FINANCIAL STRUCTURE FOUNDATION OF THE URBAN– RURAL INCOME GAP IN CHINA: AN INVESTIGATION FROM THE PERSPECTIVE OF THE DOUBLE DUAL STRUCTURE

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ABSTRACT

This article is an empirical analysis of the relations between financial structure and the urban–rural income gap (URIG) in China's economic transition, based on the country's double dual structure. We employ data of 31 provinces in China from 2001 to 2016 to empirically study the influence of financial structure on the URIG. We find an inverted U-shaped relation between financial scale and the URIG, a positive impact of urban and rural financial structure on the URIG, and an inverted U-shaped relation between the mismatch of financial resources and the URIG. These findings show that selection of the optimal proportion of the state-owned economy through ownership reform and the promotion of financial development and optimization of the allocation of financial resources are two effective ways to reduce the URIG.

Keywords: Urban–rural income gap; Financial structure; Double dual structure; Financial resources mismatch.
JEL Classification: H73; O16; R58.

I. INTRODUCTION

The increasing gap between rich and poor in China is a social problem of growing concern. Since 2000, China's Gini coefficient has continued to exceed the threshold of 0.4, which is considered alarming. Income inequality has become the main source of the downward pressure on China's economy (Chen and Fleisher, 1996; Lee et al., 2017). The ever-widening gap between the rich and the poor has reduced the total consumption of residents, restricted the improvement of the quality of labor, and triggered social instability, all of which have reduced the speed and quality of economic growth (Lu and Chen, 2004). The gap has become a major obstacle to the balanced development of China's economy. The internal clarification of the gap between the rich and the poor in China has important theoretical and practical significance for improving China's distribution status, increasing its economic growth rate, and achieving more balanced and persistent economic development.

In China, income inequality is mainly due to the urban–rural income gap (Molero-Simarro, 2016, hereafter denoted as URIG). For example, the per capita disposable income of urban residents in China was 33,616 yuan in 2016, whereas that of rural residents was 12,363 yuan, a difference of 2.72 times. From the trends in the per capita income gap between urban and rural residents and the Gini coefficient of China from 1990 to 2015, we see that these trends are similar, implying that the URIG and Gini coefficient change simultaneously. Further investigation of the URIG between different regions in China reveals differences. In 2015, the per capita income differences between urban and rural residents in eastern, central, and western China were 3.37, 3.44, and 4.24 times, respectively. It can be seen that provinces with a large URIG are mainly concentrated in the western region. This means that the URIG in underdeveloped areas is more serious when we consider regional differences.

Why, then, is China's URIG still so high? Why is there such a big difference in the URIG between different regions? To answer these questions, we must analyze China's basic economic system and economic structure and consider its economic characteristics. During the transition period from planned economy to market economy, the Chinese economy has maintained the characteristics of double dual structure. First, in China, the urban and rural sectors coexist, constituting the urban–rural dual structure of the country's economy. Second, the urban sector comprises two parts, the state-owned economy and the non–state-owned economy, constituting another dual structure of the Chinese economy. This double dual structure thus provides an important perspective from which to understand the persistence of URIG and inconsistent performance in different regions.

There is a significant difference between the urban–rural dual sectors in the ability of residents to gain access to financial resources. In the early stage of financial development, urban residents have more convenient access to financial resources than rural residents. They also have rich financial knowledge and can better use financial resources to enhance their income, thus widening the income gap between urban and rural areas. However, eventually, rural residents' access to financial resources improves, and the income gap between urban and rural areas narrows. We thus observe an inverted U-shaped relation between financial development and the URIG (Kim and Lin, 2011). In addition, in the context of the urban–rural dual structure, finance also presents urban–rural structure

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characteristics, with financial resources concentrated in the urban sector (Zhang and Chen, 2015). The financial urban–rural structure lies at the heart of the ability of the real economy to obtain financial services, resulting in imbalance at the level of industrial structure and economic growth between urban and rural sectors, which can eventually lead to greater income inequality through the channel of labor mobility and the "slumping effect" (Cheong and Wu, 2014; Johansson and Wang, 2014). Finally, according Zhang and Chen (2015), financial development provides external financing support for the construction of local public facilities. The financial structure determines the local urbanization process and will indirectly affect the URIG through urbanization (Su et al., 2015).

The mechanism of how financial development influences income inequality can be described as follows: First, the financial sector accelerates the efficiency of capital, which promotes the flow of rural savings into urban investment. Due to the continuous improvement of the quality and quantity of human capital investment in urban areas, the proficiency of financial capital can rapidly grow there. The income of urban residents therefore exhibits a quickly grows. Second, due to the lack of capital in rural areas, industry there cannot be upgraded, such that more labor is concentrated on agriculture. Due to rural residents' ability to work only in the rural sector, their income growth is also relatively slow, due to the better ability to work of urban residents, this eventually increases the level of URIG. In addition, given a lack of financial resources, the government's unequal education policy between urban and rural areas increases the relative cost of human capital investment of rural residents above that of urban areas.

