



# Market Integration in Southwest of Qing China: A Quantitative Historical Investigation

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**Abstract.** The relationship between the development of market system and economic growth has always been a concern of economists. While market integration among different regions is an important feature of market development, there is not only controversy about whether market integration existed in China in the Ming and Qing Dynasties, but also that the literature is mainly concentrated on the well-developed areas, little attention has been given to the border areas inhabited by ethnic minorities. Based on the rice price data of Yunnan, Guangxi and Guizhou in the Reign of Qianlong in Qing Dynasty, this paper quantitatively analyzes the degree of market segmentation in this region by exploiting the relative price method. The results show that the market integration degree is the highest in the political and economic center area where the provincial government is located, while the market integration degree is the worst in the remote area near the provincial border with congested traffic. Moreover, after the implementation of the prefecture-county system (directly governed by central government), the areas that governed by minority chiefs formerly with convenient transportation conditions, such as water way, experienced market development due to the opening of trade routes with other regions.

**Keywords:** Market Integration, Rice Price, Relative Price Method, Southwest China, Qing Dynasty.

## 1 Introduction

The relationship between market system cultivation and economic development has typically been the focus of economists. Beginning with Adam Smith, economists have generally stressed that the increase in productivity caused by the specialization of labor and the increase in demand brought about by the expansion of market size are important sources of long-term economic growth. With the continuous increase in production surplus and the reduction in trade costs and institutional barriers, various small and segmented markets become integrated into a large unified market. Therefore, the degree

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of market integration can be used to measure the degree of market development (Allen and Unger, 1990 [1]; Young, 2000 [2]).

In recent years, some scholars have proposed that differences in the degree of market integration may be a primary reason for the great divergence of economic development between China and the West in modern times (Shiue and Keller, 2007 [3]). This proposal has given rise to quantitative research by economic historians on market integration in historical China. First, in some studies, basic statistical methods have been used to show that China's market form during the Ming and Qing Dynasties was very close to that of a free market. For example, Lee (2000) [4] studied Yunnan and Guizhou Provinces in the Qing Dynasty and found that the changes in rice prices in each prefecture were significantly synchronized; in particular, the degree of market integration in Yunnan Province was roughly equal to that in France in the late 18th century. Yan and Liu (2011) [5] compared the difference in market integration between North and South China in the 18th century and found that the degree of market integration in the South was better than that in the North. Yu (2021) [6] found that there was segregation among the major regional markets in the Qing Dynasty. Second, in terms of influencing factors, recent studies have used cutting-edge econometric methods to identify the causal effect of transportation progress and communication on market integration in the late Qing Dynasty. For example, using a multi-period difference-in-differences econometric model, Yan and Xu (2015) [7] found that after the completion of a railway, the price dispersion of the prefectures connected by the railway decreased by 3.8%; Hao et al. (2022) [8] and Gao and Lei (2021) [9] found that the synchronization and stability of grain prices between prefectures connected by telegraph network improved. However, existing studies have focused mainly on economically developed provinces rather than on border areas such as those in Southwest China, which is one of macro-regions proposed by William Skinner (Skinner, 1985) [10].

In fact, the issues of state governance and ethnic integration and development in border areas have typically been important theoretical and practical issues for social scientists and policy-makers. The effectiveness of governance is closely related to the stability, harmony and development of border areas. Southwestern border areas (mainly referring to today's Yunnan, Guizhou, Guangxi, and southern mountainous areas of Sichuan) have always been the main areas in which ethnic minorities in China have lived; furthermore, they are under the weak rule of the Central Dynasty. In most areas of Southwest China, it was not until the large-scale "bureaucratization of native officers" during the Yongzheng period of the Qing Dynasty that the original indirect governance by local chieftains changed to direct management by officials dispatched by the central government (Huang et al., 2024) [11]. Therefore, in this study, the rice price data of various prefectures in Yunnan, Guangxi and Guizhou Provinces during the Qianlong Period of the Qing Dynasty, in combination with the relative price method based on the "law of one price", was used to quantitatively analyze the degree of market integration in each small subregion in this region to fill the research gap in the relevant literature.

