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The Relationship of Financial Development, Urbanization and Urban-Rural Income Gap:

An Empirical Research Based on Provincial Panel Data in China

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Abstract. Financial development and the urbanization are important influence factors of the urban-rural income gap, and financial development can be measured by three main indexes which are financial scale, financial activities and financial efficiency. The financial development scale of China has obviously widened the urban-rural income gap. But rural financial activities have obvious effect on increasing farmers' income, and the improvement of financial efficiency is helpful for narrowing the urban-rural income gap. The Kuznets effect between economic development and the urban-rural income gap has regional diversity. Besides that, the improvement of urbanization is also helpful for shorting the urban-rural income gap.

KeyWords. financial development; the urbanization; the urban-rural income gap

1 Introduction

With the reform and opening up policy since 1978, the economy of China has maintained high-speed growth about an average of 10%. People's living standard has been greatly improved. The per capita disposable income of urban residents and rural residents is 343.4 CNY and 133.6 CNY respectively in 1978. And it increased to 17,174.7 CNY and 5,153.2 CNY respectively in 2009. It can be seen that the urban-rural income gap of China is expanding as the rapid development of the economy.

There are a lot of researches about the urban-rural income gap of China. However, most of these studies analyzed the characteristics and influencing factors of urban-rural income gap in the view of whole China. They relatively neglected the role of financial development on the urban-rural income distribution when they studied the reasons for the widening of the gap between urban and rural areas. This paper based on panel data of 31 provinces of China, studied the internal mechanism that financial development affected the income distribution. It aims to study the impact of financial development on income gap between urban and rural areas of eastern, central and western China respectively.

2 Literature review

From the 1990s, researchers began to focus on the relationship between financial and income distribution. Scholars formed three different theoretical hypotheses about the relationship between financial development and income distribution through modeling, empirical analysis in latest 10 years.

The first view is that there is an inverted U-shaped relationship between financial development and income distribution. Greenwood and Jovanovic (1990) [1] established a dynamic model to reflect the relationship between the development of finance and the income distribution. They proved that the financial development and income distribution obey an inverted U-shaped curve with the dynamic model. The second view is that financial development will be helpful for changing the degree of inequality in income distribution. Galor and Zeira (1993) [2] constructed a two-sector dynamic model; further analysis showed that financial liberalization and financial market competition were open to more people. The poor could invest in human capital through financing to enter modern high-income sectors. Banerjee and Newman (1993) [3] constructed a three-sector model, further explained the countries which were more equal in financing, which had the smaller gap in income distribution. In general, the financial market mechanism is more flexible, the competition is greater. The more using entrance to the financial markets, the lower degree of income inequality is (Rajan and Zingales, 2003) [4].The third view holders suspect that financial development would decrease the income inequality. They believe that the rich and high-income ones would profit from the development of financial market rather than the poor and low-income ones.

Most studies on the relationship between China's financial development and income distribution are empirical analysis. Qi Zhang et al (2003) [5], Yaojun Yao (2005) [6], Tao Wen et al (2005) [7] and Xiguo Yinet al (2007) [8] had done the empirical analysis on the relationship between the level of financial development and urban-rural income gap in China. Qi Zhang et al (2003) [5] believed that the development of financial intermediaries widened the income gap between urban and rural areas. Yaojun Yao (2005) [6] confirmed that there was a long-term equilibrium relationship between financial development and urban-rural income gap. Tao Wen et al's (2005) [7] study suggests that China's financial development has a significant negative effect on the growth of farmers' income. Xiguo Yin et al's (2007) [8] empirical results show that the financial development and urban-rural income gap are not uniformity integrated variables which does not support the existence of the long-term equilibrium relationship between them. Weiguo Chen, Shide Fan (2009) [9] studied the Kuznets effect of financial development and urban-rural income distribution based on China's provincial panel data. They believed that the Kuznets effect existed on China's financial development and urban-rural income gap. The scale of the financial development significantly widened the income gap between urban and rural areas, and financial efficiency was conducive to narrowing of the urban-rural income gap.

Although there are some differences in the above findings, they explore the relationship between financial development and income gap from the national level in research perspective. There are regional differences of China's financial development, so the various conclusions are debatable. This article is different from other researches. We focus on the relationship between financial development, urbanization and urban-rural income gap. We study the eastern region, central region and western region based on the Provincial Panel Data, and proposed policies and proposals to narrow the income gap between urban and rural areas.

3 Model and data description

3.1 Model

Changes in the urban-rural income gap are influenced by financial development, the level of Economic development and urbanization and Industrial Structure Change. We can establish a multiple regression model and the functional form is as follows:

$$CR=f(F,Y,UR,M) \quad (1)$$

Where, CR represents the income gap between urban and rural areas, F represents financial development, Y represents the level of economic development, UR represents the level of urbanization, M represents the industrial structure.

