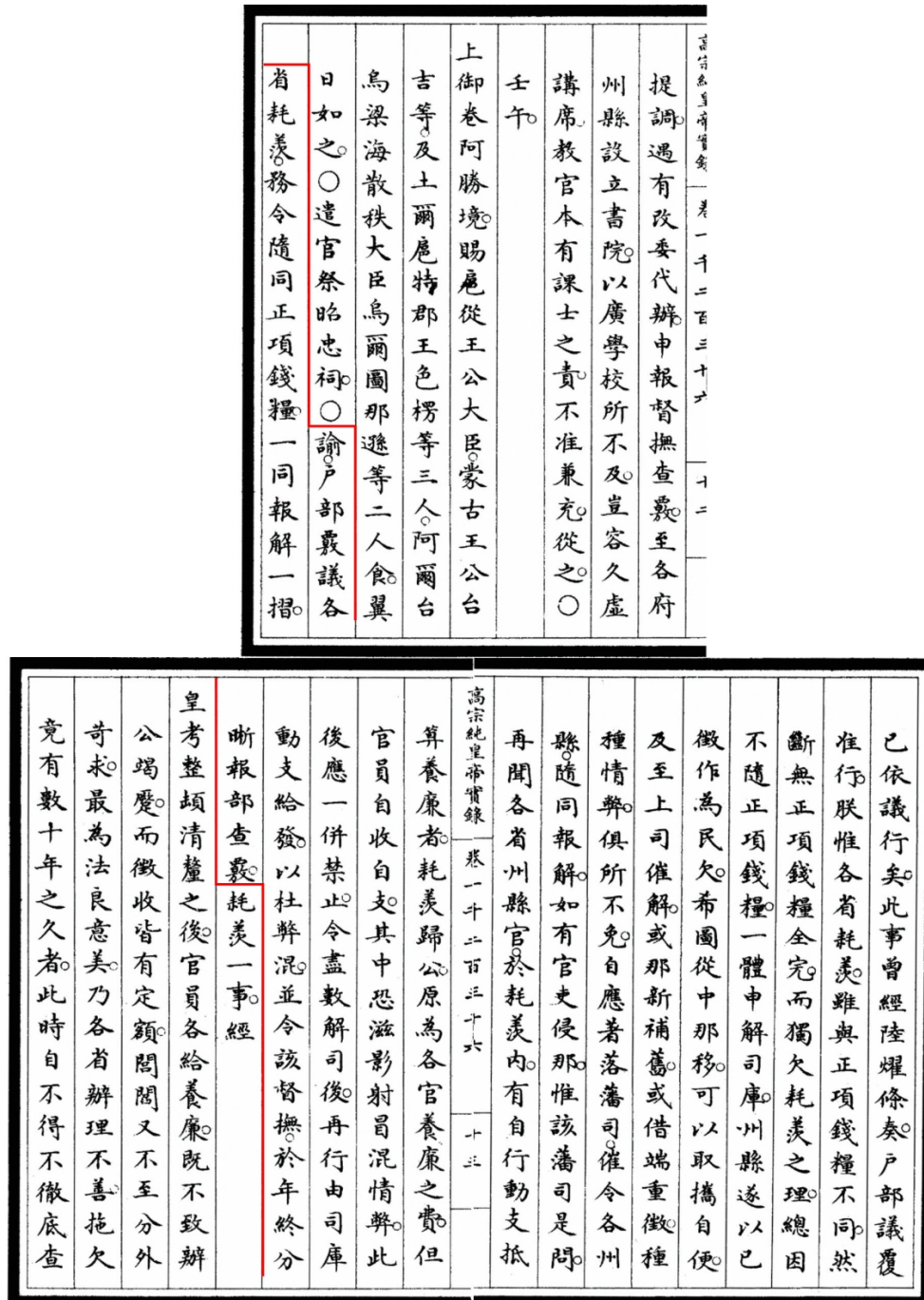
Figure A6. Sample page of a palace memorial for disaster report



Notes: Notes: This is an example of Palace Memorial in which a provincial viceroy reported a disaster occurrence. The title of this memorial is "Report on investigating disaster severity in Gaolan County and providing relief", by Chang-lin, the viceroy of Shannxi-Gansu, 1808. Archive ID: 404011545.