## 2 Data and Methods

### 2.1 Measures of the Degree of Market Integration

At present, there are three main methods used in academia to measure the degree of market integration: the trade flow method, production method and price method. Among them, the trade flow method and the production method have great limitations in controlling the influence of factors such as economies of scale and the elasticity of commodity substitution, while the price method has the advantages of directly reflecting the relationship between market supply and demand; furthermore, these data are easy to obtain. Therefore, the price method is regarded as a prospective way for measuring the degree of market integration and has been used by many scholars to discuss market integration in modern China (Yan and Liu, 2011 [5]; Yu, 2021 [6]). According to the different methods used for processing price data, the price methods can be subdivided into the cointegration analysis method, correlation-regression method and relative price method. In this study, the most popular relative price method based on variance calculation was used.

The theoretical bases of the relative price method are the “law of one price” and the “iceberg cost” model. According to the “law of one price”, when there is a difference between the prices  $P_i$  and  $P_j$  of the same commodity in two places  $i$  and  $j$ , the price difference between the two places will lead to trade arbitrage behavior, and with the arbitrage activities, the price difference between the two places will be regulated by the market and gradually shrink; eventually the prices will converge. In other words, under the action of the law of one price, arbitrage behavior causes the price levels of the two markets to fluctuate together; that is, effective market integration is realized. In contrast, if the two places are unable to achieve arbitrage activities due to geographic, transportation, institutional, and cultural barriers, then the prices in the two places will not be able to achieve the abovementioned synchronized changes, and the two markets will be in a segmented state. The “iceberg cost” model makes reasonable revisions to the “law of one price” based on transaction costs and posits that, due to the existence of transaction costs, when determining whether there is good market integration between places  $i$  and  $j$ , it is not required that the prices  $P_i$  and  $P_j$  of the same commodity rise and fall in the same way, instead, it is sufficient for their relative price,  $P_i/P_j$ , to fluctuate within a certain range. In other words, even if the prices  $P_i$  and  $P_j$  differ in terms of the direction and magnitude of change, as long as the ratio of the two prices fluctuates less, the market between the two places is considered to be well integrated (Parsley and Wei, 2001 [12]).

### 2.2 Indicator Construction

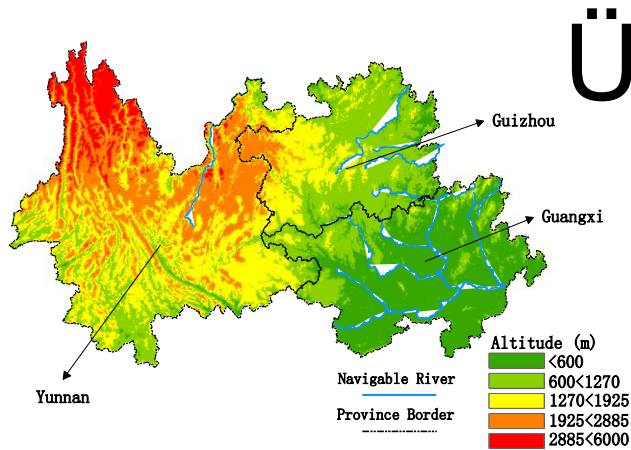
When using the relative price method to measure the degree of market integration, the present study refers to the methods of the relevant literature and uses the variance  $\text{Var}(P_i/P_j)$  of the relative prices of the same commodity in places  $i$  and  $j$  as the indicator of the degree of market integration (Yu, 2021) [6]. If the variance  $\text{Var}(P_i/P_j)$  is larger, the relative price fluctuations in places  $i$  and  $j$  will be larger. This means that the market

segmentation in the two places is more severe, that is, the degree of market integration is low. In contrast, if  $\text{Var}(P_i/P_j)$  is smaller, then the fluctuation range of relative prices in places  $i$  and  $j$  is smaller, indicating that trade barriers between the two places are lower and fewer factors hinder market integration; therefore, the degree of market integration is greater. Specifically, the construction steps of the relative price variance  $\text{Var}(P_i/P_j)$  are as follows. First, the relative prices  $P_{it}/P_{jt}$  of the same commodity in places  $i$  and  $j$  within a certain time period  $t$  are calculated. In step two,  $\ln(P_{it}/P_{jt})$  and its absolute value are calculated. In the third step, the variance of these values within a certain region or time range is calculated.

