

# **Elite or State: Grain Prices, Social Conflicts and Public Goods Provision in Eighteenth-Century China**

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## **Abstract**

State and community shape a society together. This paper documents and compares the function of the government and local elites in stabilizing fluctuations in grain prices in eighteenth-century China. Narrative evidence suggests that, while the government provided public goods including the ever-normal granary system, the elites also participated in multiple ways, including leading water project constructions, managing private granaries, and providing social relief. However, few studies have quantitatively compared the importance of these two players. We construct a prefecture-level panel data from 1742 to 1795 to examine the effect of the official granary system versus local elites. Preliminary results show that the effects differed across the country. While the government played a dominant role in the North, the elites effectively reduced price fluctuations in the Lower Yangzi.

## 1. Introduction

The rise of strong state, or increase in state capacity, is widely viewed as a prerequisite of Europe's industrial revolution. Besley and Persson (2014) define state capacity as the ability to protect property rights, to collect taxes, and to set up institutions that facilitate the market.<sup>1</sup> However, studies based on Western European countries have not paid sufficient attention to the role of social organizations, or the community, in managing local affairs and providing public goods that are crucial for industrialization. While a strong state played a vital role in Europe's industrialization, the US, for instance, has long benefited from citizens' active participation in local affairs (Tocqueville, 1835; Putnam, 2000). Community also shaped the society during the interwar Germany (Satyanath, Voigtländer and Voth, forthcoming).

Historical China witnessed strong roles played by both the state and the community in social governance. The state has been acting as a major determinant in resource distribution in China from history to present. Even when the ability of collecting taxes was rather weak in the pre-modern society (Sng, 2014; Ma and Rubin, 2017), the Chinese government was able to mobilize sufficient resources and manpower for large-scale construction projects (Will et al., 1991). Yet, starting from the Song dynasty, the local gentry gradually became a non-negligible component in the management of local affairs. In the eighteenth century, they continued to be a key pillar of local community, assisting the state in collecting taxes, maintaining social order and providing public goods such as famine relief.

In this paper, we document how the government and the local gentry provide public goods when facing negative weather shocks and quantitatively compare their effectiveness in different regions of eighteenth-century China. Collecting the detailed records on grain prices, local conflicts, and different intervening forces, we construct a prefecture-level panel data from 1742 to 1795. This is one of the most peaceful and

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<sup>1</sup> Recent literature study the importance of state capacity on economic development (Acemoglu, 2005; Besley and Persson, 2011). In the historical context, Tilly (1990) first links state capacity with industrialization. Hoffman (2015) enriches the framework from different perspectives. Dincecco (2015), Dincecco and Katz (2016), and Johnson and Koyama (2017) provide empirical evidence on the relationship between state capacity and economic outcome.

economically prosperous period in the Imperial China. When harvests were undesirable and the grain prices were high, both the state and private parties were capable of providing famine relief to help local community. To illustrate the sharp contrast among different regions in China, we especially consider two regions that traditionally advanced in agricultural production yet with distinct social structure: the North China and the Yangzi Delta. We are interested in whether the two regions relied on different forces to alleviate the negative weather shocks.

In the empirical analyses, we first establish the relationship that higher grain prices were associated with more conflicts in both rice-producing regions and wheat-producing regions, but the effect faded away when shrinking our analyzed region into the North or the Lower Yangzi. We then examine whether this result can be explained by the state or the private interventions. We use grain storage in government-managed granary system from Will et al. (1991) as a measure of public goods, and the number of student quota to measure gentry at the prefecture level. The results show that both two types of public goods were likely to reduce conflicts due to higher grain prices, yet the effects varied by region. While in the north government forces played a more dominant role, in the Yangzi Delta the effects due to local gentry was salient. We then provide context for the empirical research by adding anecdotal evidence on the different types of public goods provided by the gentry. Although it is difficult to establish a clear causal interpretation on the sources of different social structure, we list several suggestive explanations at the end of this paper.

This paper relates to a wide range of studies. Studies in Chinese history have long linked negative weather shocks with social stability. Wong (1982) investigates representing cases of food riots in the Qing dynasty and finds that food riots relate to whether the grain supplied could meet the ones demanded, rather than directly to poor harvests or higher grain prices.<sup>1</sup> Our paper empirically tests his findings. As for the safety nets, while some scholars have studied the function of the granary system (Will et al., 1991; Liu and Fei, 1979; Liu, 1980; Shiue, 2004, 2005; Wu, 2018), few have

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<sup>1</sup> Other economic studies explore how different socioeconomic factors resulted in conflicts in Chinese history including Bai and Kung (2011), Jia (2014), Chen (2015), Ma and Kung (2014a, 2014b), Bai and Jia (2016).

evaluated the effect of services provided by the local gentry. Our paper also provide quantitative evidence on whether market forces, government policies, and local gentry have effectively reduced conflicts.

This paper also relates to the famine relief literature. With natural disasters and its resulting harvest shortfalls haunted pre-modern societies, safety nets such as famine relief smooth food supply and reduce potential risks of social instability (Greif et al., 2013). Some scholars link the presence of the Old Poor Law in Britain to the country's initiation of modern economic development and industrialization (Solar, 1995; Greif et al., 2013), while the Imperial China is regarded as incapable of collecting enough taxes (Sng, 2014) or establishing an impersonal poor relief (Greif et al., 2013). This paper suggests that the public goods provision was complex in Chinese history. While some place relied on the government, other places witnessed more involvement of the community.<sup>1</sup>

## **2. Historical Background**

### **2.1 Natural Disasters, Grain Prices, and Conflicts**

In a traditional society, agriculture output was a crucial factor for maintaining social stability, and weather condition was a crucial factor for agricultural output. Unusual weather shocks and the resulting natural disasters, such as droughts or floods, were the main reasons of bad harvest. Bad harvest caused by extreme weather usually led to food shortage or, in extreme cases, social conflicts.

Unfortunately, China is a nation that is frequently afflicted by natural disasters. The unpredictable monsoon climate brought in extreme droughts and floods throughout the Chinese history.<sup>2</sup> As the biggest shock to an agrarian society, negative weather conditions led to higher grain prices and food shortage in China (Wang and Huang, 1999a). If food shortage could not be solved timely, hungry people might crowd into city centers or migrate to nearby countries and create bigger chaos: food riots started

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<sup>1</sup> Esherick and Rankin (1990) briefly summary the distinct features of the local gentry across China.

