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Financial development and income inequality in rural China 1991 - 2000

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Financial Development and Income Inequality in Rural China 1991-2000

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Abstract

Financial development can exert a significant influence on the distribution of income. In this paper, using Chinese provincial data over the period of 1991-2000 and applying the generalized method of moment (GMM) techniques, we investigate the relationship between finance and inequality in rural China by testing alternative existing theories concerning the finance-inequality nexus. A negative and linear relationship between finance and inequality is found in our estimations. The empirical results show that financial development significantly reduces income inequality in post-reform rural China.

Keywords: financial development, income inequality, economy, China

JEL classification: D63, G20, R11

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Acronyms

ABC	Agricultural Bank of China
ADBC	Agricultural Development Bank of China
BOC	Bank of China
CCB	China Construction Bank
GDP	gross domestic product
GMM	generalized method of moments methodology
ICBC	Industrial and Commercial Bank of China
NBS	National Bureau of Statistics of China
PBC	People's Bank of China
RCCs	rural credit cooperatives
RCFs	rural cooperative foundations
TVEs	township and village enterprises

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1 Introduction

The Chinese economy has experienced impressive growth over the last two decades. However, this rapid economic growth has been accompanied by remarkable increases in inequality. According to the official statistics, China's Gini coefficient rose sharply from 0.33 in 1980 to 0.458 in 2000, and China has been among the countries with the highest level of inequality in the world (World Bank 1997; Chang 2002).

Rising inequality in China has received considerable attention recently. Based on macro data or household survey data, previous studies on overall, within- and between-group inequality in term of income, consumption or other social indicators have provided important insights on the evolving pattern of inequality in China (e.g., Rozelle 1994; Tsui 1998; Kanbur and Zhang 1999; Gustafsson and Li 2002). However, no research work has been conducted to address the role of financial development in the dynamic changes of Chinese income distribution. This paper attempts to fill this void by applying the recently released provincial data to empirically explore the relationship between finance and inequality in China.

A growing body of literature on finance and income distribution has shown that financial development can exert important influence on inequality. However, alternative existing theories have made distinct predictions concerning the finance-inequality linkage. For instance, in the dynamic model of Greenwood and Jovanovic (1990), an inverted U-shaped relationship between finance and inequality is predicted, i.e., financial development could widen the income inequality during the early period, but then tends to lower it when the average income rises and more households gain access to financial intermediaries and services. By contrast, some other theoretical models suggest a negative and linear relationship between finance and inequality (e.g., Galor and Zeira 1993; Banerjee and Newman 1993), indicating that the development of financial market and financial intermediation helps to reduce income inequality.

Based on a panel data set covering Chinese provinces over the period of 1991-2000, we examine the impact of financial development on income inequality in rural China. The rest of this paper is organized as follows. The next section provides a brief theoretical review on the relationship between finance and income distribution. Section 3 highlights the recent trend of income inequality and financial development in rural China. Variables and data for regression are described in Section 4. Empirical analyses are presented in Section 5. Finally, this paper concludes with Section 6.

2 Financial development and income distribution: a brief literature review

Financial development can have important effects on the pattern of income distribution. However, two contrasting schools of thoughts concerning the relationship between finance and inequality can be generally categorized according to their different assumption on the role of financial development in influencing the distribution of income.

The first school of theories suggests an inverted U-shaped relationship between finance and inequality. In the pioneering work of Greenwood and Jovanovic (1990) on the finance-growth-inequality nexus, two production technologies are assumed to be

available in the economy, i.e., a safe technology with constant but relative low return on investment, and a more risky one but with higher expected return. In addition, the condition of costly entry is introduced into the model by assuming that to enter the financial market, a fixed entry cost is charged for financial participation; due to the existence of this entry fee, access to the financial sector may be restricted to agents with an amount of wealth superior to a certain threshold level. Their model shows that the development of financial intermediaries helps to overcome the information friction on risky investment through collecting and analysing information on investment projects; and it also contributes to smoothing away the idiosyncratic shock through risk diversification, trading and pooling.