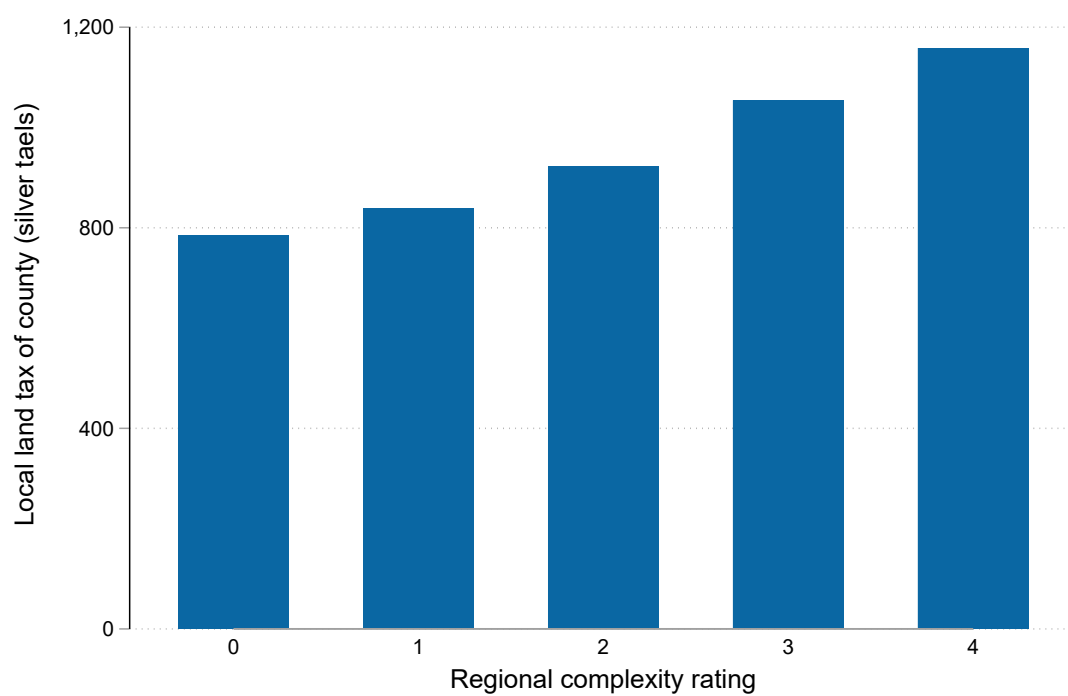
B Additional figures and tables

Figure B1. The original pages of the 1785 decree of centralizing local land tax administration