This paper makes the following contributions. First, different from the previous literature on the impact of financial development on the URIG, our work portrays the financial structure along the following three dimensions: financial development, the urban–rural financial structure, and the mismatch of financial resources. This approach allows us to comprehensively examine the relation between financial structure and the URIG. Second, unlike previous studies, this paper investigates the influence of financial structure on income inequality, as well as robustness tests, handling potential endogeneity using an instrumental variable (IV) two-stage least squares (2SLS) approach. Third, the full sample is split into three subsamples for the eastern, central, and western regions, respectively, allowing us to examine the differences in the relation between financial structure and the URIG between the different regions. This more accurate analysis can offer more targeted policy recommendations for the government.

The remainder of this paper is organized as follows. Section II reviews the literature on the relations between financial structure and income inequality. Section III describes the research design, providing detailed information on the data, variables, and measurement models. Section IV presents analyses of static effects, robustness tests, and the empirical results for the three subsamples. The last section draws our conclusions and provides policy recommendations.

II. LITERATURE REVIEW

The relations between financial development and the income gap between urban and rural residents has been given more importance by scholars and the

governments (de Haan and Sturm, 2017; Ghossoub and Reed, 2017; Baiardi and Morana, 2019). Mookerjee and Kalipioni (2010) point out that the availability of financial resources lies at the heart of income inequality. Moreover, as Lee et al. (2017) proposed, financial development could affect income inequality due to unequal access to financial resources. Hsieh et al. (2019) find that income inequality increases with financial deepening but decreases with a more market-oriented financial system.

There are three viewpoints on the relations between financial development and income inequality. First, Greenwood and Jovanovic (1990) note an inverted-U relation between financial development and income inequality. Similarly, Kim and Lin (2011) find that the benefits of financial development on income distribution arise only when the country has reached a threshold level of financial development. By using a dynamic panel data model and data on 35 developing countries, Tan and Law (2012) provide strong evidence of a U-shaped relations between financial development and income inequality.

However, on the contrary, Galor and Zeira (1993) find that financial development exerts a negative effect on income inequality, since financial development provides the poor greater access to financial resources. In line with these authors' viewpoint, Hamori and Hashiguchi (2012), Kunieda et al., (2014), and Naceur and Zhang (2016) also illustrate this idea. Similarly, other researchers claim that regional inequality can be alleviated by speeding up financial reforms to improve access to finance for the inland provinces (Zhang et al., 2007; Wang et al., 2015). By using data on 49 countries, Li et al. (1998) point out that financial development plays a major role in reducing income inequality.

Another strand of literature, however, claims that financial development promotes income inequality (e.g., Gregorio, 1996; Li and Yu, 2014; Dabla-Norris et al., 2015; Jauch and Watzka, 2016). Using a cross-country panel data of developing countries, Seven and Coskun (2016) find that, although bank development contributes to economic growth, it also exerts a positive impact on the growth of the Gini coefficient.

We now turn to the literature on the relations between financial development and income inequality in China. As Zhang et al. (2007) show, the rising regional disparity in post-reform China can be partly attributed to the unequal financial development between the coastal and inland provinces. Since the reform in the 1980s, the importance of financial structure in income distribution in China has grown and received wide attention from scholars in the context of financial marketization (Gimet and Segot, 2011; Johansson and Wang, 2014; Zhang and Chen, 2015; Lee et al., 2017; Wen et al., 2018). Employing data from China and structural vector autoregression, Zhang and Chen (2015) find that the inverted-U relations between financial development and income inequality in China. Furthermore, by using a regression-based inequality decomposition approach and data on China from 2006 to 2016, Lee et al. (2017) show that financial development is a crucial factor in regional inequality.

Scholars have investigated how urban–rural financial structure influences income inequality. For instance, from a macro perspective, Zhang and Chen (2015) point out that the URIG is gradually expanding due to the differential growth in income between urban and rural residents. Therefore, the urban–rural financial

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structure mechanism acting on the URIG is in line with the mechanism of the impact of financial development on income growth (Li et al., 2018). Theory shows that urban–rural financial structure mainly affects the income of urban and rural residents through the following channels.

