Rice vs. Wheat: How Rice Farming Shaped Informal Finance in China

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Abstract: *China's financial system is characterized by the coexistence of both formal and informal finance, and informal finance appears to be more prevalent in the south of the country compared to the north. In this paper, we use the historical demarcation of rice-farming regions and the percentage area of rice sown to ascertain the regional distribution of rice farming in the south and wheat farming in the north in order to analyze the role of rice farming in the evolution of different types of financial institutions in China. We find that rice cultivation has a positive effect on informal financial development, though its impact on formal finance is insignificant. Unlike wheat farming, rice cultivation requires farmers to collaborate during busy farming seasons and necessitates the construction of irrigation systems. Such collaboration helped enhance an acquaintance society, in which both parties to transactions enforced the rules and contract terms of their own initiative, paving the way for informal finance. This paper not only demonstrates the cultural roots of the regional financial disparities in China but also expands the research on the ways in which farming practices from the past have shaped the development of China's present financial markets.*

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1. Introduction

China's financial landscape is characterized by the presence of both formal and informal finance. Informal financial institutions, such as cooperatives, pawnbrokers, and microcredit companies, exist in addition to more extensive informal lending outside of formal banking entities (Allen et al., 2005). As a supplement to formal finance, informal finance makes capital allocation in the credit market more efficient and helps small and micro businesses meet their capital needs, thereby promoting innovation, entrepreneurship and regional economic development (Lin and Sun, 2005).

However, regional disparities exist in both formal and informal financial development across China. In comparison to formal finance, regional gaps are particularly evident for informal finance in terms of its prevalence in southern China compared to northern China. In the research literature, the coexistence of formal and informal finance is most often attributed to a range of contemporary factors such as financial suppression, transaction costs, information asymmetry, and the institutional environment (Djankov et al., 2007; Giné, 2011). The reality is that such coexistence had already set in during the late Qing Dynasty and the Republican Period, when modern banking institutions were juxtaposed with traditional money

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shops (*qianzhuang*), exchange shops (*piaohao*), and other financial institutions. Given the importance of historical factors, it is imperative to take them into account when evaluating the development of formal and informal financial institutions in China. To this end, this study aims to determine if traditional crop farming played a role in China's financial development and analyzes the historical origin of the coexistence of formal and informal finance. Discussions of this topic may shed light on the relationship between formal and informal finance and may therefore be useful in shaping Chinese financial policy.

Historically, the cultivation of different crops influenced economic and financial behaviors by shaping regional cultures that were passed from generation to generation (Galor and Özak, 2016). For instance, since wheat cultivation season is relatively short and less labor-intensive than that of rice, there tended to be weaker family bonds and more generalized trust in wheat-farming areas (Ang and Fredrickson, 2017; Ding et al., 2018). Differences in the level of innovation between northern and southern China also stem from crop-farming-related regional culture. While rice cultivation fostered a collectivist culture in the south, wheat farming gave rise to a more individualistic regional culture in the north (Talhelm et al., 2014).

With this in mind, this study investigates the influence of crop cultivation on financial development in 252 Chinese cities at the prefectural level and above, based on the differentiation of rice and drought-resistant crop farming regions during the Han (206 B.C. to 220 A.D.) and Sui (581 A.D. to 618 A.D.) dynasties, together with the area of rice sown as a share of total crop sown area in 1957 and 1995. While informal finance can be measured by the number of microcredit companies per 10,000 residents, formal finance can be measured by the number of village banks per 10,000 residents and the lending and deposit balances of formal financial institutions as a share of GDP. Regression results suggest that there is a statistically-significant positive impact of rice cultivation on the number and capital of microcredit companies. However, its effect on formal financial institutions is insignificant. In contrast to relying on third-party contract governance, where local governments develop the capacity to regulate informal finance, our findings suggest that collective rice farming and the construction of irrigation works helped to foster interpersonal connections between rice farmers in an acquaintance society, reducing information asymmetries and promoting transaction efficiency, while also reducing the risk of default in the informal financial markets.

The contributions of this study are threefold. First, many contemporary socio-economic variables are found to be key factors of the rise of formal and informal finance. Specifically, this paper provides empirical evidence of the ways in which crop farming influences formal and informal finance, which expands the research on the topic (Ahlin et al., 2011). Second, our study of cultural origins contributes to the research on the effects of historical factors such as crop cultivation on modern financial development (Pascali, 2016). Third, while the existing literature has characterized the relationship between formal and informal finance, complementary or substitutive, without reaching unanimous conclusions (Liu et al., 2014), this paper systematically tests the effects of rice-farming acquaintance societies on the relationship between formal and informal finance, clarifies both formal and informal finance development mechanisms, and enriches the literature.

2. Theoretical Analysis

Some have posited that rice cultivation is conducive to the formation of an acquaintance society based on familial ties and geographic proximity, in which the parties to transactions enforce rules and contract terms of their own initiative, paving the way for informal finance (Qian and Weng, 2009). Due to the labor-intensive nature of rice cultivation, twice the amount of manpower is required to tend to the same expanse of land as is necessary for wheat production. Rice farmers in the same village distribute the work among their own family, close neighbors, and friends.

Given the limited sowing and harvesting windows for wheat, there is an insufficient amount of time

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for wheat farmers to collaborate among themselves, necessitating the recruitment of outside seasonal labor to harvest wheat. This has enabled increased interregional exchange and collaboration among small holders while decreasing their reliance upon acquaintances. Rice cultivation requires cooperation among family members and neighbors to build rice field irrigation works, whereas the more drought-tolerant wheat relies primarily upon precipitation and irrigation wells for water, which are smaller and easier to maintain for single-family farmsteads. Closer interactions among rice farmers gave rise to limited trust models predicated upon kinship ties and geographical closeness (Greif and Tabellini, 2010; Ding et al. 2018). Interestingly, ever since the Western Han Dynasty (202-8 B.C.), Chinese farmers have grown wheat and rice in the north and south, respectively. Furthermore, due to the stable climate in both of these regions, farming practices passed down from generation to generation through experience and ancestral traditions served to build trust between people and foster the development of a society with enduring, consistent traits (Giuliano and Nunn, 2021).

Given its legal and regulatory imperfections, informal financial activities rely on an acquaintance society to mitigate informational asymmetries between lenders and borrowers, ensure contract implementation, and prevent the risk of default (Yang et al., 2011; Karaivanov and Kessler, 2018). The acquaintance society based on rice cultivation facilitates the exchange of information to mitigate adverse selection in informal lending, creating necessary conditions for stable equilibria in infinitely repeated games and for personalized transactions. In addition, the sense of trust among members of a rice cultivation community helps mitigate moral hazard, reduce transaction costs, and facilitate the conclusion of loan agreements.