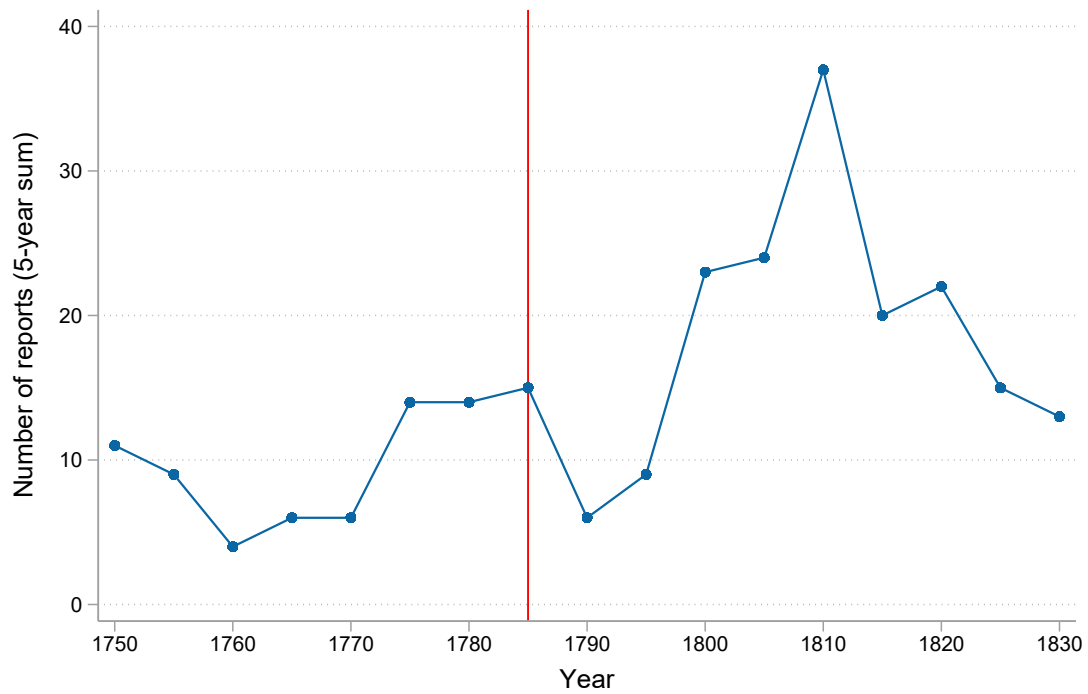
Notes: This figure shows the pages of a copy of the decree of centralizing local land tax administration.
Source: *Veritable Records of Qing Gaozong (Qianlong)*, vol 1236, p. 613, Beijing: Zhonghua shuju.

Figure B2. Average county local land tax by regional complexity rating



Notes: This figure shows the average local land tax (LLT) earmarked for county by county's regional complexity rating.

Figure B3. Number of provincial government reports on diverting LLT revenues



Notes: This figure plots the number of correspondence memorials that provincial leaders reported withholding and diverting LLT revenues to the central government.

Figure B4. Average tax shortfall probability in pre-reform period, by difficulty in tax