The first channel is the resource allocation effect. The ability of financial development to integrate labor, capital, and other factors is an important part of this channel's function. Therefore, with the expansion of urban–rural financial structure, more financial resources are allocated to the urban sector, which promotes the growth of urban residents' income; the massive outflow of factors thus makes the income growth of rural residents more vulnerable. The second channel is the effect of technological innovation. Since technological innovation lies at the heart of economic development, the ability of financial development to promote technological innovation has become an essential consideration in the interpretation of financial functions. Technology innovation is a new source of income growth. The unbalanced development of urban–rural finance leads to innovative capital financing being mainly focused in the urban sector, with the opposite effect on the residents' income. The third channel is the effect of financing. Given a deteriorating urban–rural financial structure, rural residents are subject to credit constraints far higher than in the urban sector, as well as constraints due to the financing of production activities and human capital, thus limiting their income growth. The fourth channel involves transaction costs. As urban financial institutions continue to expand, the level of urban financial development continues to be high, which helps reduce the institutions' transaction costs, since innovative services launched by the financial sector mainly benefit urban residents. Therefore, overall, the imbalance between urban and rural financial development has completely different effects on the incomes of urban and rural residents, broadening the income gap between urban and rural areas (Wen et al., 2018).

III. DATA AND METHODOLOGY

A. Data Set

This paper focuses on the impact of financial structure on the URIG gap. Since the URIG is also affected by other factors, we control for these variables, presented below.

We use the urban–rural income gap (denoted by *Urgap*) as our dependent variable. Although there are many different inequality indicators, Cheong and Wu (2014) suggest that the most common is the Gini coefficient. Furthermore, previous studies attribute the increase in China's Gini index to urban–rural inequality (Wu and Perloff, 2005; Benjamín et al., 2007; Li, 2010). Su et al. (2015) point out that the URIG is a general indicator for analyzing income inequality in China, due to the dual structure in the transition period from planned economy to market economy. Hence, in line with Molero-Simarro (2017), we also use the URIG to capture income inequality in China, which is calculated by the proportion of the per capita income of urban residents to that of rural residents. The URIG is measured by the ratio of the per capita income of urban residents to that of rural residents. To eliminate the influence of inflation, urban and rural consumer price indexes are used to calculate

the real per capita income of urban and rural regions, respectively. A higher value of this indicator implies a greater income gap between urban and rural areas.

The independent variables involve financial structure. We use the following three indicators to measure regional financial structure. 1) Our financial scale (*Fir*) is similar to the measure of Lee et al. (2017), who calculate the proportion of the deposits and loan balance of local financial institutions to the regional gross domestic product (GDP) to capture the regional financial scale. 2) We measure the urban–rural financial structure (*Urf*) according to the method of Lu and Chen (2004), that is, as the ratio of urban loans to total urban–rural loans. Urban loans are then measured by subtracting agricultural loans from total amount of loans. A higher *Urf* value indicates more financial resources allocated to the urban sector. 3) Our third measure is the mismatch of financial resources (*Fm*). Since data on loans for the state-owned sector are difficult to obtain, we calculate the ratio of the financing costs of regional private enterprises to that of state-owned enterprises. This indicator indirectly reflects the proportion of state-owned sector financing. A higher degree of financial resource mismatch indicates a larger proportion of financing in the state sector.

We use the following explanatory variables in our analysis.

1. Urbanization (*Urban*). By applying of bootstrap panel Granger causality estimations, Su et al. (2015) suggest that urbanization does Granger-cause an URIG. Similarly, Lee et al. (2017) and Wu and Rao (2017) find that the promotion of urbanization expands the URIG. Following Wu and Rao, we use the proportion of the urban sector population to the total population, *Urban*, to capture the influence of urbanization on the URIG.

2. Industrial structure (*Ind*). This index is generally used to denote industrial structure in the literature and includes the proportion of the added value of the tertiary industry to the GDP, the proportion of the added value of the secondary industry to the GDP, and the ratio of the added value of the tertiary industry to that of the secondary industry (Cheong and Wu, 2014). Cheong and Wu (2014) point out that the uneven distribution of industrialization can greatly exacerbate regional disparity. In line with other studies, we calculate the ratio of the added value of the secondary industry to the total GDP in the province to capture industry structure. A higher score for this indicator means that the industrial structure is progressing toward the manufacturing industries.

3. Foreign direct investment, or FDI (*FDI*). In addition to promoting the inflow of technology and capital, FDI changes the host country's dependence on capital, labor, and other factors, which affects the proportion of each factor in the initial distribution, eventually exerting a significant influence on the URIG. Former research also provides evidence supporting this viewpoint. Lessmann (2014) points out that, during the earlier period after the economic reform in the 1980s in China, the increase in FDI led to greater income inequality, but this influence vanished—and perhaps even reversed—after the 1990s. Following Yu et al. (2011), we employ the proportion of regional FDI to the GDP to control for the potential influence of FDI on the URIG.

