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Does the Development of the Digital Economy Promote Common Prosperity?—Analysis Based on 284 Cities in China

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Abstract: Common prosperity is the essential requirement of socialism and an important feature of Chinese-style modernization. Data from 284 cities in China from 2011 to 2020 were collected to construct an evaluation system of the digital economy and common prosperity and establish relevant econometric models to explore their impact, spatial spillover, and mechanism. It is found that: (1) the digital economy has an obvious role in promoting common prosperity, this promotion role is dynamic and nonlinear, and the digital economy's promotion is more obvious in low-level digital economy regions; (2) the digital economy has obvious externalities, and there is a spatial spillover effect in the process of promoting common prosperity; (3) resource allocation efficiency plays a mediating role in the process of promoting common prosperity development in the digital economy. Finally, countermeasures and suggestions are proposed in four aspects: strengthening the development of the digital economy, increasing investment in digital infrastructure, enhancing the digital governance capacity of the government, and building a digital economy demonstration zone. The research results deepen the understanding of the digital economy and common prosperity and provide some insights for the ultimate realization of common prosperity.

Keywords: common prosperity; digital economy; resource allocation efficiency; mediation effect; spatial spillover effect

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1. Introduction

China's GDP reached 121 trillion yuan in 2022, placing it second in the world. Everyone can see the effects of China's economic progress. However, there are still regional and urban–rural disparities in China, and the percentage of groups with moderate incomes is not high. These issues have a detrimental effect on Chinese social stability, prosperity, and economic growth. Common prosperity has manifested as an important objective for Chinese future development. Achieving common prosperity is to address uneven growth, reduce income distribution and urban–rural development gaps, and create social prosperity and stability as well as sustainable economic growth. It is clear that establishing common prosperity is a difficult, lengthy process that takes time and constant effort to complete. China needs a fresh source of economic growth to facilitate the achievement of common prosperity, as traditional economic forms are unable to accomplish such a goal. In recent years, the digital economy has brought about major shifts to countless businesses and organizations, and its broad impact on finance, manufacturing, and many other areas [1] brings with it previous unseen dangers and opportunities. The digital economy can overcome the limitations of traditional components of production on economic growth [2], and can not only be deeply integrated with various industries to promote industrial transformation, upgrading, and change in consumption patterns [3], but also can reduce search costs, eliminate information discrepancies, and narrow divides between regions.

The world, including China, has been greatly impacted by the digital economy. Many recent studies emphasize how the digital economy affects the gap between regions [4], how the digital economy reduces the wealth divide between urban and rural locations [5], and

how the digital economy promotes industrial upgrading [6]. However, few articles have explored the connection between common prosperity and the digital economy. Will the expanding digital economy promote common prosperity? What are the characteristics of this impact? These are the questions to be addressed in this article. Discussing the connection among common prosperity and the digital economy not only enriches academic research in related fields, but also provides a scientific path for China to achieve common prosperity and provides new solutions and new ideas for global sustainable development.

Therefore, this study uses data from 284 cities in China from 2011 to 2020 and various models to examine the link between the digital economy and common prosperity. The remainder of the article is organized as follows: the second part consists of a review of the literature on common prosperity and the digital economy. The third part conducts the corresponding theoretical analysis and presents the hypotheses of the study. The fourth part discusses the research's methodology, introducing the digital economy and common prosperity index system, the model used in this paper, and the data sources. The empirical analysis comprises the fifth section, which analyzes the impact and spatial effects of the digital economy to promote common prosperity, conducts robustness tests, and discusses the endogeneity problems in the model. The sixth part consists of the conclusion of this paper.

