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Original Paper

The Impact of Digital Inclusive Finance Development on the Consumption Gap between Urban and Rural Residents in Shandong Province

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Abstract

Since the reform and opening up, stimulating resident consumption has become one of the important engines of China's economic development. Especially since the Sino-US trade war and the outbreak of the pandemic, the importance of consumption in the national economic development has further increased. The country has also successively proposed the strategy of domestic and international dual circulation and the establishment of a national unified large market to further expand domestic demand. Shandong Province, with its large population and natural resources, has been one of the top three economic provinces in China for many consecutive years, making significant contributions to the national economy. In recent years, with the growth of Shandong's economy, its digital inclusive finance has also made significant progress. This paper, through the search and summarization of relevant literature, conducts a more in-depth and comprehensive exploration of the development status of digital inclusive finance in Shandong Province and the current status of the consumption gap between urban and rural residents in Shandong Province. Using both qualitative and quantitative methods, it studies the development of digital inclusive finance in Shandong Province and its relationship with the urban-rural consumption gap. Empirical analysis is conducted using data from 14 cities in Shandong Province from 2011 to 2020, and the regression results are analyzed. The results show that the development of digital inclusive finance in Shandong Province can promote resident consumption in the region, reduce the consumption gap and income gap between urban and rural residents in Shandong Province, and thereby promote balanced development in the region.

Keywords

Digital Inclusive Finance, Consumption Gap between Urban and Rural Residents, Panel Data

Introduction

In 2019, China's per capita income surpassed the $10,000 mark, and the GDP broke through the 100 trillion yuan mark in 2020. Along with economic growth, China also faces some issues. Due to the existence of a dual economic structure in China's economic development, the consumption expenditure levels in rural areas have been growing slowly, and the consumption gap between urban and rural residents has been increasing with economic development. The expansion of the consumption gap between urban and rural residents not only has a negative impact on economic development but may also trigger social equity issues. Traditional finance has played a positive role in stimulating rural resident consumption, but due to the inherent "rich-poor preference" characteristic of finance, its impact on this issue is also limited. In recent years, with the rapid development of mobile communications and the internet in China, the degree of digitalization has increased significantly, making digital inclusive finance based on this have great potential for development. Due to the characteristics of digital inclusive finance, such as its broader service area and significantly lower service costs compared to traditional finance, many scholars consider it to be one of the most suitable models for boosting rural resident consumption.

1. Literature Review

1.1 Domestic Literature

Since digital inclusive finance was proposed at the Group of Twenty(G20) summit in 2016, it has attracted significant attention from domestic scholars, resulting in a considerable number of research outcomes. For instance, scholars Lv Yanqin and Zhao Bin (2019) conducted an empirical analysis using panel data from 30 provinces in China from 2011 to 2017, concluding that digital inclusive finance can significantly reduce the consumption gap between urban and rural residents. Liu Shipeng (2019) also reached a similar conclusion through empirical analysis, indicating that in a national context, rural residents' consumption is more easily influenced by digital inclusive finance compared to urban residents. Another pair of scholars, Jiang Hongli and Jiang Pengcheng (2020), analyzed the development of digital inclusive finance in all provinces from 2011 to 2017 over eight years and found that digital inclusive finance can further enhance residents' consumption levels. Cui Haiyan (2017) also analyzed using provincial panel data in China, concluding that digital inclusive finance can play a positive role in rural residents' consumption. Some scholars have also analyzed the constraints of inclusive finance, suggesting that digital technology can address the technical and regional limitations faced by inclusive finance during its development, thereby better meeting the needs of rural residents for financial services (Mingyue Tang, 2017). Jiang Zhuyuan's (2020) research indicates that under the three dimensions of digital inclusive finance—coverage, usage depth, and digitalization—each can independently reduce the consumption gap between urban and rural residents.

1.2 Foreign Literature

Digital financial inclusion has also sparked significant interest among some foreign economists, leading to numerous research outcomes. Grossman and Tarazi (2014) argue that digital financial inclusion

stimulates household consumption by changing payment methods, and providing consumption loans to families can further boost consumption. Peterson (2017) defines digital financial inclusion as the practice of inclusive growth in developing countries and emerging economies through the use of digital financial means. Although scholars generally support the notion that digital financial inclusion can promote consumption among rural and urban residents, they are divided on whether it can narrow the consumption gap between these groups. This paper aims to enrich the research on this issue.

2. Digital Inclusive Finance and Urban-Rural Consumption Gap: Relevant Theories

2.1 Digital Inclusive Finance

The concept of inclusive finance was proposed by the United Nations in 2005, with the aim of breaking the tradition of financial services being available only to specific groups, ensuring that all social groups can equally enjoy financial services (Xiaowen Wang & Xiaoye Cui, 2019). Inclusive finance can effectively break the constraints of space and social strata, achieving rational and optimal resource allocation, allowing rural and remote underdeveloped areas to benefit from financial development, increasing their income and consumption levels, and thereby stimulating market economy vitality.