4. Infrastructure level (*Road*). Infrastructure, especially traffic facilities such as railways and roads, is an important factor in improving the mobility of

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materials between urban and rural sectors. As Calderón and Servén (2004) point out, better regional infrastructure facilitates the transfer of materials between urban and rural areas, which will narrow the URIG. Therefore, we calculate the regional infrastructure level by the regional road length per capita.

5. Economic development level (*Pergdp*). Kuznets (1955) claims that, as the level of economic development increases, the national income gap will first increase and then shrink. Furthermore, Benabou (1996) associates income inequality with growth and finds income inequality convergence in various countries. Therefore, our paper uses the real GDP per capita to measure the level of regional economic development.

6. Trade dependence (*Trade*). Previous research shows a U-shaped relation between trade dependence and the URIG (Wei and Zhao, 2012). However, on the contrary, Jalil (2012) states that the Kuznets curve fits the relations between openness and income equality in the case of China, implying an inverted U-shaped relation between trade and income inequality. Lin and Fu (2015) also point out that trade openness exerts a negative effect on income inequality in autocracies, while trade expansion has a positive effect on the Gini index in democratic countries. Unlike previous studies with nonlinear findings, however, Mah (2013) declares that trade openness positively affects income inequality. In line with the author, we therefore use the proportion of the regional trade balance to the GDP to proxy for regional trade dependence.

7. Financial expenditure intensity (*Govex*). According to Zhang and Chen (2015), the increase in fiscal expenditures and financial development widens the URIG in the short term, but eventually narrows it. Accordingly, we use the proportion of fiscal expenditures to regional fiscal revenue to measure the level of regional public expenditure.

In addition, it is worth noting that our paper uses the corresponding price index to calculate the actual values for all the nominal variables. The empirical testing uses the logarithms of all the variables. At the same time, to eliminate the influence of extreme values, the dependent variable is winsorized at the top and bottom percentiles.

The data are from the China Statistical Yearbook, the China Finance Yearbook, and the China City Statistical Yearbook and the China's economic and social development statistical database. After filtering and deleting observations missing values, we obtain a final balanced panel of data covering 31 provinces, autonomous regions, and municipalities in China from 2001 to 2016.

B. Methodology

We examine how financial structure affects the URIG by using the following measurement model:

$$Urgap_{it} = C + \alpha_1 F_{it} + \alpha_2 F_{it}^2 + \beta'X + \mu_i + \mu_t + \varepsilon_{it} \tag{1}$$

where the explanatory variable indicating the URIG is *F*, which is comprised of the financial scale (*Fir*), the financial urban–rural structure (*Urf*), and the financial resource mismatch (*Fm*), which is the square of the value of the financial structure variable; *X* stands for the other control variables; and *β* is the coefficient of the control variable. The Hausman test results support the use of a fixed effects model.[1] We use a two-way fixed effects model where μ_t represents year fixed effects and μ_i represents individual provinces' fixed effects. The term ε_{it} is the residual.

IV. MAIN FINDINGS

A. Statistical Features of Data

Table 1 provides statistical information on our variables. Table 1 shows that the variable *Urgap* has a minimum of 1.817, a maximum of 5.51, a mean of 3.437, and a median of 3.390. The distribution of *Urgap* shows a larger standard deviation, indicating large differences between the URIG between different provinces. It is worth noting that the mean of *Urgap* is higher than the median of *Urgap,* showing that this index exhibits a left skew and the income level of more than 50% of the provinces is lower than average. The minimum, maximum, mean, and median of *Fir, Urf,* and *Fm* are, respectively, 1.291, 7.376, 2.461, and 2.260; 0.510, 0.980, 0.712, and 0.729; and 0.133, 5.189, 1.134, and 1.121.

We now turn to the other explanatory variables. The minimum, maximum, mean, and median of *Urban,* for example, are 0.241, 0.903, 0.492, and 0.466, respectively, with a standard deviation of 0.143. This result implies that this variable fluctuates more, and that its differences between sample provinces are more distinct. The minimum, maximum, mean, and median of *FDI* are, respectively, 0, 0.152, 0.033, and 0.020, with a standard deviation of 0.019, meaning that *FDI* fluctuates less. The variable *Pergdp* has a mean of 2.704, with a standard deviation of 2.119, indicating large differences in *Pergdp* between the sample provinces.

Table 1.
Data Description

This table reports the detailed description of the variables in our study, which is obtained through STATA 14. Variable names appear in column 1; "N" in column 2 denotes the total number of observations, and the descriptive statistics follow.