2. Literature Review

2.1. Common Prosperity

Many scholars have analyzed the connotation of common prosperity from different dimensions. Li [7] analyzed the essence of common prosperity and believes that common prosperity is not a simple egalitarianism, but a kind of comprehensive prosperity achieved after the joint efforts of all people. Reducing disparities among regions and rural-urban areas is a key step to realizing common prosperity. Michael Dunford et al. [8] believe that common prosperity is a strategic choice China has made in the face of problems such as urban–rural and regional income gaps at this stage, with the purpose of developing productivity and eliminating polarization. Wang et al. [9] argue that common prosperity requires not only material prosperity but also spiritual prosperity, and that at the same time common prosperity includes two meanings: fairness and efficiency. Xia et al. [10] argue that the key to common prosperity lies in dealing with fairness and efficiency, and they believe that to achieve common prosperity, efficiency must be the foundation, and fairness must be the method. In summary, many scholars agree that fairness and efficiency must be properly handled in order to achieve common prosperity. In one sense, the core of common prosperity is development; to achieve common prosperity, we must develop productivity, increase social wealth, and improve efficiency. Meanwhile, in order to close gaps and lessen polarization, common prosperity also requires justice, which may be achieved by improving income distribution and government macro-control. Therefore, on the basis of improving efficiency and achieving relative equity, common prosperity can be achieved.

Numerous methods have been proposed by a large number of scholars regarding the statistical measurement of common prosperity. One is the index decomposition approach, demonstrated by Kakwani et al. [11], who decomposed and quantified the contribution of social policies and the labor market to common prosperity in China to produce the common prosperity index. However, the most common way to quantify common prosperity is constructing index systems. For example, Wang et al. [12] evaluated the level of common prosperity in the Yangtze River basin from four perspectives: material, social, spiritual, and environment. Wan et al. [13] quantified common prosperity using two dimensions of development and sharing, finding that China has made great achievements in common prosperity by analyzing the data of 162 economies from 1990 to 2020.

2.2. Digital Economy

The digital economy affects all aspects of social production and life, provides new opportunities for all economic sectors [14], and is a completely new way of accomplishing

economic and social activities using information and communication technologies [15]. Bukht et al. [16] define the economic output generated by digital services and products as the digital economy. Existing measurements on the digital economy are divided into two methods: size measurement and index construction. Han et al. [17] used the BEA method to calculate the inter-provincial digital economy scale and realized that the Chinese digital economy in total showed a high growth pattern from 2012–2017, while there were also obvious regional differences. Jiao et al. [18] measured the digital economy from Internet development, digital technologies, and industrial efficiency improvement, and found that the digital economy promotes the local economy. Zhao et al. [5] found through testing that digital inclusive finance impacts the urban–rural income disparity and pointed out that there is a negative relationship between the two, meaning that digital inclusive finance shrinks the urban–rural income disparity. Azam et al. [19] found that ICT trade promotes economic growth and reduces CO_2 emissions. Cardona et al. [20] discovered that the digital economy promotes productivity growth, and that this effect becomes stronger over time. Unlike traditional economic forms, the digital economy is widely permeable and highly versatile [21], has produced a lot of emerging industries [22], and is a crucial engine for economic growth at this stage [23,24].

2.3. Digital Economy and Common Prosperity

According to the literature review above, the digital economy is crucial for reducing the disparity between urban–rural areas and fostering economic growth on a regional and local level. While achieving common prosperity requires both economic development and gap-closing, these are the primary steps. There are two main categories of articles on the relationship between common prosperity and the digital economy, each with its own views that have not yet formed a more unified opinion. One viewpoint holds that the digital economy can help realize common prosperity. Liu et al. [25] claim that the digital economy brings about an improvement in the relationship between income distributions, and they verified that the digital economy makes income distributions between different regions more balanced and facilitates the achievement of common prosperity. Through the 30 Chinese provinces' panel data, Zhang et al. [26] discovered that the digital economy may greatly raise common prosperity and that green finance has a moderation role in this. Another type of view emphasizes that the digital economy has an adverse impact on common prosperity, arguing that the digital economy remains in the place of the winner-take-all market structure. In this case, capital invested in the digital economy may obtain excess profits, forming a "Matthew Effect" that leads to income inequality and further widens rural-urban and regional disparities, which is not helpful for common prosperity. Lam et al. [27] found that for economically developed areas, investment in digital infrastructure promotes local development, and in economically disadvantaged areas, investment in digital infrastructure does not have an impact on local development. Yao et al. [28] conducted an analysis on the link between digital finance development and population income and discovered that digital finance affects population income disparity, an effect that would only decrease with regional economic development. According to Hu et al. [29], the direct development of the digital economy may be counterproductive, creating a "digital divide" that constrains the development of less developed regions and widens regional disparities. They also claim that it is difficult to achieve comprehensive digital penetration and a balance in the allocation of skills.