<sup>2</sup> See, for example, Li (2007) for discussions on the patterns of natural disasters in North China

(Wong, 1982).<sup>1</sup>

The period we study, between 1736 and 1795, is the heyday of the Qing dynasty (1636-1912) and is one of the most prosperous periods in China's long history. Marked as the "High Qing" period or "The Great Period from Kangxi to Qianlong" ("*Kang-Qian Sheng Shi*"), this period witnessed growing population, flourishing commercial sectors, and probably the most powerful government in the Imperial China (Rowe, 2009). However, even in this peak period of the Qing dynasty, China still suffered from frequent unusual weather conditions and disasters: from the years 1736 to 1795, about 177 counties reported natural disasters or extreme weather conditions: 100 counties reported flood and 55 counties drought. On average, one county experienced a disaster every 12 years (Li, 1995).

In the heyday of the Qing dynasty, the state was able to mobilize resources to conduct famine relief when natural disasters struck, so large-scale revolts were unlikely. In fact, there were only 31 large-scale internal revolts inside China from 1736 to 1795, which was quite peaceful in the standard of pre-modern China, and they usually took place in remote mountainous or multi-ethnicity areas where no big impacts happened.<sup>2</sup> However, even in this prosperous period, there were many small-scale conflicts that usually occurred in cities (Kuhn, 1990). According to Wu (2011), over a hundred small-scale conflicts were recorded during the period we study, and the specific type of these conflicts include food riots, tax resistance, and strikes. These small-scale conflicts were quite different from large-scale rebellions, as their participants had clear requests and usually did not aim at overthrowing the central government, especially the ones in the eighteenth century (Wong, 1982). Rather, these conflicts were a method through which ordinary people seek for resolutions from the government, such as to reduce taxes, to give away food during famine, and to punish a corrupted official. People started the riots with the expectation that their requests might have been better and faster met in

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<sup>1</sup> Without any intervention, grain price differences naturally induced trade (Shiue, 2002). Cross-region grain transportation was common in the Qing dynasty. Yet, access to waterways and the postal roads limited the size of long-distance trade. Quantitative evidence on grain prices finds that the prices were less responsive to weather shocks for areas in the middle and lower Yangzi River, where waterways most denser in China, suggesting there were higher degree of market integration along the river (Keller and Shiue, 2007).

<sup>2</sup> Chen (1986).

this way (Wong, 1982, 1997). As a result, although the laws stipulated that riot leaders would receive death sentence, in many cases the leaders either escaped from punishment or survived because their requests were reasonable (Wu, 2011).

## **2.2 The State's Role in Alleviating Negative Weather Shocks**

The government's main concern was riots and protests that potentially threatened social stability. To prevent food shortage, the Qing court developed a sophisticated system to receive information, to investigate disasters, as well as to respond in a timely manner. As part of the daily efforts, the provincial officials were required to monitor and report rainfall and grain prices. To prevent for potential disasters, the government constructed water projects. The granary system was built to respond the disasters at a timely manner. When the disaster finally took place, the government postponed or reduced taxes in due. It also ordered distribution of grain from local granary system to prevent food riots.<sup>1</sup>

As direct remedy of food shortage, the granary system was an essential component in the Qing court's strategy against natural disasters. By design, the system required participation from both the government and the community, but the former dominated. Known as the ever-normal granary system, the official-managed granary was supposed distribute grain during food shortage, or sell grain at lower prices when the market price was high. It was estimated that the grain stored was about 7% of the total grain produced. Despite disagreements by scholars, it is generally accepted that the system was functional in the eighteenth century (Will et al., 1991).<sup>2</sup> China was able to provide famine relief with larger scales and better coverage than contemporary European countries. In the nineteenth century, however, the system became less efficient but was

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<sup>1</sup> An example demonstrate such efforts. In January, 1742, the emperor first discussed the famine in Anhui province, ordered to increase granary relief in the places struck by severe disasters. Then, the emperor showed "special concern" for Gansu province whose natural conditions were aggravating and allowed the provincial governor to extend the land taxes owed in the next three years (instead of one year) for four counties in Liangzhou Prefecture. In the same month, the emperor also received the report from the governor of Zhili province about a severe flood and granted relief for the flood. See *Qing Shilu Qihou Ziliao Zhaibian*, page 163.

<sup>2</sup> Scholars further focus on the economic issue in granary management. Liu and Fei (1979) use a theoretical model to evaluate the functions of the ever-normal granary system. They conclude that the granary failed to accomplish its goal. Shiue (2005) points out that the granary system faced a moral hazard problem that places received more famine relief often stored fewer grains. Wu (2018) estimates the profits of local granary and concludes that in theory, the ever-normal granary system could only balance itself. It was also shown in ministers' reports to the emperor. However, it was widely acknowledged that the peak of the system was in the eighteenth century.

still able to transfer large amount of grain when necessary. It was after the Taiping Rebellion that the system totally collapsed.

Regional analyses further suggest that the distribution of grain varied across China. For the granary system, Wong (1991) found that the provinces with more access to markets, such as Hunan, stored way fewer grains. On the contrary, In some counties in the North the government even took over some of the community granary (Oi and Will, 1991).

### **2.3 The Role of the Gentry in Local Governance**

Magistrates were county government leaders in China the eighteenth century. They were sub-contracted by the emperor and were responsible for almost everything in their counties, such as security and stability, tax collection, practice of justice, infrastructure construction, education and ideology. However, the size of local government was required to be small: the official quota of a local government was only one thousandth of the number of people it served<sup>1</sup>. This was far from sufficient for the local government to function properly. In addition, local officials were required to serve the places at least 250 kilometers away from their hometown province. Aiming to prevent corruption, this policy also made it difficult for a newcomer magistrate to know the details of the county he governed and to efficiently implement policies (Ch'u, 1962). Therefore, the magistrates often outsourced detailed work to intermediaries, such as the local gentry.

The gentry were a group of people who passed at least the lowest level of the Imperial Civil Service Examination. Since the examination system was aimed at selecting officials, the gentry had higher social status and was the pool for potential local officials. Although not required, in practice the gentry often had other identities, such as head of clans and landlords. They might have been the richest members in villages or in their family, but they usually received respects from commoners around..

In seeking for helpers, the magistrates relied on the gentry who were equally literate but had more knowledge about local circumstances. Some gentry were even retired officials who were fully equipped with skills to handle government affairs. Meanwhile,

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<sup>1</sup> See Ch'u (1962).

as native residents, the gentry also stood for local interests and were supposed to behave. This made the gentry perfect intermediary between the commoner and the magistrates. They assisted the magistrates in village affairs, such as serving in local schools, collecting taxes, maintaining local granary, and providing public goods.

It is worth noting that this arrangement sometimes left room for the gentry to abuse their rights. Despite the fact that many gentry were honest, integrated, and served the society (Chang, 1955, 1962), others might have sought for opportunities to make money, to take advantage of the often economically poorer commoners or to evade their family's obligations to the country (Hsiao, 1960; Ch'u, 1962).

### 3. Data

To examine the impact of grain price changes on conflict frequency, we assemble six prefecture-level panel datasets from 1742 to 1795: measure of conflicts, grain prices, unusual weather conditions, measures of state factor in grain markets, measures of local elites' factor in grain markets, and a set of control variables.

