



The Impact of Digital Economy Development on Common Prosperity - An Empirical Study Based on Inter Provincial Panel Data

Feng Wang^(✉)

Wuhan University of Science and Technology, Wuhan, China
1140581399@qq.com

Abstract. Realizing common prosperity is the essential requirement of socialism, based on the digital economy index, the number of Internet broadband access ports, the length of long-distance optical cable lines and Internet broadband access users, this paper constructs a comprehensive evaluation system for China's digital economy development from 2011 to 2019, and uses panel data to construct a fixed effect model for 31 provinces (cities and districts) in China, using benchmark regression. The empirical study of HT unit test and robustness test shows that the impact of digital economy index and sub dimension on common prosperity is different, and there are regional differences. Therefore, according to the differences in different regions, this paper puts forward suggestions to reduce the social gap between the rich and the poor and promote common prosperity.

Keywords: Digital Economy · Common Prosperity · Unit Root Test · Fixed Effect

1 Introduction

For the first time, the Fifth Plenary Session of the 19th CPC Central Committee put forward a major strategic plan for Solidly Promoting the common prosperity of mankind. The goal of common prosperity is to reduce the gap between the rich and the poor, so as to achieve national prosperity and promote the harmonious development of economy and society. Although China's economic strength is increasing day by day, its comprehensive national strength is also increasing year by year. However, the gap between the rich and the poor still exists. According to the main data of China Household Survey (2020), the Gini coefficient has increased from about 0.2 in the early stage of opening up to 0.468 in 2020, close to the international warning line of 0.5. Reducing the Gini coefficient and narrowing the gap between the rich and the poor have put forward more urgent requirements for us to move towards national prosperity. The Fifth Plenary Session of the 19th CPC Central Committee pointed out that the current prominent problem is still the imbalance of economic development, and there are large differences in the level of urban and rural areas and the distribution of social property.

Since the goal of "common prosperity" was put forward, how to promote common prosperity has become a hot issue concerned by all walks of life in China. Scholars

study the gap between the rich and the poor and other related issues from different angles. Most domestic scholars conduct theoretical research on the relationship between economic growth, urbanization development, fiscal expenditure, financial development, human capital, industrial structure upgrading and the gap between the rich and the poor in China. Ma Jiujiu [5] believes through the life cycle theory that the free flow of rural surplus labor force in the process of China's urbanization is of positive significance to narrow the gap between the rich and the poor and promote common prosperity. Lei genqiang and Cai Xiang [4] concluded that China's income redistribution system has a significant impact on the gap between the rich and the poor through empirical model research.

It is worth noting that in the current knowledge-based economy society, a variety of new digital economy formats. For instance, the Internet and the Internet of things are playing an increasingly important role in the national economy. The impact of the development of digital economy on common prosperity is reflected in promoting high-quality economic development and narrowing the gap between the rich and the poor. During the period of COVID-19, the digital economy provided a strong impetus to the national economy. Bai Jinhao (2020), Han Jing (2020), Niu Wenke (2020) and others fully affirmed the development of China's digital economy in the current epidemic period. At the same time, they also offered suggestions and suggestions for the development of digital economy in the post epidemic period, emphasizing the driving role of digital economy in restoring economic development [2]. Zhang Yunping (2021) calculated the comprehensive index of digital economy and high-quality economic development by constructing relevant index system, established regression model and introduced intermediary effect test, and concluded that digital economy effectively promoted high-quality economic development by improving the level of human capital and upgrading the industrial structure [9]. Hu Deshun (2021) investigated the impact of digital economy and high-quality economic development through two-way fixed effect model, intermediary effect model, panel threshold model and spatial Durbin model, and empirically concluded that digital economy promoted the high-quality economic development of the Yangtze River economic belt [3]. The development of digital economy affects the supply-demand relationship of labor force with different skills; Thus affecting the personal income gap between different skilled labor [7]. In the era of Internet economy, more technical talents are needed, and high-quality economic development will be brought about through technological progress. Therefore, the demand for labor-oriented talents will be weakened accordingly. In the central and western regions with relatively backward economic development, digital economy can combine the corresponding regional advantages with traditional industries to stimulate a variety of new models and new normals, which can significantly narrow the regional income gap. To reduce the income gap, we need to further consolidate the material foundation of common prosperity with high-quality economic development, crack the realistic contradiction of unbalanced development with high-level reform and innovation, and build the development of common prosperity with an efficient governance system [1]. The development of digital economy reduces inter regional gullies, increases inter regional viscosity and weakens inter regional income gap [6]. Before China's reform, the government formulated certain policy protection