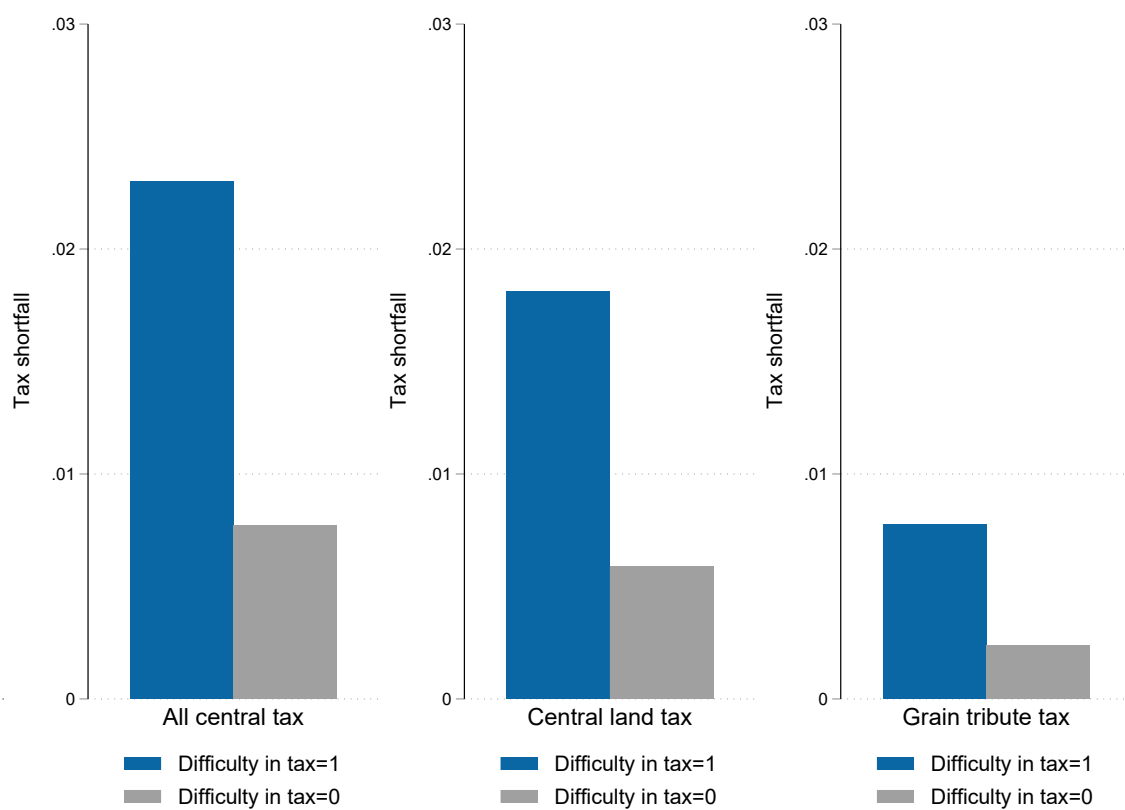


Table B1. Main result robustness: additional controls for confounding county characteristics

	Tax shortfall		
	All central tax (1)	Central land tax (2)	Grain tribute (3)
log LLT $\times$ Post	0.073*** (0.007)	0.058*** (0.006)	0.019*** (0.004)
County FE	Y	Y	Y
Year FE	Y	Y	Y
Year-Regional rating FE	Y	Y	Y
Additional controls	Y	Y	Y
Mean of D.V.	0.036	0.029	0.012
Observations	124,695	124,695	124,695

Notes: The unit of observation is the county-year. The dependent variable is an indicator equal to one if the county undergoes a shortfall relative to the revenue target for the central tax (column 1), central land tax (column 2), and grain tribute (column 3). log LLT is the log amount of local land tax earmarked for each county. Additional controls are year fixed effects interacted with predetermined county characteristics: rice suitability, distance to provincial capital, and number of officers. ***, **, * denote significance at 1%, 5%, 10% level.

Table B2. Main result robustness: controls for inflation

	Central tax shortfall			
	(1)	(2)	(3)	(4)
log LLT × Post	0.087*** (0.007)	0.079*** (0.008)	0.079*** (0.008)	0.078*** (0.008)
Price growth rate		-0.003 (0.006)		
log Grain price			-0.004 (0.006)	
Grain price index (1745)				-0.001 (0.003)
County FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Year-Regional rating FE	Y	Y	Y	Y
Mean of D.V.	0.015	0.015	0.348	0.348
Observations	131,410	97,240	100,159	92,969

Notes: The unit of observation is the county-year. The dependent variable is an indicator equal to one if the county undergoes a central tax shortfall relative to the revenue target. log LLT is the log amount of local land tax earmarked for each county. Columns 2–4 add different inflation control using prefecture-year level grain price data. Price growth rate is annual growth rate of grain price. Grain price index (1745) is an index relative to the price level in 1745. Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.

Table B3. Main result robustness: sample composition

	Tax shortfall		
	All central tax (1)	Central land tax (2)	Grain tribute (3)
Panel A: excluding provincial capitals			
log LLT × Post	0.080*** (0.007)	0.056*** (0.005)	0.032*** (0.006)
County FE	Y	Y	Y
Year FE	Y	Y	Y
Year-Regional rating FE	Y	Y	Y
Observations	113,305	113,305	113,305
Panel B: excluding prefecture-level counties (Zhilizhou)			
log LLT × Post	0.098*** (0.007)	0.074*** (0.006)	0.032*** (0.005)
County FE	Y	Y	Y
Year FE	Y	Y	Y
Year-Regional rating FE	Y	Y	Y
Observations	125,885	125,885	125,885
Panel C: only grain tax burden region			
log LLT × Post	0.126*** (0.011)	0.091*** (0.008)	0.048*** (0.008)
County FE	Y	Y	Y
Year FE	Y	Y	Y
Year-Regional rating FE	Y	Y	Y
Observations	57,205	57,205	57,205
Panel D: excluding White Lotus Rebellion affected region			
log LLT × Post	0.082*** (0.007)	0.060*** (0.006)	0.030*** (0.005)
County FE	Y	Y	Y
Year FE	Y	Y	Y
Year-Regional rating FE	Y	Y	Y
Observations	113,050	113,050	113,050