Therefore, Greenwood and Jovanovic (1990) predict that, along with the financial intermediary development, the evolution of income inequality follows an inverted U-shaped path: in the early stage of development when financial intermediaries are less developed, the economy grows slowly; in the intermediate stage of development, widening income inequality coincides with more rapid economic growth and more deepening financial development; by maturity, when an extensive financial structure is fully developed with income level raising and more agents gaining access to the financial intermediary sector, the degree of income inequality will decline and ultimately become stable in the final stage of development.

In contrast to the inverted U-shaped relationship predicted in Greenwood and Jovanovic (1990), some other theoretical models suggest a negative and linear relationship between financial development and income inequality (e.g., Galor and Zeira 1993; Banerjee and Newman 1993).

Galor and Zeira (1993) model the dynamic evolution of income distribution in an economy with indivisibility in human capital investment, where agents live for two periods, and generations are linked through the bequests. Agents can either work as unskilled labour for both periods, or make an indivisible investment in human capital when young in the first period and then work as skilled labour in the second period. However, due to financial market imperfections, only agents with sufficiently large inheritance will invest in human capital and become skilled labour, while other agents will remain unskilled. Therefore, initial wealth distribution matters for the long-run level of income, and inequality will be perpetuated through bequests between generations. In the long run, there will be a polarization of wealth between high-income skilled labourers and low-income unskilled ones: the rich/educated families will converge to the high-income steady state, whereas the poor/uneducated ones will converge to the low-income steady state.

Similar predictions can also be found in the model of Banerjee and Newman (1993) that concerns the dynamics of wealth distribution with financial market imperfections and indivisible investment. In their model, Banerjee and Newman (1993) show that opportunity for investment in high-return projects may be restricted to rich individuals with wealth larger than a threshold level. More specifically, under imperfect financial markets, only agents with wealth in excess of this threshold level may undertake the high-return investment while those with inadequate wealth will not. The initial rich will become richer through their investment in high-return investment projects; the initial poor with no access to credit markets will remain poor. Based on these theoretical analyses, a negative and linear relationship between finance and inequality is predicted by the second school, in which the development of financial markets and financial

intermediaries can help to reduce income inequality through reducing capital market imperfections and providing more opportunities for the poor to borrow and then invest in high-return projects.

However, few empirical studies have been conducted to test these alternative theories. The recent work of Li, Squire and Zou (1998) and that of Clarke, Xu and Zou (2003) are two notable exceptions. Using dataset of Gini coefficients for 40 developed and developing countries from 1947 to 1994, Li, Squire and Zou (1998) examine the relationship between financial depth and income inequality. They find that better-functioning financial markets are strongly associated with lower income inequality. Similarly, by employing panel data from both developing and developed countries between 1960 and 1995, Clarke, Xu and Zou (2003) analyse the relationship between finance and inequality. They find that inequality is lower in countries with better-developed financial sectors, and that inequality decreases as economies develop their financial intermediaries. Therefore, their empirical results provide strong support to the linear hypothesis suggested by Galor and Zeira (1993) and Banerjee and Newman (1993), yet they find no evidence of an inverted U-shaped relation between finance and inequality as that predicted in Greenwood and Jovanovic (1990).

In this paper, using Chinese provincial data, we attempt to test the alternative predictions made by different schools of theories concerning the finance-inequality linkage. To the best of our knowledge, this is the first paper looking at the relationship between finance and inequality for the case of China.

3 Financial reforms and income inequality in rural China

Two decades of rural reforms in China have successfully stimulated rural economic growth, and greatly improved the living standards of rural households. Rapid development of the rural economy largely altered the pattern of income distribution in rural China. Meanwhile, in order to establish a more efficient investment-supporting mechanism to meet the financial demands of rural households and to better serve the rural sector, a series of policy measures have also been introduced to reform and strengthen China's rural financial system.

3.1 Reforms in rural financial system

Before economic reforms, a mono-banking system was formed under the centrally planned economy, and the People's Bank of China (PBC) was the unique financial institution in China. However, the traditional financial system failed to provide sufficient financial support to meet the needs arising from production expansion in such economic sectors as agriculture, industry, construction, transport and commerce.