for regions with relatively backward economic development, which limited the development of industrial division of labor among regions to a great extent and posed a great challenge to the upgrading of industrial structure in resource intensive regions; Regional information is also relatively slow in economic development, resulting in information gap with other regions, resulting in information and technology closure and gap. With the advent of digital economy society, data and information can flow across regions, the aggregation degree of industrial chain in each region decreases, and the industrial chain becomes shorter and more scattered. The development of digital economy provides accurate matching between product operators and consumers [8].

Although studies have begun to explore the impact of digital economy on common prosperity, digital economy is still a comprehensive concept without a clear scope. There is no unified standard for the measurement of digital economy, and the sub dimensional influence of various elements of digital economy on common prosperity is not deep and comprehensive enough. Based on this, this paper uses empirical research method and panel data to evaluate the influence of the development of sub elements of digital economy on reducing the social gap between the rich and the poor. Finally, based on the research conclusions, this paper puts forward policy suggestions.

2 Model Setting and Variable Selection

2.1 Model Setting

This paper mainly considers the impact of digital economy on reducing the urban-rural income ratio. Referring to the existing literature and considering various factors affecting the urban-rural income ratio, this paper constructs the following benchmark model:

$$\text{Lngap}_{it} = \beta_0 + \beta_1 \text{Indig}_{it} + \beta_2 \text{var}_{it} + \varepsilon \quad (1)$$

Among them, gap is the explained variable - urban-rural income ratio index (because the socio-economic gap is more vulnerable to the impact of Internet technology). The article only considers the urban-rural income ratio, dig represents the digital index, and var represents other control variables, mainly including regional openness (trade), fiscal expenditure ratio (fiscal), urbanization development level (urban), human capital (ed) and other control variables. This paper uses benchmark regression analysis to test the impact of digital economy on reducing the gap between the rich and the poor and promoting common prosperity. Considering the endogeneity between the social gap between the rich and the poor (urban-rural income ratio) and the digital economy, this paper tests the robustness by replacing the explanatory variables and other relevant indicators.

In order to avoid Heteroscedasticity in the specific processing process, this paper makes logarithmic processing on the original data to make the variables more stable and reduce the fluctuation range.

2.2 Variable Selection

2.2.1 Explained Variables

The explanatory variable of this paper refers to the gap between the rich and the poor in China. From the perspective of the accuracy, simplicity and credibility of statistical data,

most studies directly use the urban-rural income gap (gap) as an indicator to measure the gap between the rich and the poor in China. The data mainly adopts the income ratio of urban residents to rural residents, which is collected in the China Statistical Yearbook.

2.2.2 Explanatory Variables

The explanatory variable of this paper is the digital economy index. According to existing research, there is no unified index to measure the development scale of digital economy. We mainly learn from Li Yang et al. (2021) that the digital economy is mainly based on the embodiment of information level. Therefore, this paper adopts three sub dimensional indicators: the number of Internet broadband access ports N_a (10000), the length of long-distance optical cable C_l (km) and the number of Internet broadband access users A_u (10000) to construct the index system of digital economy development level. The data comes from China Internet Statistics report over the years.

2.2.3 Control Variables

The proportion of local fiscal expenditure to GDP (fiscal) this paper uses the proportion of local fiscal expenditure to GDP (fiscal) to evaluate the degree of market intervention of the central government in regional economic market activities.

Urbanization development level: it has witnessed the process of social and economic development, the transformation of social structure and the gradual migration of rural population to cities and towns. This paper uses the population urbanization rate (urban), that is, the proportion of urban population in the total population, as the measurement standard.

Opening to the outside world: in recent years, due to the gradual globalization of China's economy and the development of foreign trade, China's economy has developed at a high speed. The developed foreign trade between regions is closely related to the employment rate of regional personnel, so as to promote economic development. Therefore, the degree of opening to the outside world is replaced by "the proportion of total import and export value in regional GDP (trade)".