#### 3.1 Outcome variable: Conflicts

The key dependent variable in this paper is conflicts. There are different definitions of conflicts in literature and archives, many of which focus on large-scale warfare or ethnic conflicts<sup>1</sup>. Different from that, we focus on the price-induced small conflicts, such as food riots, strikes, tax resistance, and other forms of urban protests. These conflicts usually involved at most hundreds of people and without much causality. In addition, they were much more sensitive to changes in grain prices than the large-scale warfare.

In this paper, we use data of urban conflicts collected by Wu (2011). Most of his data was gathered from both national-level official archives, including *Palace Stored Archives* ("Gong zhong dang") and *Collections of Commented Official Documents in Yongzheng and Qianlong Dynasties* ("Zhupi zouzhe"). Compared to the data from other

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<sup>1</sup> Previous literature use conflict data from multiple sources. For example, Jia (2013), Bai and Kung (2014) use information from *A Chronology of Warfare in Dynastic China*. Ma and Kung (2014a, 2014b) use information from *Shilu* in the Qing and the Ming dynasties.

sources, the data from official documents at the national level was generated in a relatively consistent way over time. Wu also supplements this data with records from local gazetteers, personal diaries, and some secondary sources such as *Historical Materials on Revolts and Protests of Urban and Rural Citizens in the 17<sup>th</sup> and 18<sup>th</sup> Centuries* (“*Kangyongqian shiqi chengxiang renmin fankang douzheng ziliao*”).

We computerize Wu’s data and build a dataset on conflicts from 1742 to 1796, containing the location and year of conflicts at the county level as well as causes (or excuses) for conflicts. We use the records of conflicts from 1742 to 1796. There were 128 recorded conflicts taking place in 18 provinces. Food shortage was the most common reason that led to 63 conflicts. Although the data reports conflicts taken place in cities, in fact it reflected conflicts organized by both urban and rural people, because rural conflicts always targeted local government in cities.<sup>1</sup> For example, in 1747, Henan prefecture in Henan province, a local *shengyuan* (the lowest title of the Examination) Wang Guogan was unsatisfied with the granary’s grain lending policies in the rural area. He then wrote and spread posters to instigate a conflict against the local magistrate. This conflict involved about 116 people at its peak, damaged the county hall and hurt county clerks. The organizer finally received death sentence and the followers received various other punishments. An interesting fact about this conflict is that, although Wang was smart enough not to participate the conflict himself, he was still considered as the organizer and beheaded immediately.<sup>2</sup>

Figure 1 displays the density of conflicts in the 18 provinces. The statistics present significant provincial-level heterogeneity, suggesting that provincial unobservable characteristics were likely correlated with the frequency of conflicts. For example, it is natural that more populous and urbanized places tended to have more urban conflicts. In addition, people in provinces with better market conditions might have relied more on external food supply and sensitive to conflicts. Land and traffic conditions also affected the cost to organize conflicts. To address these factors, we use prefecture fixed-

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<sup>1</sup> The urbanization rate in China was around 8% in (Xu et al., 2015). The cities were the places to trade. Rural people went to cities frequently to trade, to see local officials, or to protest. Therefore urban conflicts reflect such incidents in both cities and countryside.

<sup>2</sup> *Kangyongqian shiqi chengxiang renmin fankang douzheng ziliao*. Page 568-569

effects to control for time-invariant characteristics and prefecture specific time trends to capture possible different linear trends in the frequency of conflicts. In this way, the variation we use to identify the impact of grain prices on conflicts are the deviations from average prefecture means. Line 1 of Table 1 displays the summary statistics.

### 3.2 Grain Prices

Grain price is the main independent variable in our empirical analysis. The data was originated from provincial governors' reports to the emperor. The Qing government demanded provincial governors to report grain prices and weather conditions on a monthly basis, aiming to gather information and issue necessary interventions timely. Economic historians began to collect this data as early as in the 1930s.<sup>1</sup> In this paper, we use the data collected by Yeh-chien Wang from the *Lists of Grain Prices* from the No.1 Historical Archives of China. This data was widely used by scholars who study this topic, and its reliability was well acknowledged. In this paper we use grain prices in December and consider deviations from the previous year. This is the time when people usually faced food shortage and were likely sensitive to high grain prices. So it was the best month to study the relationship between grain prices and conflicts. In addition, since the northern and southern China produced and consumed different types of grain, we use wheat as the representative grain in the north and rice in the south.

We use grain price in December. Winter was the time when the economy experienced the most severe shortage of food and people were particular sensitive to food shortage and higher grain prices (Wang, 2015). Cases recorded in *Qing Shilu* also suggest that the emperor deliberately considers to distributing grain during the winter time, when the last years' harvests were already consumed but the new crops were still growing (“*qing huang bu jie*”).

To illustrate the validity of the grain prices, we match recorded natural disasters from *Lidai Tianzai Renhuo Biao* (Natural Disasters and Warfare in Chinese History) with grain prices in a Northern county. Figure 6 shows the price fluctuations and the frequency of natural disasters. During 1742, 1757, 1773, and 1784 when there were

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<sup>1</sup> Research using this data includes Chuan and Kraus (1975), Wang (1993), Li (1993), Purdue (1993), Shiue (2002), and Shiue and Keller (2007).

recorded drought or flood took place, the grain prices also rose rapidly.

### **3.3 Weather Conditions**

In a traditional agrarian society, weather shocks were the main reason for bad harvests and might lead to food riots (Greif and Iyigun, 2013). Previous studies on Chinese history already find that negative weather shocks tend to increase conflicts (Bai and Kung, 2011; Jia, 2014; Chen, 2015). During the period we study, the only annual information available on weather shocks is the weather records collected by the State Meteorological Society of China.<sup>1</sup> The original data reports the events of unusual conditions in 120 stations over 500 years, with each province has several observations for a given year. Unusual weather events are classified in five categories: exceptional flood, limited flood, normal weather, limited drought, and exceptional drought. We construct an inverse distance matrix based on geographic information from China Historical Geographic Information System as the weighting matrix, and insert measures for extreme weather conditions for each prefecture. Line 3 of Table 1 reported the summary statistics.

### **3.4 Measure of State Control**

The government had many policy tools to control the negative effect of natural disasters, such as the granary system, tax reduction, and famine relief. We focus on the granary system that were directly aimed at reducing the harms of grain price fluctuations.

For grain storage, we use annual provincial-level grain holdings collected by Will et al. (1991). This data is originated from *Minshu gushu qingce*, recorded when the Qianlong Emperor demanded local ministers to report local population every year. Will et al. (1991) conduct a careful examination on the quality of this data and concluded that most of the numbers during the eighteenth century was reliable. Figures 2 displays total and per capita storage in a given year. The east, especially the Yangzi Delta, has relatively lower level of per capita grain storage, while the hinterland and less populated west had more per capita storage. Line 4 of Table 1 reported the summary statistics.