For instance, most microcredit companies lend to their principal sponsors' affiliates, acquaintances and friends, who account for a hefty share of their cumulative issuance of loans (Zhang et al., 2013). For loan customers outside this circle of acquaintances who lack valid collateral and documentation, microcredit companies have work harder to understand their assets, incomes, reputations, family relations, and other information through site visits by local loan officers in order to assess a borrower's eligibility and creditworthiness (Mersland and Strøm, 2009; Su et al., 2017).

In an acquaintance society, however, ethical and reputational constraints serve as mitigating factors against the potential for default. The effect of these informal norms is often as rigorous as formal constraints such as legislation and regulatory oversight. In addition to conventional due diligence such as the scrutiny of financial accounts and utilities bills, Zhejiang Haining Hongda Microcredit company, for example, deems credibility as a leading consideration, believing that risk prevention comes down to personal integrity. Yet formal financial institutions such as banks are more dependent on the assurance of formal systems, such as legal protection, government regulation and in-house risk management, rather than the informal systems associated with agricultural production, such as the acquaintance society, in conducting credit business (Qian and Strahan, 2007). An example of this is village banks being subject to the supervision of the then China Banking and Insurance Regulatory Commission (CBIRC) as well as close adherence to the *Law on Commercial Banks* and other applicable laws and regulations. Moreover, the primary sponsor of a village bank must be a financial institution with sound governance systems, including regular shareholders' meetings, a board of directors, a board of supervisors, and senior management.

Another possible explanation is that rice farming may prompt local governments to scale up their capabilities and develop third-party contract governance that facilitates informal financing. Rice farming requires significant investment in water conservancy works such as irrigation, flood control, and drainage that often entails government participation and oversight in order to be accomplished effectively and efficiently. Such efforts are both capital- and labor-intensive (Wittfogel, 1957). Furthermore, rice cultivation requires collective labor to channel and retain water resources. Compared to wheat farming, rice cultivation is therefore more advantageous in terms of enhancing local government capabilities. More capable local governments are better positioned to implement regional policies for economic

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and financial development beyond the boundary of their administrative authority prescribed under formal systems. Difference in local government competence means uneven levels of informal financial development across regions.

In contrast to formal financial institutions, which are subject to control from the central government, informal financial institutions are mostly regulated by local governments. Moreover, local governments may influence informal financial development through regulatory policies, tax rates, and issuance of business licenses. Upon the initiation of a microcredit pilot program, local governments in Jiangsu and Zhejiang provinces relaxed restrictions on financing ratios, broadened financing conduits, and permitted the establishment of inter-regional businesses or branches to increase the performance and sustainability of microcredit companies (Hu et al., 2014).

In this paper we propose the following testable hypotheses based on the preceding theoretical analysis. (i) Rice cultivation has a positive influence on informal financial institutions but no significant effect on formal financial institutions. (ii) By enhancing the acquaintance society, rice cultivation promotes informal finance. (iii) Rice cultivation serves as a stimulus for the local government to build up its capacities in the development of informal finance.

3. Data

3.1 Samples

We examine the correlation between rice cultivation and the growth of formal and informal financial institutions in 27 provinces, municipalities and autonomous regions throughout China, utilizing data from 252 cities at the prefectural level or higher in 2016[1]. Microcredit businesses experienced an explosive expansion between 2009 and 2013 after the microcredit pilot program was launched at the end of 2008 before leveling off in 2016, and village banks have thrived over the past decade since their initial pilot program began in 2006. We thus focus on the development of traditional financial institutions such as money shops, which reached the pinnacle of their development in the late Qing Dynasty, as well as modern banks in China since the 1930s. Despite experiencing a downturn from 1900 to 1910, money shops began to reconstitute themselves as modern banking institutions between 1910 and 1930. The inception of the Imperial Bank of China in 1897 ushered in the emergence of modern Chinese banking establishments, which grew in size by the 1930s and formed China's modern banking system.

3.2 Variable Selection

3.2.1 Informal financial institutions: Microcredit companies

This study focuses on microcredit companies as part of the informal financial sector, and utilizes the number and capital of microcredit companies per 10,000 residents in every prefectural city as the explained variable. In accordance with the *Guidelines on the Pilot Program for Microcredit Companies (Yin Jian Fa [2008] No.23)*, microcredit companies must be formed as limited liability or joint-stock companies, and those approved by provincial governments must be registered with the local bureau of industry and commerce. We compiled a data set of prefectural-level microcredit institutions with information from Tianyancha.com and the National Enterprise Credit Information Publicity System's website. This data set includes registration details, dates of incorporation, initial capital, and shareholder profiles. Demographic information is sourced from the 2017 edition of the *China City Statistical Yearbook* and various provincial statistical yearbooks.

[1] Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, and Ningxia.

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3.2.2 Formal financial institutions: Village banks

In this paper, the development of formal financial institutions is gauged by the number of village banks per 10,000 residents under the following considerations. First, the *Guidelines on the Pilot Program for Microcredit Companies* state that microcredit companies can be converted into village banks if they fulfill certain criteria, and both village banks and microcredit companies count farmers and small business owners as their primary clients, making their business scope similar and comparable. Second, village banks have developed into an important player in the rural financial market since their pilot program was initiated in 2006, which coincided with the pilot program for microcredit companies. We thus apply the ratio of formal financial institutions' lending and deposit balances to GDP as a surrogate metric for the development of formal financial institutions, using data from the 2017 provincial statistical yearbooks. This approach is taken in light of the limited scale of village banks and the susceptibility of these banks to policy shifts (Guo, 2016).

3.2.3 Rice cultivation

This study incorporates four indicators to examine rice cultivation, including whether a prefectural city was located in a rice-farming region during the Han or Sui dynasty and the percentage of the total crop sown area used for rice in the city in 1957 and 1995. During the Han Dynasty, Chinese farmers began cultivating drought-resistant crops in the north and rice in the south, and this regional pattern persists to this day. During the Han and Sui dynasties, the regions where rice and wheat were grown were separated by boundaries that ran from the *Qinling* Mountains to the *Huai* River and from the *Hanjiang* River to the *Yangtze* River.

Our study focuses on the Han and Sui dynasties due to the movements of the boundaries between the areas of rice and wheat cultivation within this range over the course of the following dynasties. Using data from 1957 and 1995, we can minimize the effects of agricultural mechanization, which became prevalent across China beginning in 1996, on traditional methods of crop cultivation. The data presented above come from Lu (2014), the *Compendium of Statistical Information of Crop Cultivation Area and Output in Various Provinces (Municipalities and Autonomous Regions) in 1957*, as well as various provincial statistical yearbooks in 1996.

