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The Impact of Digital Financial Inclusion on Urban and Rural Citizens' Consumption in Zhejiang Province

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Abstract: In order to create a harmonized society, it is important to reduce the urban-rural consumption disparity. Digital financial inclusion plays a major role in weakening the rural-urban consumption gaps and promoting common prosperity. Zhejiang Province is located in southeastern China, with a large population and developed economy. For the past few years, moreover, its rapid growth in the field of digital economy has enabled it to lay a deep foundation for the growth of digital financial inclusion. This paper explores the influence of the current growth of digital inclusive finance on the consumption of urban and rural residents in Zhejiang Province by selecting each city's panel data at the prefecture level in Zhejiang Province during the period of 2011-2021.Results displayed: firstly, as digital financial inclusion grows in Zhejiang, both rural and urban consumers will benefit from it;Secondly, the growth of digital financial inclusion will have a more remarkable effect on the consumption of rural residents than that of urban residents, i.e., urban-rural consumption disparities in Zhejiang Province can be narrowed by digital financial inclusion.

Keywords: digital financial inclusion, urban and rural consumption, fixed effects model

1. Introduction

In recent years, the global economic situation has been complicated and recessionary, the Sino-US trade war is escalating, the new crown epidemic has stumbled repeatedly, and the Russia-Ukraine war has continued, which has had a significant impact on China's economy, and at present China's economic development is faced with the triple pressure of demand contraction, supply disturbances, and expectation weakening. Consumption as one of the troika constituting aggregate demand, as the ultimate goal of economic growth, China's consumption growth has slowed down significantly since 2020, and even encountered the first negative growth since the reform and opening up, the problem of sluggish consumption has become more prominent. In addition to this, the problem of a large urban-rural consumption disparity has always existed. In 2021, the resolution of the National People's Congress pointed out that it is necessary to in-depth implementation of the strategy of expanding domestic demand, accelerate the cultivation of the domestic demand system, build a strong domestic market with strong consumer demand, realize the increase in the volume of residents' consumption, and upgrade the consumption structure.

Digital financial inclusion refers to the combination of digitalization and traditional finance, and is characterized by "low-cost", "broad coverage" and "sustainability"[1]. Its features of "low cost", "wide coverage" and "sustainability" can effectively accelerate the sharing of information resources,

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reduce the threshold of financial transactions and the transaction cost of financial dealings, provide financial services to a broader audience, and meet the production and investment needs of small and medium enterprises, special groups and poor groups [2]. Therefore, digital financial inclusion is of great meaning in promoting rural revitalization, narrowing the urban-rural disparity, and realizing common prosperity. In the report of the 18th National Congress, it is pointed out that we should vigorously develop inclusive finance, and inclusive finance has become a necessary way for China to realize the goal of "building a moderately prosperous society". In 2016,China put forward the use of digital information technology, which is a new tool, to promote the growth of digital financial inclusion at the G20 Summit. At Digital Financial Inclusion Summit held in November 2020, the industry's view on "digitization" was widely recognized, and it is believed that digital financial inclusion will be the main direction for the growth of inclusive finance.

Meanwhile, Zhejiang Province is the first place of digital economy, and the first province in China to put forward common prosperity [3]. Therefore, it is of certain meaning to research the effect of China's digital financial inclusion on the consumption of urban and rural citizens by taking Zhejiang Province as an example.

2. Literature Review

China's imbalanced urban-rural development has become an important constraint on its balanced economic development. Urban-rural consumption disparity is one of the concrete manifestations of the urban-rural disparity. Digital financial inclusion, as a product of the combination of the digital economy and inclusive finance, has had an active influence in promoting inclusive finance to expand coverage, reduce costs and improve quality, which is benifit to promoting the development of rural areas [4].