The abandon of mono-banking system in the late 1970s marked the beginning of China's financial reform. Four specialized banks, authorized with specialized functions

concerning different scopes of economic activities, were separated from the traditional system, and the PBC was then reorganized as the Central bank of China.[1]

Among the four state-owned specialized banks, the Agricultural Bank of China (ABC) plays the most important role in serving the rural sector, and acts as the key component in China's rural financial system. Another important financial institution in rural China was the rural credit cooperative (RCCs), located at the township and county level, and subject to the monitoring of the ABCs. In the 1980s, the focus of reforms on the RCCs was to revive its role in collective organization, democratic management and administration, and to expand its autonomy in business operations. Since the beginning of the 1990s, the government began to accelerate the process of commercializing the state-owned banks. To facilitate the transformation of the ABCs into competitive, autonomous, and self-accountable commercial banks, the Agricultural Development Bank of China (ADBC), i.e., a policy-lending bank responsible for financial loans on the purchase and sale of agricultural products, was established in 1994. The promulgation of the Commercial Bank Law in 1995 ensured independent operations for the commercial banks, which strongly deepened the commercializing reforms of the state-owned specialized banks. The process of commercialization was further advanced by the separation of the RCCs from the ABCs in 1996, and the RCCs were subject to the direct supervision and monitoring of the PBC. Meanwhile, rural cooperative foundations (RCFs), created at the beginning of 1980s and organized by local governments as informal financial institutions to fill the credit vacuum of formal finance in rural sector, have also experienced rapid development during this period. Therefore, a multi-institutional financial system was formed in rural China, including the formal financial institutions and various types of informal financial organizations.

However, great changes have recently occurred in the market orientation and operations strategy of the ABCs. In order to improve efficiency and profitability, the ABCs began to reduce their rural financial business. The focus of the ABCs has been transformed from the rural to urban areas; meanwhile, along with the expansion of the ABCs' credit business into non-agricultural sectors, the role of the ABCs in promoting rural development has been sharply weakened. As for the other state-owned commercial banks, they also gradually withdrew from rural areas. From 1998 to 2002, the state-owned banks have cancelled or merged more that 30,000 rural financial branches and organizations functioning below the prefecture or county level. Moreover, the Chinese government and the PBC have recently implemented a series of policy measures to control the development of informal finance in rural China; as a result, the RCFs were either abolished or merged into the RCCs in 1999.

Consequently, the RCCs have become the dominant financial institution serving China's rural sector. The ratio of the RCCs' agriculture loans in total agricultural credits has increased rapidly from 26 per cent in 1979 to 54 per cent in 1997, and then to 77 per cent in 2001; as for the loans to the township and village enterprises (TVEs), the proportion of the RCCs has also expanded from 32.1 per cent in 1979 to 69.5 per cent in 1997, and to 77.3 per cent in 2001. These results indicate that the monopoly position of the RCCs in rural finance has been gradually strengthened over the last several years.