There are two ways to calculate the relative price variance of the same commodity in two places. Taking the research object in this paper as an example, the first is to use the relative prices of the two prefectures in different years to calculate the variance within a time period (e.g., Qianlong Period). The advantage of this method is that the relative prices for each year are obtained from the same two prefectures; therefore, the trade conditions are comparable. However, the dynamic process of the degree of market integration over time cannot be studied using this method, so it is called static analysis here. The second is the corresponding dynamic analysis. This method calculates the variance of the relative prices of the prefecture pair combinations (i.e., the pairwise combinations of the prefectures in the same province) within the same region (e.g., a province) each year. In this way, one variance can be obtained for each year. Therefore, how the variance changes over time can be observed. However, the drawback is that different pairs of prefectures can have different trade conditions, which may reduce the correlation between the variance and market integration. In view of this, these two methods are used simultaneously for analysis.

### 2.3 Data Sources and Relevant Descriptions

To conduct a detailed quantitative analysis of the degree of market integration in Southwest China, a series of historical and geographic data, including rice prices, from 49 prefectural-level administrative regions of Yunnan (21 pref.), Guizhou (16 pref.), and Guangxi (12 pref.) provinces during the Qianlong Period of the Qing Dynasty (1736-1796), was collected. Fig. 1 depicts the geographic scope of the study area. We can see that, Guangxi which located in the east, has a relatively flat terrain and more navigable rivers, while northern Yunnan and northwestern Guizhou have higher elevations. Because the grain trade played an important role in domestic trade activities in the 18th century, the level of development of the grain market can be used to effectively measure the level of overall market development (Lee, 2000) [4]. In the selection of grain varieties, since rice is the main plant in southern China, the rice price was selected as the main object of analysis in this study. The Qianlong Period was chosen as the time frame because the most complete grain price records in the Qing Dynasty were concentrated in the 18th century; furthermore, those from the Qianlong Period are of the highest quality.



**Fig. 1.** The terrain of the studied areas.

Source: Altitude: National Earth System Science Data Center, National Science & Technology Infrastructure of China (<http://www.geodata.cn>); Navigable River: Lee (2000) [4]; Others: CHGIS V6 (<https://chgis.fas.harvard.edu/data/chgis/v6/>).

The prefecture-level rice price data in this paper are from the “Qing Dynasty Grain Price Database” constructed by Yeh-chien Wang (Wang, 2014) [13]. In the Qing Dynasty, beginning in the first year of Qianlong Period (1736), each province reported the prices of major grains in their respective prefectures, directly governed subprefectures, and departments to the emperor on a monthly basis. These original documents of grain price reports were referred to as “grain price lists.” The lists followed a consistent format: using the prefecture-level administrative divisions as units, they recorded the highest and lowest grain prices for each month in each prefecture, expressed in uniform units (cangshi/taels of silver). Since rice was the main staple food in the southern regions, the focus of the study was the prices of the most commercialized grade of rice, “superior rice.” In addition, since the time span studied in this paper is relatively long and there are many missing monthly rice price data, we took the average of the monthly rice prices for each year as the annual rice price data. The information on the “bureaucratization of native officers” in each prefecture was obtained by the author through consulting historical materials such as the Draft History of Qing - Biography of Chieftainship and local chronicles, focusing mainly on the time each county completed the “bureaucratization of native officers”. In addition, since the relative price method is used for analysis, the prefectures in Southwest China are first matched in pairs to form prefecture pairs to calculate the relative prices and variance changes between the two places. Notably, developed, short-distance trade is also an important feature of local market integration. Considering the limited transportation conditions and high transportation costs of long-distance trade in pre-modern times, the prefecture pairs generated in this paper comprise only two adjacent prefectures that are geographically contiguous; that is, the main focus is on regional short-distance trade.