3.2.4 Control variables

(i) Contemporary factors: First, the development of microcredit companies and other informal financial institutions is primarily influenced by the strength of regional economies and formal financial institutions, which are measured in this paper by China's GDP per capita and the lending and deposit balances of formal financial institutions as a share of GDP in the year of 2015. In validating rice farming's effects on the development of formal financial institutions in particular, we substitute the variable of the lending and deposit balances of formal financial institutions as a share of GDP with the number of informal financial institutions per 10,000 residents, including microcredit companies, pawnbrokers, private capital management companies, private lending registration service firms, and mutual aid cooperatives.

In order to control for the effects of the industrial structure and the development of the private sector of the economy, we further incorporate value added from the secondary and tertiary industries as a share of GDP, and the number of people employed in private enterprises and individual businesses as a share of the labor force in 2015. The fiscal self-sufficiency ratio and the total fixed-asset investment as a share of GDP in 2015 are also incorporated into the regression equation, taking into consideration the responsibility of local governments for the approval and oversight of microcredit companies, and the possibility that informal finance can provide financing for fixed-asset investment.

Second, human capital and economic openness also contribute to the development of financial institutions. We therefore include the number of college graduates per 10,000 residents and the total

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exports as a share of GDP in 2015 in order to control for the impact of human capital and the level of economic openness, respectively, referencing data from the *China City Statistical Yearbook 2016* and provincial statistical yearbooks.

Third, religious culture, immigration, and ethnic composition may simultaneously influence agricultural production and financial development (Zhou, et al. 2018). Thus, we utilize data from the Sixth National Demographic Census of 2010 and the *Atlas of Religions in China* from the China Data Center at the University of Michigan to calculate the proportion of ethnic minorities in the overall population, whether the city had a net population inflow during the sample period, and the number of Buddhist and Taoist venues per 10,000 residents.

Last, we control for six natural and geographical variables, including the length of rivers in various cities, the shortest distance to the coastline, average elevation gradient, latitude, precipitation, and temperature, based on data from the *Chinese Historical Geographic Information System* (CHGIC, 2007) and Fick and Hijmans (2017). In order to control for potential provincial-level differences arising from varying local governmental regulations, a dummy variable representing each of the provinces, municipalities, and autonomous regions is also included in the regression equation.

(ii) Historical factors: First, there is a direct relationship between historical farming practices and economic development, and the degree of economic prosperity in the past has an impact on economic development today. In order to control for the effects of different initial economic conditions across regions on contemporary financial development, we use the population density and urbanization rate in 1910 as the proxy variables of economic development in the late Qing Dynasty using data from Cao (2001). Through both domestic and foreign trade, trade ports opened during the late Qing Dynasty have had a long-lasting impact on China's contemporary economic growth (Jia, 2014). Using information from Yan et al. (1955), our model incorporates whether a city was a trading port in the past.

Second, the educational background of the present generation is shaped by preceding generations, thereby having an indirect impact on the sophistication of financial institutions (Chen et al., 2020). In this paper, the number of *jinshi* scholars in the Ming and Qing dynasties (standardized relative to China's total population in 1910) that provided by Zhu and Xie (1980) are utilized to gauge the level of human capital throughout history.

Third, clans that form due to familial ties and local origins in a society where kinship is valued have a considerable impact on informal lending (Guo et al., 2013), and clans with a long-established presence may additionally be closely associated with rice cultivation (Ang and Fredrickson, 2017). This paper therefore employs the number of genealogies per 10,000 people in each city drawn from the *Bibliography of Chinese Genealogy: The Genealogical Knowledge Service Platform of Shanghai Library* as an index with which to evaluate the presence of clans in the various cities.

Last, the close historical relationship between agricultural production and access to transportation suggests that transportation has been an influential factor in the development of financial institutions in modern times. In this study, we utilize the number of courier stations in the Ming and Qing dynasties to assess the historical accessibility of transportation by employing data from the CHGIS (2007). There have been substantial changes to the jurisdictional boundaries of prefectural cities in contemporary China compared to the Qing Dynasty, and we utilize GIS information to match the historical data from the Qing Dynasty with the contemporary data set of jurisdictional demarcation weighted by jurisdictional overlap to compile a data set for prefectural cities that includes contemporary socioeconomic data, historical data, and geographical data.

Descriptive statistics in Table 1 indicate that there were 0.088 microcredit companies per 10,000 residents with an AUM (assets under management) of 7.1 million yuan, as well as 0.035 village banks per 10,000 residents. In our sample, 52.8% of the prefectural cities grew paddy rice during the Han Dynasty, and 46.8% of the prefectural cities were in the rice-farming region during the Sui Dynasty, as the drought-resistant crop cultivation belt in the middle and lower reaches of the Yellow River moved

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southward after the Han Dynasty. In 1957 and 1995, rice cultivation occupied 29.7% and 25.5% of the total sown crop area, respectively.

Table 1: Descriptive Statistics of Variables

Variable	Definition	Observations	Mean	Standard error	Min.	Max.
MFI/Pop	Number of microcredit companies per 10,000 residents	252	0.088	0.084	0.010	0.562
Capital/Pop	Capital of microcredit companies per 10,000 residents (in 100 million yuan)	252	0.071	0.057	0.006	0.270
Villagebank/Pop	Number of village banks per 10,000 residents	252	0.035	0.030	0	0.230
Creditdeposit/GDP	Lending and deposit balances at formal financial institutions as a share of GDP	252	2.503	1.232	0.910	10.318
Rice Han	Whether the city was in the rice-farming region in the Han Dynasty	252	0.528	0.500	0	1
Rice Sui	Whether the city was in the rice-farming region in the Sui Dynasty	252	0.468	0.500	0	1
Riceratio1957	Rice sown area as a share of crop sown area in 1957	246	0.297	0.266	0	0.935
Riceratio1995	Rice sown area as a share of crop sown area in 1995	252	0.255	0.225	0	0.797
Ln(GDP per capita)	Logarithm of GDP per capita	252	10.655	0.538	9.304	12.007
Structure2	Value added from the secondary industry as a share of GDP	252	0.468	0.091	0.193	0.714
Structure3	Value added from the tertiary industry as a share of GDP	252	0.412	0.089	0.242	0.797
Selfsufficiency	Fiscal self-sufficiency	252	0.469	0.226	0.087	1.038
Export/GDP	Total exports as a share of GDP	252	0.108	0.168	0	0.961
Private	Employment in private enterprises and individual businesses as a share of the total workforce	252	0.491	0.134	0.064	0.945
Fixedinvest	Fixed asset investments as a share of GDP	252	0.929	0.311	0.188	2.055
Ln(Buddtao/Pop)	Logarithm of the number of Buddhist and Taoist venues per 10,000 residents	252	0.151	0.264	0	1.920
Ln(Genealogy/Pop)	Logarithm of the number of genealogies per 10,000 residents	252	0.211	0.344	0	1.958
Migration	Whether the city had a net population inflow	252	0.333	0.472	0	1
Minority	The percentage of minority population in the total population	252	0.091	0.195	0	0.869
Collegestu/Pop	Number of on-campus college students per 10,000 residents	252	0.192	0.263	0	1.294
Density1910	Population density in 1910	252	0.147	0.102	0.001	0.517
Urban1910	Urbanization rate in 1910	252	0.069	0.079	0	0.450
Jinshi/Pop	Number of *jinshi* scholars per 10,000 residents in Ming and Qing dynasties	252	0.690	0.724	0.002	4.702
Treatyport	Whether the city was a treaty port	252	0.250	0.434	0	1
Ln(Courier/Area)	Logarithm of the number of queries stations per 10,000 km²	252	1.255	0.856	0	2.971
Ln(Coastaldis)	Logarithm of the shortest distance to the coastline	252	4.092	3.932	0	19.075
Ln(Slope)	Logarithm of the average gradient index	252	1.153	0.612	0.048	2.665
Ln(Riverlength/Area)	Logarithm of the length of rivers per 10,000 km²	252	2.805	0.489	0	4.698
Ln(Precipitation)	Logarithm of precipitation	252	6.838	0.537	4.417	7.648
Ln(Temperature)	Logarithm of temperature	252	2.686	0.432	-0.324	3.242
Latitude	Latitude	252	30.948	5.178	18.389	41.511