At present, many scholars have explored such topics as digital financial inclusion and how digital financial inclusion affects residents' consumption. Xiao Peiwen use the panel threshold model and finds that the urban-rural income gap can be narrowed by digital financial inclusion[5].Wang Wenjing et al. discusses the impact of DIF on regional economic growth and development driven by innovation[6].Yu Chuanjiang et al. explored the link between the digital financial inclusion index and the consumption structure of rural residents and found that it facilitates the upgrading of the consumption structure of agricultural residents[7].Zhang Xiaofeng find that digital financial inclusion helps to narrow the gap between regional economic development through individual fixed effects modeling[8]. Shi Xiuli found that the development of digital finance has a greater impact on the residents of the western region and rural areas, and is conducive to closing the gap[9].

According to a literature review, digital financial inclusion has an obvious influence on rural and urban citizens' consumption, while research with Zhejiang Province as the study area is relatively rare. At the same time, in China, Zhejiang Province is the first province to propose common wealth, and its digital financial inclusion is in the leading position in the development of China. The study takes Zhejiang Province as an example of how digital financial inclusion affects consumption by urban and rural citizens.

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3. Empirical analysis

3.1. Variable description

Table 1: Variable description

variant	variable name	notation	clarification
explanatory variable	Level of urban residents	LNUC	Consumption expenditure of urban residents
	Rural population level	LNRC	Consumption expenditure of rural inhabitants
	urban and rural citizens' consumption ratio	URR	urban citizens' consumption expenditure/ rural citizens'consumption expenditure
explanatory variable	Level of development of digital financial inclusion	LNINDEX	Digital Inclusive Finance Index
control variable	Transportation development	LNROAD	Road mileage
	urbanization level (of a city or town)	CITY	urbanization rate
	financial expenditure	LNFIN	Amount of financial expenditure
	Level of economic development	LNGDP	gross domestic product (GDP)
	industrial structure	IS	Percentage of tertiary sector

3.2. Assumptions and model construction

3.2.1. Assumptions

Generally speaking, digital financial development at a higher level is more favorable to residents' consumption, and also can reduce the urban-rural consumption disparity, for which the following hypotheses are proposed:

（1）The horizontal of digital financial inclusion development positively contributes to consumption growth in both urban and rural;

（2）The horizontal of growth of digital financial inclusion has a positive contribution to the narrowing of the urban-rural consumption disparity.

3.2.2. Modeling

As explanatory variables, the digital inclusive financial index is used to explain the consumption level and ratio level of urban and rural citizens, and the level of urbanization, structure of industry, fical expenditure and economic growth level and regional transportation status as the control variables for regression[10], and in order to minimize the error of the model, then the least squares method (OLS) is used for regression to construct the overall regression model as follows:

$$LNUC_{it} = \alpha + \beta_1 * LNINDEX_{it} + \beta_2 * LNROAD_{it} + \beta_3 * CITY_{it} + \beta_4 * LNFIN_{it} + \beta_5 * LNGDP_{it} + \beta_6 IS + \varepsilon_{it} \quad (1)$$

$$LNRC_{it} = \alpha + \beta_1 * LNINDEX_{it} + \beta_2 * LNROAD_{it} + \beta_3 * CITY_{it} + \beta_4 * LNFIN_{it} + \beta_5 * LNGDP_{it} + \beta_6 IS + \varepsilon_{it} \quad (2)$$

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$$LNUUR_{it} = \alpha + \beta_1 * LNINDEX_{it} + \beta_2 * LNROAD_{it} + \beta_3 * CITY_{it} + \beta_4 * LNFIN_{it} + \beta_5 * LNGDP_{it} + \beta_6 IS + \varepsilon_{it} \quad (3)$$

Where β_i(i=1,2,.... ,6) are the magnitudes of the influence of the explanatory and control variables on the consumption of the population and its ratio, with α is the constant term, and ε is the model residual.

3.3. Empirical studies

3.3.1. Descriptive statistics

In order to better analyze the variables, the distributional characteristics of the variables were analyzed by establishing descriptive statistics.