Variable	N	Mean	Standard Deviation	Minimum	Maximum	Median
Urgap	496	3.437	0.741	1.8170	5.510	3.390
Fir	496	2.461	0.804	1.291	7.376	2.260
URF	217	0.712	0.127	0.510	0.980	0.729
Fm	496	1.134	0.518	0.133	5.189	1.121
Urban	496	0.492	0.143	0.241	0.903	0.466
IND	496	0.480	0.088	0.340	0.813	0.472
FDI	496	0.033	0.019	0	0.152	0.020
Road	496	2.050	1.180	0.450	10.37	1.700
Pergdp	496	2.704	2.119	0.281	10.84	2.076
Trade	496	0.310	0.390	0.0300	1.980	0.130
Govex	496	2.523	2.041	1.056	16.07	2.177

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[1] Due to space limitations, the results of the Hausman test are not tabulated here but are available from the authors.

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B. Panel OLS Results

We use provincial panel data and test the stationarity of variables by three methods: test provided by Levin et al. (2002) (denoted by LLC), test provided by Im et al. (2003) (denoted by IPS) and test of Harris and Tzavalis (1999) (denoted by HT). The results show that the variables follow I(1). Second, we carry out the cointegration test proposed by Pedroni (2004) to verify the long-term relations between financial structure and the URIG. Five of the seven statistics reject the null hypothesis and suggest a stable long-term relations between financial structure and the URIG.[2]

Table 2 provides the results of how the financial structure affects the URIG under the two-way panel fixed effects model. The dependent variable is the URIG (*Urgap*). In columns (1) to (3), the explanatory variable is the degree of financial development (*Fir*), the urban–rural financial structure (*Urf*), and the financial resource mismatch (*Fm*), respectively. After controlling for other factors and individual province and time effects, the coefficient of *Fir* in column (1) is 0.408 and significantly positive at the 1% level, while the coefficient of Fir^2 is -0.364 and significantly negative at the 5% level. This regression shows an inverted U-shaped relations between the financial scale and the URIG. In the early stage of financial development, the urban sector obtains more financial resources and has higher resource utilization efficiency, which expands the URIG. As the financial scale increases, more financial resources are invested in the rural sector, reducing the income gap between urban and rural areas.

We now further investigate the relations between the urban–rural financial structure and the URIG: the coefficient of *Urf* in column (2) is 0.156 and significantly positive at the 1% level, while the regression coefficient of Urf^2 is -0.099 and nonsignificant at the 10% level. This result shows a positive correlation between the urban–rural financial structure and the URIG. The greater the measure of the financial urban–rural structure, the more financial resources are allocated to the urban sector, widening the URIG.

Finally, we move on to the effect of financial resource mismatch on the URIG. The coefficient of *Fm* in column (3) is 0.057 and significantly positive at the 1% level; the coefficient of Fm^2 is -0.054 and significantly negative at the 10% level. This finding suggests an inverted U-shaped relations between financial resource mismatch and the URIG. When the degree of the financial resource mismatch is low, the increase in financial resources in the state-owned sector increases the sector's productivity of capital, promoting the profitability of capital in the urban sector and eventually widening the income gap between urban and rural areas. When the degree of financial resource mismatch is too high, resources are concentrated in the state sector, which reduces the allocation of capital and the productivity of the urban sector, decreasing the income gap between urban and rural areas.

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[2] Due to space limitations, the results of the panel unit root test or the Pedroni cointegration test are not tabulated here but are available from the authors.

Table 2.
Panel OLS Estimator for Full Sample

This table reports the results on the effect of financial structure on urban- rural income gap. The *t*-statistics are in parenthesis; 'Year' and 'Province' represents the individual fixed effect and time fixed effect, respectively; Finally, ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Independent Variable	Dependent Variable: *Urgap*		
	(1)	(2)	(3)
Fir	0.408***		
	(4.38)		
Fir²	-0.364**		
	(-2.31)		
URF		0.156***	
		(3.90)	
URF²		-0.099	
		(-1.56)	
Fm			0.057***
			(3.74)
Fm²			-0.054*
			(-1.75)
Urban	-0.164***	-0.061***	-0.022**
	(-2.73)	(-3.01)	(-2.29)
IND	-0.245***	-0.009***	-0.027**
	(-2.80)	(-3.23)	(-2.02)
FDI	-0.056	0.001	-0.007
	(-1.09)	(0.07)	(-0.91)
Road	0.039	0.022	0.007
	(0.69)	(1.20)	(0.79)
Pergdp	0.371***	0.141***	0.055***
	(4.89)	(5.44)	(4.36)
Trade	0.360***	0.137***	0.052***
	(5.20)	(5.71)	(4.49)
Govex	0.402***	0.149***	0.600***
	(5.83)	(6.20)	(5.03)
Year	yes	yes	yes
Province	yes	yes	yes
Cons	2.134***	0.903***	0.365***
	(4.12)	(3.81)	(4.44)
N	496	217	496
R²	0.238	0.540	0.737
F	9.472	11.957	7.110

C. Robustness Test
C1. New Index of the URIG

To verify the reliability of the benchmark results, this section changes the measure of the dependent variable and conducts a robustness test. Some use the Taylor index to calculate the URIG (Braithwaite and Braithwaite, 1980). To avoid the regression bias caused by the index, we calculate the Taylor index (*TL*) of the URIG and carry out a panel ordinary least squares estimation with fixed effects for robustness. The larger the value of *TL*, the larger the URIG. The regression results are shown in Table 3.