Note: Since the rice sown area data of 1957 is missing for the six prefectural cities of Aba and Ganmu prefectures in Sichuan Province and Yinchuan, Shizuishan, Wuzhong and Guyuan cities in the then Ningxia province in 1957, we ended up with 246 observations for the *Riceratio1957* variable.

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4. Rice Farming's Effects on Contemporary Financial Development

4.1 Empirical Model

The following benchmark regression equation was specified to test how rice farming practices in the past have influenced financial development in the present:

$$y_i=\beta_0+\beta_1 Rice_i+X_i'\beta_2+Prov_j'\beta_3+\varepsilon_i \quad (1)$$

In equation (1), y_i is the number or capital of microcredit companies per 10,000 residents, the number of village banks, or the lending and deposit balances of formal financial institutions in city i in 2016; $Rice_i$ means whether prefectural city i was located in a rice farming region during Han or Sui dynasty, and the rice sown area as a share of the total crop sown area; X_i is the column vector of the control variable, β_2 is the column vector of the control variable's coefficient; $Prov_j$ is the column vector of the provincial dummy variable, and β_3 is the column vector of the provincial dummy variable's coefficient; ε_i is the stochastic disturbance term.

4.2 Rice Farming's Effects on the Development of Financial Institutions in China

Columns 1 through 4 and columns 5 through 8 in Table 2 detail the effects of rice cultivation on the number and capital of microcredit companies in China. In Columns 1 and 2, the rice farming coefficient for the Han and Sui dynasties is significantly positive at 1%, indicating that there were historically more microcredit companies in rice farming regions. The coefficient for rice sown area as a proportion of total crop sown area in 1957 and 1995 is also significantly positive at 1%, indicating that microcredit companies were more prevalent in prefectural cities where rice sown area accounted for a larger proportion of the total sown crop. Similarly, the estimated coefficient of rice cultivation practices for microcredit companies' capital is significantly positive (Columns 5 through 8). The capital of microcredit companies was greater in rice-growing regions than in non-rice-growing regions.

As for the marginal effects of rice cultivation, the number and capital of contemporary microcredit companies are 4.5% and 4.4% larger in prefectural cities where rice was cultivated during the Han Dynasty (Columns 1 and 5), and 3.5% and 2.3% (Columns 2 and 6) larger in prefectural cities, respectively, where rice was cultivated during the Sui Dynasty than in non-rice-farming regions during

Table 2: Rice Farming's Effects on Informal Financial Institutions

Variable	Logarithm of the number of microcredit companies per 10,000 residents				Logarithm of the capital of microcredit companies per 10,000 residents			
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Rice Han	0.045*** (0.011)				0.044*** (0.010)			
Rice Sui		0.035*** (0.011)				0.023** (0.010)		
Riceratio1957			0.125*** (0.023)				0.085*** (0.024)	
Riceratio1995				0.121*** (0.023)				0.053* (0.029)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	246	252	252	252	246	252
Adj. R^2	0.755	0.748	0.745	0.760	0.675	0.653	0.655	0.652

Note: Numbers in parentheses are robust standard errors; ***, **, and * represent significance at 1%, 5% and 10% levels, respectively; in the interest of length, the estimated coefficients of control variables are not reported but available upon request. The same applies to the following tables.

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those dynasties. An increase in the share of rice farming area in 1957 by one percentage point would lead to an increase in the number and capital of microcredit companies by 0.125% and 0.085% (Columns 3 and 7), respectively, and an increase in the share of the rice sown area by each percentage point in 1995 would cause the number and capital of microcredit companies to rise by 0.121% and 0.053%, respectively (Columns 4 and 8).

In terms of the number of village banks per 10,000 residents and the lending and deposit balances at formal financial institutions, the estimated coefficients of the rice-farming variable are all statistically insignificant at the 10% level, as shown in Table 3. Thus, rice cultivation did not affect the development of formal financial institutions.

Table 3. Rice Farming's Effects on Formal Financial Development

Variable	Logarithm of village banks per 10,000 residents				Lending and deposit balances at formal financial institutions as a share of GDP			
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Rice Han	0.006 (0.008)				0.173 (0.162)			
Rice Sui		0.011 (0.008)				-0.153 (0.170)		
Riceratio1957			-0.016 (0.020)				-0.591 (0.446)	
Riceratio1995				-0.020 (0.018)				-0.623 (0.736)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	246	252	252	252	246	252
Adj. R^2	0.303	0.307	0.277	0.305	0.678	0.678	0.679	0.679

4.3 Robustness Tests

4.3.1 Dealing with potential endogeneity problems

Our benchmark regression analysis may not establish a causal relationship between crop cultivation and financial development due to the influence of unobservable factors such as local governance and cultural customs. We thus used regression discontinuity design (RDD) and the instrumental variable method to mitigate this potential endogeneity problem. First, there is a distinct dividing line between rice-growing regions and wheat-growing regions, which runs from the *Qinling* Mountains to the *Huai* River around the 32nd parallel north. There are no systematic economic, institutional, or environmental differences within any region surrounding this boundary, and all crop differences are due to the random selection of locations.