The definition of digital inclusive finance was first proposed at the 2016 G20 summit in Hangzhou, with the definition suggesting that anything that promotes inclusive finance through internet technology falls under the category of digital inclusive finance (Tao Li & Shenglan Yang, 2021). Digital inclusive finance enables financial institutions to provide financial services to remote underdeveloped areas at affordable costs, ensuring the right of people to equally enjoy financial services, thereby promoting social equity.

After the concept of digital inclusive finance was introduced, various methods for measuring it also emerged. Among them, scholars Guo Feng and Xiong Yunjun believe that the main methods for measuring digital inclusive finance in China include three types: the first, analyzing and researching digital finance within traditional finance as an indicator. The second, a composite financial development index formed by multiple indicators, as used in this article. The third mainly includes digital economy indicators released by certain financial institutions.

2.2 Urban-Rural Consumption Gap

Residents in China are primarily categorized into rural and urban residents. There are two ways to classify them: one, based on household registration, where agricultural household registration is categorized as rural residents and non-agricultural household registration as urban residents; two, based on place of residence, where people living in towns and cities above the county level are defined as urban residents and the rest as rural residents (Xuefeng Wang, 2016; Juan Zhao, 2016). The first method is used in China's Statistical Yearbook. The data used in this paper from Shandong Province's Statistical Yearbook also follows the first classification method.

Consumption levels of residents over a period of time can reflect their consumption levels. Currently, academia has conducted in-depth research on consumption issues, and many scholars believe that multiple factors influence resident consumption, including income levels, price levels, and consumption

expectations, among others.

In decades of economic development, China has always been accompanied by the problem of uncoordinated urban-rural economic development. The main reason is that the development of developing countries mainly relies on the agricultural and industrial sectors, with the industrial sector pursuing efficiency and developing rapidly, while agriculture is relatively backward. With the development of the country, the economy of cities and rural areas has produced certain gaps, which are also caused by various factors such as fiscal policies, income gaps, and urbanization levels. To measure the size of this gap, three main methods are used: the Gini coefficient, the Theil index, and the ratio of urban to rural consumption. The Gini coefficient can measure the size of income disparities among residents in a region and is a commonly used method; the Theil index is an important indicator for studying regional development balance, and the urban-rural consumption ratio is a method used by many scholars, calculated as the urban resident consumption divided by rural resident consumption. This method is also used in this paper.

2.3 Analysis of the Impact of Digital Inclusive Finance on the Consumption Gap between Urban and Rural Residents

The article mainly analyzes the impact of residents' own consumption capacity and payment methods.

(1) The impact on residents' own consumption capacity. Firstly, due to the wide availability, convenience, and low entry barriers of financial products in digital inclusive finance, many people, especially those in remote rural areas, can purchase financial products such as bonds and funds through online platforms according to their own risk preferences. Residents can purchase low-risk financial products like money market funds and government bonds, which can provide relatively stable returns, thereby increasing their expected income and subsequently raising their consumption levels (Lu Hui & Zhou Maotao, 2016). Secondly, digital inclusive finance also provides insurance products. With relatively lower operating costs compared to traditional insurance, the cost of insurance is also lower, allowing more people to enjoy insurance services. Having insurance reduces people's concerns about unpredictable future events, enabling them to consume more confidently and boldly, thus increasing their consumption levels.

(2) Digital inclusive finance influences people's payment methods through its efficient, convenient, and secure payment features. In daily life, we have become accustomed to using WeChat and Alipay QR codes for payments, entering an era of cashless transactions. On one hand, this payment method frees consumption from the constraints of cash, significantly reducing the probability of transaction failures due to insufficient cash and greatly promoting market transactions. On the other hand, the ability to transfer and pay across spaces means that transactions are no longer bound by geographical locations. For example, people can purchase various goods online, greatly satisfying the consumption needs of residents in remote areas and stimulating consumption.

3. The Development Status of Digital Inclusive Finance in Shandong Province and the Analysis of the Consumption Gap between Urban and Rural Residents

3.1 The Development Status of Digital Inclusive Finance in Shandong Province

This article will compare the development indices of 14 cities in the province over a decade longitudinally and conduct a horizontal comparison with the national level. By analyzing the horizontal and longitudinal data, we aim to provide a comprehensive view of the development status of digital inclusive finance in Shandong Province.

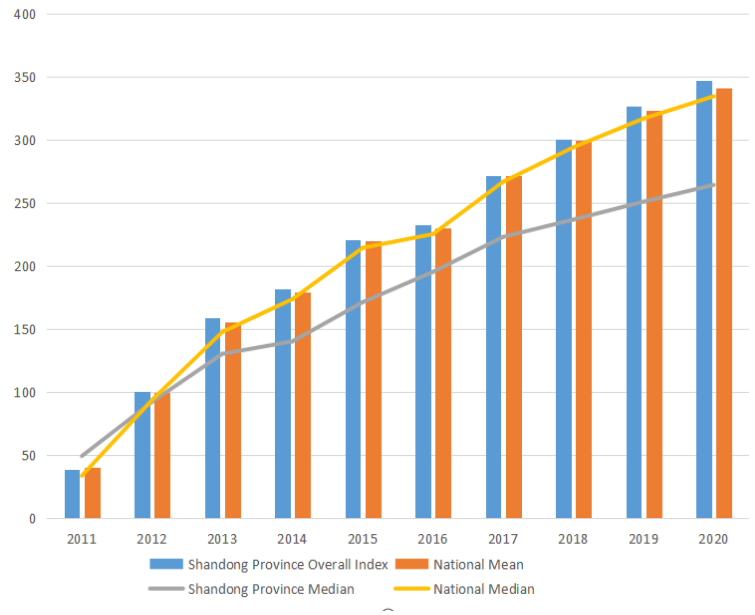

Figure 1. Digital Inclusive Finance Index in Shandong Province and Nationwide from 2011 to 2019