### 3 Analysis Results of Market Integration

#### 3.1 Static Analysis

To analyze and compare the differences in the degree of market integration among the three southwestern provinces, the variance in the relative rice price for each province pair during the entire Qianlong Period (i.e., the static analysis in Section 2.2) is first calculated, and then the variances are averaged by region, since the administrative borders are obstacles for market integration even in contemporary China (Wang and Tang, 2023) [14]. The results are shown in Table 1. First, among the three southwestern provinces, the mean of the relative price variance of the prefecture pairs in Yunnan Province was the largest (0.0165), which implies that the rice price fluctuation in Yunnan was more intense during the Qianlong Period, and as a result, the degree of market integration may be low in Yunnan Province. The possible reason is that the development of the border area of Yunnan Province was late; therefore, the market was still relatively closed. In addition, during the Qianlong Period, there were frequent conflicts between the southwestern border areas of Yunnan and Myanmar, and the food shortages caused by wars and natural disasters gave rise to sharp fluctuations in local prices. According to the method proposed by Lee (2000) [4], if the year 1768-1772, which was more severely affected by war and natural disasters, was excluded from the calculations, the variance decreased to 0.00747, but it was still the highest. The relative price variance in Guangxi was the smallest (0.00438), but the difference from that in Guizhou (0.00545) was not significant. During the Qianlong Period, there was no large-scale war in either Guangxi or Guizhou; therefore, the degree of market integration in both Guangxi and Guizhou was generally greater than that in Yunnan. Among them, Guangxi's rice market had the highest degree of integration due to its favorable topographical conditions, especially its flatter terrain and more developed water systems in its eastern area. The values in the third column of Table 1 are the means of the relative prices of all pairs of prefectures in each of the three provinces. A smaller value indicates that, in general, the prices between two prefectures in the region were closer; that is, the degree of rice market integration was better. The results show that the degree of integration was still the highest in Guangxi (0.075), followed by Guizhou (0.142), and the lowest was in Yunnan; however, this value differed minimally from Guizhou after specific years were excluded (0.146).

In addition, for the areas that underwent “bureaucratization of native officers” in the Qing Dynasty, their market ties with the outside world also strengthened. For example, after the Miao border in southeastern Guizhou opened up during the Yongzheng Period, the Qing government continuously opened and dredged the Du liujiang waterway, which connected the Guizhou water system with the Xi jiang water system, promoting trade among Guizhou, Guangxi and Guangdong provinces (Huang & Wang, 2017) [15]. In the present study, the areas passed by this waterway (the prefectures of Duyun, Liping, Liuzhou, Xunzhou, and Wuzhou) were selected as the analysis objects; the results are shown in the fourth row of Table 1. Both the mean (0.13) and variance (0.004) of the relative rice prices among these prefectures were lower than those of the other

provinces, not only illustrating the importance of water transportation to trade circulation but also revealing to some extent the enhanced economic and trade exchanges between the original chieftain areas and other regions after the “bureaucratization of native officers”.

**Table 1.** Degree of market integration in each region of in the three southwestern provinces.

Region	Var ( Ln(Pi/Pj) )	Var ( Ln(Pi/Pj) ) (Exclude 1768- 1772)	Ln(Pi/Pj)	Ln(Pi/Pj)  (Exclude 1768- 1772)
Yunnan	0.0165	0.00747	0.186	0.146
Guizhou	0.00545	\	0.142	\
Guangxi	0.00438	\	0.075	\
River- side	0.004	\	0.116	\

In the above, the differences in the degree of rice market integration among provinces and specific regions in Southwest China are analyzed. In fact, the market integration in different regions within a province may be significantly different due to differences in geographic endowment, economic structure, and cultural characteristics. Therefore, the degree of market integration in different areas within each of the three southwestern provinces was further analyzed. With reference to Cao's approach, the author divided Yunnan into six regions, i.e., central Yunnan, southwestern Yunnan, eastern Yunnan, northeastern Yunnan, western Yunnan, and northwestern Yunnan; divided Guizhou into four regions, i.e., central Guizhou, northern Guizhou, southeastern Guizhou, and western Guizhou; and divided Guangxi into two regions: western Guangxi and eastern Guangxi (Cao, 2001) [16]. The calculation method for the degree of market integration in each region remained the same. As shown in Table 2, there are significant differences in the degree of rice market integration between different regions within a province.

