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Does Digital Inclusive Finance Narrow the Urban-Rural Income Gap through Primary Distribution and Redistribution?

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Abstract: Excessive income gap (IG) between urban and rural areas harms the quality of economic development, and imbalanced primary distribution (PD) as well as redistribution (RD) are considered to be the main factors contributing to the urban–rural IG. Does digital Inclusive Finance (DIF) affect the urban–rural IG through PD and RD? This paper empirically studies the impact of digital inclusive finance on Chinese urban–rural IG from the perspectives of PD and RD respectively, through updated and comprehensive provincial data, using the method of mediating effect. The results show that DIF narrowed China's urban–rural IG with regional differences. Meanwhile, DIF also narrowed the urban-rural IGs in PD and RD, both with regional heterogeneity. Moreover, narrowing the urban–rural IG of PD exerted a mediating effect on the general urban–rural IG, while narrowing the urban–rural IG of RD did not. The results are helpful for DIF to better narrow urban–rural IG. Therefore, countermeasures are put forward for DIF to apply from the perspectives of PD and RD.

Keywords: digital inclusive finance (DIF); urban–rural income gap; primary distribution (PD); redistribution (RD); mediating effect model

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1. Introduction

After the reform and opening started, China's economy has grown rapidly, significantly raising the income level of residents but widening the excessive income gap (IG) between urban and rural areas. Although a series of measures have already been taken to narrow the IG between urban and rural areas, the urban–rural income ratio remained as high as 2.56 by the end of 2020. The excessive IG between urban and rural areas will not only aggravate social inequality but will also affect the high-quality development of China's economy. Therefore, how to effectively narrow the urban–rural IG along with the economic growth has attracted the attention of numerous scholars. Similar to Greenwood and Jovanovic, who brought finance into the income gap research framework for the first time [1], and to Beck et al., who pointed out that the allocation of financial resources has a great impact on the income gap [2–4], some scholars have carried out certain analyses and research from the perspective of finance. These literature can be classified from three types of finance: traditional finance, Inclusive Finance and digital inclusive finance (DIF), while their conclusions are very different among these different types.

Firstly, like the conclusions of many studies in other countries [5–9], most researchers found out that China's traditional finance had actually widened the IG between urban and rural areas [10–14]. Secondly, there were great differences among the conclusions on whether inclusive finance could narrow China's urban–rural IG. Xu and Zhang argued that inclusive finance could certainly narrow the urban–rural IG, but the effect was not obvious [15]. Li found that there was a U-shaped relationship between these two objects [16]. Some scholars also discovered that inclusive finance could significantly inhibit the expansion of urban–rural IG [17,18]. Thirdly, most researchers believed that DIF effectively narrowed the IG between urban and rural areas [19–23]. In this regard, Song argued

that DIF could serve more customers by extending the reaches, reducing the costs and enhancing the risk controls [24]. Based on micro data, Zhang et al. confirmed that DIF could promote inclusive growth and increase farmers' income more significantly [25]. Liu et al. also found that DIF can reduce rural poverty [26].

The above literature showed that DIF can significantly narrow the IG between urban and rural areas, compared with the traditional finance and inclusive finance. On this basis, some researchers further studied the mechanism. Li empirically analyzed the panel data of 31 provinces in China from 2011 to 2018 and found out that DIF narrowed the urban-rural IG by improving the human capital accumulation and promoting its upgrading [27]. Based on the data from 2011 to 2017, Zhang and Wu jointly disclosed that stimulating rural residents' entrepreneurship was an important mechanism for DIF to improve farmers' incomes and narrow the urban–rural IG [28]. Li et al. implemented the structural analysis from the perspectives of coverage breadth, use depth and digitization degree of DIF [29]. The results showed that China's DIF had narrowed the IG between urban and rural areas, mainly in terms of coverage and use depth. The discovery of these mechanisms is helpful to understand how DIF reduces the IG between urban and rural areas and provides policy implications. Some scholars have studied the effect of DIF on narrowing the IG between urban and rural areas from the perspective of spatial spillover [30,31]. However, these studies took the general urban–rural IG as the research object and lacked the corresponding structural analysis.

Different from the above, some scholars have studied the IG from the perspective of income structure [32,33], while they have not studied the impact of DIF on it. Combining DIF with income structure, Yu and Wang made an empirical analysis [34]. Using the data of 25 provinces in China from 2014 to 2018, they studied the impacts of DIF on urban–rural wage IG, operational IG, property IG and transfer IG respectively. The results showed that narrowing the wage IG, property IG and transfer IG played an intermediary role in mitigating the urban–rural IG. This study provides a structural perspective and helps to understand the influences of DIF from different IG structures.

To deal with the efficiency and fairness concerns of income distribution, it can be divided into primary distribution (PD) and redistribution (RD) according to the income distribution theory. The PD is based on the contributions of labor, capital, land, technology and other factors in production. The more contributions, the more incomes. RD refers to the process that the government regulates the distribution of income among subjects through taxation, policies, laws and other measures based on the PD. It is also the particular process of readjusting the PD. From this perspective, He et al. studied the impact of regional finance on residents' income inequality, and argued that both PD and RD were their impact paths [35]. However, the urban–rural IG was not discussed, and it was mainly from the perspectives of PD and RD, rather than from the PD IG and RD IG. In addition, Kong only discussed the impact of finance on the PD gap between urban and rural areas, but did not study the RD IG [36]. More importantly, they were both based on traditional finance rather than DIF.

Although the relationship between DIF and IG has been extensively discussed in the existing literature, there is still a lack of studies discussing the impact of DIF on urban–rural IG from the perspective of PD IG and RD IG. Therefore, this paper attempts to empirically study the impact of DIF on the urban–rural IG from the new perspective of PD IG and RD IG, which can enrich the research framework and research literature. At the same time, we use Chinese data for research, because China's DIF has developed rapidly in recent years and had a great impact in the international field. For example,, the "310" model developed by China's e-commerce bank has increased its ability to serve small and micro customers and rural customers, and has cooperated with hundreds of traditional banks to serve tens of millions of customers who found it difficult to obtain financial loans before. About 80% of WEBANK's loan customers have a college degree or below, and about 78% are engaged in the non-white-collar service industry or manufacturing industry. The main contributions of this paper are as follows: First, we analyze the mechanism of the effect of DIF on PD

IG as well as RD IG in rural and urban areas using Chinese provincial data. Second, we discuss the mediating effects of PD and RD in DIF in narrowing rural–urban IG. Third, we put forward some recommendations to promote the development of DIF and to enhance the role of DIF in narrowing rural–urban IG.