We thus used RDD regression to determine the causal relationship between rice cultivation and financial development by randomly grouping city samples from both sides of the *Qinling* Mountain Range to the *Huai* River, employing the third, fourth, fifth, and sixth parallels on both sides of the *Qinling* Mountain Range through the *Huai* River as the symmetrical windows to ensure robustness. Specifically, estimation was conducted for prefectural city samples located between the third and sixth parallels on both sides of the line from the *Qinling* Mountain Range through the *Huai* River. Table 4 indicates that in rice-growing regions, microcredit companies are more numerous and have more capital than in wheat-growing regions (Columns 1 and 2). In Columns 3 and 4, the estimated RDD regression coefficients are all insignificant or non-robust at the 10% level. In other words, rice cultivation has no appreciable effect on formal financial development.

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Table 4: RDD Regression Results

	Logarithm of the number of microcredit companies per 10,000 residents	Logarithm of the capital of microcredit companies per 10,000 residents	Logarithm of the number of village banks per 10,000 residents	Lending and deposit balances at formal financial institutions as a share of GDP
Width of symmetrical window	(1) RDD	(2) RDD	(3) RDD	(4) RDD
Third parallel	0.039***	0.027**	-0.012	-0.094
	(0.014)	(0.014)	(0.008)	(0.135)
Fourth parallel	0.039***	0.032***	-0.013*	0.001
	(0.012)	(0.012)	(0.007)	(0.174)
Fifth parallel	0.032***	0.024**	-0.008	0.003
	(0.012)	(0.012)	(0.007)	(0.123)
Sixth parallel	0.036***	0.029***	-0.008	0.107
	(0.011)	(0.011)	(0.006)	(0.116)
Control variable	Yes	Yes	Yes	Yes

Utilizing two exogenous variables in the form of rice and wheat suitability indices for various prefectural cities, we are able to counterbalance the endogenous estimation bias even more effectively. These indices reflect a combination of soil, solar radiation, temperature, terrain, and environmental factors based on the Global Agro-ecological Zones database. There is a strong correlation between the probability of rice farming in various prefectural cities and the suitability indices of both rice and wheat in the region. Areas with a greater rice suitability index and a lower wheat suitability index are better suited for rice farming. Furthermore, the suitability of crops for various regions is largely dependent on external natural factors, such as soil characteristics, rather than being directly correlated to economic development. The suitability index for rice in Table 5's initial estimations is significantly positive, whereas the coefficient for the wheat suitability index is significantly negative.

Furthermore, the *p*-values of the LM statistics in the under-identification test are all smaller than the 0.01 confidence level, and the statistics of the weak instrumental variable test are all greater than 10. This implies that both the rice and wheat suitability indices are highly correlated with the choice of rice cultivation and free from the problem of a weak instrumental variable. The *p*-values for the over-identification test are all in excess of the critical value of 0.1 as well, indicating that we cannot reject the null hypothesis that no association exists between the instrumental variable and the disturbance term. According to the results of two-stage estimation, rice farming has a statistically significant positive estimated coefficient for the number and capital of microcredit companies, while the estimated coefficient for formal financial development is insignificant. This suggests that rice farming is conducive to the development of informal financial institutions without significantly affecting formal financial development.

4.3.2 Substitution of metrics for informal and formal financial development

The following robustness test was conducted because the number and capital of microcredit companies per 10,000 residents and the number of village banks used in the benchmark regression of this paper may not accurately measure the development of informal and formal finance. First, we collected information on pawnbrokers, informal capital management firms, and informal lending registration services firms from Tianyancha.com and the National Enterprise Credit Information Publicity System. This information was then compiled with the number and capitalization of microcredit companies to serve as a substitute for the informal financial development index. According to our estimated results, rice farming's coefficient remained significantly positive.

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Table 5: Instrumental Variable Regression Results

Variable	Logarithm of the number of microcredit companies per 10,000 residents				Logarithm of the capital of microcredit companies per 10,000 residents			
	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS	(6) 2SLS	(7) 2SLS	(8) 2SLS
Rice Han	0.077***				0.052***			
	(0.022)				(0.018)			
Rice Sui		0.093***				0.062***		
		(0.030)				(0.023)		
Riceratio1957			0.152***				0.115**	
			(0.053)				(0.046)	
Riceratio1995				0.165***				0.110***
				(0.045)				(0.038)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	246	252	252	252	246	252
Adj. R^2	0.746	0.719	0.743	0.757	0.674	0.628	0.652	0.643
First-stage regression results								
Rice Suitability	0.170***	0.150**	0.058**	0.090***	0.170***	0.150**	0.058**	0.090***
	(0.050)	(0.064)	(0.022)	(0.019)	(0.050)	(0.064)	(0.022)	(0.019)
Wheat Suitability	-0.116***	-0.091***	-0.053***	-0.048***	-0.116***	-0.091***	-0.053***	-0.048***
	(0.025)	(0.023)	(0.010)	(0.009)	(0.025)	(0.023)	(0.010)	(0.009)
Kleibergen-Paap rk LM statistic	27.693	29.804	40.727	45.946	27.693	29.804	40.727	45.946
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Over-identification Test Chi-square statistic	0.006	0.045	0.101	0.198	0.334	0.374	0.168	0.623
	[0.938]	[0.832]	[0.751]	[0.656]	[0.563]	[0.541]	[0.682]	[0.430]
Cragg-Donald Wald F statistic	31.582	18.649	24.100	40.386	31.582	18.649	24.100	40.386
	Logarithm of the number of village banks per 10,000 residents				Lending and deposit balances at formal financial institutions as a share of GDP			
Rice Han	-0.008				0.227			
	(0.015)				(0.491)			
Rice Sui		-0.012				0.247		
		(0.019)				(0.598)		
Riceratio1957			-0.026				0.479	
			(0.041)				(1.263)	
Riceratio1995				-0.025				0.390
				(0.032)				(1.041)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	246	252	252	252	246	252
Adj. R^2	0.292	0.279	0.276	0.304	0.678	0.673	0.673	0.674

Note: Numbers in parentheses and square brackets are robust standard errors and p-values, respectively.

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We also incorporated the China Labor Force Dynamic Survey (CLDS) data from 2016 to evaluate the dynamism of private lending through a two-value dummy variable "Have you loaned money to someone else?", and the variable "Amount of outstanding loans to others". The correlation between crop-farming data at the prefectural city level and labor force survey data was assessed to evaluate the impact of rice farming on the development of informal finance such as private lending. The results of this regression suggest that after controlling for the household head and other factors at both the household and prefectural city levels, all the estimated coefficients for households in rice farming regions are significantly positive, indicating an inclination for households in these regions to engage in and devote more funds to private lending.