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<sup>1</sup> Shiue (2002), Shiue and Keller (2007), and Jia (2014) also used this information in their studies.

The average storage at the provincial level was 206.20 million *shi* (of unhusked grain), with the peak storage was 483.24 and the lowest storage was 76.59. According to an estimation by Shi (1989) and Guo (2001), the grain stored was about 1% of the total grain produced.

While this data provides useful panel information, one has to be careful to interpret the results as it relies on provincial-level grain storage and lacks clear indication about how much of the grain reported belonged to officially-managed granary system, although the great majority of the grain stored is managed by the government. It would be reassuring to explore the pattern of grain holdings at a more detailed level when data is available. As a result, we also collect grain holdings at the prefecture level from local gazetteers, which indicate whether the grain stored was managed by local government or contributed by local gentry. This additional information allows us to address previous two caveats by examining the data at finer level as well as to examine whether the distributions of official managed and private managed grains were different. Since the prefecture-level storage is available in only four provinces during the examined period (as shown in Figure 3), we only use this information as a robustness check.

### **3.5 Measure of Gentry**

As mentioned before, gentry played an indispensable role in providing private public goods, especially famine relief. To measure the gentry's role, we collect the student quotas of the Imperial Civil Service Exams at the prefecture level as a proxy for the actual number of local gentry. The original data was collected from *Qinding Xuezheng Quanshu* (Collections of Law and Statutory Regarding the Imperial Examination in the Qing Dynasty) in mid-Qing period. In the Exam system, student quota restricted the number of people who were eligible to attend county school and county exam, the lowest level of exams. In other words, it defines the initial pool from which commoners became gentry. Compared to the limited number of people who passed examines and received position assignments usually far from their hometown, the number of student quota was more likely to measure the actual distribution of low-level gentry, in other words, elites stayed in their hometown. In addition, the student

quota barely changed during the study time.<sup>1</sup> Line 5 of Table 1 reports the summary statistics. The mean of student quota across prefecture is 97.1 and with quite a large variation. In extreme cases, the maximum and minimum student quotas are 422 and 4.

### 3.6 Measure of Market Forces

In this paper we also control for market forces, which also alleviated the impact of unfavorable weather conditions. The eighteenth century witnessed the recovery and commercialization of markets (Myers and Wang, 2002). Keller and Shiue (2007) also document the importance of river in closing price gaps in Southern China. Case studies suggest that market forces served as substitutes of the granary system. In Hunan, the amount of civilian holders was lower in places with better market conditions (Perdue, 1992). To address the effect of commercialization, we collect information on major rivers and post houses to capture market conditions. The last two lines of Table 1 report summary statistics of the variables that capture market conditions.

## 4. Baseline Regression

In this section, we empirically study the impact of grain prices on conflicts and how this relationship changed under the state or gentry's intervention. We first examines how grain prices affected conflicts. Since this analysis raises concerns on omitted variables and reverse causality, we then use abnormal weather conditions as an instrument variable for grain prices. We then examine the effects of state storage and private parties in mitigating urban conflicts in different regions.

### 4.1 The Relationship between Grain Prices and Urban Protests.

We first establish the relationship between volatility in grain prices and conflict frequency. For province  $i$ , prefecture  $j$  at year  $t$ , the baseline regression equation is

$$\log\left(\frac{Conflicts}{popu}\right)_{ijt} = \alpha + \beta_1 \Delta \log(price_{ijt}) + \beta_2 \log(price_{ijt}) + \gamma_{ij} + \sigma_t + \epsilon_{ijt},$$

where the dependent variable is the frequency of conflicts divided by population at the

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<sup>1</sup> The student quota was first set in 1685, considering population and literacy in a region. Counties were broadly categorized into small, medium, and large, and assigned with student quota of eight, fifteen, and twenty, separately. The only major nationwide adjustment of the student quota in the eighteenth century took place in 1924. County-level adjustments were more often, but still rare during our study period.

prefecture level in natural log form. The variable  $price_{ijt}$  is grain price at prefecture  $j$  at year  $t$ . The log difference of grain prices in fact measures percentage change of grain prices in the year  $t$  relative to the year  $t - 1$ . We expect  $\beta_1$  to be greater than zero. That is, we expect more conflicts took place if this years' grain price was higher. The variable  $weather_{ijt}$  measures weather conditions at prefecture  $j$  at year  $t$ .  $\gamma_{ij}$  controls for prefecture-level fixed effects and  $\sigma_t$  captures national shocks.

Table 2 reports the results of the fixed-effect model by region. Columns (1) and (2) for rice-producing regions and Columns (5) and (6) for wheat producing regions. The fixed-effect model suggests that one percent change in the price of rice was associated with a 0.0223 percent increase in conflicts per million people in rice-growing regions and a 0.0123 percent increase in conflicts per million people in wheat-growing regions. The effects stay the same after controlling for prefecture time trends.

Columns (3), (4), (7), and (8) report results for Yangzi Delta and the four Northern provinces respectively. For Lower Yangzi, the coefficient becomes slightly larger yet the significance level drops. For the North, the coefficient becomes smaller and not statistically significant. We will discuss regional variations in the subsequent section.

## 4.2 Instrumental Variable

The baseline results may suffer from endogeneity problems. For example, regional shocks might have affected both grain prices and conflicts. In addition, since we measure conflicts on a yearly basis, it is also possible that our findings the impact of conflicts on higher grain prices.

We then use weather shocks as an instrumental variable to address concerns on endogeneity. To construct this measure, we assign the station-level data to each county based on an inverse distance matrix, and choose the county with the worst weather in each prefecture to represent prefecture-level weather conditions.

The equation for the two-stage least square estimation is as follows. For each prefecture  $j$ , province  $i$  and year  $t$ , we run the following equation as the first stage

$$\Delta \log(\widehat{price}_{ijt}) = \alpha + \beta_1 weather_{ijt} + \gamma_{ij} + \sigma_t + \epsilon_{ijt}.$$

We then use the first stage  $\Delta \log(\widehat{price}_{ijt})$  to run the second-stage

$$\log\left(\frac{Conflicts}{popu}\right)_{ijt} = \alpha + \beta_1 \Delta \log(\widehat{price}_{ijt}) + \gamma_{ij} + \sigma_t + \epsilon_{ijt},$$

where weather is the frequency of flood or drought and other variables are defined as in the previous section.