Human capital: improving rural access to higher education can improve their quality of life and has a positive effect on reducing the gap between the rich and the poor. In this paper, human capital is measured by the number of years of Education (ed) per capita. The calculation formula is: average years of education in urban and rural areas = (rural education + Urban Education)/2.

3 An Empirical Analysis of the Impact of Digital Economy on Common Prosperity

3.1 Data Sources

According to the available data, this paper uses the panel data of 30 provinces (Tibet, Hong Kong, Macao and Taiwan will not be studied temporarily due to lack of data) from 2011 to 2019 for empirical analysis. The selected data come from China Statistical Yearbook, China Internet statistical report and China Information Yearbook. Table 1 shows the descriptive statistics of each variable.

Table 1. Descriptive statistical analysis of variables

VARIABLES	Obs	mean	sd	min	max
Province	270	15.50	8.672	1	30
Year	270	2,015	2.587	2,011	2,019
Ingap	270	0.961	0.156	0.613	1.381
Indigitization_level	270	5.458	0.716	2.026	6.136
InNA	270	7.198	0.918	4.127	9.052
InCL	270	10.08	0.858	6.819	11.71
InAU	270	6.467	0.907	3.728	8.243
Ined	270	2.181	0.063	2.001	2.401
Infiscal	270	3.124	0.445	0.233	4.141
Inurban	270	4.033	0.201	3.554	4.495
Intrade	270	2.791	0.967	0.0651	4.982

Table 2. Stability test

Original value	Ingap	Indigitization_level	InNA	InCL
results	stable	stable	stable	stable
InAU	Ined	Infiscal	Inurban	Intrade
stable	stable	stable	stable	stable

3.2 Stability Test

In this paper, HT test is used for unit root test to test whether the panel data is stable. In order to avoid pseudo regression, the stability test results are shown in Table 2. It can be seen that the panel data is stable data.

3.3 Analysis of Regression Results

If the fixed model or random effect is adopted, Hausmann test is required, and the *p* value of the test results is 0.000. Therefore, the fixed effect is used for empirical analysis of the benchmark model; At the same time, in order to further study the impact of digital economy on reducing the urban-rural income ratio, regional regression analysis is carried out. The results are shown in Table 3.

It can be seen from Table 3 that the impact of digital economy index on urban-rural income ratio is negatively correlated at the significant level of 1% nationwide, which shows that the development of digital economy is conducive to reducing the social urban-rural income ratio and reducing the gap between the rich and the poor. From the three dimensions of the number of Internet broadband access ports, the length of long-distance optical cable lines and the number of Internet broadband access users, the

Table 3. Regression results of the impact of digital economy on the whole country and different regions

Ingap	whole country	east	central section	west
Indig-level	-0.0328***	-0.0212***	-0.0263***	-0.0761***
	(0.00610)	(0.00866)	(0.0114)	(0.0117)
InNA	-0.0169**	-0.0803**	-0.0693	-0.0931***
	(0.0210)	(0.0346)	(0.0399)	(0.0350)
InCL	-0.0040**	-0.0121*	-0.0344	-0.01482**
	(0.0221)	(0.0276)	(0.0653)	(0.0393)
InAU	-0.0109*	-0.151***	-0.134*	-0.1855**
	(0.0250)	(0.0416)	(0.0538)	(0.0397)
Ined	-0.0112*	-0.258*	-0.0695*	-0.0111*
	(0.122)	(0.284)	(0.152)	(0.228)
Infiscal	-0.0101	-0.0104	-0.0295	0.202***
	(0.0134)	(0.0157)	(0.0765)	(0.0636)
Inurban	-0.677***	-0.359*	-0.924***	-0.520***
	(0.119)	(0.195)	(0.316)	(0.190)
Intrade	-0.0257**	-0.00585*	-0.112***	-0.0186
	(0.0110)	(0.0194)	(0.0348)	(0.0128)
_cons	-3.786***	-2.434**	-4.744***	-2.610***
	(0.518)	(1.101)	(1.260)	(0.924)
N	270	99	81	90
R2	0.616	0.527	0.709	0.800
Control ID	YES	YES	YES	YES

t statistics in parentheses ***p < 0.01,**p < 0.05,*p < 0.1.