Table 2: Descriptive statistics

variant	LNUC	LNRC	LNURR	LNLNDEX	LNFIN	LNGDP	CITY	IS
Mean	10.2646	9.6939	1.7858	5.3151	6.1606	8.1143	64.4222	48.5054
Median	10.2844	9.7497	1.7378	5.4031	6.1305	8.2011	64.5000	47.4636
Maximum	10.7920	10.3164	2.7449	5.8852	7.7799	9.8042	84.0000	68.0430
Minimum	9.6979	8.6918	1.4250	4.2194	4.8318	6.6500	44.8000	36.1497
Std. Dev.	0.2587	0.3517	0.2579	0.4152	0.6776	0.7893	7.7944	6.4198

From the results of statistical analysis, the level of urban and rural consumption and its ratio of the internal level of large differences; urban and rural citizens consumption gap maximum value of 2.7449, minimum value of 1.4250, indicating that the urban-rural consumption gap in various cities and towns in Zhejiang Province is still a certain distance. The same can be seen in the digital inclusive financial index, the difference between the control variables is large, can be empirically tested.

3.3.2. Correlation analysis

Table 3: Correlation analysis

Probability	LNUC	LNRC	LNURR	LNLNDEX	LNFIN	LNGDP	CITY	IS
LNUC	1.0000							
LNRC	0.9507***	1.0000						
LNURR	-0.5729***	-0.7969***	1.0000					
LNLNDEX	0.8533***	0.8728***	-0.6586***	1.0000				
LNFIN	0.7674***	0.6962***	-0.3682***	0.6117***	1.0000			
LNGDP	0.6215***	0.5555***	-0.2759***	0.3838***	0.9037***	1.0000		
CITY	0.7795***	0.7354***	-0.4381***	0.5351***	0.8308***	0.7472***	1.0000	
IS	0.6988***	0.6037***	-0.2647***	0.6468***	0.6373***	0.4288***	0.6707***	1.0000

Note: "*", "**", and "***" show significance at the 10%, 5%, and 1% significance levels, respectively.

A correlation analysis indicated that there is a strong correlation between the explanatory variables and the explanatory variables, and the regression of variables may be significant; there is an obvious connection between urban residents' consumption, rural residents' consumption and the explanatory variables, while the urban-rural citizens' consumption gap and the explanatory variables show a negative relationship, and the specifics of how to be empirically tested.

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3.4. Regression results

According to Hausmann test to determine the final three models are more appropriate to choose the fixed effects model.

Table 4: Hausman results

	Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
1	cross-section random	34.6489	6	0.0000***
2	cross-section random	38.4155	6	0.0000***
3	cross-section random	150.3745	6	0.0000***

Fixed effects model regressions were performed for Model I, Model II, and Model III, respectively, and as a result of fitting, the following results were obtained:

Table 5: OLS model regression results

explanatory variable	1	2	3
LNLNDEX	0.2386***	0.2622***	-0.475***
	(0.0232)	(0.0749)	(0.0906)
LNFIN	0.2977***	0.3961***	-0.4583***
	(0.0482)	(0.1055)	(0.2037)
LNGDP	0.0387	0.1504	0.9704***
	(0.0372)	(0.1308)	(0.2765)
CITY	0.0018	0.0046**	-0.0063
	(0.0022)	(0.0022)	(0.0056)
IS	-0.0016	-0.0016	-0.002
	(0.0183)	(0.0029)	(0.0044)
LNROAD	-0.1132***	-0.03862	0.0022
	(0.0309)	(0.0387)	(0.1270)
constant term	7.8448***	4.7749***	-0.2501
(math.)	(0.2611)	(0.6989)	(1.0519)
R-squared	0.9190	0.9771	0.8444
F-statistic	215.4947	277.8469	35.2777
P-value	0.0000***	0.0000***	0.0000***

Note: "*", "**" and "***" show significance at the 10%, 5% and 1% significance levels, respectively, with standard errors in parentheses.