Note 1) Data source: Official website of the Beijing University Digital Finance Research Center; same below.

As shown in Figure 1, from 2011 to 2020, the development of digital inclusive finance across the country gradually increased. By 2020, the national digital inclusive finance development index was 341, which was 8.5 times that of 2011. The median of the national index increased from 34 in 2011 to 335 in 2020, a growth of nearly 8 times. This indicates that digital inclusive finance across the country experienced rapid development from 2011 to 2020 over a period of 10 years. Looking at Shandong Province, during the 10 years from 2011 to 2020, the level of digital inclusive finance in Shandong was generally slightly higher than the national level. In 2011, it was below the national average, but by 2020, it exceeded the national average by 7 points. The median of Shandong's city indices increased from 49 in 2011 to 264 in 2020, a more than fivefold increase, indicating that the development of digital inclusive finance in Shandong was relatively fast.

Since the Digital Inclusive Finance Development Center at Peking University has constructed the concept

of digital inclusive finance involving multiple dimensions and indicators, reflecting the development of digital inclusive finance in Shandong Province from a single aspect would lack accuracy. Therefore, in addition to the national digital inclusive finance development index, this paper also analyzes the depth of use, digitalization, and coverage of Shandong's digital inclusive finance development, as well as the sub-indicators of payment, credit, and insurance data, to comprehensively and deeply study the development of digital inclusive finance in Shandong. As shown in Figure 2.

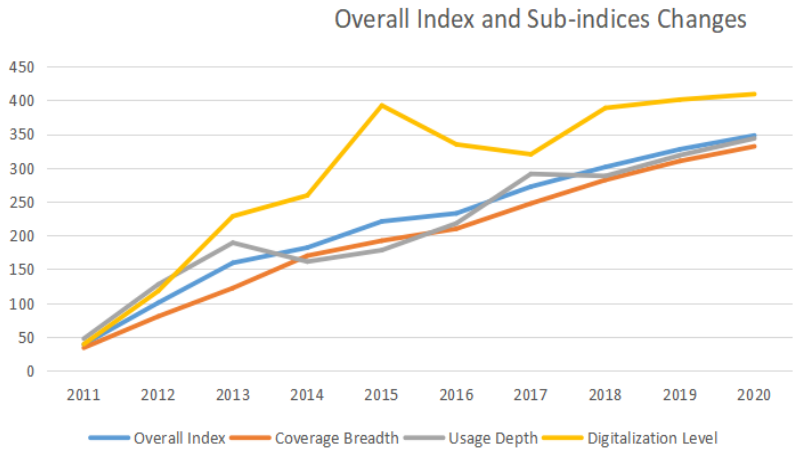

Figure 2. Median Values of Shandong's Digital Inclusive Finance Total Index and Sub-Indices from 2011 to 2020

As can be seen from Figure 2, during the 10 years from 2011 to 2020, the development of digital inclusive finance in Shandong Province was rapid. During the period from 2011 to 2014, the growth rate was fastest for digitalization level, followed by depth of use and coverage. From 2014 to 2016, the growth rate of the digitalization level was significantly higher than the other two dimensions, becoming the main driving force for the growth of the total index. However, from 2018 to 2020, the growth rate of the digitalization level slowed down, while the depth of use and coverage continued to grow at a fast pace. Through the analysis of these three dimensions, we can see that Shandong's digitalization level is relatively mature, and its depth of use and coverage may have significant growth potential in the near future.

From the data in Figure 3, it can be seen that first, the digital insurance index developed the fastest, increasing from 9.07 in 2011 to 637.67 in 2020, a 70-fold increase over 10 years. The most rapid growth occurred between 2012-2013 and 2015-2016. This was due to the increasing awareness of insurance among people during this decade, leading to faster development in the insurance industry, as well as the improvement in digitalization levels that enabled online insurance and claims processing. This method reduced the costs for insurance institutions, thereby lowering premiums for policyholders, allowing more people to benefit from insurance services. Second, digital mobile payments also maintained a gradual growth trend, increasing from 44.24 in 2011 to 287.68 in 2020. Due to the convenience of mobile

payments, they gained more popularity among people, thereby expanding the range of financial services. With the development of technology, the use scenarios for mobile payments have become more diverse, and their functions more comprehensive. For example, scanning with WeChat and facial payment methods are now commonplace in modern life. Finally, digital lending showed significant growth, increasing from 63.38 in 2011 to 234.73 in 2020. The development of digital finance broadened the lending channels for small and medium-sized enterprises, especially for projects related to rural issues. The loan procedures became more simplified, thereby highlighting the positive role of digital inclusive finance in promoting rural economic development.