number of Internet broadband access ports is significantly negatively correlated with the growth of urban-rural income ratio, and the significance degrees are different, and the influence coefficients are 0.0169, 0.0040 and 0.0109 in turn. From the influence coefficient between the explanatory variable and the explained variable, the influence degree of each explanatory variable on the explained variable is different. The number of Internet broadband access ports has the greatest impact. For each additional unit of Internet broadband access ports, the urban-rural income ratio will be reduced by 0.0169. The number of Internet broadband access users has the second degree of influence. For each additional unit of Internet broadband access users, the urban-rural income ratio will be reduced by 0.0109. The impact of long-distance optical cable line length is the lowest. For each additional unit of long-distance optical cable line length, the urban-rural income ratio will be reduced by 0.0040.

From the perspective of national subregions: the impact of digital economy index on urban-rural income ratio in different regions is negative, and the significance is negatively correlated at 1%. The number of Internet broadband access ports in different regions has a negative impact on the urban-rural income ratio, and the significance is not significant in the central region. In terms of numerical value, according to the order of influence from small to large, the degree of influence in the central region is the smallest and the influence is not significant. The eastern region is in the middle and the western region has the greatest influence. The impact of the two sub dimensions of long-distance optical cable line length and the number of Internet broadband access users on the regional urban-rural income ratio is similar to the number of Internet broadband access ports. This shows that the current development of digital economy in the central region is different. After the reform and opening up, the eastern region has more development opportunities. It is far ahead in the development level of digital economy and forms a virtuous circle with the overall development of the country. The development level of digital economy in the western region is still greatly improved. The development to digital economy can effectively reduce transaction costs, improve the efficiency of factor allocation, stimulate innovation vitality and promote balanced economic development to reduce the income gap in urban areas.

3.4 Robustness Test

According to the above regression results, the development of digital economy can improve the gap between the rich and the poor in China, but whether the result is robust remains to be tested. This paper uses Gini coefficient to replace urban-rural income ratio for regression to observe whether the result is stable (Table 4).

According to the empirical regression results, the effect of digital economy on Gini coefficient is negative, and it has passed the significance test of 1% nationwide. The results of robust test are basically consistent with the benchmark results.

Table 4. Regression results of the impact of digital economy on Gini coefficient across the country and among different regions.

Inurr	whole country	east	central section	west
Indig-level	-0.0275***	-0.0118***	-0.0378***	-0.0403***
	(0.00438)	(0.00613)	(0.00758)	(0.00998)
InNA	-0.0693**	-0.0596**	-0.0104	-0.150***
	(0.0151)	(0.0245)	(0.0265)	(0.0299)
InCL	-0.0157**	-0.0173*	-0.0221	-0.0710**
	(0.0158)	(0.0195)	(0.0434)	(0.0336)
InAU	-0.0471*	-0.0157***	-0.0633*	-0.0437**
	(0.0179)	(0.0295)	(0.0357)	(0.0339)

(continued)

Table 4. (continued)

Inurr	whole country	east	central section	west
Ined	−0.197**	−0.466**	−0.118	−0.433**
	(0.0878)	(0.201)	(0.101)	(0.195)
Infiscal	−0.00583	−0.00637	−0.0971*	−0.0253*
	(0.00964)	(0.0111)	(0.0508)	(0.0543)
Inurban	−0.697***	−1.123***	−1.046***	−0.253
	(0.0857)	(0.138)	(0.210)	(0.162)
Intrade	−0.0240***	−0.0233*	−0.0820***	−0.00775
	(0.00786)	(0.0137)	(0.0231)	(0.0110)
_cons	−5.307***	−7.385***	−6.444***	−3.805***
	(0.372)	(0.779)	(0.836)	(0.789)
N	270	99	81	90
R2	0.929	0.916	0.945	0.952
Control ID	YES	YES	YES	YES

t statistics in parentheses***p < 0.01,**p < 0.05,*p < 0.1.

4 Research Conclusions and Policy Recommendations

4.1 Research Conclusion

At present, the continuous improvement of Internet technology has promoted the rapid growth of digital economy, the national life has entered a well-off level, and the economic life is moving towards common prosperity. One problem is to reduce the gap between the rich and the poor. This paper finds that the development of digital economy has a significant positive impact on reducing the urban-rural income ratio, but the impact of different dimensions in different regions is different. Promoting the development of digital economy has the greatest influence on the urban-rural income ratio in the western region, followed by the eastern region and the central region. In addition, the number of years of education, the proportion of fiscal expenditure, the degree of opening to the outside world and the urbanization rate among regions have a certain impact on reducing the urban-rural income ratio and promoting common prosperity.