Table 3 displays the results of the relations between financial structure and the URIG, based on the two-way fixed effects model employing a new dependent variable, the URIG (*TL*). The explanatory variable in columns (1) to (3) is similar to that in Table 2. After controlling for other factors and the effects of individual

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provinces and time, we find the coefficient of *Fir* in column (1) is 0.055 and significantly positive at the 1% level; the regression coefficient of Fir^2 is found to be -0.069 and significantly negative at the 5% level. These findings provide evidence of an inverted U-shaped relations between financial development and the URIG. The coefficient of *Urf* in column (2) is 0.090 and significantly positive at the 1% level, while the regression coefficient of Urf^2 is -0.070 and nonsignificant at the 10% level. This result indicates that the urban–rural financial structure exerts a positive effect on the URIG. Finally, the coefficient of *Fm* in column (3) is 0.083 and significantly positive at the 5% level, while the coefficient of Fm^2 is -0.050 and significantly negative at the 5% level. This result supports an inverted U-shaped relations between financial resource mismatch and URIG. The results in Tables 2 and 3 are similar, which provides strong evidence of the reliability of the benchmark findings.

Table 3.
Robustness Test: New Measurement of Urban- Rural Income Gap

This table reports the results on the effect of financial structure on urban- rural income gap which is measured by the TL index. The *t*-statistics are in parenthesis; 'Year' and 'Province' represent the individual fixed effect and time fixed effect, respectively; Finally, ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Independent Variable	Dependent Variable: *TL*		
	(1)	(2)	(3)
Fir	0.055***		
	(3.10)		
Fir^2	-0.069**		
	(-2.16)		
URF		0.090***	
		(3.97)	
URF^2		-0.070	
		(-1.53)	
Fm			0.083**
			(2.21)
Fm^2			-0.050**
			(-2.15)
Urban	-2.682*	-2.297	-4.091***
	(-1.93)	(-1.53)	(-2.96)
IND	-4.155**	-2.569	-6.477***
	(-2.03)	(-1.29)	(-2.83)
FDI	-2.473**	-1.085	-2.346*
	(-2.30)	(-0.97)	(-1.67)
Road	-0.204	1.244	-0.835
	(-0.16)	(0.95)	(-0.60)
Pergdp	5.110***	4.751**	7.576***
	(2.90)	(2.47)	(3.82)
Trade	5.193***	5.173***	5.164*
	(3.26)	(2.91)	(1.84)
Govex	6.294***	5.995***	7.163***
	(4.03)	(3.35)	(4.70)
Year	yes	yes	yes
Province	yes	yes	yes
Cons	0.314***	0.305**	0.031
	(3.04)	(2.45)	(0.09)
N	496	217	496
R^2	0.631	0.735	0.313
F	7.563	6.703	7.048

C2. Endogeneity

Because the dependent and independent variables involve regional economic performance, endogeneity could exist between the variables. We employ an IV method and a 2SLS estimation method to address the influence of endogeneity on our empirical results. We select the first-order lag and the growth rate of the financial structure as the IVs of financial structure. Specifically, the first-order lag of *Fir* (denoted *L.Fir*) and the growth rate of *Fir* (denoted *Firr*) are employed as IVs of financial scale, while the first-order lag of *Urf* (*L. Urf*) and the growth rate of *Urf* (*Urfr*) are used as instrumental ariables for the urban–rural financial structure; the first-order lag of *Fm* (*L.Fm*) and the growth of *Fm* (*Fmr*) are included as IVs of financial scale.

The selection of IVs requires a validity check. In the IV–2SLS regression, we report the test of the IVs in the last rows of Table 4. First, the estimated values and *t*-values of the IVs in the first-stage regression are reported. The regression coefficients of the IVs are significantly positive, which indicates that the instrumental variables employed are significantly positively correlated with financial structure. Furthermore, the Cragg–Donald Wald statistic obtained from the weak instrumental variable test is very high, indicating no problem with weak instrumental variables. The *p*-value for over-recognizing the Hansen test results is very large, suggesting that we cannot reject the null hypothesis that the IVs are exogenous. These indicators show that the IVs we select are appropriate. Turning to the regression results in Table 4, we can see that the results in the various columns for the 2SLS instrumental variable regression are similar to the basic regression results in Table 2.