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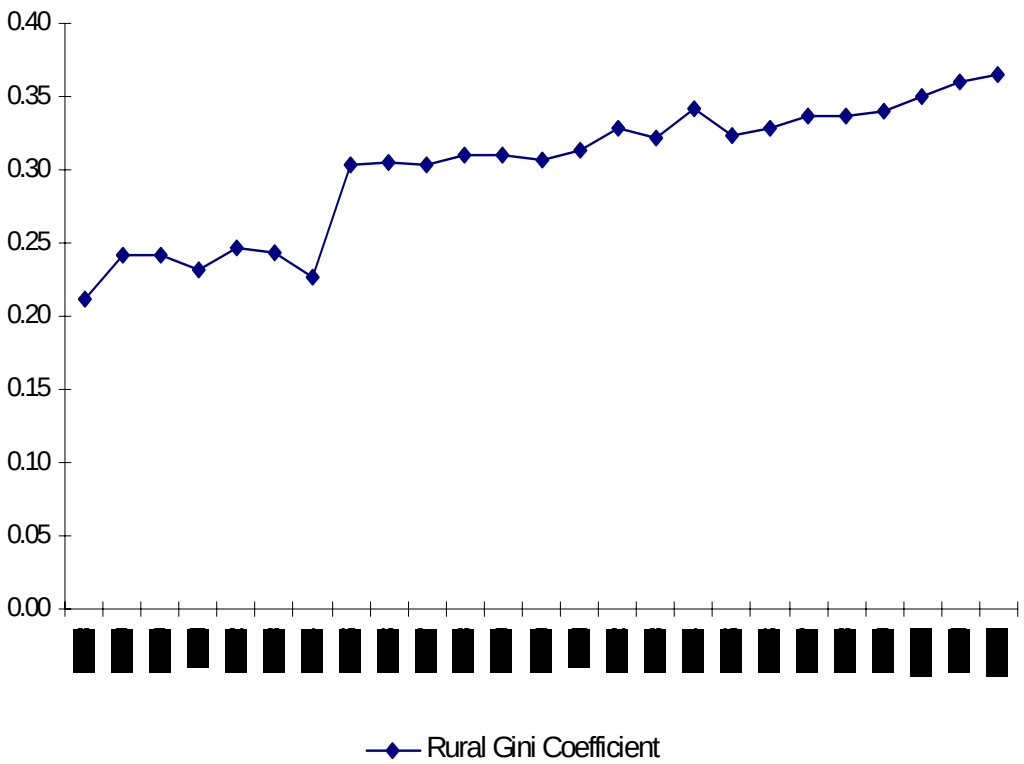
1 The four state-owned specialized banks are the Agricultural Bank of China (ABC), the Construction Bank of China (CCB), the Bank of China (BOC) and the Industrial and Commercial Bank of China (ICBC).

Due to the important role of the RCCs in the rural financial system, the Chinese government and the PBC have launched a series of reforms to transform the RCCs into viable financial institutions that operate independently, bear risks on their own, and take responsibility for their own profits and losses. In addition, policy measures have also been advanced to make the RCCs into true cooperatives that better serve their members and the rural sector. A pilot programme for further reforming the RCCs has been implemented in several areas. Eight counties were selected for a pilot reform project on interest rate liberalization within the RCCs, so that RCC deposit rates can float up to 30 per cent of the official based deposit rate, and their lending rate up to 70 per cent of the reference level. In some areas, the RCCs at the township and county level were merged into the county financial union, and these in turn would be transformed into rural commercial banks according to the shareholding system principle. So far, three rural commercial banks have been established in Jiangsu province. In addition, efforts were made to organize rural cooperative banks in certain advanced areas, and in 2003, the first rural cooperative bank was set up in Zhejiang province. However, to strengthen rural financial systems and to promote economic growth in rural areas, foundational financial reforms in ownership structure and corporate governance are required in the future.

3.2 Income inequality in rural China

Along with the rapid economic growth in the rural sector, rising rural income inequality has become a noticeable issue of concern in China's development process. Figure 1

Figure 1
Rural income inequality in China, 1978-2002
(Gini coefficient)



Source: Compiled by the author based on NBD data (various years).

presents the change of official Gini coefficient for rural China over the last two decades. The rural Gini coefficient rose sharply from 0.212 in 1978 to a much higher level of 0.365 in 2002, an increase by more than 70 per cent during this period.

Rising inequality has posed a serious challenge to the Chinese government. Increasing concern over social equity and social stability has led the authorities to exert greater effort to fight inequality. In order to reduce rural inequality, the central government has implemented a series of policy measures to support rural development. Such policies include prices support for agricultural products; policy aid to stimulate the development of rural industry further, especially in the least-developed provinces; and the increase in public investment in roads, irrigation, electrification, education, agricultural research and development (R&D), and other public services in rural areas. These policies will greatly promote production growth, and help to lower income inequality in China's rural areas.