The subsequent content is arranged as follows: Section 2 introduces the logical mechanism and research hypotheses. Section 3 describes the data and main methods. Section 4 is the empirical results and Section 5 is conclusions and recommendations.

2. Logical Mechanism and Research Hypothesis

The fundamental reason why traditional finance aggravates the IG between urban and rural areas is that its development gathers in cities, which forms the Financial Exclusion to rural areas [37], resulting in the dual structure of finance between urban and rural areas and the inequality of financial services. Therefore, urban residents enjoy the benefits of financial development, while rural ones find it difficult to obtain similar opportunities. Inclusive Finance is an extension of the traditional financial model, which is also incompetent to solve the problem of unequal financial opportunities between urban and rural areas.

Different from the former two, DIF can serve rural areas because of its characteristics of convenience, technology and digitization. Firstly, DIF provides financial services through mobile networks and digital technologies, which reduces the marginal cost of services and lays the foundation to serve a wider range of rural areas. Secondly, the technical and digital characteristics of DIF increase the degree of information symmetry between financial institutions and rural customers, which facilitate to promote the achievement of financial services. Thirdly, DIF adds measures of risk control for financial institutions to grant financial loans to rural areas, which reduces their risk-taking and improves their service willingness. These can all alleviate the Financial Exclusion to rural areas, increase the urban–rural equality of financial services, enable farmers to enjoy similar benefits of financial development, increase farmers' income and narrow the IG between urban and rural areas in the end.

In addition, although DIF is developing rapidly in China, the regional imbalance in the speed and level of DIF development is equally prominent due to the serious imbalance in the economic, technological and informatization level of each region in China, which may lead to an imbalance in the effect of DIF on reducing urban–rural IG among different regions. Therefore, Hypothesis 1 is proposed as follows:

Hypothesis 1 (H1). *DIF helps to narrow the IG between urban and rural areas, but there is regional heterogeneity.*

The development of DIF has effectively increased the opportunities for labor, capital, land, technology and other production factors in rural areas to participate in the economic cycle, which can improve the PD income of farmers. First, the convenience of DIF can raise the employment opportunities for rural residents to participate into flexible occupations in their spare time and obtain the extra income. Second, the development of DIF has attracted more homecoming urban talents and rural residents to start their own businesses, which can also increase the income brought by rural labor force, land and other production factors. Third, DIF increases the farmers' opportunities for wealth management and correspondingly raises the benefits brought by managed investment. Under the development of traditional finance, it is difficult for rural areas to get these opportunities. Therefore, DIF can facilitate the improvement of the farmers' PD income and narrow the gap between urban and rural PD incomes. Simultaneously, the endowments and structures of production factors such as labor, capital, land and technology are different in various regions. Even under the same level of DIF developments, there may still be different impacts. Therefore, Hypothesis 2 is proposed as follows:

Hypothesis 2 (H2). *DIF helps to narrow the PD IG between urban and rural areas, and there is a regional heterogeneity.*

The development of DIF improves the government's ability to adjust the urban–rural IG through RD. First, the digital characteristics of DIF assist the government in designing the tax policies more accurately, help prevent high-income earners from evading taxes and increase the amount of redistributed funds. Second, DIF facilitates the government to more accurately implement poverty alleviation measures in rural areas and provide precise social security for the poor. In addition, it also increases the opportunities for rural residents to conveniently participate in and enjoy both endowment insurance and medical insurance. Meanwhile, the growth of DIF has also promoted the development of social mutual assistance and charity. Although it is not yet mature, it also facilitates increasing the ability of overall RD regulation. These all can increase the RD function of the government, and thereby help to narrow the IG between urban and rural areas. However, due to the different governance capabilities of governments in different regions, even at the same level of DIF, the impacts may be of regional heterogeneity. Therefore, Hypothesis 3 is proposed as follows:

Hypothesis 3 (H3). *DIF helps to narrow the RD IG between urban and rural areas, and there is a regional heterogeneity.*

Theoretically, narrowing the urban–rural PD IG or the urban–rural RD IG facilitates the narrowing of the urban–rural IG. However, different from the welfare states, China's modernization started late and remained in its infancy. This country does not only pursue the economic efficiency of income distribution, but also pays attention to the social equity of income distribution, which leads to a large proportion of the PD in the total income distribution. Therefore, the role of DIF in narrowing the IG between urban and rural PDs may be more obviously conducive to mitigating the IG between urban and rural regions, which is defined as the intermediary effect. The role of DIF in narrowing the IG between urban and rural RDs may not present such an intermediary effect. Therefore, Hypothesis 4 is proposed as follows:

Hypothesis 4 (H4). *Narrowing the IG between urban and rural PDs is the intermediary effect of DIF to mitigate the IG between urban and rural areas, but narrowing the IG between urban and rural RDs is not.*

According to the logical mechanism analyses and hypotheses above, the logical framework of DIF affecting the urban–rural IG, urban–rural PD IG and urban–rural RD IG respectively is shown in Figure 1.

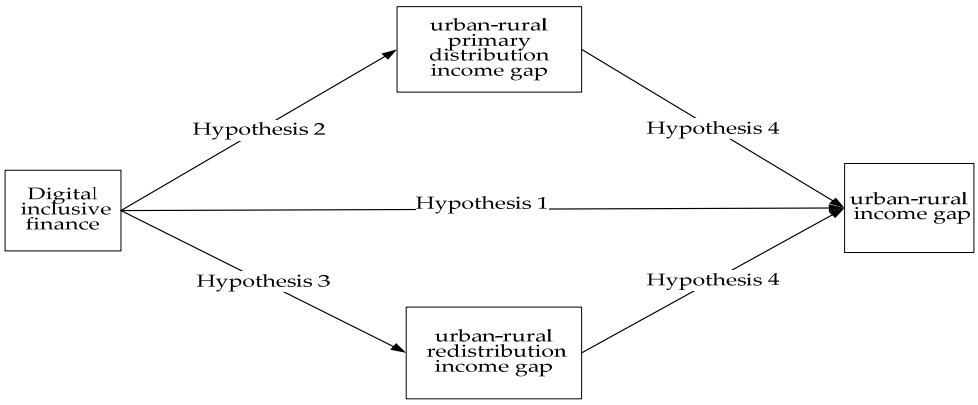

Figure 1. Logical framework.

3. Data and Methods

3.1. Variables Selection

The explained variable, intermediate variables, core explanatory variable and control variables are selected respectively as follows.