By combing the above two points of view, it is found that scholars who argue that the digital economy is not beneficial to common prosperity simply see it as a form of the economy driven by information technology, and do not find that the digital economy also signifies a shift in the economy's structure. The digital economy itself is endowed with the capacity to enhance resource allocation effectiveness, economic development effectiveness, and public management effectiveness, all of which are conducive to achieving "more efficiency." Its function of bridging the urban–rural divide and regional gaps is also more

conducive to promoting "fairness". It makes it possible to realize common prosperity depending on the digital economy.

In summary, there are few research studies investigating the digital economy's effects on common prosperity, and the majority of these studies focus on provincial regions, with the city receiving far less attention. To discover the interaction between the digital economy and common prosperity, this article builds an indicator system for both, using municipal data from 2011 to 2020. As a result, it not only can enrich the research's content, but can also offer some theoretical support for the practice processes of relevant departments.

3. Theoretical Analysis and Research Hypothesis

The digital economy can have an indirect influence on common prosperity through some mechanism of action in addition to its direct impact on common prosperity owing to its inherent qualities. The impact of the digital economy may also have regional spillover effects. Thus, this study emphasizes four elements of direct impact, nonlinear effect, spatial spillover, and mechanism to show the impact of the digital economy on common prosperity and to provide matching theories.

3.1. Direct Impact

Due to its adaptability and low marginal cost, the digital economy, as an economic structural transformation, may not only encourage economic growth and provide new growth areas for economic development, but also may guarantee balanced development, justice, and sharing [30]. This enables the digital economy to resolve the tension between "growing the cake bigger" and "sharing the cake properly" and to successfully overcome the barriers standing in the way of reaching common prosperity. Since common prosperity has the characteristics of "one body with two sides" (that is, common prosperity is the unity of efficiency and fairness), it is necessary to examine the direct impact of the digital economy from two aspects.

Regarding efficiency, the digital economy can improve resource use and propel development in the economy. The digital economy is supported by advanced intelligent technologies and the organic integration of these advanced technologies with other elements promotes the innovative development of new industries and creates new markets and employment opportunities [31]. Various industries can greatly benefit from this, increasing their output [32]. Meanwhile, the digital economy opens up new markets for economic activity, eliminates barriers to economic transactions, interconnects various economic agents, shortens production time, increases the speed of capital turnover, and thus improves the efficiency of business operations [33]. It is therefore more efficient for a country to develop a digital economy than a traditional economy.

Regarding equity, a digital economy with the characteristic of zero marginal cost is conducive to solving the problem of unbalanced development [34]. The digital economy can not only effectively communicate between cities and villages and break geographical boundaries; it can also promote common prosperity by reducing search costs and eliminating information gaps [35]. Meanwhile, digital governance, as part of the digital economy, guarantees the effective flow of data among individuals, markets, and governments, allowing governments to formulate social security policies in a more targeted manner, improve social security systems, and reduce income inequality. Therefore, the following hypothesis is proposed.

Hypothesis 1 (**H1**). *Common prosperity is enhanced by the digital economy.*

3.2. Non-Linear Effects

Due to economic and informatization differences in regions, there are heterogeneity [36] and a threshold effect [37,38] in the digital economy. Dynamically, low-digital economy regions do not fully enjoy the "digital dividend" brought about due to the imperfection of their digital infrastructure. Thus, there is still room for improving the digital

economy's role in fostering common prosperity. The gap between the incomes of these regions and the incomes of developed regions needs to be narrowed, and the digital economy should be brought into full play in less developed regions to stimulate their development potential and achieve common prosperity. Regions with developed digital economies, because of their excessive investment of capital for the digital economy, may be detached from the demand of the market and experience reduced coordination between the economy and society, which eventually weakens the pulling effect of the digital economy on common prosperity. Thus, low levels of growth of the digital economy, the driving effect of the digital economy on common prosperity, will be stronger in areas with a strong digital economy. The following hypothesis is proposed.