To sum up, in order to further release the digital dividend, the article believes that all regions should actively formulate the development strategy of digital economy, adjust measures to local conditions, promote the integration of regional real economy and digital economy, steadily narrow the income gap between urban and rural areas, improve the income of residents in rural areas, and cultivate and develop new agricultural business entities.

4.2 Policy Recommendations

4.2.1 Increase Investment in Digital Economy in Backward Areas

The government should actively promote the development of digital economy in backward areas, avoid the digital divide, increase investment in the digital economy in backward areas, such as the number of Internet broadband access ports, the length of long-distance optical cable lines, Internet broadband access users, speed up network construction, reasonably distribute cloud computing, and improve the ability of rural people in these backward areas to use the Internet to develop their economy. For rural areas, We should make use of our own location advantages and natural resource endowment to speed up the transformation from traditional industries to digital industries.

4.2.2 Create a Fair, Just and Open Internet Environment

The government should formulate corresponding policies to promote high-quality economic development and reduce the gap between the rich and the poor, so as to make the digital economy develop healthily in rural areas. The government should actively lead all kinds of capital to strengthen research and development and scientific and technological innovation of digital economy technology, and actively develop new industries and new business models of digital economy, The government should pay attention to the fairness of digital platform economic development, and constantly adjust and improve the scope, strength and framework of platform antitrust supervision.

4.2.3 Carry Out Begin Interaction Among Regions to Form a Positive Driving Role

At present, the level of digital economy is developing well in the eastern region. The eastern region should continue to play the exemplary role of the digital economy, seize the existing digital industry technology, and accelerate the role of the digital economy in promoting common prosperity. At the same time, it is essential to improve the development of the digital economy, expand the scale, of transition from urban to rural areas, and form corresponding industrial clusters to get rich first and later develop the digital economy in its own way. Also, it is necessary to drive the development of the digital economy in the central and western regions, and promote the balanced development of the digital economy among regions.

References

1. Chen Xin Common prosperity under the Marxist concept of wealth: realistic picture and practical path – Also on the transcendence of welfare politics [J] Zhejiang Social Sciences, 2021 (08): 4–10 + 156. <https://doi.org/10.14167/j.zjss>. 2021.08.001.
2. Han Jing, sun Yawen, Chen Xi Path analysis of China's digital economy development in the post epidemic era [J] Comparison of economic and social systems, 2020 (05): 16–24
3. Hu Deshun, pan Ziyang, Su bin Digital economy, manufacturing upgrading and high-quality economic development – An Empirical Test Based on 107 cities in the Yangtze River economic belt [J] Journal of Hubei University of Arts and Sciences, 2021, 42 (08): 29–38

4. Lei genqiang, Cai Xiang Distortion of initial distribution, urban bias of fiscal expenditure and urban-rural income gap – Empirical Evidence from China’s Provincial Panel Data [J] Research on quantitative economy and technical economy, 2012, 29 (03): 76–89
5. Li Bin, Ma Jiujie The impact of labor mobility on urban-rural income gap: from the perspective of life cycle [J] China population, resources and environment, 2013, 23 (11): 102–107
6. Li Shantong, Wu sansang, Gao Chunliang Prediction and analysis of urbanization speed in China [J] Development research, 2017 (11): 19–22
7. Liu Jun, Cao Yaru, Bao Yifa, Zhao Yuhui Research on the impact of manufacturing intelligence on income gap [J] China soft science, 2021 (03): 43–52
8. Liu Ru, Zhang Yiwei Digital economy and common prosperity – An Empirical Study Based on spatial threshold effect [J] Journal of Southwest University for Nationalities (Humanities and Social Sciences Edition), 2022, 43 (03): 90–99
9. Zhang Yunping, Dong Chao, Luan Jing Research on the mechanism of digital economy promoting high-quality economic development – evidence based on Provincial Panel Data [J] Journal of Jinan University (Social Science Edition), 2021, 31 (05): 99–115 + 175

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