4 Variables, model and data

4.1 Variables definitions and measurements

In this study, we attempt to empirically explore the impact of financial development on income inequality in rural China. The logarithm of the provincial rural Gini coefficients (GINI) will be employed as the dependent variable in the empirical regressions.[2] In order to measure the level of financial development in rural China, we construct an indicator of rural financial development (FINANCE), defined as the ratio of total rural loans to rural GDP. Unfortunately, official data on rural loans and rural GDP are not available. To calculate these variables, we first divide the rural sector into two subsectors, i.e., the agricultural sector and the non-agricultural sector. Rural loans are then computed as the sum of credit allocated to the agricultural sector and the TVEs (township and village enterprises). For the rural GDP, we follow the procedure of Fan *et al.* (2004), in which the GDP of the agricultural sector is equivalent to the GDP of the primary sector used by China's National Bureau of Statistics (NBS); and the value-added for rural industry (including construction) and services is used as a proxy to GDP of the non-agricultural sector in rural areas; then rural GDP is computed as the sum of GDP for these two subsectors.[3]

Another important explanatory variable is the real per capita rural net income (RY, expressed in logarithm) at 1985 constant prices. In order to test the inverted U-shaped Kuznets hypothesis on the relationship between economic development and income inequality, we take into account the squared terms of the logarithm of real per capita rural net income (RY^2).

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2 China's National Bureau of Statistics (NBS) has annually conducted well-established national household surveys covering both rural and urban areas for all regions of the country in the post-reform period. These data are ideal for the analysis of China's evolving pattern of income distribution. However, we do not have comprehensive access to these official household survey data. Fortunately, based on these rural household surveys, summary statistics for various income intervals of rural households are still available at provincial level, and we use these to calculate China's provincial rural Gini coefficients.

3 Please see Fan *et al*. (2004) for great detail on this procedure.

Given the important role of public investments in rural development, we include the variable of government investment in agricultural sector (AGEXP), defined as the ratio of government expenditures in agricultural sector to GDP.[4] In addition, we also introduce in our estimation model the variable of TVEs development (TVED), defined as the ratio of employment in the township and village enterprises (TVEs) to the total rural labour force.

4.2 Regression model

In general, to test the linear hypothesis suggested by Galor and Zeira (1993) and Banerjee and Newman (1993), we have the following regression model:

$$GINI_{i,t} = \alpha + \beta_0 GINI_{i,t-1} + \beta_1 FINANCE_{i,t} + \beta_2 X_{i,t} + \mu_i + \varepsilon_{i,t} \quad (1)$$

Note that all variables are expressed in logarithm. In this model, $GINI_{i,t}$ is the Gini coefficient for province i at year t, $FINANCE_{i,t}$ is the financial indicator, $X_{i,t}$ is a vector of the other control variables. The inclusion of the lag of the Gini coefficient

Table 1
Definitions of variables

Variable	Definition
GINI	Gini coefficient
FINANCE	Rural financial development level, measured by the ratio of total rural loans to rural GDP
RY	Real per capita rural net income
AGEXP	Government investment in agricultural sector (AGEXP), measured by the ratio of government expenditures in agricultural sector to GDP
TVED	Development level of the township and village enterprises (TVEs), measured by the ratio of TVEs employment to the total rural labour force

Note: All variables are expressed in logarithm in empirical estimations.

Table 2
Description statistics of variables

	Mean	Std dev.	Minimum	Maximum	Observations
GINI	0.2751	0.0395	0.1862	0.4009	210
FINANCE	0.0951	0.0463	0.0104	0.3632	210
RY	1791.2	1039.9	446.1	5596.4	210
AGEXP	0.0090	0.0059	0.0021	0.0307	210
TVED	0.3157	0.1518	0.0531	0.8267	210

Note: GINI: Gini coefficient; FINANCE: rural financial development level; RY: real per capita rural net income; AGEXP: government investment in agricultural sector; TVED: development level of the township and village enterprises.

4 Government expenditures in agricultural sector include the expenditures for supporting agricultural production, the investments for comprehensive development of agriculture, and the operating expenses of agriculture, forestry, water conservancy and meteorology.

($GINI_{i,t-1}$) allows us to use the information contained in the initial conditions to generate more efficient estimation. In addition, this specification also contains an unobservable province-specific effect u_i, a constant term α and an error term $\varepsilon_{i,t}$. Table 1 presents the definitions of variables. Descriptive statistics for all these variables can be found in Table 2.