Total differential for formula (1):

$$dCR = \frac{\partial f}{\partial F}dF + \frac{\partial f}{\partial Y}dY + \frac{\partial f}{\partial UR}dUR + \frac{\partial f}{\partial M}dM \quad (2)$$

The measures of financial development can be classified as financial - scale, financial - activities and financial - efficiency. FIR represents the financial scale, BANK represents financial activities, FE represents financial efficiency. It means that financial development is a function of these three variables, that is:

$$F=F(FIR,BANK,FE) \tag{3}$$

Total differential for formula (3):

$$dF=\frac{\partial F}{\partial FIR}dFIR+\frac{\partial F}{\partial BANK}dBANK+\frac{\partial F}{\partial FE}dFE \tag{4}$$

Take formula (4) into formula (2), we have:

$$dCR=\frac{\partial f}{\partial FIR}dFIR+\frac{\partial f}{\partial BANK}dBANK+\frac{\partial f}{\partial FE}dFE+\frac{\partial f}{\partial Y}dY+\frac{\partial f}{\partial UR}dUR+\frac{\partial f}{\partial M}dM \tag{5}$$

We take the logarithm of all indicators in order to eliminate the heteroscedasticity. In order to further test whether the inverted U-shaped relationship between regional income gap and the level of economic development exists, we introduce the quadratic of regional per capita GDP. Established model is as follow.

$$LnCR_{it}=\omega_i+\alpha_1 Lnrjgdp_{it}+\alpha_2 Lnrjgdp_{it}^2+\beta_1 LnFIR_{it}+\beta_2 LnBANK_{it}+\beta_3 LnFE_{it}+\lambda LnUR_{it}+\gamma Lnmodern_{it}+u_{it} \tag{6}$$

Where, the subscript i represents the 31 provinces and autonomous regions in China, t represents 1978 to 2009, ω_i is the fixed effects of i-th province, u_{it} is a random disturbance term.

3.2 Data description

In this article, CR, the income gap between urban and rural areas, is measured by the ratio of per capita disposable income of urban residents and rural per capita net income. FIR, the overall size of the financial development, is measured by the ratio of total financial assets and GDP. BANK, rural finance activities, is measured by the ratio of financial institutions lending for agriculture and GDP. FE, the efficiency of financial development, is measured by the ratio of savings and loan. Y, the level of economic development, is measured by per capita GDP. It is represented by rjgdp. At the same time, introduce quadratic of rjgdp. UR, the level of urbanization, is measured by the ratio of urban population and total population. M, industrial structure, is measured by the ratio of GDP in the second and tertiary industries. It is represented by modern.

The time windows of the above indicators are from 1978 to 2009. The data is collated and calculated according to the raw data of “China Compendium of Statistics 1949～2008”, “China Statistical Yearbook 2010” and Statistical Yearbook of every province in 2010.

4 Empirical analyses

4.1 Variables stationary test

In order to avoid spurious regression of panel data, it is needed for panel data unit root test to determine its stationarity. It can be divided into common root test and individual root test according to whether cross-section sequence has a unit root. The main methods of common root test are LLC, Breitung, Hadri. And the main methods of individual root test are IPS, Fisher-ADF, Fisher-PP. We use LLC and IPS to test unit root. Results are shown in Table 1.

Table 1. Variables unit root test

Variables	Original level value		First-order difference value	
	Levin-Lin Test	**IPS Test**	**Levin-Lin Test**	**IPS Test**
lncr	-0.64889 （0.2582）	-6.05707*** （0.0000）	-13.5088*** （0.0000）	-14.0468*** （0.0000）
lnfir	-3.47580*** （0.0003）	-2.01562** （0.0219）	-18.6306*** （0.0000）	-21.1667*** （0.0000）
lnfe	-0.30799 （0.3790）	0.26986 （0.6064）	-19.8505*** （0.0000）	-21.6436*** （0.0000）
lnbank	-2.35443*** （0.0093）	-2.91651*** （0.0018）	-19.3253*** （0.0000）	-21.1117*** （0.0000）
lnur	-1.73105** （0.0417）	0.72107 （0.7646）	-16.3157*** （0.0000）	-11.8637*** （0.0000）
lnmdern	-3.86736*** （0.0001）	-6.26194*** （0.0000）	-16.3281*** （0.0000）	-18.3843*** （0.0000）
lnrjgdp	-2.06600** （0.0194）	-3.49876*** （0.0002）	-7.68699*** （0.0000）	-8.73575*** （0.0000）
$lnrjgdp^2$	-4.23472*** （0.0000）	-3.67297*** （0.0001）	-5.97470*** （0.0000）	-7.35431*** （0.0000）

Note: (1) ***, ** and * denote rejected null hypothesis that “unit root is exist” on the 1%, 5% and 10% confidence level respectively. (2) The intercept term and time trend is exist in the estimated equation.