**Yunnan.** There was considerable difference in market integration among the various regions within Yunnan. In particular, the central region of Yunnan, centered on Kunming, the capital, had the highest degree of market integration among the three southwestern provinces (the mean relative price variance was 0.0010), while the market segmentation in western Yunnan and northwestern Yunnan was the most severe (the mean relative price variances were 0.026 and 0.027, respectively); the rest of the regions were at moderate levels. As the political and economic center of Yunnan, Central Yunnan is the gathering area of ethnic minority populations. Starting in the early Ming Dynasty, a large number of Han people began immigrating into the area. In the early Qing Dynasty, immigrants from the eastern provinces and Sichuan continued to move into this area. Due to its relatively large population agglomeration and relatively complete geographic market, the degree of market integration in central Yunnan was relatively high. In contrast, in the areas that underwent “bureaucratization of native officers” relatively late, such as western and northwestern Yunnan (centered around Yongchang, Dali, and Lijiang prefectures), due to geographical conditions, their market interdependence was

lower than that of other regions like southern Yunnan (centered around Pu'er Prefecture, primarily engaged in tea trade) and northeastern Yunnan (centered around Dongchuan Prefecture, mainly engaged in copper mine development).

**Guizhou.** The degree of market integration between different regions within Guizhou was not as severe as in Yunnan. Central Guizhou, which was the political center of Guizhou, and southeastern Guizhou, which had a developed water system, showed the highest degree of market integration (with mean relative price variances of 0.0041 and 0.003 respectively), while market segmentation was most severe in western Guizhou (0.012); northern Guizhou was at a moderate level (0.0071). Guizhou is located on the Yunnan-Guizhou Plateau, with terrain that is high in the west and low in the east, resulting in a relatively high average elevation. Western Guizhou is located in the Wumeng Mountains, the highest elevation range within the province, and its harsh terrain and inconvenient transportation conditions made it difficult for western Guizhou to achieve good market integration. In comparison, central Guizhou, as the central region of Guizhou, had the highest population concentration, thus enjoying relatively good market development.

**Guangxi.** The differences in the degree of market integration among the various regions in Guangxi were also relatively small. Compared with that in western Guangxi (the mean relative price variance is 0.0056), the degree of market integration in eastern Guangxi (the mean relative price variance is 0.003) was slightly greater. The possible reason is that the waterways in eastern Guangxi are widely distributed (e.g., the Xijiang water system), which not only facilitated water trade with Guangdong but also provided topographic conditions convenient for transportation and agriculture. These areas, which included the Guizhong Basin and the Xunjiang Plain, with Liuzhou at the center, thus had better market integration. Western Guangxi, which implemented the "bureaucratization of native officers" later, has a large area of karst topography, posing greater obstacles to agricultural cultivation and trade; as a result, the market segmentation in this area is severe.

**Table 2.** Degree of market integration by region in the three southwestern provinces.

Province	Region	Var ( $ \ln(P_i/P_j) $ )	$ \ln(P_i/P_j) $
Yunnan	Central	0.0010	0.157
	Southwest	0.015	0.149
	East	0.019	0.245
	Northeast	0.0085	0.143
	West	0.026	0.256
	Northwest	0.027	0.248
Guizhou	Central	0.0041	0.12
	North	0.0071	0.126
	Southeast	0.003	0.126
	West	0.012	0.160
Guangxi	West	0.0056	0.080
	East	0.003	0.060