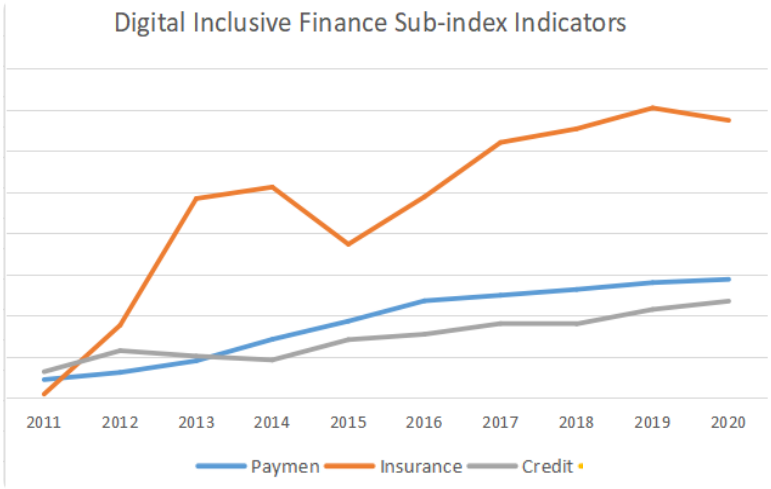

Figure 3. Characteristics of Digital Payments, Insurance, and Credit Development

By comparing the total index of digital inclusive finance in various cities of Shandong Province from 2011 to 2020, more was made of the development levels and differences among the cities. As shown in Figure 4, the development index of digital inclusive finance in the 14 cities of Shandong Province has been gradually increasing over time, with Qingdao, Dongying, and Weihai performing better, while Heze and Dezhou are relatively lagging behind. From the fluctuations in the line graph, it can be seen that the amplitude of fluctuations is decreasing over time, indicating that the differences in digital inclusive finance among Shandong's cities are gradually decreasing.

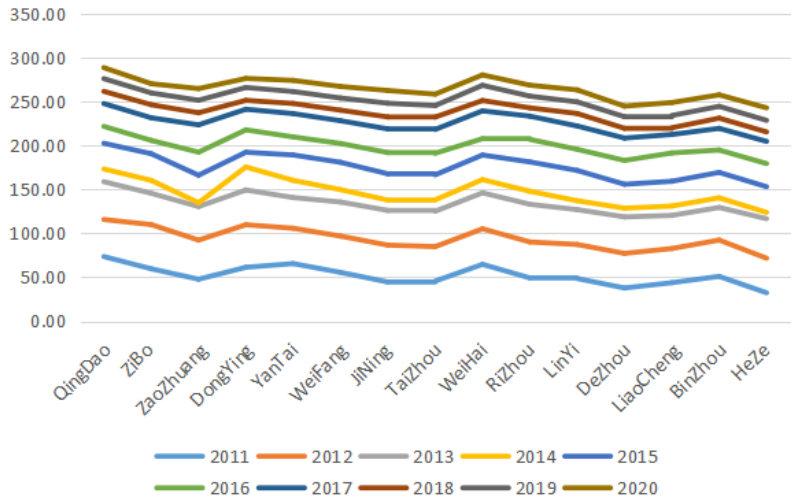

Figure 4. Development Level of Digital Inclusive Finance in 14 Cities of Shandong Province

Table 1. Development Index of Digital Inclusive Finance in 14 Prefecture-Level Cities of Shandong Province from 2011 to 2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Qingdao	73	116	159	173	202	221	247	261	276	288
Zibo	60	110	145	160	190	206	231	246	260	270
ZaoZhuang	48	92	130	135	166	192	223	237	251	264
Dongying	61	110	149	175	192	218	241	251	266	276
Yantai	65	106	141	160	189	210	236	248	261	274
WeiFang	56	97	136	150	181	202	228	240	254	267
JiNing	45	87	126	138	168	192	219	232	248	262
Taizhou	46	85	125	138	166	191	218	232	245	258
Weihai	65	105	146	161	189	208	239	251	268	280
RiZhao	49	90	133	148	181	207	233	243	256	268
LinYi	49	87	127	137	171	195	222	236	249	263
Dezhou	38	77	119	129	156	183	208	219	232	244
LiaoCheng	44	83	120	131	159	191	212	220	234	249
BinZhou	51	92	129	140	169	195	219	231	244	257
HeZe	32	72	117	124	153	179	204	215	228	243

The development status of digital inclusive finance in 14 cities of Shandong Province over the past 10 years is shown in Table 1. By 2020, the fastest developing city was Qingdao, which is also the most economically advanced city in Shandong, with relatively well-developed infrastructure. The least developed city was Heze, with an index of 243, which differs by 45 from Qingdao. Overall, the development gap was relatively small, with a fairly balanced development among various cities.