Additionally, the level of formal financial development was measured by the loan balances of formal financial institutions, the balance of deposit savings as a share of GDP, the number of commercial banks per 10,000 residents, the number of village banks per 10,000 residents, and the total number of commercial banks (Beck et al., 2000) according to the statistical yearbooks of various provinces in 2017 and the CBIRC's website and added to the regression. The results indicate that the estimated coefficients of rice cultivation are either not statistically significant or not robust.

Finally, we matched the rice-farming data at the level of prefectural cities with CLDS village-level data in 2016 and measured formal financial development by the two variables "Is there a bank within your village's jurisdiction?" and "How many banks are there within your village's jurisdiction? (standardized by the village's resident population)". Then, a robustness test was performed to determine if the prefectural city of the village was located in a rice-farming region and how large the rice sowing area was. After including the control variables of migrant population as a percentage of total village population, the number of primary and secondary schools per 10,000 residents, and the number of ancestral shrines per 10,000 residents, none of the estimated coefficients for rice farming were statistically significant. Due to limited space, the estimated results listed above are omitted but available upon request.

4.3.3 Exclusion of municipalities directly under the central government, cities specifically designated in the state plan, and provincial capitals or prefectural cities in pastoral and livestock economic belts

Policy preferences may benefit municipalities directly under the central government, provincial capitals, and cities specifically designated in the state plan. Pastoral and livestock economies have historically dominated in the arid and semiarid regions of northwestern China, the high-altitude regions of Qinghai and Tibet, the East Monsoon Climate Zone pastures in the northern region, and in the northeastern region. Therefore, a re-estimation was conducted with samples excluding the aforementioned prefectural cities, and Inner Mongolia, Liaoning, Jilin, Heilongjiang, Guizhou, Yunnan, Gansu, Qinghai, Ningxia, and Xinjiang are among the non-arable economic regions. The estimated coefficients for rice farming's effects on the number and capital of microcredit companies were significantly positive, whereas those for formal financial development were either insignificant or weak, regardless of whether municipalities, cities specifically designated in the state plan, provincial capitals, or prefectural cities in nomadic regions were excluded. In other words, the conclusion that rice cultivation has a positive impact on informal financial development but a negligible impact on formal financial development is robust across multiple regression samples. Due to space constraints, the estimated results are not detailed here but are available upon request.

5. The Mechanism of Rice Farming's Effects on Informal Financial Development

In this section, we employ the intermediate effect test method devised by Wen et al. (2004) to validate the rice farming's effects on informal financial development discussed in the theoretical analysis section. First, rice farming's effects on acquaintance society are examined at both the macro and micro

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levels. In rural Chinese society, clans with the same surname tended to reside in the same community, resulting in the formation of surname-distinct villages. The strong ties and identity of family lineage increase the degree of interpersonal trust between relatives and neighbors (Huang, 2000).

Using data from the 2010 China Family Panel Studies (CFPS), we construct indicators for measuring crop farming based on the responses to the questions "Does your family grow rice or wheat?" and "What was your family's total rice or wheat production last year?" The intensity of an acquaintance society is determined by the response to the question "Does your family maintain a genealogy?" In addition, the equation includes control variables at the level of the household head, households, and communities, as well as a dummy variable for province, in order to evaluate crop farming's effects on acquaintance society.

Our results indicate that the estimated coefficient of rice farming is significantly positive, while the estimated coefficient of wheat farming is negative but not statistically significant, suggesting that rice-farming households are more likely to maintain a genealogy with a greater intensity of acquaintance society. This regression result is also robust between the full-sample estimation and the estimation based on subsamples of farmer households. These estimated results are not elaborated here but are available upon request due to space limitations.

Next, we measure the intensity of the acquaintance society based on the number of genealogies per 10,000 residents in each prefectural city and separately include the variable of rice cultivation, whose estimated coefficients are significantly positive (Columns 1 through 4 in Table 7). This suggests that rice cultivation significantly influenced informal financial development as a whole. According to the findings in Table 6 on rice farming's effects on the number of genealogies, the estimated coefficients of rice farming are all significantly positive, indicating that rice farming helped strengthen the acquaintance society. The estimated coefficients of both rice farming and the number of genealogies are also significantly positive at the 10% confidence level (Columns 5 through 8 of Table 7), indicating that the acquaintance society has a partial intermediate effect on the development of informal finance.

When measuring rice cultivation with different variables, the intermediate effect accounts for 4.26% to 16.92% of the total effect. Further subsample regression of the median values of genealogies in each prefectural city reveals that in regions with fewer genealogies, rice farming's effects on the number and capital of microcredit companies are either insignificant or not robust, whereas in regions with more numerous genealogies, rice farming's effects on microcredit companies are significantly positive. The implication is that rice cultivation may in fact promote informal finance by fostering acquaintanceships. Subsample estimates are not included here due again to space constraints.

We next use the local government fiscal self-sufficiency ratio to assess the effects of rice cultivation on informal financial development via the improvement of local government competence. In general, fiscal strength is a significant manifestation and source of local government governance capacity (Besley and Persson, 2009), and the greater a local government's fiscal self-sufficiency ratio, the stronger it is. After separately including the rice cultivation variable in the regression, we estimated its coefficient to be significantly positive. The aggregate effect of rice farming on informal financial development is significant, but the estimated coefficient of rice farming in relation to the governance capacity of local government is not robust.

Finally, after simultaneously including the rice farming variable and the local government fiscal self-sufficiency ratio, the rice farming estimated coefficient remains significantly positive, whereas the local government governance capacity estimated coefficient is not significant even at the 10% level. We therefore conduct a Sobel test to determine the existence of the intermediate effect of local government competence. All Z statistics are substantially greater than the critical value at the 5% significance level, indicating that the intermediate effect of local governments is not statistically significant. Due to space constraints, the estimation results listed above are not displayed but are available upon request.