### 3.2 Dynamic Analysis

To investigate temporal changes in the degree of rice market integration in different regions of the three southwestern provinces, the variance in the relative prices of each pair of prefectures in a certain region in a certain year is calculated and then the calculation results are presented by year to investigate the dynamic changes in market integration over time. The corresponding results are shown in Fig. 2. First, during the Qianlong Period, the relative price variance in Guangxi gradually decreased and became stable; this province had the highest degree of market integration among the three southwestern provinces. This shows that in Guangxi during the Qianlong Period, the factors hindering market integration continuously decreased, and market segmentation continuously weakened. Second, the degree of market segmentation in Yunnan was consistently high, reaching a peak at approximately 1770 due to the Qing-Burmese War and natural disasters. The degree of market integration in Guizhou, on the other hand, was between that of Guangxi and Yunnan; after a short period of decline, it gradually increased.

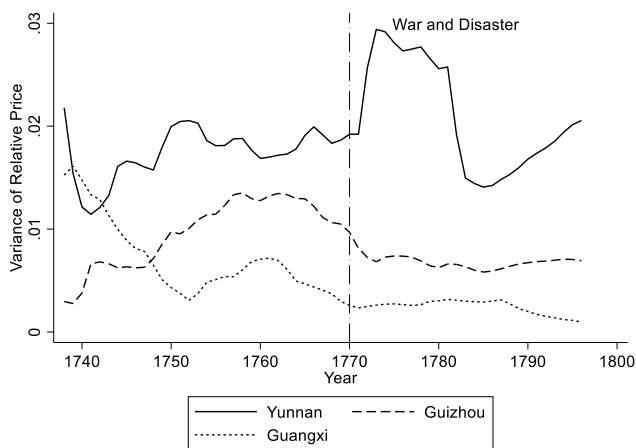


Fig. 2. Temporal trends of the degree of market integration in the three southwestern provinces.

In addition, this paper further analyzes the correlation between rice prices among different regions at the prefecture level. We first calculated the ratio of rice prices for each prefecture to other prefectures within 200 kilometers of it, and averaged them to obtain the annual average; Then, calculate the overall average of the annual mean during the sample period (1738~1796). The lower the value, the closer the rice prices of a prefecture and its surrounding prefectures are, indicating a higher degree of market integration, and vice versa. The corresponding results are shown in Fig. 3. One can see that, similar to the above results, the market integration level is highest in eastern Guangxi, where the terrain is flat and the waterway is convenient, while the market integration level is lowest in the rugged terrain of northern Yunnan and the border area of the three provinces.

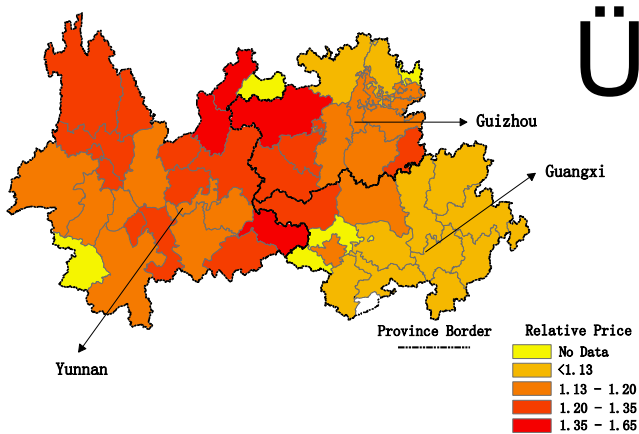


Fig. 3. Relative prices between each prefecture and its neighboring prefectures in the three southwestern provinces.