Similarly, to test the Greenwood-Jovanovic hypothesis of an inverted U-shaped relationship between finance and inequality, we introduce a squared term of the financial variable ($FINANCE^2_{i,t}$) into our estimation, and thus the regression model can be rewritten as follows:

$$GINI_{i,t} = \alpha + \beta_0 GINI_{i,t-1} + \beta_1 FINANCE_{i,t} + \beta_2 FINANCE^2_{i,t} + \beta_3 X_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

The generalized method of moments (GMM) methodology, proposed by Arellano and Bond (1991) and then further developed by Blundell and Bond (1998), is employed here to control for endogeneity in our regression model.

The GMM estimator has been widely employed in recent empirical works, particularly in the studies of macroeconomics and finance. This method has a number of advantages. For instance, Beck, Levine and Loayza (2000) argue that the GMM panel estimator is good in exploiting the time-series variation in the data, accounting for unobserved individual specific effects, allowing for the inclusion of lagged dependent variables as regressors, and therefore providing better control for endogeneity of all the explanatory variables. Following Beck, Levine and Loayza (2000), we use the GMM system estimator to investigate the finance-inequality relationship in China.

4.3 Data

Our empirical work is based on a panel data set covering 21 Chinese provinces over the period of 1991-2000.[5] Data used in our empirical test are from *China Statistical Yearbook* (various issues), *China Financial Yearbook* (various issues), *China Rural Statistical Yearbook* (various issues), and *Comprehensive Statistical Data and Materials on 50 Years of China*, individual provincial statistical yearbooks and China's National Bureau of Statistics.

5 Empirical results

Based on the methodology of the GMM system estimator, empirical results are reported in Tables 3 and 4. For each regression, we test our specification of equation with the Sargan test for instrument validity, and then with the serial correlation test for the second order serial correlation. The test results suggest that our instruments are valid, and there exists no evidence of second serial correlation in our estimations.

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5 Due to the limitation of the Chinese data, computable and complete summary statistics of rural household surveys for the calculation of rural Gini coefficient are only available for 21 Chinese provinces over the period of 1991-2000. The 21 provinces included in our sample are: Tianjin, Hebei, Shanxi, Inter Mongolia, Liaoning, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Henan, Hubei, Hunan, Guangdong, Guangxi, Yunnan, Shaanxi, Qinghai, Xinjiang.

We first test the linear hypothesis that suggests a negative and linear relationship between finance and inequality (e.g., Galor and Zeira 1993; Banerjee and Newman 1993). Empirical results are presented in Table 3. We find that financial development significantly reduces income inequality in rural China. The coefficients of FINANCE are negative and significant at 1 per cent level in all regressions. According to the results in regression model IV, a 1 per cent rise in FINANCE is found to be associated with 0.03 per cent decline in rural Gini coefficient, indicating that rural financial development contributes to the improvement of income distribution in rural areas.

Table 3
Financial development and income inequality in rural China
Test for the linear hypothesis[1]

(Dependent variable = $GINI_{i,t}$: the logarithm of Gini coefficient)[2]

	Regression I	Regression II	Regression III	Regression IV
$GINI_{i,t-1}$	0.4131*** (4.86)	0.2591*** (2.78)	0.3651*** (3.75)	0.2871*** (3.02)
Financial development:				
$FINANCE_{i,t}$	-0.0383*** (-5.54)	-0.0358*** (-5.20)	-0.0309*** (-4.14)	-0.0315*** (-4.79)
Per capita Income:				
$RY_{i,t}$	0.4924*** (3.44)	0.2714* (1.83)	0.4762*** (3.53)	0.2999** (2.19)
$RY_{i,t}^2$	-0.0456*** (-4.34)	-0.0325*** (-2.99)	-0.0438*** (-4.53)	-0.0329*** (-3.23)
Other control variables:				
$AGEXP_{i,t}$		-0.0316*** (-3.83)		-0.0282*** (-3.28)
$TVED_{i,t}$			0.0199** (2.14)	0.0159** (2.43)
Constant	0.0314*** (13.97)	0.0367*** (10.64)	0.0300*** (8.42)	0.0342*** (8.90)
Sagan test	1.0000	1.0000	1.0000	1.0000
AR(2)	0.4061	0.8781	0.5421	0.8572
Observations	168	168	168	168
Provinces	21	21	21	21