Table 3 reports results for the 2SLS model. The magnitude of coefficient becomes greater after using the IV, with the coefficient becomes 0.514 for rice-producing regions and 0.140 for wheat regions. For Lower Yangzi, the coefficient now is 0.220 but still not statistically significant. The magnitude is much smaller than the coefficient for the whole rice regions. For the North regions, the coefficient is 0.0673 and also much smaller than the coefficients for the whole wheat regions. Both results confirm findings from the OLS results and suggest that the Lower Yangzi and the North were relatively insensitive to negative weather shocks.

## 5. The Impact of Interventions

The previous section establishes the relationship between grain prices and conflicts. When disaster struck, grain prices soared, and conflicts took place, China's central government distributed grain to hungry people from the ever-normal granary system. Historical records show that local gentry also helped community by constructing water projects and establishing charitable organizations. Using historical data, we now quantitatively document the alleviation effects from official and private interventions and examine which one is more significant.

### 5.1 Compare State and Private Interventions

We use the following regression equation to address the interventions

$$\begin{aligned} \log\left(\frac{Conflicts}{popu}\right)_{ijt} &= \alpha + \beta_1 \Delta \log(price_{ijt}) + \beta_2 Storage_{it} \\ &+ \gamma_1 \Delta \log(price_{ijt}) \times Storage_{it} + \gamma_2 \Delta \log(price_{jt}) \times Gentry_{jt} + \gamma_{ij} \\ &+ \sigma_t + \epsilon_{ijt} \end{aligned}$$

where  $\frac{Conflicts}{popu}$  and  $\log(price_{it})$  have previous interpretations.  $Storage_{jt}$  is the provincial-level storage in natural log form.  $Gentry_{it}$  is the measure of local gentry at

the prefecture level, which is the natural log form of the total number of student quota in county official schools divided by population.

We expect  $\beta_1$  to be greater than zero, indicating that higher grain prices would lead to more conflicts.  $\gamma_1$  is less than zero, for storage system should decrease the frequency of conflicts.  $\gamma_2$  should be less than zero if local gentry helped reduce conflicts.

One may suspect that storage was endogenous to local socioeconomic characteristics that were likely to affect conflicts as well. The use of provincial-level storage already mitigates this problem as provincial storage unlikely responded to conditions in a particular county. To further address this concern, we use lagged storage that were not supposed to be correlated with conflicts at a given period.

Table 4 reports the results. The coefficient of grain price change suggested that, all the effect aside, the change in grain price significantly increased conflicts in the North and the Lower Yangzi. In addition, we find that, surprisingly, access to river demonstrates no effects in mitigating conflicts. Rather, the number of postal houses clearly reduced conflicts in the Yangzi Delta. As for the variables of interests, lagged storage itself reduced conflicts by 0.0116 and -0.00647 in all wheat producing regions. Lagged storage also reduced conflicts during grain price shock by -0.0359 in the North and by -0.0765 in wheat producing regions. The coefficient in the North indicates that one percent increase in the lagged grain storage would reduced 0.0359 percent conflicts, which is about 6.3 percent of the number of conflicts induced by grain price changes. In the Yangzi Delta, one percent increase in student quota density, as a measure of gentry, effectively reduced conflicts by -0.0755. This is about eight percent of the conflicts induced by grain price changes. That is, five percent increase increase in the ratio of student quota to population would be associated with forty percent drop in the number of conflicts.

## **5.2 Gentry and Community Public Goods**

The local gentry were usually leaders of local community. In normal days, they often provided many kinds of local public goods. We first examine the correlation between the measure of local gentry and different types of granaries, then provide

descriptive evidence on the number of local gentry with other privately managed public goods.

### *Managing Local Granary*

The private granaries, that is, community granaries and charity granaries, were important components of the country's granary system. While the state granaries usually located in county seat that might be far away from rural people, most of the private granaries located in countryside to better help rural and remote people. They were first built in the seventeenth century, when the emperor believed that building private granaries was a very gracious policy (“*shen shu mei zheng*”), but it was better to leave the granaries under the control of local community to improve efficiency and flexibility. Government officials only monitored its running.<sup>1</sup> Some ministers even believed that local governance was the ultimate solution for constant provision of grain.<sup>2</sup> To promote contributions to private granaries, the contributors could get various rewards from the government, such as honorable titles. In practice, the function of the private granary varied a lot, as it relied more on local efforts, such as contributions, funding, and local elites. In some counties it became equally or even more functional than the ever-normal granary system, while in others it gradually collapsed and taken over by the government (Will et al., 1991).

We use cross-sectional prefecture-level granary data from local gazetteers that allow us to identify whether the storage of public and private granaries. While this set of regressions hardly has a causal interpretation, it demonstrates the relationship between student quota and grain stored in the state granaries and the private granaries. Table 5 provides the results. The regressions show very different relationships between the state and the private granaries. When ratio of student quota in population increased by one percent, the storage of state granary decreased by 0.004 percent, while the private granary increased by 0.01 percent. This is consistent with the fact that the gentry was managing the private granary but not the public granary. The coefficients of other

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<sup>1</sup> *Yongzheng Chao Manwen Zhupi Zouzhe Huibian*, No.5045.

<sup>2</sup> Rowe (2001) discussed the case of Chen Hongmou, a famous politician and experienced provincial governor in the eighteenth century. He believed that government resources were unable to fulfill people's needs. As a result, the government should allow people to nourish themselves (*yi min yang min*) under the guidance of the government, including encouraging local people to manage their own granary.

variables suggest that the distribution of these two granaries had very different, somewhat opposite patterns, and they were supplementary to each other in the country's granary system.

### *Leading Water Projects*

Floods and droughts were major types of natural disasters in historical China, thus water projects were essential to fight against climate shocks. Yet, in the Qing dynasty, only nation-level water projects, such as the ones related to the Grand Canal and the Yellow River, were paid and organized by the central or the local governments in the Qing dynasty. Smaller water projects that aimed to benefit local communities were usually paid and organized by the community. In practice, the state usually “lent money” to the local community to finance the project. If people failed to pay off the debt, the state often forced them by increasing local taxes. In such projects, the gentry, as community leaders, were usually project leaders who communicated with officials, mobilized local work force and resources, and supervised the projects to avoid possible embezzlements.

We list civil water projects that required corporations of the community and leadership of local elites using data collected by Liu (2012) from official reports. The rough pattern shows that the official projects located quite evenly across different places, while the unofficial ones varied greatly across different regions. Table 6 provides a summary of the unofficial water projects. Among the total 95 civil cases in the examined period, the Jiangsu province contributed 36 cases, with other provinces provided 13 cases at most. While it is possible that the Jiangsu province had more rivers thus acquired more water projects, its water projects peaked at both the number of cases and the average scale of these water projects. This marks the importance of unofficial forces in local management in this region.