3.1.1. Explained Variable and Intermediate Variables

At present, the methods of measuring the urban–rural IG include the absolute gap method, the urban–rural income ratio method [38], the Gini coefficient method [39] and the Theil coefficient method [40]. Firstly, the absolute gap method can only observe the changes between the absolute gaps of urban–rural incomes, and it is difficult to apply this method to investigate the relative situation. Secondly, although the urban–rural income ratio can effectively measure the relative IG between urban and rural areas, it does not reflect the relevant influential factors of population. The Gini coefficient method is more applicable to measure the IG between multiple groups within the same area, but its ability to measure the IG between urban and rural areas is unsatisfactory. Therefore, the Theil coefficient is more applicable to measuring the IG between urban and rural areas. Therefore, this paper adopts the Theil coefficient method as the explained variable. The wider the IG between urban and rural areas is, the larger the value will be. The calculation formula of Theil coefficient method is as follows:

$$TheilGapit = \sum_{j=1}^{2} \left(\frac{I_{itj}}{I_{it}} \times ln \left(\frac{I_{itj}}{I_{it}} / \frac{P_{itj}}{P_{it}} \right) \right) \quad (1)$$

where I represents the per capita disposable income of households, P represents the number of permanent residents, i represents the provincial serial number, t represents the year, $j = 1$ represents the urban sector and $j = 2$ represents the rural sector respectively. When measuring the intermediate variable of urban–rural PD IG, I will be the per capita PD income of resident families, including per capita wage income, per capita operating income and per capita property income. When measuring the intermediate variable of urban–rural RD IG, I will be the per capita RD income of resident families, that is, per capita transfer income.

3.1.2. Core Explanatory Variable

In 2016, the Institute of Digital Finance of Peking University and the Research Institute of Ant Group jointly compiled the Peking University Digital Inclusive Finance Index of China (PKU-DIFIC), by using the big data of ant group on DIF which were updated in 2019 and 2021 respectively. The latest version of the big data includes the 2011–2020 DIF indexes which can measure the development of DIF in various regions well, and has been widely applied by scholars in recent years [41–43]. To keep consistent with other researchers, this paper also applies the index in 2021 as the core explanatory variable, with the latest update of data.

3.1.3. Control Variables

The control variables of this paper include the economic development variables, traditional finance variables, agricultural support policy variables, consumer price index (CPI) variables and other variables that reflect the IG between urban and rural areas.

Firstly, the relationship between IG and economic growth is inverted U-shaped according to the Kuznets hypothesis [44]. Therefore, this paper selects both per capita GDP and its square term as the control variables to measure the level of economic development. Because the difference in industrial structures also affects the IG between urban and rural areas, the proportion of agricultural GDP is also selected as the control variable to measure the industrial structure.

Secondly, the literature review shows that traditional finance evidently aggravated the IG between urban and rural areas. To compare with DIF, this paper selects per capita loan as the control variable to measure the development level of traditional finance.

Thirdly, the intensity of agricultural support policies is different in various regions. This type of policy is an important tool for the government to support agricultural development and rural revitalization, which facilitates narrowing the IG between urban and rural areas [45]. Therefore, this paper selects the individual proportions of agricultural, forestry and water fiscal expenditure as the control variables to measure the intensity of agricultural support policy.

Fourthly, when the CPI rises, the sales prices of agricultural products will turn higher, and the incomes of farmers will increase accordingly. Therefore, the CPI can reflect the sales incomes of farmers to a certain extent, before indicating the IG between urban and rural areas. Therefore, the CPI is also selected as the control variable.

In addition, the urban registered unemployment rate reflects the employment situation of the city. The higher the unemployment rate is, the slower the urban economic growth and the less income growth of urban residents there will be. Moreover, the illiteracy rate reflects the education levels of the population over the age of 15. Thanks to the abundant supply of educational resources in cities, this index can better reflect the value of rural human capital. The higher the value of rural human capital, the lower the IG between urban and rural areas. Therefore, this paper selects the urban registered unemployment rate and illiteracy rate as the control variables to measure urban employment and the value of rural human capital respectively.

3.2. Data Selection

The data of explanatory variables mainly comes from the Institute of Digital Finance of Peking University [46]. Except the data of traditional financial variables, which is from the Wind database, those of explained variable, intermediary variables and control variables are from the China Statistical Yearbook (CSY).

Since China adjusted the statistical standard of rural per capita disposable income in 2013 to maintain the data consistency, those from 2014 to 2020 are selected as the research range. A total of 31 provinces in China are selected as the research samples, including 11 in the eastern region, 8 in the central region and 12 in the western region respectively. The meaning and source of variables are shown in Table 1. The descriptive statistics of the major variables are shown in Table 2.

Table 1. Meaning and source of variables.

Variable	Implication/Definition	Data Source	Time Availability
TGap	Urban–rural income gap	CSY	2014–2020
TGap_pr	Urban–rural income gap of primary distribution	CSY	2014–2020
TGap_re	Urban–rural income gap of redistribution	CSY	2014–2020
DIF_index	Digital inclusive financial index	PKU-DIFIC	2014–2020
GDP_P	Per capita GDP	CSY	2014–2020
GDP_P2	Square term of per capita GDP	CSY	2014–2020
GDP_Str	Industrial structure	CSY	2014–2020
Loan_P	Development of traditional finance	Wind	2014–2020
Policy	Agricultural support policy	CSY	2014–2020
CPI	Consumer price index	CSY	2014–2020
Rate_unem	Registered urban unemployment rate	CSY	2014–2020
Rate_illiter	Illiteracy rate	CSY	2014–2020

Table 2. Descriptive statistics of major variables.

Variable	Observations	Mean	Std	Min	Max
TGap	217	8.467	3.638	1.830	17.81
TGap_pr	217	8.746	4.260	1.209	20.38
TGap_re	217	8.474	4.341	1.282	23.09
DIF_index	217	266.8	61.26	143.9	431.9
GDP_P	217	6.096	2.821	2.616	16.49
GDP_P2	217	45.08	47.44	6.846	271.9
GDP_Str	217	9.384	5.013	0.268	25.10
Loan_P	217	9.326	6.134	2.823	37.02
Policy	217	0.1180	0.0357	0.0411	0.2040
CPI	217	102.0	0.587	100.6	103.7
Rate_unem	217	3.206	0.634	1.300	5.300
Rate_illiter	217	5.862	6.146	0.890	41.12

3.3. Econometric Model

Firstly, Hypothesis 1 is tested as the impact of DIF on urban–rural IG. Through the tests of mixed data cross-section regression, time fixed-effect regression and individual fixed-effect regression respectively, it is found that individual fixed-effect regression can be the best choice for estimation. Its model is designed as follows:

$$TGap_{it} = \alpha_0 + \alpha_1 DIF\_index_{it} + \alpha_2 Z_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

where $TGap_{it}$ is the explained variable, representing the urban–rural IG in i province in t year, DIF_index_{it} represents the index of DIF in i province in t year, Z_{it} represents the control variables in i province in t year, μ_i represents the individual fixed effect and ε_{it} is the stochastic disturbance.