In Table 1, all variables reject the null hypothesis of exist unit root at the 5% significance level, except the sequence of the urban-rural income gap and financial efficiency is non-stationary data that tested by LLC. And the first difference of all variables is stable. The null hypothesis is rejected at the 1% significance level, these variables are I (1).

4.2 Empirical results

Panel data regression is classified as fixed effect regression and random effect regression. The former believe that unobserved individual characteristics are correlated with the explanatory variables, while the latter is not considered relevant. Fixed effect model is a reasonable model when the cross-section units are all units of the overall.

We generally use Hausman test in Empirical studies to determine whether to choose fixed effect model or random effect model. The results showed that, the entire country, the eastern region, central region and the western region should be used for the fixed effect regression model. There may be heteroscedasticity of cross-section or period of the panel data. It will adversely affect regression results. In this article, we use the ordinary least squares and selected generalized least squares with White cross-section to estimate. Regression results are as follow.

Table 2. Regression Results

	$LnCR_{it}$							
	National		**East**		**Central**		**West**	
	OLS	GLS	OLS	GLS	OLS	GLS	OLS	GLS
C	0.33*	0.16	-0.42***	-0.35***	4.03***	2.25**	1.04**	1.25*
	(1.91)	(1.21)	(-2.34)	(-2.66)	(4.32)	(2.37)	(2.04)	(1.92)
$LnFIR_{it}$	0.19***	0.078**	0.06	0.05	0.63***	0.28***	0.19***	0.12**
	(4.93)	(2.03)	(1.19)	(1.14)	(5.48)	(4.60)	(2.92)	(2.43)
$LnBANK_{it}$	-0.04***	-0.03***	-0.06***	-0.06***	-0.05	-0.04**	-0.02	-0.01
	(-3.78)	(-3.41)	(-5.30)	(-4.64)	(-1.33)	(-2.00)	(-1.05)	(-0.10)
$LnFE_{it}$	-0.12***	-0.10***	-0.13***	-0.11***	-0.20	-0.05	-0.19***	-0.15***
	(-4.02)	(-4.24)	(-2.93)	(-3.13)	(-1.57)	(-0.49)	(-4.10)	(-4.94)
$Lnrjgdp_{it}$	0.09***	0.13***	0.15***	0.16***	-0.63***	-0.38*	0.05	0.01
	(2.59)	(5.86)	(4.98)	(6.30)	(-3.00)	(-1.79)	(0.38)	(0.10)
$Lnrjgdp_{it}^2$	-0.00	-0.00***	-0.00**	-0.00***	0.04***	0.03**	-0.00	0.00
	(-0.33)	(-2.54)	(-2.16)	(-3.98)	(3.03)	(2.27)	(-0.09)	(0.22)
$LnUR_{it}$	-0.14	-0.06**	-0.08***	-0.08**	0.09	-0.24***	-0.02	-0.02
	(-0.57)	(-2.54)	(-2.61)	(-2.51)	(0.81)	(-3.75)	(-1.05)	(-0.63)
$Lnmodern_{it}$	0.35***	0.73***	0.56***	0.75***	0.22***	0.44***	0.90***	1.14***
	(6.88)	(5.33)	(4.11)	(5.45)	(2.91)	(4.64)	(7.32)	(5.16)
R^2	0.94	0.89	0.82	0.87	0.96	0.93	0.77	0.82
Obs	878	878	322	322	233	233	293	293

Note: ***, ** and * denote coefficient statistically significant on the 1%, 5% and 10% confidence level respectively.

The table above illustrates that the significance of generalized least squares regression with White cross-section is slightly better than the OLS. The analysis uses GLS estimation results. R^2 of the model is more than 70%. R^2 of national and central regions are more than 90%. It shows that the model fits it well. The specific analysis of the impact of various factors on the income gap between urban and rural areas is as follow.

4.2.1 The relationship between financial development and urban-rural income gap

The financial scale widens the income gap between urban and rural areas significantly. The expansion of the financial scale widen income gap between urban and rural areas from the national perspective. Its coefficient passes the 5% level of significance test. The expansion of financial scale of the eastern, central and western regions has positive effect on the income gap between urban and rural areas. The other two regions of their coefficient are statistically significant except the eastern region. It is because the financial institutions of eastern area are the earliest developed ones in China. Their scale has been developed to a very high level at local. With the deepening of economic development, financial institutions increased their investments in the central and western regions. Resulting in the scale of the

financial institutions in these two regions increased rapidly, the role of the urban-rural income gap is more obvious.