### *Building Charitable Organizations*

Another major form of private intervention is charitable organizations. Different from community granary that was emerged under the government's order and maintained largely relied on official efforts, charitable organizations had a long

tradition. This tradition was inherited from the Song dynasty (Liang, 2013). The Qing rulers did not interfere much at the 1720s, as it was beneficial for people's life. Later, the emperor's advocates encouraged some attentions from local governors, who provided financial and management supports for in the eighteenth century. According to Liang (2013)'s summary of charitable organizations from local gazetteers from 1600 to 1850, Jiangsu and Zhejiang province had the greatest number of such organizations, with 45% of the total.<sup>1</sup>

## **6. Suggestive Explanations on the Different Social Structure between North China and the Lower Yangzi**

Previous sections discuss the functions of the government and the local gentry in mitigating the negative impact of weather shocks. The regression results also suggest a sharp contrast between the North and the Lower Yangzi, implying distinct social structure in these two regions. It would be difficult to attribute this difference to one particular factor. Below we offer several possible explanations suggested by the literature, including geographic conditions, distance to the capital, as well as warfare and nomad invasion in the history of North.

The North China and the Yangzi Delta were the two most prosperous regions in the eighteenth century. The North China was traditionally important in agricultural production, while the Yangzi Delta had the probably highest labor productivity in agricultural production (Li, 2007). However, the social structure and local governance were very different in these two regions. The Lower Yangzi had the probably the most powerful gentry in Ming and Qing China. The 26 prefectures is less than 2% of the total number of prefectures in China, but contributed more than one quarter of the total number of *jinshi* from the beginning of the Qing dynasty and the end of the Qianlong reign.<sup>2</sup> The gentry actively participated in managing local affairs in as early as the

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<sup>1</sup> Of course, some organizations emphasized the cultural organizations, such as *qingjietang*, an organization for female chastity. These organization aside, the overall portion of Jiangsu and Zhejiang was still greater than its population percentage

<sup>2</sup> Calculated from Jiang (2009) *Qingchao Jinshi timinglu*.

fifteenth century. There were public group meetings by the literate discussing local policies (Feng, 2015). On the contrary, many villages in the North lacked enough gentry as local leaders. Spencer (1973) documents a case that a county in Shandong Province had only one *jinshi* over decades. In some counties in Shandong, the private granary was so collapsed that it was finally taken over by the officials (Will et al., 1991).

There are several possible explanations on the distinct social structure. First, the North China had large areas of plains yet less densely distributed river than the Yangzi Delta. As a result, its population density was low and some villages were relatively isolated. Scholars based on Manchuria survey in the 1930s find that villages in the lower China had smaller areas of landholding and fewer tenants (Buck, 1937; Huang, 1985; Myers, 1972), which is a pattern likely to hold during the Qing dynasty. The isolated families had fewer connections with each other and less likely to form local autonomous groups.

Political importance of the North was more likely to explain the powerful government in this region since the Ming dynasty, the emperor intentionally moved the capital to the north to fight against threats from the nomads. As the economic center was in the south, this acquires constant transfer of resources from the south to the north, through which the Grand Canal became the main route. The Canal made it easier for the government to control for counties along it and mobilize resources to ensure the peace around the capital. Similarly, the core responsibility of the North was to protect and to support the capital. Government control became the driving force in resource allocation and famine relief in the North (Will, 1983; Li, 2007).

Warfare was another reason that destroyed big families and clans in the North. The North used to be the political and economic center of China. Holding the birthplace of the Chinese culture and ancient capitals, powerful elites and clans settled in the North before the tenth century. However, constant warfare due the collapse of the Tang Empire in the tenth century harassed the elite families and clans. Decades of extreme violence led to the the physical elimination of the “great clans” during this period (Tackett, 2014). The surviving families moved to the South. Later, while the North was long occupied by the Nomads, the Song dynasty took over the South. The Song government

formalized the Imperial Examination system, setting quotas and building public schools that resulted in the rise of the gentry as an essential group in local governance. This structure barely changed until the end of the Qing dynasty (Hartwell, 1982).

## **7. Conclusion**

Both the state and the community play important roles in maintaining stability and fostering economic prosperity in Chinese history. This paper conducts a quantitative study to examine the forces that stabilize the Chinese society in the eighteenth century. Using the well-documented grain price information and local conflicts, We study separately state and private forces in stabilizing fluctuations in grain prices. We find that, despite the importance of state granary across the country and especially in the North, the local communities, especially the gentry, played a greater role in the Lower Yangzi.

We provide quantitative and anecdotal evidence to show that the gentry played an important role in managing local affairs by providing multiple public goods and effectively reduced the harms of unfavorable weather conditions in the eighteenth century. In this sense, the finding of this paper suggests that the actual capacity of the Imperial China might have been greater than the state capacity literature already recognizes.

The community was still active after the eighteenth century. In fact, the gradually decline of the state in the nineteenth century left more rooms for the local community. When the state was slow in turning its directions during China's first encounter with the Western world, the emergence of autonomous groups in the countryside and commercial organizations in cities largely took over the role of local officials. In the 1970s, the open-up reform was first initiated from the bottom and private investments emerged from rural communities has been serving as driving forces of China's rapid growth (Peng, 2004). The community is not only an indispensable factor that helped maintain social stability in history, but also a vital source of economic growth today.