Secondly, both Hypothesis 2 and Hypothesis 3 are tested as the separate impacts of DIF on urban–rural IGs of PD and RD, and their model is designed as follows:

$$TGap\_pr_{it}/TGap\_re_{it} = \beta_0 + \beta_1 DIF\_index_{it} + \beta_2 Z_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

where $TGap\_pr_{it}$ and $TGap\_re_{it}$ are the explanatory variables, representing the urban–rural IG of PD and RD in i province in t year.

Thirdly, Hypothesis 4 is tested as the mediating effect. Apply $TGap\_pr_{it}$ and $TGap\_re_{it}$ as the mediating variables in the following model:

$$TGap_{it} = \lambda_0 + \lambda_1 DIF\_index_{it} + \lambda_2 TGap\_pr_{it}/TGap\_re_{it} + \lambda_3 Z_{it} + \mu_i + \varepsilon_{it} \quad (4)$$

If α_1, β_1 and λ_2 pass the significance test, and λ_1 does not, the mediating variable will show a complete mediating effect. If α_1, β_1, λ_1 and λ_2 all pass the significance test, the mediating variable will play a partial mediating effect which is valued as $\beta_1 * \lambda_2/\alpha_1$. If β_{12} does not pass the significance test, there will be no mediating effect at all.

4. Analysis of Empirical Results

4.1. Correlation and Model Setting Test

Before the regression analysis, in order to ensure the accuracy of the regression model, this paper carried out variable correlation analysis, multicollinearity analysis and a fixed effect model test.

Firstly, Table 3 gives the correlation matrix between the explained variable, intermediate variables, core explanatory variables and control variables. It can be seen that there is a significant negative correlation between DIF and urban–rural IG, urban–rural PD IG and urban–rural RD IG. At the same time, there is a significant positive correlation between urban–rural IG, urban–rural PD IG and urban–rural RD IG. In addition, most of the control variables have a significant correlation with the urban–rural IG.

Table 3. Correlation matrix of variables.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
TGap (1)	1											
TGap_pr (2)	0.969 *	1										
TGap_re (3)	0.320 *	0.119	1									
DIF_index (4)	−0.482 *	−0.416 *	−0.397 *	1								
GDP_P (5)	−0.746 *	−0.689 *	−0.379 *	0.607 *	1							
GDP_P2 (6)	−0.671 *	−0.619 *	−0.359 *	0.572 *	0.975 *	1						
GDP_Str (7)	0.515 *	0.452 *	0.289 *	−0.342 *	−0.731 *	−0.684 *	1					
CPI (8)	−0.161	−0.104	−0.252 *	0.443 *	0.175 *	0.137	−0.031	1				
Loan_P (9)	−0.609 *	−0.557 *	−0.366 *	0.611 *	0.889 *	0.912 *	−0.673 *	0.173	1			
Rate_unem (10)	−0.034	−0.104	0.157	−0.149	−0.168	−0.187 *	0.058	−0.145	−0.216 *	1		
Rate_illiter (11)	0.567 *	0.590 *	−0.054	−0.238 *	−0.304 *	−0.261 *	0.109	0.022	−0.137	−0.1	1	
Policy (12)	0.644 *	0.589 *	0.211 *	−0.277 *	−0.672 *	−0.627 *	0.675 *	−0.112	−0.523 *	0.112	0.387 *	1

Note: * shows significance at the 0.01 level.

Secondly, Table 4 shows the variance inflation factors (VIFs) of all explanatory variables and control variables. It can be seen that the Mean VIFs is 9.02, which mainly comes from per capita GDP and its square term, and the value of other control variables is relatively small. It means that there is no serious collinearity problem between explanatory variables and control variables.

Table 4. Variance inflation factors.

Variable	VIF	1/VIF
GDP_P	31.05	0.032209
GDP_P2	30.35	0.032948
Loan_P	7.53	0.132811
GDP_Str	3.21	0.311599
Policy	2.68	0.373027
DIF_index	2.35	0.425399
Rate_illiter	1.51	0.661471
CPI	1.39	0.720822
Rate_unem	1.11	0.897990
Mean VIFs	9.02	

Third, this paper uses Hausman test to judge whether the fixed effect model or the random effect model should be used. Table 5 shows the Hausman test results of fixed effect and random effect. The *p* value of the Hausman test is 0, indicating that the fixed effect model should be used.

Table 5. Hausman test of fixed effect.

	Fe	Re	Difference	Std. Err.
DIF_index	−0.0147	−0.0107	−0.004	0.0005
GDP_P	−0.6025	−0.8119	0.2094	0.0355
GDP_P2	0.0241	0.034	−0.0099	0.0017
GDP_Str	−0.2047	−0.1645	−0.0402	0.0071
CPI	−0.1571	−0.1465	−0.0106	0.0023
Loan_P	0.1653	0.0834	0.0819	0.0126
Rate_unem	−0.2611	−0.2072	−0.0539	0.0110
Rate_illiter	0.0710	0.0850	−0.0139	0.0098
Policy	−8.7089	−5.6713	−3.0376	0.3977
Test value	$chi^2 = 91.17$		Prob > $chi^2 = 0.0000$	

4.2. Estimation Results of Hypothesis 1

The clustering standard error is applied to solve the possible heteroscedasticity problem, and the regression analysis is implemented with model (2) by gradually increasing the control variables. Simultaneously, the regression analysis is conducted for different regions. Their results are shown in Table 6. Model 1 has only the explanatory variables, Model 2 adds the control variables of economic development and CPI, and Model 3 further adds the remaining control variables. These three regression results show that DIF facilitated narrowing the IG between urban and rural areas. Models 4–6 are the regressions of the eastern region, the central region and the western region respectively. The results show that in any region, DIF could effectively facilitate to narrow the urban–rural IG, but there was a regional heterogeneity. More importantly, in Models 1–6, DIF passed the significance test at the level of 1%. Simultaneously, the fitting values R-squared of the models were all high, indicating that the designed Model was reasonable. These major conclusions imply that Hypothesis 1 has been verified eventually.