Table 4 reports the empirical results for the IV–2SLS estimation. The results for the dependent and independent variables for each column in Table 4 are consistent with those in Table 2. After controlling for the other factors and the fixed effects of provinces and time, we find the coefficient of *Fir* (in column (1)) to be 0.233 and significantly positive at the 1% level, while the coefficient of Fir^2 is -1.469 and significantly negative at the 1% level, implying an inverted U-shaped relations between financial development and the URIG. The coefficient of *Urf* (in column (2)) is 0.072 and significantly positive at the 1% level, while the coefficient of Urf^2 is -0.119 and nonsignificant at the 10% level. This result suggests that the urban–rural financial structure has a positive effect on the URIG. The coefficient of *Fm* (in column (3)) is 0.039 and significantly positive at the 1% level, while the coefficient of Fm^2 is -0.475 and negative at the 1% level. This result shows an inverted U-shaped relations between financial resource mismatch and the URIG. The regression results in Table 4 are similar to those in Table 2, verifying the reliability of the benchmark results.

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Table 4.
Robustness Test- IV- 2SLS Estimations

This table reports the results on the effect of financial structure on urban- rural income gap using the IV-2SLS. The *t*-statistics are in parenthesis; 'Year' and 'Province' represent the individual fixed effect and time fixed effect, respectively; The ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Moreover, to save space, we do not report the coefficient of control variable, which is available upon request.

Independent Variable	Dependent Variable: *Urgap*		
	(1)	(2)	(3)
Fir	0.233***		
	(12.56)		
Fir²	-1.469***		
	(-3.53)		
URF		0.072***	
		(15.36)	
URF²		-0.119	
		(-1.04)	
Fm			0.039***
			(9.97)
Fm²			-0.475***
			(-5.21)
N	465	186	465
R²	0.166	0.225	0.154
F	73.896	64.759	174.132
Firr	0.921*		
	(1.80)		
L.Fir	0.708**		
	(2.17)		
URFr		0.623**	
		(2.04)	
L.URF		0.715**	
		(2.21)	
Fmr			0.938*
			(1.74)
L.Fm			0.160***
			(9.09)
Cragg-Donald Wald F	127.66	137.31	114.65
Hansen-value	1.079	0.650	0.082
p-value	(0.299)	(0.420)	(0.774)

C3. Results for Sub- Samples

According to the previous empirical analysis, there is an inverted U-shaped relation between both financial scale and financial resource mismatch and the URIG, whereas the urban–rural financial structure exerts a positive effect on the URIG. However, the degree of market-oriented reform and financial development are not the same across different regions of China, so there are great differences in financial structure. Most previous studies split the full sample of Chinese provinces into three subsamples (i.e., eastern, central, and western regions) to determine the influence of a particular factor on income inequality. For instance, Yu et al., (2011) and Lessmann (2013) investigate the influence of FDI on income inequality for eastern, central, and western zones; Su et al. (2015) and Wu and Rao (2017) also examine the relations between urbanization and income inequality in these three regions. Is the effect of financial structure on the URIG then, consistent across different regions? By clarifying these issues, we can more specifically formulate policies to narrow the income gap between urban and rural areas.

For this purpose, in line with Cheong and Wu (2014), we construct three subsamples—the eastern, central, and western regions—to explore the impact of financial structure on the URIG among the different regions of the sample provinces. The three subsamples include 12, eight, and 11 individual provinces, respectively, for a period of 16 years. The three subsamples constitute long panel data. In the long panel data regression, the assumption of an independent and identical distribution of the perturbation terms can be relaxed. The comprehensive Feasible Generalized Least Squares (FGLS) method considers intra-group autocorrelation, inter-group heteroscedasticity, and contemporaneous correlation in long panel data regressions. We therefore regress the three subsamples, using comprehensive FGLS. The regression results are shown in Table 5.

First, we examine whether financial scale exerts different impacts on the URIG between the three subsamples. The coefficient of *Fir* in column (1) of Table 5 is 0.214 and significantly positive at the 1% level, while the coefficient of Fir^2 is -0.344 and significantly negative at the 1% level, indicating an inverted U-shaped relations between financial scale and the URIG in the eastern region. The results of columns (4) and (7) suggest that this relations also holds in the central and western regions. However, if we pay more attention to the absolute values of the coefficients, we find that the influence of financial scale on the URIG is greater in the eastern region than in the other two, and the positive effect of financial scale on the URIG also decreases less in the eastern region.