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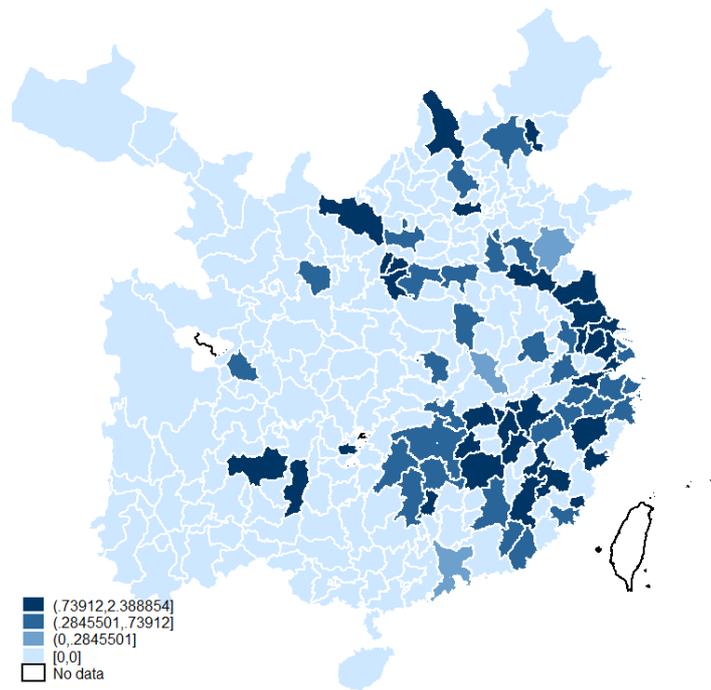
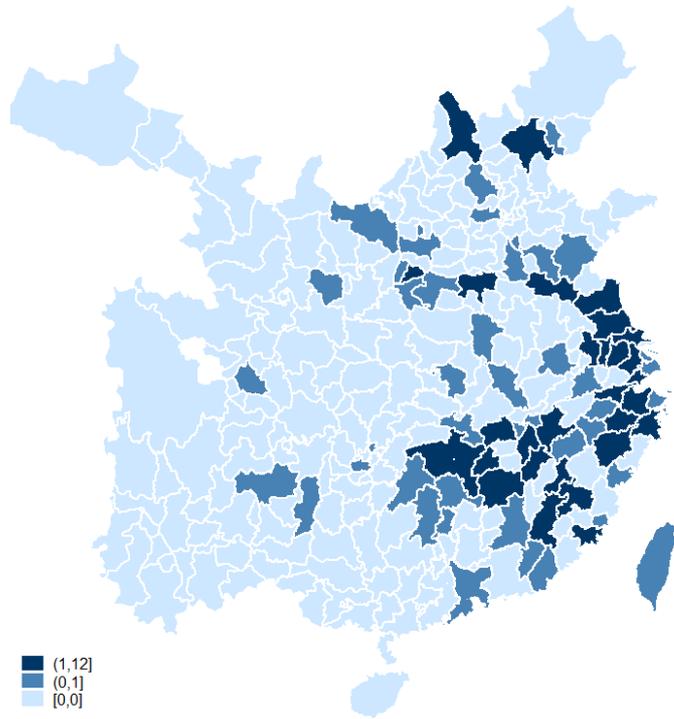
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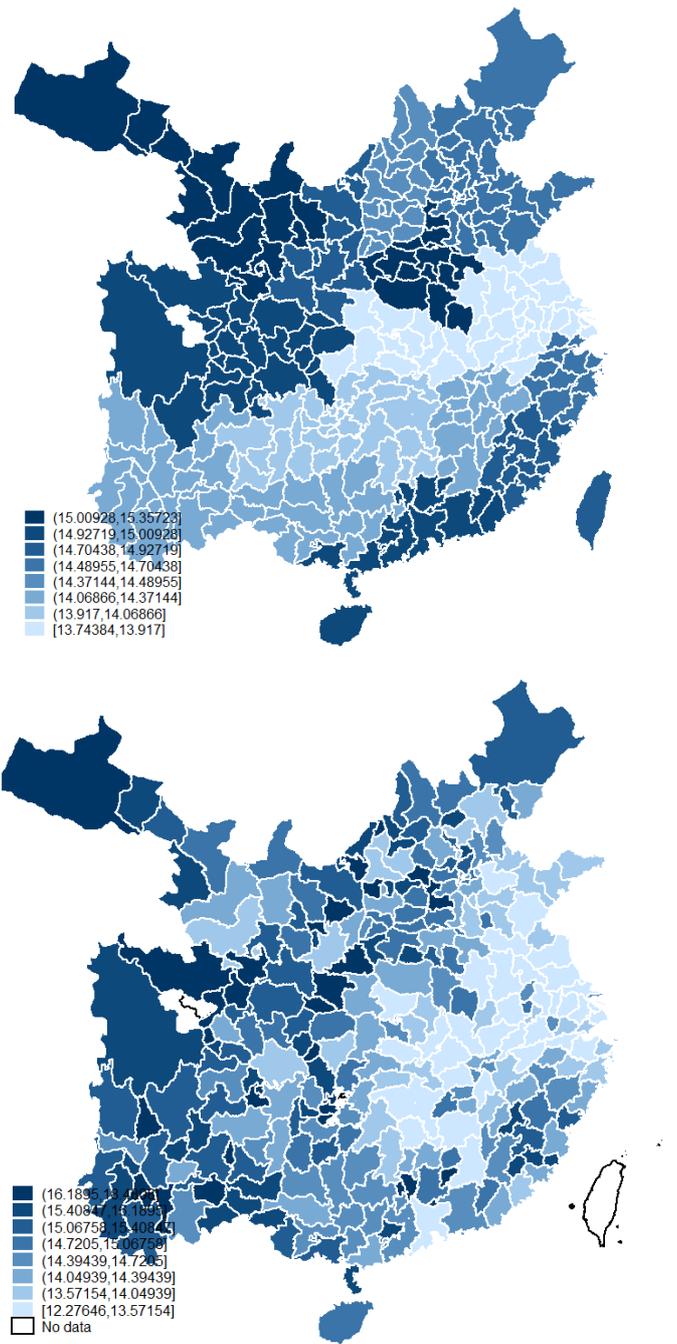
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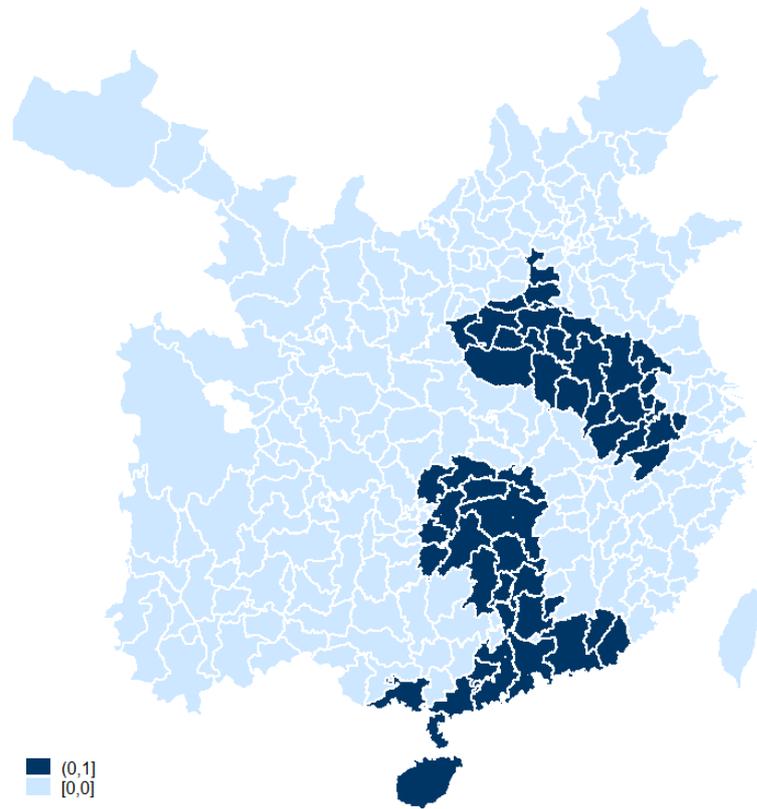
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**Figure 1 The Density of Urban Conflicts (up: total; down: per capita)**