Table 6. Estimation results of Hypothesis 1.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
DIF_index	−0.0122 ***	−0.0097 ***	−0.0147 ***	−0.0130 ***	−0.0059 **	−0.0229 ***
	(0.0012)	(0.0017)	(0.0019)	(0.0012)	(0.0018)	(0.0020)
GDP_P		−0.9260 ***	−0.6020 ***	−0.3710 ***	−1.8460 ***	−0.4440
		(0.1970)	(0.1350)	(0.0710)	(0.2120)	(0.3040)
GDP_P2		0.0443 ***	0.0241 ***	0.0137 ***	0.1480 ***	0.0050
		(0.0071)	(0.0059)	(0.0028)	(0.0199)	(0.0238)
GDP_Str		−0.2130 ***	−0.2050 ***	−0.1950 ***	−0.1160 ***	−0.2350 ***
		(0.0553)	(0.0476)	(0.0368)	(0.0226)	(0.0363)
CPI		−0.1080 **	−0.1570 ***	−0.1060 ***	−0.1830 **	−0.2200 **
		(0.0487)	(0.0490)	(0.0322)	(0.0721)	(0.0821)
Loan_p			0.1650 ***	0.1560 ***	0.0089	0.3220 ***
			(0.0380)	(0.0255)	(0.0533)	(0.0597)
Rate_unem			−0.2610 *	−0.5790 ***	0.0661	−0.5390 **
			(0.1300)	(0.1150)	(0.0690)	(0.2130)
Rate_illiter			0.0710 ***	0.1430 ***	0.1300	0.0405 ***
			(0.0240)	(0.0203)	(0.0738)	(0.0116)
Policy			−8.7090 **	2.0100	−0.6190	−7.7450 **
			(3.2220)	(1.7160)	(3.4490)	(3.3680)
Constant	11.720 ***	27.7400 ***	32.8400 ***	22.2500 ***	33.7300 ***	44.5800 ***
	(0.3290)	(4.8610)	(5.2360)	(2.9590)	(7.6710)	(8.8840)
Region	Overall	Overall	Overall	East	Central	West
Method	FE	FE	FE	FE	FE	FE
Observations	217	217	217	77	56	84
R-squared	0.695	0.829	0.870	0.934	0.943	0.929
Number of provinces	31	31	31	11	8	12

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, robust standard errors in parentheses.

Model 3 covering the whole country is adopted for further analysis. First, every additional unit of DIF was found to reduce the IG between urban and rural areas by 0.0147. Second, there was no inverted U-shaped relationship between the economic development and urban–rural IG, which might be related to China's development stage. The larger the proportion of agriculture in the economic structure was, the smaller the IG between urban and rural areas would be. Third, the traditional finance and illiteracy rate both widened the IG between urban and rural areas, while the CPI, urban registered unemployment rate and agricultural support policies all narrowed the IG between urban and rural areas. These results were the same as expected. Furthermore, all the variables passed the significance test.

4.3. Estimation Results of Hypothesis 2 and Hypothesis 3

The regression results of Hypothesis 2 with model (3) are shown in Table 7. Models 1–3 gradually increase the control variables, and Models 4–5 are the regression of different regions. Model 3 shows that DIF facilitated narrowing the PD IG between urban and rural areas, but Models 4–6 reveal that this effect was heterogeneous in different regions. The western region exhibited the largest effect, the eastern region presented a significant effect, but the central region did not. The results verified Hypothesis 2.

The regression results of Hypothesis 3 with model (3) are shown in Table 8. Models 1–3 gradually increase the control variables, and Models 4–5 are the regression of different regions. Model 3 shows that DIF assisted in narrowing the RD IG between urban and rural areas, but Models 4–6 reveal that this effect was also heterogeneous in different regions. The eastern region exhibited a significant effect, the central region and western region did not. The results verified Hypothesis 3.

Table 7. Estimation results of Hypothesis 2.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
DIF_index	−0.0108 ***	−0.0068 ***	−0.0131 ***	−0.0119 ***	−0.0016	−0.0256 ***
	(0.0015)	(0.0021)	(0.0031)	(0.0017)	(0.0022)	(0.0049)
GDP_P		−1.2930 ***	−0.8620 ***	−0.6620 ***	−2.8800 ***	−0.2870
		(0.2350)	(0.1930)	(0.1790)	(0.6300)	(0.6410)
GDP_P2		0.0577 ***	0.0325 ***	0.0247 **	0.2150 ***	−0.0289
		(0.0095)	(0.0088)	(0.0079)	(0.0599)	(0.0362)
GDP_Str		−0.2410 **	−0.2270 ***	−0.3270 ***	−0.1270 **	−0.2900 **
		(0.0937)	(0.0812)	(0.0846)	(0.0410)	(0.0983)
CPI		0.0160	−0.0321	−0.0902	0.0392	−0.0879
		(0.0658)	(0.0847)	(0.0617)	(0.1130)	(0.1680)
Loan_p			0.1980 ***	0.1640 ***	0.0237	0.4870 ***
			(0.0609)	(0.0411)	(0.0638)	(0.1240)
Rate_unem			−0.3720 *	−0.6260 ***	0.0596	−0.8520 **
			(0.1870)	(0.0956)	(0.0813)	(0.3100)
Rate_illiter			0.1350 ***	0.0721	0.1510	0.1550 ***
			(0.0391)	(0.0415)	(0.1320)	(0.0401)
Policy			−4.0160	2.5600	6.5000	−2.5910
			(4.1580)	(5.5430)	(9.4410)	(4.4580)
Constant	11.6200 ***	16.4700 **	20.4500 **	22.7700 ***	12.5800	31.2600
	(0.3880)	(6.9440)	(9.1010)	(6.7230)	(13.0500)	(18.2900)
Region	Overall	Overall	Overall	East	Central	West
Method	FE	FE	FE	FE	FE	FE
Observations	217	217	217	77	56	84
R-squared	0.520	0.685	0.739	0.840	0.793	0.851
Number of provinces	31	31	31	11	8	12

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, robust standard errors in parentheses.

Table 8. Estimation results of Hypothesis 3.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
DIF_index	−0.0217 ***	−0.0311 ***	−0.0277 ***	−0.0173 **	−0.0188	−0.0262
	(0.0036)	(0.0051)	(0.0090)	(0.0072)	(0.0134)	(0.0184)
GDP_P		1.4340 *	1.0420	−0.3200	3.7460	−0.9930
		(0.8090)	(0.6920)	(0.9230)	(2.0060)	(2.1520)
GDP_P2		−0.0381	−0.0224	0.0290	−0.1680	0.1070
		(0.0309)	(0.0293)	(0.0368)	(0.1950)	(0.1490)
GDP_Str		−0.1810	−0.2170	−0.0416	−0.1720	−0.1680
		(0.2310)	(0.2200)	(0.3560)	(0.2870)	(0.3190)
CPI		−0.7540 ***	−0.8050 ***	−0.7310 **	−1.0560 **	−0.6830
		(0.2260)	(0.1800)	(0.2910)	(0.3160)	(0.3950)
Loan_p			−0.0815	−0.1090	−0.9780	0.1450
			(0.1730)	(0.1130)	(0.5170)	(0.4310)
Rate_unem			0.2020	−0.9160 *	0.0197	0.1970
			(0.2820)	(0.4220)	(0.2800)	(0.8000)
Rate_illiter			−0.2920	0.4440 **	−0.7460	−0.3820 **
			(0.1810)	(0.1920)	(0.6500)	(0.1530)
Policy			−31.4600	−42.4000	−73.1000 *	−22.9000
			(19.3300)	(24.1900)	(38.5100)	(20.4200)
Constant	14.2700 ***	88.3700 ***	100.2000 ***	95.1000 **	125.9000 **	94.2600 *
	(0.9590)	(22.3500)	(19.2900)	(34.9000)	(38.6300)	(44.6600)
Region	Overall	Overall	Overall	East	Central	West
Method	FE	FE	FE	FE	FE	FE
Observations	217	217	217	77	56	84
R-squared	0.381	0.481	0.524	0.777	0.651	0.453
Number of provinces	31	31	31	11	8	12

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, robust standard errors in parentheses.