Notes:
1 This hypothesis suggests a negative and linear relationship between finance and inequality (e.g., Galor and Zeira 1993; Banerjee and Newman 1993);
2 All variables are expressed in logarithm. GINI: Gini coefficient; FINANCE: rural financial development level; RY: real per capita rural net income; AGEXP: government investment in agricultural sector; TVED: development level of the township and village enterprises;
*** significant at the 1% level;
** significant at the 5% level;
* significant at 10% level; for all regressions;
T-statistics values are presented in parentheses.

Moreover, empirical results show that an increase of government expenditure in agricultural sector (AGEXP) helps to lower income inequality in rural areas. The variable of AGEXP is negatively and significantly correlated with rural Gini coefficient. As shown in regression IV, the elasticity of rural Gini coefficient with respect to government expenditure in agricultural sector (AGEXP) is -0.028. In addition, a negative and statistically significant impact of TVEs development level (TVED) on rural Gini coefficient is also reported in our empirical estimations, which indicates that rural inequality will be smaller in provinces with a better development level of the township and village enterprises.

Table 4
Financial development and income inequality in rural China
Test for the inverted U-shaped hypothesis[1]

(Dependent variable = $GINI_{i,t}$: the logarithm of Gini coefficient)[2]

	Regression I	Regression II	Regression III	Regression IV
$GINI_{i,t-1}$	0.3607*** (4.11)	0.4108*** (3.76)	0.5408*** (4.02)	0.5275*** (4.16)
Financial development:				
$FINANCE_{i,t}$	-0.0312 (-0.75)	-0.0114 (-0.21)	-0.1405* (-1.80)	-0.1063 (-1.31)
$FINANCE^2_{i,t}$	-0.0015 (-0.12)	0.0039 (0.25)	-0.0329 (-1.51)	-0.0231 (-1.01)
Per capita income:				
$RY_{i,t}$	0.4708** (2.01)	0.3579 (1.44)	1.1729** (2.50)	0.9841** (2.04)
$RY^2_{i,t}$	-0.0428*** (-2.72)	-0.0355** (-2.14)	-0.0943*** (-2.78)	-0.0815** (-2.36)
Other control variables:				
$AGEXP_{i,t}$		-0.0262 (-1.43)		-0.0200 (-0.97)
$TVED_{i,t}$			0.0930** (2.46)	0.0856** (2.30)
Constant	0.0291*** (10.66)	0.0298*** (10.99)	0.0330*** (7.79)	0.0337*** (8.13)
Sagan test	1.0000	1.0000	1.0000	1.0000
AR(2)	0.5404	0.5319	0.2392	0.3036
Observations	168	168	168	168
Provinces	21	21	21	21

Notes:
1 This hypothesis suggests that there exists an inverted U-shaped relationship between finance and inequality (Greenwood and Jovanovic 1990);
2 All variables are expressed in logarithm. GINI: Gini coefficient; FINANCE: rural financial development level; RY: real per capita rural net income; AGEXP: government investment in agricultural sector; TVED: development level of the township and village enterprises;
*** significant at the 1% level;
** significant at the 5% level;
* significant at 10% level; for all regressions;
T-statistics values are presented in parentheses.

Furthermore, in consistent with the insights of Kuznets (1955), our regression results suggest an inverted U-shaped relation between economic development and income inequality. In all estimations, the coefficients on both the logarithm of real per capita rural net income (RY) and its squared term (RY^2) are statistically significant in all regressions. The positive coefficient of RY and the negative coefficient of RY^2 indicate the existence of an inverted U-shaped relationship between economic development and income inequality.

However, when the squared term of financial indicator is included in the empirical estimations to test the non-linear hypothesis of an inverted U-shaped relationship between finance and inequality, empirical results show that the coefficients of financial squared term are always statistically insignificant and even have the wrong signs (Table 4). As such, there is little evidence supporting the inverted U-shaped hypothesis.