3.2 Analysis of the Consumption Gap between Urban and Rural Residents in Shandong Province

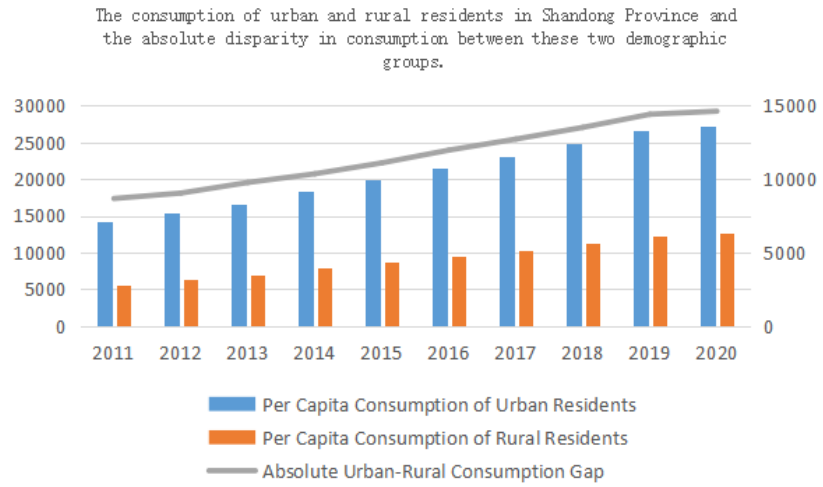

Figure 5. Consumption of Urban and Rural Residents in Shandong Province from 2011 to 2020 and Their Absolute Gap

Note 2) Data source: Compiled based on data from the Shandong Provincial Bureau of Statistics; same below.

Figure 5 shows the current status of consumption and the absolute consumption gap between urban and rural residents in Shandong Province, where the absolute gap is defined as urban residents' consumption minus rural residents' consumption. Observing the bar chart in the figure, it can be seen that in 2011, the per capita consumption of urban and rural residents in Shandong Province was 14,164 yuan and 5,489 yuan, respectively. By 2020, these figures had increased to 27,291 yuan and 12,660 yuan, respectively. During this 10-year period, the per capita consumption of urban and rural residents increased by 1.9 times and 2.3 times, respectively, with a relatively fast growth rate. By comparing the two, it is clearly evident that the per capita consumption of urban residents is higher, while that of rural residents is relatively lower, indicating a significant gap between urban and rural areas. Observing the line chart in the figure, it can be seen that the curve is generally sloping upwards to the right, indicating that the consumption gap between urban and rural residents has been increasing year by year, and from 2012 to 2019, the curve almost showed linear growth. However, from 2019 to 2020, the gap tended to ease. In 2011, the consumption gap between urban and rural residents in Shandong Province was 8,675 yuan, and by 2020, this figure had increased to 14,631 yuan, with the gap expanding by 1.68 times over 10 years, with an average annual growth rate of 4.1%. This situation is clearly not optimistic, as allowing it to expand would not only affect the economic development of the region but also reduce people's sense of happiness and gain, potentially leading to some social issues. Therefore, while Shandong Province continues to promote consumption growth, it should also focus on addressing the issue of increasing consumption gaps. Figure 6 shows the development trend of consumption and the relative consumption gap between

urban and rural residents in Shandong Province, where the relative gap is defined as the ratio of urban residents' consumption to rural residents' consumption. The line chart in the figure shows a general downward trend to the left, indicating that the consumption ratio between urban and rural residents in Shandong Province has been continuously decreasing over time. From the figure, it can be seen that the urban-rural consumption ratio in Shandong Province decreased rapidly from 2011 to 2014 but slowed down from 2015 to 2020, indicating that the growth rate of the urban-rural gap in Shandong Province has somewhat decreased to some extent.

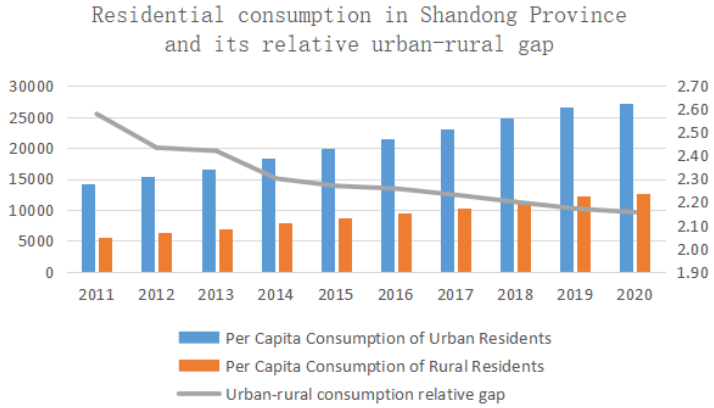

Figure 6. Development of Urban and Rural Resident Consumption and Relative Consumption Gap in Shandong Province from 2011 to 2020