## 4 Conclusions

The relationship between market system cultivation and economic development has typically been a concern of economists. Existing research generally affirms the existence of a certain degree of regional market integration in China during the Ming and Qing dynasties. However, it mostly focuses on economically developed areas, neglecting minority border areas. In this paper, the degree of market integration in Yunnan, Guizhou, and Guangxi provinces during the Qianlong Period of Qing Dynasty is quantitatively examined using prefecture-level rice price data and the relative price method. The results of quantitative analysis show that overall, during the Qianlong Period, Guangxi had the highest degree of rice market integration. Guizhou had the next highest degree, and that of Yunnan was the lowest. However, significant differences existed within each province. The areas with the highest market integration were generally the political and economic centers where the provincial capitals were located; these areas were also among the first to be incorporated into the county system administration. In contrast, remote areas near provincial borders with poor transportation routes and delayed implementation of the “bureaucratization of native officers” exhibited the lowest market integration. In former chieftain areas with convenient transportation conditions like waterways, trade routes opened up after the “bureaucratization of native officers”, leading to robust economic exchanges with other regions. In summary, both qualitative and quantitative analyses indicate that during the Qianlong Period, the markets in the southwestern provinces experienced some development, and regions were able to export local specialty products to other areas, thus further promoting economic development through market specialization and trade.

## References

1. Allen, C., Unger, R.: The depth and breadth of the market for polish grain, 1500-1800, *Baltic affairs: relations between the Netherlands and North-Eastern Europe: 1500-800* (1990).
2. Young, A.: The Razor's Edge: Distortions and Incremental Reform in the People's Republic of China, *The Quarterly Journal of Economics*, 115(4), 1091-135 (2000).
3. Shiue, C., Keller, W.: Markets in China and Europe on the Eve of the Industrial Revolution, *American Economic Review*, 97(4), 1189-216 (2007).
4. Lee, J.: *The Political Economy of a Frontier: Southwest China, 1250-1850*, Harvard University Press, Harvard (2000).
5. Yan, S., Liu, C.: Market Integration in Southern and Northern China in the Eighteenth Century: A Study Based on Grain Price Data in Qing Dynasty, *Economic Research Journal*, 46(12), 124-137 (2011). (in Chinese)
6. Yu, K.: Market Integration and Its Spatial Structure in Qing Dynasty (1738-1820), *Chinese Economic History Research Journal*, 2021(05), 95-106 (2021). (in Chinese)
7. Yan, S., Xu, M.: Railways and Domestic Market Development in the Late Qing Dynasty, *China Economic Quarterly*, 14(2), 779-800 (2015). (in Chinese)
8. Hao, Y., Li, Y., Nye, J.: Wiring China: The impact of telegraph construction on grain market integration in late imperial China, 1870–1911, *The Economic History Review*, 75(3), 857-80 (2022).
9. Gao, P., Lei, Y.: Communication Infrastructure and Stabilizing Food Prices: Evidence from the Telegraph Network in China, *American Economic Journal: Applied Economics*, 13(3), 65-101 (2021).
10. Skinner, W.: Presidential Address: The Structure of Chinese History, *The Journal of Asian Studies*, 44(2), 271-292 (1985).
11. Huang, T., Li, N., Liu, X.: Governance Rule, State Capacity, and Market Integration: Evidence from Qing Dynasty of China. In: *Proceedings on 10th International Annual Symposium on Quantitative History*, Shanghai (2024).
12. Parsley, D., Wei, S.: Limiting currency volatility to stimulate goods market integration: a price based approach, National Bureau of Economic Research Cambridge, Mass., USA (2001).
13. Wang, Y.: "Qingdai liangjia ziliao ku (The Database of Grain Price in Qing)." <http://mhdb.mh.sinica.edu.tw/foodprice/> (released in 2014).
14. Wang, Y., Tang, W.: Transportation network, administrative boundary and factor market integration-Evidence from the inter-regional investment of listed companies, *China Economic Quarterly*, 23(4), 1461-1476 (2023). (in Chinese)
15. Huang, Y., Wang, Q.: The construction of "roads and bridges" in the lower reaches of the Duliu River and network of relationships with people during the Qing Dynasty, *Journal of Guizhou university (Social Sciences)*, 35(6), 65-72 (2017). (in Chinese)
16. Cao, S.: *Chinese Population History: Qing Dynasty*, Fudan University Press, Shanghai (2001). (in Chinese)

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