Financial activities of agricultural loans conducive to narrowing the income gap between urban and rural areas. From a national perspective, for every 1% increase in agricultural loans, the income gap will be reduced by 0.03%. In the eastern and central regions, for every 1% increase in agricultural loans, the income gap will be reduced by 0.06% and 0.04% respectively. But western coefficient statistics is not significant, because the agricultural activities are mostly decentralized management in the western region. They lack of scale of intensive management.

Financial efficiency is conducive to narrowing the income gap between urban and rural areas. We can see from the estimated results, the coefficient of LnFE is less than 0 in eastern, central and western regions and the whole country. Coefficients of all the other parts are statistically significant at the 1% level except the central region.

4.2.2 The relationship between the level of economic development and urban-rural income gap

There are regional differences about the impact of economic development level to the income gap between urban and rural areas. According to the sign and value of coefficients $\alpha 1$ and $\alpha 2$, we can determine whether there is an inverted U-shaped relationship between the urban-rural income gap and economic development level. To the eastern region and national level, $\alpha 1 > 0$, $\alpha 2 < 0$, the inverted U-shaped relationship exists. While in the central and western regions, $\alpha 1 < 0$, $\alpha 2 > 0$, the inverted U-shaped relationship doesn't exist. The quadratic coefficient is greater than 0, it means that with economic development, urban-rural income gap further expand. So, there are regional differences of Kuznets effect in our country.

4.2.3 Relationship between the level of urbanization and urban-rural income gap

Raising the level of urbanization is conducive to narrowing the income gap between urban and rural areas. According to the sign of the coefficient λ, $\lambda > 0$, raising the level of urbanization will expand the income gap. $\lambda < 0$, raising the level of urbanization will narrow it. As can be seen from the estimated results, all the λ of eastern, central and western regions are less than 0. Result of the combined effects shows that, raising the level of urbanization significantly narrow the income gap between urban and rural areas in the whole country. However, λ of the western region is not statistically significant. It is because of the economic openness of the western region is relatively low, and the level of urbanization process is relatively slow. The farmers have not fully enjoyed the benefits of urbanization.

4.2.4 Relationship between the changes in the industrial structure and the urban-rural income gap

The changes of industrial structure have expanded the income gap between urban and rural areas significantly. According to the sign of the coefficient γ, $\gamma > 0$, the changes in the industrial structure will expand the income gap. $\gamma < 0$, the industrial structure changes will narrow it. The estimation results show that all γ of eastern, central and western regions are greater than 0, and the coefficients are statistically significant. Result of the combined effects shows that, changes in the industrial structure in the overall level of the country have significantly expanded the income gap between urban and rural areas.

5 Conclusions and policy recommendations

In this paper, we use the inter-provincial panel data from 1978 to 2010, and analyze the impact of financial development to residents' income gap of 31 provinces of China in different regions. We

show empirical results as follows.

First, the three indexes of financial development have different impact on the income gap between urban and rural areas. Financial scale widens the income gap significantly. The level of financial development not only fails to promote the growth of farmers' income, but also inhibits the growth. This effect is more obvious in the central and western regions. Besides that, it is conducive to narrowing the urban-rural income gap when strengthen agricultural loans, but it is not obvious in the western region. In addition, the financial efficiency is also conducive to narrowing the urban-rural income gap.

Second, there are regional differences of Kuznets effect between the level of economic development and urban-rural income gap. The Kuznets effect exists in the eastern region and the national level. However, with the economic development, the urban-rural income gap further expands in the central and western regions.

Third, raising the level of urbanization is conducive to narrowing the income gap between urban and rural areas, while the changes in the industrial structure expand it significantly.

In the empirical study above, we found that financial development does not necessarily lead to a narrowing of the income gap between urban and rural areas. But the financial development will make the increase in the total amount of social wealth. Whether the allocation is fair in the increased social wealth, is largely determined by the level of urbanization. Raising the level of urbanization can enjoy an increase in residents that of the high return on investment under the financial development in the whole community, thus to narrow the gap in income distribution. Therefore, the paper proposes the following policy recommendations.

First, with the expansion of the financial scale and the improvement of financial efficiency, we must strengthen the supply of financial services for the rural, especially in the central and western regions. We should open and impel the rural financial market, and improve financial services to farmers and rural enterprises.

Second, we should promote the integration of urban and rural development process, propel the construction of rural infrastructure, and improve the supply of public services in rural areas effectively. At the same time, about the development of urbanization, industry must support the advancement of urbanization. On the one hand, we should develop the second and tertiary industries vigorously. On the other hand, we should accelerate the development of characteristic agriculture and the exploitation of special resources, and build urban industrial support system.

Third, we should promote the adjustment of industrial structure based on comparative advantage. It is needed to achieve the employment effects of the adjustment of industrial structure, increase the employment needs of the modern sector, promote non-agricultural transformation of the rural labor force, and upgrade industrial structure and employment structure.

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