The regression results are:

$$\mathrm{LNUC_{it}} = 7.8448 + 0.2386 * \mathrm{LNINDEX_{it}} - 0.1132 * \mathrm{LNROAD_{it}} + 0.0018 * \mathrm{CITY_{it}} + 0.2977 * \mathrm{LNFIN_{it}} + 0.0387 * \mathrm{LNGDP_{it}} - 0.0016 * \mathrm{IS} + \varepsilon_{it} \quad (1)$$

$$\mathrm{LNRC_{it}} = 4.7749 + 0.2622 * \mathrm{LNINDEX_{it}} - 0.03862 * \mathrm{LNROAD_{it}} + 0.0046 * \mathrm{CITY_{it}} + 0.396 * \mathrm{LNFIN_{it}} + 0.1504 * \mathrm{LNGDP_{it}} + -0.0016 * \mathrm{IS} + \varepsilon_{it} \quad (2)$$

$$\mathrm{LNUUR_{it}} = -0.2501 - 0.475 * \mathrm{LNINDEX_{it}} + 0.0022 * \mathrm{LNROAD_{it}} - 0.0063 * \mathrm{CITY_{it}} - 0.458 * \mathrm{LNFIN_{it}} + 0.9704 * \mathrm{LNGDP_{it}} - 0.0002 * \mathrm{IS} + \varepsilon_{it} \quad (3)$$

According to the regression results, the R^2 of the three models are close to 1, with a high degree of fit; and the three models' F statistic is significantly greater than 3, and the corresponding P value

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is significantly 0 at the 1% significance level, which illustrates that the model results are significant, i.e., the estimation results for the models are valid.

From the results of the three models, respectively, the coefficient of the explanatory variable Digital Inclusion Development Index (LNINDEX) is 0.2386 for urban citizens' consumption at the 5% significance level, and the coefficient of LNINDEX is 0.2622 for rural citizens' consumption, and the two models are significantly positive, which illustrates that the growth of the Digital Inclusion Index has a significant influence on the increase of urban and rural citizens' consumption expenditure of both urban and rural citizens. It can also be seen that when the digital inclusive finance index changes by 1 percentage point, the change in consumption expenditure of urban residents is 0.2386 percentage points, and the change in consumption expenditure of rural residents is 0.2622 percentage points, which means that the development of digital financial inclusion is more able to promote the growth of rural residents' consumption expenditure. This is also proved in the third model, the coefficient of LNINDEX is -0.475, that is, by developing digital inclusive finance, urban residents can reduce their consumption gaps, urban-rural consumption disparities will be reduced by 0.475 percentage points when the digital inclusive finance index grows by 1 percentage point.

Besides that, at the 5% significant level, urban and rural citizens' consumption expenditures are positively influenced by increased financial expenditures, urban and rural residents' consumption expenditures will grow by 0.2977 and 0.3961 percentage points, respectively, when the digital inclusive finance index grows by 1 percentage point. The level of transportation has an obvious inhibitory effect on urban residents' consumption expenditure, which is not in line with expectations; this may be due to the fact that the development of transportation promotes residents to go out of town for consumption.

3.5. Robustness Tests

For the purpose of maximize the circumvention of the effect of chance on the results, a robustness test was conducted using the shortened sample approach, and the sample data from 2014-2021 were re-regressed, again based on the fixed effects model, with the following regression results:

Table 6: OLS model regression results

explanatory variable	1	2	3
LNLNDEX	0.2910***	0.4402***	-0.2390**
	(0.0878)	(0.1449)	(0.0995)
LNFIN	0.1230**	0.0993	0.0297***
	(0.0566)	(0.0806)	(0.0648)
LNGDP	0.3669***	0.3755***	-0.0083***
	(0.0796)	(0.1412)	(0.0866)
CITY	0.0020	-0.0006	0.0042
	(0.0028)	(0.0029)	(0.0032)
IS	-0.0043**	-0.0024	-0.0036
	(0.0018)	(0.0015)	(0.0023)
LNROAD	-0.0330	0.0083	0.0036
	(0.0490)	(0.0274)	(0.0353)
constant term (math.)	4.7497***	3.7851***	2.4585
	(0.4331)	(0.5285)	(0.3915)
R-squared	0.9814	0.9866	0.9493
F-statistic	233.9148	327.4676	327.4676
P-value	0.0000***	0.0000***	0.0000***

Note: "*", "**" and "***" show significance at the 10%, 5% and 1% significance levels, respectively, with standard errors in parentheses.