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Table 6. Rice Farming's Effects on the Number of Genealogies in Prefectural Cities

Variable	Logarithm of the number of genealogies per 10,000 residents			
	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Rice Han	0.109*			
	(0.064)			
Rice Sui		0.187**		
		(0.087)		
Riceratio1957			0.394*	
			(0.212)	
Riceratio1995				0.648***
				(0.166)
Control variable	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes
Observations	252	252	246	252
Adj. R^2	0.526	0.535	0.531	0.550

Table 7: Rice Farming's Effects on Informal Financial Development

Variable	Logarithm of the number of microcredit companies per 10,000 residents							
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Rice Han	0.047***				0.045***			
	(0.012)				(0.011)			
Rice Sui		0.039***				0.035***		
		(0.011)				(0.011)		
Riceratio1957			0.133***				0.125***	
			(0.023)				(0.023)	
Riceratio1995				0.131***				0.121***
				(0.022)				(0.023)
Ln(Genealogy/Pop)					0.022***	0.020***	0.021**	0.015*
					(0.008)	(0.008)	(0.009)	(0.009)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	246	252	252	252	246	252
Adj. R^2	0.750	0.745	0.740	0.759	0.755	0.748	0.745	0.760
	Logarithm of the capital of microcredit companies per 10,000 residents							
Rice Han	0.046***				0.044***			
	(0.010)				(0.010)			
Rice Sui		0.027***				0.023**		
		(0.010)				(0.010)		
Riceratio1957			0.092***				0.085***	
			(0.023)				(0.024)	
Riceratio1995				0.063**				0.053*
				(0.029)				(0.029)
Ln(Genealogy/Pop)					0.018**	0.018**	0.017**	0.017*
					(0.008)	(0.009)	(0.008)	(0.009)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	246	252	252	252	246	252
Adj. R^2	0.670	0.648	0.650	0.648	0.675	0.653	0.655	0.652

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6. Rice Farming's Effects on Financial Development in the Republican Period (1912-1949)

Utilizing data from the *National Banking Yearbooks* of 1934 and 1935 concerning money shops and modern banks, we now conduct a test to determine whether the cultivation of crops had an impact on formal and informal financial institutions in modern China. The regression equation has been adjusted to account for omitted variables by incorporating the following: Population density in 1910, urbanization rate, the number of *jinshi* scholars and schools per 10,000 residents, the number of Confucian shrines and temples, and the number of genealogies per 10,000 residents, the number of industrial enterprises in existence in 1927, whether the city was a trading port, the number of Christians per 10,000 residents, access to railways, the shortest distance to the coastline, the degree of terrain variation, the length of rivers, latitude, and a dummy variable for province.

Due to the absence of money shops and modern banks in certain regions of the country during the 1930s, we also conduct a robustness test using the Tobit model and OLS regression. Table 8 presents the estimated results, indicating that the coefficient of rice farming's impact on the number of money shops during the Republican Era is significantly positive. Conversely, the estimated coefficient for the number of modern banks appears to be insignificant. This indicates that rice farming had historically positive effects on informal financial development without substantially affecting the number of modern banks, and this regression outcome is still valid after a two-stage estimation using the rice and wheat suitability indices as instrumental variables for rice farming.

Table 8. Rice Farming's Effects on the Number of Financial Institutions during the Republican Era

Variable	Logarithm of money shops per 10,000 residents in 1934				Logarithm of the number of money shops per 10,000 residents in 1935			
	(1) OLS	(2) OLS	(3) Tobit	(4) Tobit	(5) OLS	(6) OLS	(7) Tobit	(8) Tobit
Rice Han	0.321***		1.715**		0.238*		-0.042	
	(0.111)		(0.752)		(0.143)		(0.500)	
Rice Sui		0.263		1.975**		0.293*		-0.051
		(0.161)		(0.912)		(0.176)		(0.530)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	259	259	259	259	259	259	259	259
Adj./Pseudo R^2	0.481	0.478	0.451	0.456	0.525	0.526	0.405	0.405
	Logarithm of the number of banks per 10,000 residents in 1934				Logarithm of the number of banks per 10,000 residents in 1935			
	(1) OLS	(2) OLS	(3) Tobit	(4) Tobit	(5) OLS	(6) OLS	(7) Tobit	(8) Tobit
Rice Han	0.008		-0.0003		0.002		0.003	
	(0.010)		(0.012)		(0.012)		(0.014)	
Rice Sui		0.009		0.004		0.010		0.004
		(0.008)		(0.014)		(0.009)		(0.013)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	259	259	259	259	259	259	259	259
Adj./Pseudo R^2	0.478	0.478	-1.095	-1.096	0.454	0.456	-0.802	-0.802

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Table 8 Continued

	Logarithm of the number of money shops per 10,000 residents in 1934		Logarithm of the number of money shops per 10,000 residents in 1935		Logarithm of the number of banks per 10,000 residents in 1934		Logarithm of the number of banks per 10,000 residents in 1935	
	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS	(6) 2SLS	(7) 2SLS	(8) 2SLS
Rice Han	0.770**		0.657*		0.044		0.047	
	(0.325)		(0.339)		(0.028)		(0.033)	
Rice Sui		1.068**		0.869*		0.063		0.070
		(0.489)		(0.460)		(0.041)		(0.047)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dummy variable of province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	259	259	259	259	259	259	259	259
Adj. R^2	0.467	0.435	0.515	0.508	0.447	0.408	0.419	0.395

7. Conclusions

This study examined the impact of rice cultivation on the development of both formal and informal financial institutions in China based on data for formal and informal financial institutions located in Chinese cities at or above the prefectural level in 2016, in addition to historical crop farming data. Our findings suggest that rice cultivation has had a positive impact on informal financial development while having no discernible impact on formal financial development. This result also still stands after implementing RDD methodology, conducting a two-stage instrumental variable estimation, substituting the formal and informal financial development indices, and conducting regression analysis that excluded municipalities directly under the central government, cities specifically designated in the state plan, provincial capitals, and nomadic regions.

The underlying mechanism through which rice farming on the development of informal finance lies in the strengthening of interpersonal connections in the acquaintance society, rather than the improvement of governance capacity of local government. This indicates that the enforcement of rules by both parties to a transaction on their own initiative has heterogenous effects on formal and informal finance. However, the effects of third-party contract enforcement are not significantly different from this self-policing.

We also investigated rice farming's effects on the development of financial institutions during the Republican Period (1912-1949) based on data on money shops and modern banks in the 1930s, and discovered that rice farming had contributed to an increase in the number of money shops but not modern banks. In this way, we validated once more the differentiated long-term effects of China's regional cultural differences influenced by "rice cultivation in the south and wheat cultivation in the north" on formal and informal financial development.

References:

[1] Ahlin, Christian, Jocelyn Lin, and Michael Maio. 2011. "Where Does Microfinance Flourish? Microfinance Institution Performance in Macroeconomic Context." *Journal of Development Economics*, 95(2): 105-120.

[2] Allen, Franklin, Jun Qian, and Meijun Qian. 2005. "Law, Finance, and Economic Growth in China." *Journal of Financial Economics*, 77(1): 57-116.

[3] Ang, James B., and Per G. Fredriksson. 2017. "Wheat Agriculture and Family Ties." *European Economic Review*, 100: 236-256.

(C)1994-2023 China Academic Journal Electronic Publishing House. All rights reserved. http://www.cnki.net

[4] Beck, Thorsten, Ross Levine, and Norman Loayza. 2000. “Finance and the Sources of Growth.” *Journal of Financial Economics*, 58(1-2): 261-300.