Table 2. Absolute and Relative Consumption Gap between Urban and Rural Residents in Shandong Province

year	Per Capita Consumption of Urban Residents (Billions of Yuan)	Per Capita Consumption of Rural Residents (Billions of Yuan)	Absolute Consumption Gap between Urban and Rural Areas (Billions of Yuan)	Urban-rural consumption disparity
2011	14164	5489	8675	2.58
2012	15349	6304	9045	2.43
2013	16646	6877	9769	2.42
2014	18323	7962	10361	2.30
2015	19854	8748	11106	2.27
2016	21495	9519	11976	2.26
2017	23072	10342	12730	2.23
2018	24798	11270	13528	2.20
2019	26731	12309	14422	2.17
2020	27291	12660	14631	2.16

4. Digital Finance Development in Shandong Province and Its Impact on Urban-Rural Consumption Disparity: Empirical Analysis

4.1 Model Specification

To further explore the relationship between the development of digital financial inclusion and the urban-rural consumption disparity, this study draws on Liu Yuan's research to select variables and set up the model (Yuan Liu, 2021). Panel data from 14 cities in Shandong Province from 2011 to 2020 were obtained, with the urban-rural consumption disparity serving as the dependent variable and the digital financial inclusion development index as the core explanatory variable. Multiple other explanatory variables were also included in the regression. An F-test was conducted on the model, and the result rejected the null hypothesis. Subsequently, a Hausman test was performed, with the p-value being 0.0012 < 0.01, thus setting the model as a fixed effects model. The general model is constructed as follows:

$$y_{it} = \alpha_i + \beta_1 x_{1it} + \beta_2 x_{2it} + \beta_3 x_{3it} + \beta_4 x_{4it} + \beta_5 x_{5it} + \varepsilon_{it}$$

Among other things, the subscript i, t denotes cities and time, α represents the intercept of the model, β is the regression coefficient, and ε is the error term. y is the dependent variable, representing the gap in consumption between urban and rural residents; x is the independent variable, representing the development index of digital inclusive finance, the gap in income between urban and rural residents, industrial structure, government intervention, and economic development conditions. When $\beta 1 < 0$ in the model, it indicates that the expansion of consumption gaps can be restrained.

4.2 Variable Selection and Data Sources

4.2.1 Data Sources

The dependent and independent variables in the text were obtained from the "Shandong Statistical Yearbook" and were organized through corresponding methods. The core independent variable, the development index, is sourced from the "Peking University Digital Inclusive Finance Index" compiled by the Peking University Center for Digital Finance (Feng Guo, Jingyi Wang, Wang Fang, Kong Tao, Zhang Xun, & Cheng Zhiyun, 2020). This index was released in April 2021 and includes three dimensions and 33 specific indicators, almost covering all large, medium, and small cities across the country.

4.2.2 Variable Selection

Dependent Variable (consumrato): Urban-rural consumption gap

In existing literature, the main methods for measuring the urban-rural consumption gap have been introduced in the preceding sections. This article's dependent variable uses the third method mentioned in the previous section, which is the ratio of per capita consumption between urban and rural residents.

Explanatory Variables: Digital Inclusive Finance Development Index (core explanatory variable), urban-rural income gap, industrial structure, government intervention, economic development status

Digital Inclusive Finance Development Index (lndif): This index has been explained in the preceding text and will not be elaborated on here. Many scholars have used this index in their research related to the content of this paper, which demonstrates its authority. Since this data differs significantly from other

indicators, it has been logarithmically transformed.

Urban-Rural Income Gap: As existing research findings indicate indicate

Explanatory variables, are based on the method for measuring the gap between urban and rural residents' consumption, the basis of the average disposable income of urban residents, and the e average disposable income of rural residents. a per-basis average.

Industrial structure (indus): Studies have confirmed that the upgrading of industrial structure can narrow the consumption gap between urban and rural residents (Xu Min, Jiang Yong, 2015). This paper uses the Gross Domestic Product (GDP) of the tertiary sector to represent the industrial structure.

Government intervention (gov): Fiscal expenditure is one way to reflect government intervention. Fiscal expenditure has a certain impact on the consumption gap between urban and rural residents, calculated by dividing the fiscal expenditure of the region by the region's GDP.

Economic development status (lngdp): The level of regional economic development is closely related to the consumption level of residents in that region. The higher the level of economic development, the higher the consumption level is, often. Since GDP is the main indicator for measuring regional economic development, it is selected to represent the economic development status. Due to the significant difference between this data

and other indicators, it is logarithmically processed.

Table 3. Variable Definitions

Variable types	Variable Name	Variable Symbol	Variable Description
Explained Variable	Urban-rural consumption gap	consumrato	Urban per capita consumption expenditure/rural per capita consumption expenditure
Core explanatory variable	Digital Inclusive Finance Index	lndifi	Peking University Digital Inclusive Finance Index
Explanatory Variables	Urban and rural residents' income gap	incomerato	Urban per capita disposable income/rural per capita disposable income
	Industrial structure	indus	Gross Domestic Product of the tertiary industry
	Government intervention	gov	Fiscal expenditure/GDP
	Economic development status	lngdp	Regional GDP

4.3 Model Results Verification and Analysis

4.3.1 Descriptive Statistics

The data, when organized in the corresponding manner, yields the results presented in Table 4.