4.4. Estimation Results of Hypothesis 4

The regression results of Hypothesis 4 are shown in Table 9. Model 1 adopts model (2), Model 2 and Model 4 adopt Model (3), Model 3 and Model 5 adopt Model (4) respectively. The explained variable of Models 1–5 is the urban–rural IG, urban–rural PD IG, urban–rural IG, urban–rural RD IG and urban–rural IG respectively. The results show that the urban–rural PD IG has passed the significance test, and the urban–rural RD IG has not passed the significance test. The results of Model 1, Model 2 and Model 4 reveal that narrowing the urban–rural PD IG is the intermediary effect of DIF mitigating the urban–rural IG. The results of Model 1, Model 2 and Model 5 show that narrowing the urban–rural RD IG is not. Moreover, the intermediary role of narrowing the IG between urban and rural PD is 42.33%.

Table 9. Estimation results of Hypothesis 4.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
DIF_index	−0.0147 ***	−0.0131 ***	−0.0085 ***	−0.0277 ***	−0.0141 ***
	(0.0019)	(0.0031)	(0.0012)	(0.0090)	(0.0017)
TGap_pr			0.475 ***		
			(0.0711)		
TGap_re					0.0235
					(0.0301)
GDP_P	−0.6020 ***	−0.8620 ***	−0.1930	1.0420	−0.6270 ***
	(0.1350)	(0.1930)	(0.1330)	(0.6920)	(0.1330)
GDP_P2	0.0241 ***	0.0325 ***	0.0087	−0.0224	0.0247 ***
	(0.0059)	(0.0088)	(0.0058)	(0.0293)	(0.0058)
GDP_Str	−0.2050 ***	−0.2270 ***	−0.0970 ***	−0.2170	−0.2000 ***
	(0.0476)	(0.0812)	(0.0246)	(0.2200)	(0.0469)
CPI	−0.1570 ***	−0.0321	−0.1420 ***	−0.8050 ***	−0.1380 ***
	(0.0490)	(0.0847)	(0.0232)	(0.1800)	(0.0484)
Loan_p	0.1650 ***	0.1980 ***	0.0712 ***	−0.0815	0.1670 ***
	(0.0380)	(0.0609)	(0.0258)	(0.1730)	(0.0380)
Rate_unem	−0.2610 *	−0.3720 *	−0.0846	0.2020	−0.2660 *
	(0.1300)	(0.1870)	(0.0638)	(0.2820)	(0.1310)
Rate_illiter	0.0710 ***	0.1350 ***	0.0068	−0.2920	0.0779 ***
	(0.0240)	(0.0391)	(0.0291)	(0.1810)	(0.0201)
Policy	−8.7090 **	−4.0160	−6.8020 **	−31.4600	−7.9710 **
	(3.2220)	(4.1580)	(3.0470)	(19.3300)	(3.0210)
Constant	32.8400 ***	20.4500 **	23.1300 ***	100.2000 ***	30.4900 ***
	(5.2360)	(9.1010)	(3.0000)	(19.2900)	(5.1050)
Region	Overall	Overall	Overall	Overall	Overall
Method	FE	FE	FE	FE	FE
Observations	217	217	217	217	217
R-squared	0.870	0.739	0.932	0.524	0.872
Number of provinces	31	31	31	31	31

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, robust standard errors in parentheses.

4.5. Robustness Analysis

Considering the possible endogenous problems, this method is regarded as effective by applying the lag first order of DIF as the instrumental variables. This paper also passed the unrecognizable test, weak instrumental variable test and over-identification test respectively.

First, based on the first-stage regression, the mediation effect is verified again, and the results are shown in Models 1–5 of Table 10. The explained variable of Models 1–5 is the urban–rural IG, urban–rural PD IG, urban–rural IG, urban–rural RD IG and urban–rural IG respectively. The results of Model 1, Model 2 and Model 4 reveal that narrowing the urban–rural PD IG is the intermediary effect of DIF mitigating the urban–rural IG. The results of Model 1, Model 2 and Model 5 show that narrowing the urban–rural RD IG is not. The results reveal that the effects of DIF on narrowing the urban–rural IG, the urban–rural PD IG and the urban–rural RD IG are all stable. The partial mediating effect

of the urban–rural PD IG and the non-mediating effect of the urban–rural RD IG are both robust. This shows that the endogenous problem has little impact on the research results of this paper, which is consistent with the research conclusions of Yin et al. [47].

Table 10. Robustness of mediating effects.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
DIF_index	−0.0205 ***	−0.0162 ***	−0.0152 ***	−0.0523 ***	−0.0198 ***
	(0.0022)	(0.0034)	(0.0021)	(0.0116)	(0.0025)
TGap_pr			0.3280 ***		
			(0.0472)		
TGap_re					0.0130
					(0.0166)
GDP_P	−0.3710 ***	−0.6500 ***	−0.1580	1.5280 **	−0.3910 ***
	(0.1370)	(0.2080)	(0.1090)	(0.7090)	(0.1400)
GDP_P2	0.0156 ***	0.0246 ***	0.0076	−0.0413	0.0161 ***
	(0.0061)	(0.0092)	(0.0048)	(0.0312)	(0.0061)
GDP_Str	−0.1980 ***	−0.2320 ***	−0.1220 ***	−0.1350	−0.1970 ***
	(0.0259)	(0.0393)	(0.0234)	(0.1340)	(0.0257)
CPI	−0.0476	0.0085	−0.0504	−0.2560	−0.0443
	(0.0537)	(0.0815)	(0.0429)	(0.2770)	(0.0531)
Loan_p	0.2220 ***	0.2250 ***	0.1490 ***	0.2200	0.2190 ***
	(0.0412)	(0.0625)	(0.0368)	(0.2130)	(0.0412)
Rate_unem	−0.2600 ***	−0.3370 ***	−0.1490 ***	0.0061	−0.2600 ***
	(0.0662)	(0.1000)	(0.0561)	(0.3420)	(0.0655)
Rate_illiter	0.0682 ***	0.1420 ***	0.0216	−0.3660 ***	0.0729 ***
	(0.0246)	(0.0373)	(0.0206)	(0.1270)	(0.0251)
Policy	−12.7000 ***	−9.3270 ***	−9.6430 ***	−28.3400 ***	−12.3300 ***
	(2.0810)	(3.1580)	(1.73100)	(10.7400)	(2.1160)
Region	Overall	Overall	Overall	Overall	Overall
Method	IV	IV	IV	IV	IV
Observations	186	186	186	186	186
R-squared	0.880	0.739	0.924	0.476	0.883
Number of provinces	31	31	31	31	31

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, robust standard errors in parentheses.