Notes: The unit of observation is the county-year. Panel A excludes counties that belonged to the provincial capital prefectures. Panel B excludes prefecture-level counties (*Zhilizhou*) that held a higher administrative rank. Panel C restricts the sample to counties that had a regular grain tribute burden. Panel D excludes regions that were affected by the White Lotus Rebellion during 1794–1804. The dependent variable is an indicator equal to one if the county undergoes a shortfall relative to the revenue target for the central tax (column 1), central land tax (column 2), and grain tribute (column 3). log LLT is the log amount of local land tax earmarked for each county. ***, **, * denote significance at 1%, 5%, 10% level.

Table B4. Heterogeneity by provincial top-down encroachment: time-varying interaction

	Central tax shortfall		
	(1)	(2)	(3)
log LLT $\times$ Post	0.085*** (0.007)	0.085*** (0.007)	0.078*** (0.007)
log LLT $\times$ Post $\times$ Encroach _{p,t}	0.003*** (0.001)		
Encroach _{p,t}	-0.007*** (0.002)		
log LLT $\times$ Post $\times$ Encroach _{p,t-1}		0.003*** (0.001)	
Encroach _{p,t-1}		-0.004** (0.002)	
log LLT $\times$ Post $\times$ Encroach _{p,t t-5}			0.010*** (0.002)
Encroach _{p,t t-5}			-0.009* (0.005)
County FE	Y	Y	Y
Year FE	Y	Y	Y
Year-Regional rating FE	Y	Y	Y
Mean of D.V.	0.036	0.036	0.036
Observations	131,410	131,410	131,410

Notes: The unit of observation is the county-year. The dependent variable is an indicator equal to one if the county undergoes a central tax shortfall relative to the revenue target. Encroach_{p,t} is an indicator equal to one if there was one case of diverting or withholding local land tax revenue in province p and year t. Columns 2–4 measure the same independent variable in year t-1, moving average from year t to t-5, and moving average from year t to t-10. ***, **, * denote significance at 1%, 5%, 10% level.

Table B5. Correlation between provincial top-down encroachment and central tax shortfall

	Central tax shortfall			
	(1)	(2)	(3)	(4)
Encroach _{p,t}	0.010*** (0.003)	0.012*** (0.002)	0.050*** (0.009)	0.062*** (0.013)
Independent variable measured in	t	t-1	MA: t t-5	MA: t t-10
County FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Mean of D.V.	0.036	0.036	0.036	0.036
Observations	131,410	131,410	131,410	131,410

Notes: The unit of observation is the county-year. The dependent variable is an indicator equal to one if the county undergoes a central tax shortfall relative to the revenue target. Encroach_{p,t} is an indicator equal to one if there was one case of diverting or withholding local land tax revenue in province p and year t. Columns 2-4 measure the same independent variable in year t-1, moving average from year t to t-5, and moving average from year t to t-10. ***, **, * denote significance at 1%, 5%, 10% level.

Table B6. The effect on local public goods: disaster relief provision

	Relief		Relief (gazetteer)	
	(1)	(2)	(3)	(4)
log LLT $\times$ Post	-0.052*** (0.020)	-0.052** (0.022)	-0.030** (0.012)	-0.029** (0.013)
County FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Year-Regional rating FE		Y		Y
Mean of D.V.	0.119	0.119	0.031	0.031
Observations	16,080	16,076	16,094	16,090

Notes: The unit of observation is the county-year. The sample is restricted to county-years with severe abnormal rainfall level. The dependent variable is an indicator for relief provision. Columns 1 and 2 use relief data from government record (the *Veritable Records of Qing*). Columns 3 and 4 use relief data from alternative source constructed from local gazetteers (Zhang, 2004). log LLT is the log amount of local land tax earmarked for each county. Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.