Table 4. Descriptive Statistics of Sample Variables

VarName	Obs	Mean	SD	Min	Median	Max
consumratio	150	2.2568	0.4370	1.3625	2.1927	3.1666
lndifi	150	5.0777	0.5050	3.4769	5.2504	5.6638
incomeratio	150	2.3387	0.3002	1.7412	2.2813	3.2227
Indus	150	0.4245	0.0672	0.2470	0.4240	0.6140
gov	150	0.1184	0.0265	0.0670	0.1139	0.2011
lngdp	150	8.1085	0.4747	7.1017	8.0424	9.4255

Table 4 shows that Obs, Mean, SD, Min, Median, and Max represent sample size, mean, standard deviation, minimum, median, and maximum, respectively. From the table, it can be seen that the maximum value of the urban-rural consumption gap is 3.166, and the minimum value is 1.3625, with the maximum value being approximately 2.43 times the minimum value. The mean and median differ by 0.06, indicating that the urban-rural consumption gap situation in various cities of Shandong Province is similar. The digital inclusive finance development index is also similar to the urban-rural consumption gap, with the maximum value being 5.6638 and the minimum value 3.4769, and the mean is close to the median. However, there are differences in government intervention among various cities, with the largest being 0.2011 and the smallest being 0.0670, indicating that the fiscal expenditure policies in various cities of Shandong Province differ. The above data reflect the basic situation of Shandong Province, so further exploration can be conducted.

4.3.2 Correlation Test

Before conducting a correlation analysis, a scatter plot can more intuitively display the correlation between digital inclusive finance and the urban-rural consumption gap, as shown in Figure 7. From the figure, it can be clearly seen that the positions of the points are generally concentrated, and the trend is also obvious, indicating that as the digital inclusive finance index develops, the urban-rural consumption gap tends to decrease. There is a clear negative correlation between the two variables overall. Although the scatter plot is more intuitive, it can only observe the trend of development and cannot provide a more precise description. Therefore, a correlation analysis was conducted in the
following text.

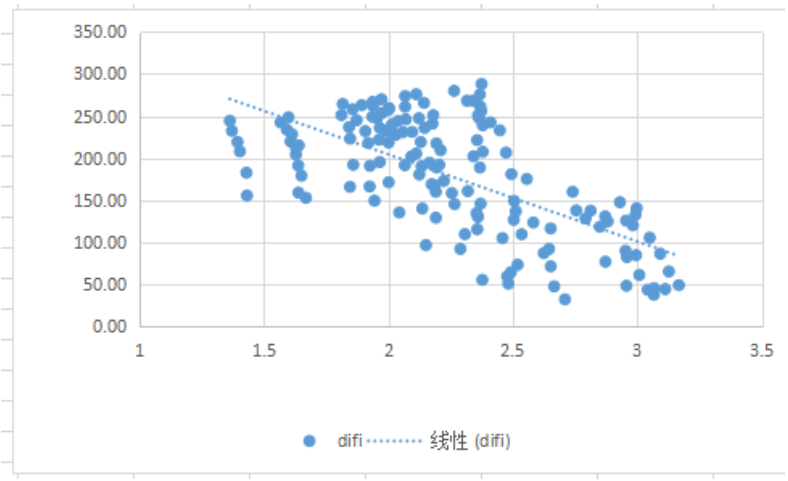

Figure 7. Scatter Plot

Table 5. Correlation Analysis

	consumratio	lndifi	incomeratio	indus	gov	lngdp
consumratio	1					
lndifi	-0.672***	1				
incomeratio	0.654***	-0.556***	1			
indus	-0.434***	0.660***	-0.450***	1		
gov	-0.502***	0.354***	-0.451***	0.472***	1	
lngdp	-0.170**	0.388***	-0.038	0.516***	-0.069	1

Note: The symbols *, **, and *** denote the significance levels of 10%, 5%, and 1%.

Table 5 is the correlation matrix of the variables in this paper. As shown in the table, the correlation coefficients between the development index and the indicators of rural-urban consumption gap and income gap are -0.672 and -0.556, respectively, indicating that digital inclusive finance has a significant negative correlation with both. Additionally, the correlation coefficient between the rural-urban income gap and the consumption gap at the 1% significance level is 0.654, which also indicates that the two can promote each other. Analyzing the data in the table also shows that there is no significant correlation between the variables in this paper, so there is no need to conduct a VIF test for multicollinearity. Therefore, we can proceed directly with the subsequent regression analysis.

4.3.3 Regression Results

Table 6. Regression Results

	(1) consumratio	(2) consumratio	(3) consumratio	(4) consumratio	(5) consumratio
lndifi	-0.582***	-0.387***	-0.427***	-0.442***	-0.422***
	(-12.297)	(-7.390)	(-7.930)	(-8.188)	(-7.723)
incomeratio		0.590***	0.604***	0.485***	0.519***
		(5.945)	(5.827)	(4.548)	(4.600)
indus			0.508	1.119***	1.591***
			(1.272)	(2.733)	(2.827)
gov				-4.159***	-4.817***
				(-4.640)	(-4.838)
lngdp					-0.105
					(-1.479)
_cons	5.211***	2.842***	2.798***	3.385***	3.929***
	(21.476)	(6.342)	(6.132)	(7.150)	(6.988)
N	150	150	150	150	150
F	151.204	103.277	67.038	70.788	58.717
R^2	0.452	0.565	0.569	0.613	0.621

Note: The symbols “*”, “**”, and “***” denote the significance levels of 10%, 5%, and 1%, respectively, with the t-values enclosed in parentheses.