**Figure 2 The Distribution of Grain Storage in 1779**



**Figure 3 The Availability of Prefecture-level Storage Information in the Late Eighteenth Century**

**Table 1 Summary Statistics**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<i># Conflicts per prefecture</i>	16,115	.008	.102	0	3
<i>Population in 1776 (million)</i>	14,410	1.160	1.034	.017	5.292
<i>The frequency of abnormal weather</i>	14,135	.225	.302	0	1
<i>Provincial storage</i>	9,689	2061969	869316.7	76585	4832431
<i># student quotas</i>	14,245	97.058	62.193	4	422
<i># post houses in natural log form</i>	16,115	1.073	.857	0	3.091
<i>Access to main rivers</i>	14,245	.622	.485	0	1

**Table 2 Impact of Grain Price Fluctuations on Urban Conflicts (Fixed-Effect Model)**

VARIABLES	(1) Urban Conflicts (Rice Regions)	(2) Urban Conflicts (Lower Yangzi)	(3) Urban Conflicts (Wheat Regions)	(4) Urban Conflicts (North 4)	(5) Urban Conflicts (Southeast)	(6) Urban Conflicts (Rice Regions)	(7) Urban Conflicts (Lower Yangzi)	(8) Urban Conflicts (Wheat Regions)	(9) Urban Conflicts (North 4)
Grain Price	0.00967 (0.00786)	0.0389** (0.0171)	0.00618 (0.00447)	0.00575 (0.00432)	0.0148 (0.0125)	0.00991 (0.00765)	0.0393* (0.0204)	0.00623 (0.00510)	0.00577 (0.00789)
$\Delta$ Grain Price	0.0223** (0.0101)	0.00858 (0.0207)	0.0123* (0.00690)	0.00677 (0.00693)	0.0302* (0.0152)	0.0222** (0.0102)	0.00838 (0.0212)	0.0123** (0.00575)	0.00677 (0.00851)
Constant	-0.0469 (0.0390)	-0.193** (0.0857)	-0.0205 (0.0249)	-0.0292 (0.0222)	-0.0741 (0.0632)				
Observations	5,074	1,462	5,555	2,447	1,772	5,074	1,462	5,555	2,447
R-squared	0.086	0.128	0.046	0.074	0.068	0.109	0.150	0.073	0.099
Number of pref	114	31	130	61	36				
Pref FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE		Y	Y	Y	Y	Y	Y	Y	Y
i.pref*year						Y	Y	Y	Y

Notes: Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . The outcome variable is the local conflicts per million people in natural log form.  $\Delta$  Grain Price is the log difference of rice prices in December in natural log form. The region of Lower Yangzi is coded following G William Skinner's macroregions (Skinner, 1977).

**Table 3 Impact of Grain Price Fluctuations on Urban Conflicts (IV)**

	(1)	(2)	(3)	(4)
VARIABLES	Urban Conflicts (Rice) IV	Urban Conflicts (Lower Yangzi) IV	Urban Conflicts (Wheat) IV	Urban Conflicts (North 4) IV
$\Delta$ Grain Price	0.397* (0.212)	0.330 (0.691)	0.0774* (0.0464)	0.0410 (0.0913)
Observations	5,004	1,462	5,509	2,447
R-squared	-0.187	-0.053	0.020	0.067
Number of pref	111	31	128	61
FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Cragg-Donald				
Wald F stat	34.231	7.623	38.474	9.784

Notes: Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . The outcome variable is the local conflicts per million people in natural log form.  $\Delta$ Grain Price is the log difference of rice prices in December in natural log form. The region of Lower Yangzi is coded following G William Skinner's macroregions (Skinner, 1977).

**Table 4 Impact of Government and Private Interventions**

VARIABLES	(1)	(2)	(3)	(4)
	Urban Conflicts (Rice Regions)	Urban Conflicts (Wheat Regions)	Urban Conflicts (Lower Yangzi)	Urban Conflicts (North)
l. log(storage)	-0.0102 (0.00947)	-0.00647** (0.00312)	0.000688 (0.0141)	-0.0116* (0.00624)
Grain Prices	0.00563 (0.0134)	0.00374 (0.00798)	0.00860 (0.0119)	0.00854 (0.00757)
$\Delta$ Grain Price	0.612 (0.496)	1.117* (0.606)	0.945* (0.534)	0.563** (0.253)
river $\times$ $\Delta$ Grain Price	-0.0518 (0.0314)	0.0137 (0.0206)	-0.0186 (0.0304)	0.0267 (0.0211)
log(postal houses) $\times$ $\Delta$ Grain Price	0.00830 (0.0141)	-0.00688 (0.0167)	-0.0494*** (0.0154)	-0.0186 (0.0230)
l. log(storage) $\times$ $\Delta$ Grain Price	-0.0403 (0.0338)	-0.0765* (0.0413)	-0.0409 (0.0355)	-0.0359** (0.0164)
quota $\times$ $\Delta$ Grain Price	0.00384 (0.0180)	0.00635 (0.00871)	-0.0755*** (0.0213)	-0.00179 (0.00687)
Constant	0.122 (0.180)	0.0809 (0.0593)	-0.0522 (0.220)	0.127 (0.0833)
Observations	2,985	3,147	707	1,579
R-squared	0.096	0.091	0.080	0.100
Number of pref	103	115	26	59
Pref FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. The outcome variable is the local conflicts per million people in natural log form.  $\Delta$  *Grain Price* is the log difference of rice prices in December in natural log form. *River* is a dummy variable that equals to one if this prefecture has access to major rivers. *log(posts)* is the number of official post stations in natural log form. *Quota* is the number of student quotas from Xuezheng Quanshu (*Collections of Law and Statutory Regarding Education in the Qing Dynasty*).

**Table 5 The Relationship between Student Quota and Prefecture Storage  
(Anhui, Guangdong, Henan, and Hunan)**

VARIABLES	(1) log (evernormal)	(2) log(community)
Student Quota	-0.00431*** (0.000307)	0.0172*** (0.000310)
Population in 1776 (million people)	0.186*** (0.00862)	-0.00156 (0.00613)
Access to main rivers	-0.0946*** (0.0110)	0.252*** (0.0151)
# postal houses	0.128*** (0.00497)	-0.185*** (0.00518)
Constant	10.80*** (0.0178)	8.348*** (0.0202)
Observations	7,392	6,512
R-squared	0.786	0.910
Prov FE	Y	Y

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6 Summary of Civil Water Projects**

prov	# cases	# cases reported	expenditure	money spent per case
Jiangsu	36	27		57,431
Henan	13	12		21,827
Anhui	11	7		50,495
Shandong	11	3		24,658
Hubei	8	8		31,373
Zhili	5	4		5,343
Yunnan	5	4		2,221
Gansu	3	3		40,805
Jiangxi	2	2		23,467
Shaanxi	1	1		67,552
Sichuan	1	1		2,000
Total	96	72		37,151