In sum, we find a negative and linear relationship between finance and inequality in rural China: rural inequality is lower in Chinese regions with better-developed rural financial sectors. Our empirical evident provides strong support to the linear hypothesis suggested by Galor and Zeira (1993) and Banerjee and Newman (1993), but not to the inverted U-shaped hypothesis of Greenwood-Jovanovic (1990). This result is also consistent with the findings in Clarke, Xu and Zou (2003).

6 Conclusion

Theoretical predictions on the finance-inequality nexus are inconclusive and mixed. Greenwood and Jovanovic (1990) propose an inverted U-shaped relationship between finance and inequality, while a negative and linear relationship is predicted in some other theoretical models (e.g., Galor and Zeira 1993; Banerjee and Newman 1993).

Using Chinese provincial data over the period of 1991-2000 and applying the generalized method of moment (GMM) techniques, this study tests the alternative hypotheses by investigating the impact of financial development on the distribution of income in rural China.

We find that financial development significantly contributes to the reduction of rural income inequality. Our estimation results provide strong support to the linear hypothesis, but not to the Greenwood-Jovanovic hypothesis of an inverted U-shaped relationship between finance and inequality.

These findings have important policy implications to China's economic development. To lower China's rural inequality, further steps have to be taken to strengthen the rural financial systems, and effective policy measures should also be taken to accelerate financial development in rural areas.

References

Arellano, M., and S. Bond (1991). 'Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations'. *Review of Economic Studies*, 58 (2): 277-97.

Banerjee, A. V., and A. F. Newman (1993). 'Occupational Choice and the Process of Development'. *Journal of Political Economy*, 101 (2): 274-98.

Beck T., R. Levine, and N. Loayza, (2000). 'Finance and The Sources of Growth'. *Journal of Financial Economics*, 58 (1-2): 261-310.

Blundell, R., and S. Bond (1998). 'Initial Conditions and Moment Restrictions in Dynamic Panel Data Models'. *Journal of Econometrics*, 87 (1): 115-43.

Chang, G. H. (2002). 'The Cause and Cure of China's Widening Income Disparity'. *China Economic Review*, 13: 335-40.

Clarke, G., L. C. Xu, and H. Zou (2003). 'Finance and Income Inequality: Test of Alternative Theories'. WB Policy Research Working Paper No. 2984. Washington, DC: World Bank.

Fan, S., L. Zhang, and X. Zhang (2004). 'Reform, Investment and Poverty in Rural China'. *Economic Development and Cultural Change*, 52 (2): 395-422.

Galor, O., and J. Zeira (1993). 'Income Distribution and Macroeconomics'. *Review of Economic Studies*, 60 (1): 35-52.

Greenwood, J., and B. Jovanovic (1990). 'Financial Development, Growth, and the Distribution of Income'. *Journal of Political Economy*, 98 (5): 1076-107.

Gustafsson, B., and S. Li (2002). 'Income Inequality within and across Counties in Rural China 1988 and 1995'. *Journal of Development Economics*, 69 (1): 179-204.

Kanbur, R., and X. Zhang (1999). 'Which Regional Inequality? The Evolution of Rural-Urban and Inland/Coastal Inequality in China'. *Journal of Comparative Economics*, 27: 686-701.

Kuznets, S. (1955). 'Economic Growth and Income Inequality'. *American Economic Review*, 45 (1): 1-28.

Li, H., L. Squire, and H. Zou (1998). 'Explaining International and Intertemporal Variations in Income Inequality'. *The Economic Journal*, 108 (446): 26-43.

NBS (National Bureau of Statistics) (various years). *China Statistical Yearbook*. Beijing: China Statistic Publishing House.

Rozelle, S. (1994). 'Rural Industrialization and Increasing Inequality: Emerging Patterns in China's Reforming Economy'. *Journal of Comparative Economics*, 19 (3): 362-91.

Tsui, K. Y. (1998). 'Trends and Inequality of Rural Welfare in China: Evidence from Rural Households in Guangdong and Sichuan'. *Journal of Comparative Economics*, 26: 783-804.

World Bank (1997). *Sharing Rising Incomes: Disparities in China*. Washington, DC: World Bank Publications.