[5] Besley, Timothy, and Torsten Persson. 2009. “The Origins of State Capacity: Property Rights, Taxation, and Politics.” *American Economic Review*, 99(4): 1218-1244.

[6] Cao, Shuji. 2001. *Population History of China (Volume V: Qing Dynasty).* Shanghai: Fudan University Press.

[7] Chen, Ting, James Kai-sing Kung, and Chicheng Ma. 2020. “Long Live *Keju*! The Persistent Effects of China’s Imperial Examination System.” *Economic Journal*, 130(631): 2030-2064.

[8] Ding, Congming, Ying Zhou, and Zhenqiao Liang. 2018. “Crops, Cooperation and Trust Pattern: Empirical Evidence of China.” *China Economic Quarterly*, 17(2): 579-608.

[9] Djankov, Simeon, Caralee McLiesh, and Andrei Shleifer. 2007. “Private Credit in 129 Countries.” *Journal of Financial Economics*, 84(2): 299-329.

[10] Fick, Stephen E., and Robert J. Hijmans. 2017. “WorldClim2: New 1-km Spatial Resolution Climate Surfaces for Global Land Areas.” *International Journal of Climatology*, 37(12): 4302-4315.

[11] Galor, Oded, and Ömer Özak. 2016. “The Agricultural Origins of Time Preference.” *American Economic Review*, 106(10): 3064-3103.

[12] Giné, Xavier. 2011. “Access to Capital in Rural Thailand: An Estimated Model of Formal vs. Informal Credit.” *Journal of Development Economics*, 96(1): 16-29.

[13] Giuliano, Paola, and Nathan Nunn. 2021. “Understanding Cultural Persistence and Change.” *Review of Economic Studies*, 88(4): 1541-1581.

[14] Greif, Avner, and Guido Tabellini. 2010. “Cultural and Institutional Bifurcation: China and Europe Compared.” *American Economic Review*, 100(2): 135-140.

[15] Guo, Feng. 2016. “Local Finance in China from the Political Intervention Perspective: A Literature Review.” *Chinese Review of Financial Studies*, 3: 67-79.

[16] Guo, Yunnan, Linyi Zhang, and Yang Yao. 2013. “Lineage Networks, Microfinance and Entrepreneurship.” *Journal of Financial Research*, 9: 136-149.

[17] Harvard Yenching Institute. 2007. CHGIS (Version 4). https://dataverse.harvard.edu/dataverse/chgis_v4. (accessed January 2007).

[18] Hu, Jinyan, and Qiaohui Liang. 2014. “Inter-provincial Differences in the Development of Micro-loan Companies.” *Reform*, 8: 131-140.

[19] Huang, Zongzhi. 2000. *The Peasant Economy and Social Change in North China. Beijing: China Book Bureau.* Beijing: China Book Bureau.

[20] Jia, Ruixue. 2014. “The Legacies of Forced Freedom: China’s Treaty Ports.” *Review of Economics and Statistics*, 96(4): 596-608.

[21] Karaivanov, Alexander, and Anke Kessler. 2018. “(Dis) advantages of Informal Loans–Theory and Evidence.” *European Economic Review*, 102: 100-128.

[22] Lin, Yifu, and Xifang Sun. 2005. “Information, Informal Finance and SME Financing.” *Economic Research Journal*, 7: 35-44.

[23] Liu, Xichuan, Qiming Yang, and Lihui Chen. 2014. “Formal Sector and Informal Sector in Rural Households Credit Market: Substitutes or Complements?” *Economic Research Journal*, 11: 145-158.

[24] Lu, Xiqi. 2014. *The Spatial Structure of Chinese History*. Guilin: Guangxi Normal University Press.

[25] Mersland, Roy, and R. Øystein Strøm. 2009. “Performance and Governance in Microfinance Institutions.” *Journal of Banking & Finance*, 33(4): 662-669.

[26] Pascali, Luigi. 2016. “Banks and Development: Jewish Communities in the Italian Renaissance and Current Economic Performance.” *Review of Economics and Statistics*, 98(1): 140-158.

[27] Qian, Jun, and Philip E. Strahan. 2007. “How Laws and Institutions Shape Financial Contracts: The Case of Bank Loans.” *Journal of Finance*, 62(6): 2803-2834.

[28] Qian, Shuitu, and Lei Weng. 2009. “Social Capital, Informal Finance and Industrial Clusters’ Development: Empirical Study of Zhejiang Province.” *Journal of Financial Research*, 11: 194-206.

[29] Su, Dongwei, Chunchun Chen, Zhenguo Xu, and Bin Li. 2017. “Social Networks of Commercial Banks and the Sustainable Development of Microfinance in China.” *Economic Research Journal*, 2: 140-155.

[30] Talhelm, Thomas, Xuemin Zhang, Shigehiro Oishi, Shimin Chen, Dongyuan Duan, Xuezhao Lan, and Shinobu Kitayama, “Large-scale Psychological Differences within China Explained by Rice versus Wheat Agriculture”, *Science*, 2014, 344(6184), 603-608.

[31] Wen, Zhonglin, Lei Chang, Kit-Tai Hau, and Hongyun Liu. 2004. “Testing and Application of the Mediating Effects.” *Acta Psychologica Sinica*, 5: 614-620.

[32] Wittfogel, Karl S.. 1957. *Oriental Despotism: A Comparative Study of Total Power*. New Haven: Yale University Press.

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[33] Yan, Zhongping, Yisheng Xu, Xianhao Yao, Yutang Sun, Jingyu Wang, Baozhang Nie, Wenzhi Li, Youyi Zhang, and Ergang Luo. 1955. *Extracts of Statistical Materials on Chinese Modern Economic History*. Beijing: Science Press.

[34] Yang, Rudai, Binkai Chen, and Shi'e Zhu. 2011. "The Credit Behavior of Rural Households from the Perspective of Social Network." *Economic Research Journal*, 11: 116-129.

[35] Zhang, Longyao, Chang Chen, and Junjie Liu. 2013. "Social Capital and Microfinance Risk Control: Theoretical Mechanism and Empirical Analysis." *Economic Perspectives*, 2: 73-77.

[36] Zhou, Jianbo, Shengmin Sun, Bo Zhang, Jiantao Zhou. 2018. "Buddhist Faith, Business Credits and Institutional Change: The Vicissitude of Temple Finance in China's Medieval Ages from a New Institutional Economics Perspective." *Economic Research Journal*, 6: 186-198.

[37] Zhu, Baojiong, and Peilin Xie. 1980. *Official Directory of Ming-Qing Imperial Exam Graduates.* Shanghai: Shanghai Ancient Books Publishing House.

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