Table B7. Effects on unlawful fees and bribes

	Unlawful fees and bribes	
	(1)	(2)
log LLT × Post	1.058*** (0.132)	0.788*** (0.133)
County FE	Y	Y
Year FE	Y	Y
Year-Regional rating FE		Y
Mean of D.V.	0.41	0.41
Observations	131,410	131,410

Notes: The unit of observation is the county-year. The dependent variable is an indicator equal to one if there are any cases of alleged unlawful fees and bribes, rescaled by 100 for legibility. log LLT is the log amount of local land tax earmarked for each county. Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.

Table B8. The effect on grain price and abnormal price surge

	Grain price			Price surge		
	(1)	(2)	(3)	(4)	(5)	(6)
log LLT × Post	-0.6182 (2.936)	-3.9332 (3.254)	-3.7424 (3.253)	-0.0033 (0.005)	-0.0035 (0.005)	-0.0017 (0.005)
Weather shock			7.2715*** (0.311)			0.0492*** (0.003)
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Year-Regional rating FE		Y	Y		Y	Y
Mean of D.V.	169.014	169.014	169.014	0.05	0.05	0.05
Observations	100,159	100,159	100,159	97,240	97,240	97,240

Notes: The unit of observation is the county-year. In columns 1–3, the dependent variable is the yearly average grain price. In columns 4–6, the dependent variable is a dummy variable whether the county experiences abnormal price growth with a yearly growth rate higher than 95% percentile (17.11%). Weather shock is an indicator for severe abnormal rainfall (level 1 or 5). Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.

Table B9. Controlling for potential crop failure

	Central tax shortfall		
	(1)	(2)	(3)
log LLT $\times$ Post	0.079*** (0.008)	0.087*** (0.007)	0.087*** (0.007)
Price surge	0.001 (0.003)		
Disaster		0.005*** (0.002)	
Weather shock			0.001 (0.002)
County FE	Y	Y	Y
Year FE	Y	Y	Y
Year-Regional rating FE	Y	Y	Y
Mean of D.V.	0.036	0.036	0.036
Observations	97,240	131,410	131,410

Notes: The unit of observation is the county-year. The dependent variable is an indicator equal to one if the county undergoes a central tax shortfall relative to the revenue target. log LLT is the log amount of local land tax earmarked for each county. Price surge is a dummy variable whether the county experiences abnormal price growth with a yearly growth rate higher than 95% percentile (17.11%). Disaster is an indicator equal to one if the county experiences real disaster incidents. Weather shock is an indicator for severe abnormal rainfall or drought (precipitation level 1 or 5). Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.

Table B10. Testing change in monitoring

	Tax shortfall	Disciplinary record		
	(1)	Punish (2)	Remove (3)	Demote (4)
log LLT × Post	0.161*** (0.049)	-0.028 (0.265)	-0.033 (0.206)	0.022 (0.136)
log LLT × Post × log Distance to ProvCapital	-0.015 (0.010)			
log Distance to ProvCapital × Post	0.098 (0.064)			
County FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Year-Regional rating FE	Y	Y	Y	Y
Mean of D.V.	0.036	1.358	0.79	0.432
Observations	131,410	131,410	131,410	131,410

Notes: The unit of observation is the county-year. The dependent variable in column 1 is an indicator equal to one if the county undergoes a central tax shortfall relative to the revenue target. In columns 2–4, the dependent variable is an indicator (rescaled by 100) for whether the county magistrate faces any disciplinary punishment, is removed, and is demoted. Robust standard errors in parentheses are clustered at the county level. ***, **, * denote significance at 1%, 5%, 10% level.