Second, this paper also tested the regional differences of DIF in narrowing the urban–rural IG, the regional heterogeneity of DIF in narrowing the urban–rural PD IG, and the regional heterogeneity of DIF in narrowing the urban–rural RD IG. The results are listed in Table 11. The explained variable of Model 1–3 is the urban–rural IG, the explained variable of Model 4–6 is the urban–rural PD IG and the explained variable of Model 7–9 is the urban–rural RD IG respectively. The results show that regional heterogeneity still exists.

Table 11. Robustness of regional differences and heterogeneities.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
DIF_index	−0.0170 ***	−0.0005	−0.0023 ***	−0.0112 ***	0.0101 *	−0.0384 ***	−0.0443 ***	−0.1060 ***	−0.0265
	(0.0022)	(0.0004)	(0.0006)	(0.0027)	(0.0059)	(0.0067)	(0.0105)	(0.0327)	(0.0236)
GDP_P	−0.3720 ***	−0.1790 ***	−0.0016	−0.7270 ***	−2.7890 ***	0.6710	−0.3070	5.2040 *	−1.5150
	(0.1240)	(0.0364)	(0.0640)	(0.1490)	(0.4850)	(0.7800)	(0.5800)	(2.6770)	(2.7280)
GDP_P2	0.0131 **	0.0141 ***	−0.0014	0.0270 ***	0.2050 ***	−0.0755	0.0280	−0.2720	0.1370
	(0.0051)	(0.0031)	(0.0049)	(0.0061)	(0.0420)	(0.0592)	(0.0240)	(0.2320)	(0.2070)
GDP_Str	−0.2940 ***	−0.0211 ***	−0.0299 ***	−0.3940 ***	−0.1140 ***	−0.2530 ***	−0.1840	−0.3270	−0.0736
	(0.0559)	(0.0031)	(0.0071)	(0.0669)	(0.0415)	(0.0863)	(0.2610)	(0.2290)	(0.3020)
CPI	−0.0649	−0.0156	−0.0018	−0.0920 *	−0.1260	0.0669	−0.3790 *	0.4070	−0.2790
	(0.0464)	(0.0095)	(0.0115)	(0.0555)	(0.1270)	(0.1410)	(0.2170)	(0.7020)	(0.4920)
Loan_p	0.2080 ***	0.0054	0.0222 *	0.1470 ***	−0.2780	0.5890 ***	0.2180	0.9060	−0.0411
	(0.0356)	(0.0147)	(0.0126)	(0.0426)	(0.1960)	(0.1540)	(0.1660)	(1.0810)	(0.5380)
Rate_unem	−0.6280 ***	0.0006	−0.0615 ***	−0.6230 ***	0.1320	−0.7680 ***	−1.2710 ***	−0.5530	0.1440
	(0.0966)	(0.0072)	(0.0183)	(0.1160)	(0.0960)	(0.2230)	(0.4510)	(0.5300)	(0.7800)
Rate_illiter	0.1370 ***	0.0176 *	0.0019	0.0778 *	0.1400	0.1400 ***	0.2580 *	−0.7930	−0.4470 **
	(0.0333)	(0.0093)	(0.0042)	(0.0399)	(0.1240)	(0.0511)	(0.1560)	(0.6840)	(0.1790)
Policy	−0.2860	−0.9920 **	−0.9540 **	2.7250	5.3120	−7.0490	−65.8600 ***	−112.4000 ***	−14.2300
	(3.3500)	(0.4990)	(0.4450)	(4.0070)	(6.6610)	(5.4260)	(15.6600)	(36.7500)	(18.9800)
Region	East	Central	West	East	Central	West	East	Central	West
Method	IV	IV	IV	IV	IV	IV	IV	IV	IV
Observations	66	48	72	66	48	72	66	48	72
R-squared	0.899	0.884	0.851	0.812	0.791	0.849	0.814	0.550	0.388
Number of provinces	11	8	12	11	8	12	11	8	12

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, robust standard errors in parentheses.

5. Discussion

The empirical and robustness test results show that DIF facilitated narrowing the IG between urban and rural areas, the IG between urban and rural PDs and the IG between urban and rural RDs respectively, all of which were of the regional heterogeneity. In addition, narrowing the urban–rural PD IG was recognized as the intermediary effect of DIF mitigating the urban–rural IG, but narrowing the urban–rural RD IG was not. Therefore, Hypotheses 1–4 proposed in this paper have already been verified.

5.1. DIF's Narrowing Urban–Rural IG and Suggestion

Comparative results are presented in Table 6. Traditional finance exacerbates the urban–rural IG. On the contrary, DIF helps to narrow the urban–rural IG. These two conclusions further verify the effects of traditional finance [10–14] and DIF [19–23] on the urban–rural IG. It means that the DIF has shown different characteristics from traditional finance and Inclusive Finance, which has helped to alleviate the urban–rural imbalance of financial development under the dual economic structure, mitigate the rural financial exclusion and enable the rural areas to enjoy more comprehensive financial services than before. Since 2005, the world bank has been trying to promote the development of Inclusive Finance to grant the poor and weak groups more access to quality financial services. However, the commercial sustainability of Inclusive Finance has been insufficient, therefore the effect achieved over the years was not obvious. On the contrary, DIF can effectively solve this problem and improve the willingness and ability of financial institutions to serve the rural areas, which may also be one of the reasons for the rapid development of Digital Inclusive Finance in China [48].