Table 6 is the regression result .Among which, the first column shows that the coefficient is -0.582 and significant at the 1% level when no other variables are included; the second column is the regression result when the urban-rural income gap is included, and the regression coefficient is -0.387 (significant at 1% level, t=-7.390); and the fifth column is the regression result when industrial structure, government intervention, and economic development status are added as variables, and the coefficient of digital inclusive finance for the urban-rural consumption gap is -0.422 (t=-7.723). In the regression results, the coefficient of the urban-rural income gap is positive and significant at the 1% level, indicating that relevant policies can not only reduce the urban-rural income gap but also further reduce the urban-rural consumption gap, which is consistent with the findings of existing research (Fan Feifei, 2012). The coefficient of government intervention is also negative and significant at the 1% level, indicating that increasing fiscal spending by the government also helps to reduce the urban-rural consumption gap.

5. Research Conclusions and Policy Recommendations

5.1 Research Conclusions

Promoting resident consumption remains a key focus of China's economic work at present. This paper,

through literature analysis and the use of panel data from 14 prefecture-level cities in Shandong Province from 2011 to 2020, established a multiple regression model to quantitatively analyze the inhibitory effect of the development of digital inclusive finance in Shandong Province on the urban-rural consumption gap. The following conclusions were drawn from the analysis of the results:

(1) Through literature and relevant data analysis, it is known that Shandong Province has seen rapid development in digital inclusive finance, with overall development speeds higher than the national average. Its digital infrastructure is well-established, and it has significant potential for future development. However, there are issues of uneven development, with the southern and western regions of Shandong relatively lagging behind, while the eastern region is more developed. Although the urban-rural consumption gap continues to widen, the rate of increase has slowed down, indicating that digital finance played a certain role during this period.

(2) Through relevant analysis, it was found that the urban-rural consumption gap is significantly influenced by the five factors studied in this paper. Therefore, when formulating policies to narrow the gap, the province can consider the factors mentioned above to enhance the effectiveness of the measures.

(3) According to the regression results, the development of digital inclusive finance, government intervention, and economic development conditions can all reduce the gap. However, the coefficient of regional industrial structure is positive, which means it helps to expand the gap. Given the correlation, the development of digital inclusive finance helps to increase residents' income, which can subsequently reduce the urban-rural income gap and simultaneously boost rural consumption levels.

5.2 Policy Recommendations

Based on the above conclusions, the following recommendations are proposed:

(1) Accelerate infrastructure development to enhance public awareness. On one hand, digital inclusive finance is based on big data and the internet. Shandong Province should first increase its network infrastructure construction, especially in rural and remote areas. Ensure that the region's network communication and mobile payments are used normally in daily life, thereby improving digitalization levels and making digital financial products and services accessible to more people. On the other hand, each city and county in Shandong Province should formulate urban and rural development goals based on their actual conditions to achieve balanced urban-rural development. On the other hand, efforts should be made to actively introduce the knowledge of digital inclusive finance to the public, allowing them to better understand the financial products related to it. Not only should the advantages of digital inclusive finance products, such as convenience, speed, and low threshold, be explained to facilitate the use of these financial tools by the public, but also the disadvantages, such as telecom fraud and online illegal fundraising, should be made known to prevent the public from suffering losses.

(2) Increase rural residents' income. It can also be seen from the regression results that increasing residents' income is beneficial for reducing the urban-rural consumption gap. On one hand, when the government formulates employment policies, it can moderately tilt towards rural areas, providing employment assistance to rural unemployed individuals, especially rural college graduates, to increase

migrant worker wages and improve medical, educational, and pension security measures in rural areas, thereby increasing rural residents' income and enhancing the consumption level in rural areas. On the other hand, farming, animal husbandry, and other economic activities still account for a large proportion of farmers' income. The government should actively guide farmers to combine local conditions and provide relevant suggestions and assistance, such as organizing farmers to learn modern agricultural planting techniques and encouraging more young people to return to the countryside to start businesses, and thereby promoting rural development. These measures not only help farmers increase their income, thereby reducing the urban-rural income gap, but also better address the 'three-rural' issues, improving the living standards of rural residents.

Increase fiscal spending in rural areas. From the correlation analysis, we know that fiscal expenditure levels have a significant impact on the income and consumption gap between urban and rural residents. Therefore, relevant policies can increase welfare-oriented fiscal spending to improve residents' welfare, for example, by distributing consumption vouchers from the government to stimulate resident consumption. On the other hand, appropriate increases in funding for the 'three-rural' issues can accelerate the improvement of rural infrastructure, implement a series of pro-agriculture and supportive policies, and thereby boost rural residents' consumption, improve the consumption level in rural areas, and thus narrow the urban-rural consumption gap.

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