We further analyze the influence of urban–rural financial structure on the URIG. The coefficient of *Urf* in column (2) of Table 5 is 0.038 and significantly positive at the 1% level, while the coefficient of Urf^2 is -0.206 and nonsignificant at the 10% level, which means that the urban–rural financial structure exerts a positive impact on the URIG in the eastern region. Similar findings are obtained for the central and western regions, as shown in columns (5) and (8), respectively. Furthermore, when we compare the coefficient of *Urf* in columns (2), (5), and (8), we find that the positive effect of the urban–rural financial structure on the URIG is largest in the central region, while that in the western region is the smallest.

Finally, we turn to the effect of financial resource mismatch on the URIG. We find that the coefficient of *Fm*, in column (3) in Table 5, is 0.116 and significantly positive at the 1% level, while the coefficient of Fm^2 is -0.188 and significantly negative at the 1% level, indicating an inverted U-shaped relations between financial resource mismatch and the URIG in the eastern region. The results of columns (6) and (9) suggest that this relations between financial resource mismatch and the URIG also holds in the central and western regions. However, if we pay more attention to the absolute values of these coefficients, we find that the influence of financial resource mismatch on the URIG is greatest in the western region, and the positive effect of financial resource mismatch on the URIG also decreases more in the western region than in the other two regions.

Table 5.
Further Research for Three Sub- Samples

This table reports the results on the effect of financial structure on urban- rural income gap for three sub-samples. The Z-statistics is reported in parenthesis; 'Year' and 'Province' represent the individual fixed effect and time fixed effect, respectively; The ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Wald value provides the fitting effect of this model. Moreover, to save space, we do not report the coefficient of control variable, which is available upon request.

Independent variable	Dependent Variable: *Urgap*								
	(I) East			(II) Center			(III) West		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fir	0.214***			0.073***			0.035***		
	(12.39)			(16.76)			(9.53)		
Fir^2	-0.344***			-0.418***			-0.715***		
	(-3.91)			(-5.17)			(-3.24)		
URF		0.038***			0.041***			0.027***	
		(6.97)			(6.56)			(5.97)	
URF^2		-0.206			-0.616			0.696	
		(-0.88)			(-1.43)			(1.48)	
Fm			0.116***			0.166**			0.468***
			(3.44)			(2.53)			(3.18)
Fm^2			-0.188***			-0.374**			-0.549***
			(-4.76)			(-2.10)			(-8.64)
N	176	77	176	128	56	128	192	84	192
Wald	147.339	45.838	134.854	85.272	75.350	272.861	783.467	294.631	318.267

V. CONCLUDING REMARKS

In this paper, we construct an economic model based on China's economic double dual structure and theoretically analyze the relations between financial structure and the urban–rural income gap (URIG). After the theoretical analysis, we conduct empirical tests using the data of 31 provinces in China from 2001 to 2016 and employ such estimations as panel ordinary least squares, IV–2SLS, and FGLS. Specifically, we depict the financial structure along three dimensions: financial scale, the urban–rural financial structure, and the degree of financial mismatch. The results show an inverted U-shaped relations between financial scale and the URIG, as well as between financial resource mismatch and the URIG, and the urban–rural financial structure exerts a positive effect on the URIG. Finally, we split the total sample, by region, into three subsamples to explore the effect of financial structure on the URIG between different regions, employing comprehensive FGLS. The results show that, in the eastern, central, and western regions, the relations between financial structure and the URIG is consistent with that for the full sample. However, the influence of financial scale on the URIG is greatest in the eastern region, and the positive effect of financial scale on the URIG decreases less in the eastern region than in the other two regions. We find the urban–rural financial structure to have a positive effect on the URIG, and this effect is strongest in the central region, while that in the western region is the weakest. Finally, the influence of financial resource mismatch on the URIG is greatest in the western

region, and this positive effect decreases more in the western region than in the other two regions due to its lower financial development.

The findings of this paper offer several policy implications. First, expansion of the financial scale eventually narrows the income gap between urban and rural areas. Local governments should promote the improvement of the financial system and the development of the financial market, which can narrow the income gap between urban and rural areas. Second, easing the barriers of access to financial resources between urban and rural sectors will narrow the income gap between urban and rural areas. The government should improve the allocation of financial resources between urban and rural areas. To develop rural finance, barriers to accessing financial resources in the rural sector must be reduced, and financial institutions encouraged to provide more services to rural regions. By formulating preferential measures such as interest rates and tax rates, the flow of financial resources can be guided from the urban sector to the rural sector, increasing the proportion of rural financial resources and narrowing the income gap between urban and rural residents. Third, the government must promote the process of urbanization and break down its barriers. The urban–rural structure is the main cause of the inequality of resources, knowledge, learning ability, and opportunities between residents. Breaking the barriers to urbanization is conducive to the optimization of the allocation of financial resources among all residents, narrowing the urban–rural financial structure and thus reducing urban–rural income inequality.

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