However, it is worth noting that the role of DIF in narrowing the income gap between urban and rural areas has regional differences. On the one hand, this has reflected the unbalanced development of DIF in different regions [49]. In 2020, the highest DIF index was 431.93 in Shanghai and the lowest was 298.23 in Qinghai. However, due to the limited development time and the high spillover effect of DIF at present, this problem is expected to acquire a better solution during future development. The average value of China's DIF index was 40 in 2011 and 341 in 2020, with an increase of 752.5% over the past decade. On the other hand, the inequality of regional IG has also been one of the reasons. In 2020, the standard deviation of urban per capita income among 31 provinces was about $1706, and that in rural areas was $894. Within the incomes of urban residents, the largest gap was $6591 between Shanghai the highest and Heilongjiang the lowest. Within the incomes of rural residents, the largest gap was $3768 between the highest Shanghai and the lowest Gansu. Nevertheless, the unbalanced development of digital Inclusive Finance is still noteworthy. Zhao's research shows that different development levels of DIF may have different effects on the IG between urban and rural areas [50].

Therefore, efforts should be made to solve the unbalanced development of DIF. On the one hand, financial institutions, including banks, trusts, insurance and fund companies, should further strengthen the development of digital transformation and improve their comprehensive abilities to better serve both long-tail rural customers. Local financial institutions should seize the opportunity of digital development to provide the differentiated services for customers within the particular regions and meet the rightful needs from different farmers. On the other hand, government departments should increase the implementation of new infrastructures in the backward areas and rural areas, especially from the domains of 5G-communication, big data center and artificial intelligence. These would provide a solid foundation for the further development of DIF in these areas. Additionally, popularizing the knowledge of DIF and improving the coverage and depth of smartphone uses in the rural areas should also be the main tasks of local governments. They should actively mobilize the market and social forces to provide professional training to farmers, and to increase the farmers' ability to apply DIF for obtaining necessary financial services.

5.2. DIF's Narrowing Urban–Rural PD IG and Suggestion

He et al. [35] discussed the impact of traditional finance on residents' IG through PD, while Kong [36] only discussed the impact of traditional finance on urban–rural PD IG. Different from them, this paper further discussed the impact of DIF on urban–rural PD IG and its intermediary role. The results in Table 6 show that DIF helps to narrow the PD IG between urban and rural areas, and the results in Table 8 show that this narrowing effect has an intermediary effect on the narrowing of urban–rural IG. This means that DIF can promote rural production factors to participate more in economic development, and then narrow the urban–rural PD IG and urban–rural IG. However, DIF's narrowing urban–rural PD IG has regional heterogeneity, which affects the better play of the intermediary effect.

Therefore, it is necessary to promote the integration of DIF and rural revitalization strategies to further enhance the role of DIF in stimulating rural PD income. The key to the implementation of the Rural Revitalization Strategy is to encourage more engagement of production factors from rural areas, including labor, capital and land, into the economic development and circulation for the purpose of fully promoting the integrated developments of three industries in rural areas. During this process, DIF should provide more extensive, convenient, accurate and efficient financial services, including payments and settlements, credit products, insurance, futures, funds, etc., covering as many fields of rural development as possible. Especially in terms of differentiated credit products, financial institutions should provide farmers with credits of agricultural supply chain, cooperative credits and credits of short-term working capital through DIF in coordination with various agricultural characteristics in different regions.

5.3. DIF's Narrowing Urban-Rural RD IG and Suggestion

He et al. [35] discussed the impact of traditional finance on residents' IG through RD. Different from them, this paper further discussed the impact of DIF on urban–rural RD IG and its intermediary role. The results in Table 7 show that DIF helps to narrow the RD IG between urban and rural areas, but the results in Table 8 show that this narrowing effect does not have an intermediary effect on the narrowing of urban–rural IG, which is different from the role of PD IG. The reasons for the poor integration of RD and DIF may have mainly come from the following two aspects. On the one hand, the proportions of redistributed income were relatively low, only 18.96% in cities and 18.89% in rural areas. Therefore, there has been little room for DIF to take effect. On the other hand, local governments in different regions had different governance capabilities. Some might not be good at seizing the opportunities brought by DIF to enhance their RD capacities. Meanwhile, DIF's narrowing urban–rural RD IG also has regional heterogeneity.

Therefore, measures should be taken to promote the integrated development of governance capacity and DIF to further exert the effect of DIF on improving the rural RD income. On the one hand, through DIF and big data analysis, tax evasion by high-income earners can be further prevented, especially by intelligent judgments on illegal incomes, to increase the government's disposable funds and enhance the market vitality. On the other hand, the low-income and poor groups in rural areas can be easily identified through DIF, while social security and supportive resources can be allocated to such groups more accurately and efficiently. In addition, with the help of the technology and digital characteristics of DIF, farmers' willingness can also be improved to participate in endowment insurance and medical insurance, and the safeguard ability of endowment insurance and medical insurance can be strengthened for the rural residents. These measures will facilitate to enhance the role of DIF in RD and improve the farmers' RD income.

6. Conclusions

6.1. Main Work and Conclusions

Firstly, this paper combs the existing literature from three perspectives: traditional finance, Inclusive Finance and DIF, which lays a foundation for raising the research problems of this paper. Secondly, through the analysis of logical mechanism, four research hypotheses

and logical frameworks are established. Third, through empirical research and robustness testing on the data of 31 provinces in China from 2014 to 2018, four research hypotheses are tested. The results show that DIF helps to narrow the urban–rural IG, the urban–rural PD IG and the urban–rural RD IG, but it has regional heterogeneity. In addition, PD IG plays an intermediary role in narrowing the urban–rural IG, but RD IG does not. Finally, based on the empirical results, this paper discusses and gives corresponding suggestions.

6.2. Practical Implications

Firstly, the conclusion of this paper provides theoretical support and empirical tests for further playing the role of DIF in narrowing the urban–rural IG from the PD and RD. In particular, by addressing the imbalance in the development of DIF and promoting the integration of DIF and RD, China can further narrow the urban–rural IG, which can help promote the implementation of China's common prosperity officially proposed in recent years. Secondly, the theory and practice of China's DIF narrowing the urban–rural IG, the urban–rural PD IG and the urban–rural RD IG can provide reference for other developing countries to narrow the income gap, and the research of this paper provides support for this.

6.3. Future Research Directions

This paper studied the mechanism of DIF narrowing the urban–rural IG from novel perspectives, that is, PD and RD, which is helpful to further understand the advantages of the DIF development in narrowing the IG. However, due to China's vast territory, considerable regional differences and large IG between different regions, does DIF still exert a significant effect on narrowing the regional IG? The follow-up research on this issue will further explore the role of DIF in narrowing the IG.

More importantly, the theory of income distribution has recently developed from PD and RD to the third distribution. At present, the third distribution has not been taken into account by the official statistics. Soon, micro survey data can be adopted to further explore the impact of DIF on the third distribution and the role of urban–rural IG. This will be a very meaningful topic and will facilitate the building of a theoretical framework of DIF and the three distributions.

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