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The results of the robustness test show that at the 5% significance level, urban and rural consumers are still positively affected by digital inclusive finance's development index, residents of rural areas are more affected by the changes in consumption than those of urban areas, and it has a dampening effect on the urban-rural consumption disparity, i.e., by promoting digital financial inclusion, urban-rural consumption disparities are reduced. The results of the robustness test show that the conclusions obtained in the previous section are robust and the conclusions are valid.

This paper empirically analyzes the influence of the growth of digital inclusive finance on the consumption of urban and rural citizens in Zhejiang Province, taking 11 cities in Zhejiang Province as examples, so as to draw the following conclusions. First, on the whole, both urban and rural residents in Zhejiang Province benefit from the growth of digital inclusive finance. Second, in Zhejiang Province, there is heterogeneity in the impact of digital inclusive finance on urban and rural residents' consumption. The development of digital inclusive finance has a greater influence on rural household consumption than on urban household consumption., i.e., it has an obvious influnece on narrowing the urban-rural citizens consumption disparity.

4. Conclusion and Policy recommendations

4.1. Conclusion

This paper empirically analyzes the influence of the growth of digital inclusive finance on the consumption of urban and rural citizens in Zhejiang Province, taking 11 cities in Zhejiang Province as examples, so as to draw the following conclusions. First, on the whole, both urban and rural residents in Zhejiang Province benefit from the growth of digital inclusive finance. Second,in Zhejiang Province, there is heterogeneity in the impact of digital inclusive finance on urban and rural residents' consumption. The development of digital inclusive finance has a greater influence on rural household consumption than on urban household consumption.,i.e., it has an obvious influnece on narrowing the urban-rural citizens consumption disparity.

4.2. Policy recommendations

4.2.1. Improvement of digital financial infrastructure

Through empirical analysis, in Zhejiang Province, it has been found that digital inclusive finance positively impacts consumption levels both urban and rural. Therefore, we should expand the scope of digital inclusive finance radiation in Zhejiang Province and enhance digital inclusion in finance by accelerating its development. This must strengthen digital inclusive financial infrastructure construction, and vigorously support all kinds of financial institutions to enter the countryside, serve the countryside, and give full play to the low cost and high efficiency characteristics of digital inclusive finance, so as to effectively promote the growth of digital inclusive finance. Digital financial inclusion is low-cost and highly efficient, which can effectively promote consumption of residents. Meantime, the publicity of digital inclusive finance should be increased, and villagers should be actively taught digital knowledge and financial knowledge, so as to guide them to join the inclusive financial system.

4.2.2. Supporting rural industries, broadening the coverage of financial services

The rural industry occupies a pivotal position in the internal economy. For this reason, it is essential to organically combine digital inclusive finance with rural industries, so as to give full play to its function of promoting rural revitalization. Digital inclusive finance has lower costs and better risk management than traditional financial inclusion, and has greater development space and application

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value in rural small and micro enterprises. The Government should actively promote the sinking of the mobile payment project for the convenience of the people, improve digital service channels and broaden the coverage of financial services, so that rural citizens can enjoy the same services as urban residents. It is important that policy financial institutions offer a variety of financial services to help develop SME and the agricultural industry, easing the financial pressure on the development of rural industries. Financial technology should be actively utilized to continuously reduce the financing costs of SME in rural areas, and to accurately match them with finance services and improve service effective rate.

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