Hypothesis 2 (**H2**). *The impact of the digital economy on common prosperity has a non-linear trajectory, and for regions with a high digital economy development level, the digital economy has a stronger contribution to common prosperity than in regions with a low development level.*

3.3. Spatial Spillover Effects

There are obvious externalities associated with the digital economy, unlike the agricultural and industrial economies, which are characterized by high mobility and strong penetration with spatial spillover characteristics [39]. Data and information can be disseminated across space and time at a low cost, breaking the limitation of spatial distance between regions, weakening the law of decay of the technology spillover effect, and enhancing the sharing and universality of knowledge and technology. It constitutes a highly interconnected networked structure based on knowledge and information, and the conditions created for the allocation and use of various factors make the coordinated and integrated development between regions and urban–rural areas more convenient, further promoting common prosperity by reducing the gap. Therefore, when studying the relation between common prosperity and the digital economy, it is important to analyze the spatial impacts of the digital economy from the standpoint of spatial measurement. The hypothesis is as follows.

Hypothesis 3 (**H3**). *The promotion of common prosperity is impacted spatially by the digital economy.*

3.4. The Mechanism of Action of the Digital Economy for Common Prosperity

The growth of the digital economy can significantly increase resource allocation effectiveness [40,41]. The use of digital technology decreases income inequality, eliminates informational obstacles, minimizes information asymmetry, and increases market transparency and openness, effectively enhancing resource allocation efficiency. From the viewpoint of the workforce, the digital economy increases lots of jobs; because more transparent information gives workers more employment options, the allocation efficiency of the labor force is improved significantly. Meanwhile, the digital economy provides low-cost education opportunities for the low-income population, improves their skills, and increases their labor remuneration [42]. The digital economy has decreased economic inequality and brought about common prosperity. From a capitalistic perspective, the digital economy increases financial services' availability and practicality, solves the problem of financial exclusion due to geographical problems, reduces the difficulty of financing, makes it easier for capital to move to areas and sectors offering greater pay, improves the allocation efficiency of capital, helps diminish wealth disparities, and encourages the attainment of common prosperity. Thus, the hypothesis is as follows.

Hypothesis 4 (**H4**). *By increasing the effectiveness of resource allocation, the digital economy contributes to the creation of a prosperous society.*

4. Research Design

4.1. Variable Measures and Descriptions

4.1.1. Explained Variables

As an explanatory variable, the combination of "common" and "prosperity" is the basis of common prosperity. Therefore, this paper measures the common prosperity of Chinese cities in two dimensions, "commonality" and "prosperity", as shown in Table 1. By applying the entropy weight approach, the amount of common prosperity development was determined; it is denoted as *cp*.

Table 1. Common prosperity development level indicator system.

First Level Index	Second Level Index	Third Level Index	Impact
Prosperity	Resident Life	GDP per capita	+
		Per capita disposable income of urban residents	+
		Per capita disposable income of rural residents	+
		Per capita consumption expenditure of urban residents	+
		Per capita consumption expenditure of rural residents	+
	Education Level	Per pupil education expenditure	+
	Medical level	Number of hospital beds per capita	+
	Social Service Level	Local fiscal general budget expenditure/GDP	+
	Cultural life level	Public library holdings per capita	+
	Financial input	Fiscal spending/GDP	+
	Science and education input	Science and education expenditure/GDP	+
Commonality	Urban–rural gap	The ratio of rural residents' income to urban residents' income	+
		The ratio of consumption expenditure of rural residents to that of urban residents	+
	Regional Gap	The ratio of rural residents' income to the national average rural residents' income	+
		The ratio of urban residents' income to the national average urban residents' income	+

+ means positive indicator.

4.1.2. Core Explanatory Variables

The digital economy, denoted as *dige*, is the core explanatory variable, and the indicator building approach is used to depict the digital economy. This article refers to the method of Zhao et al. [43], through which the digital economy is measured using internet development and digital finance. Internet development consists of the number of internet broadband access users per 100 people, the proportion of employed persons in the computer service and software industry, the number of cell phone users per 100 people, and the total amount of telecommunication business per capita. Measurements of digital finance adopt the Peking University Digital Financial Inclusion Index [44].

4.1.3. Mediating Variables

Resource allocation effectiveness, denoted as *dist*, serves as the mediating factor in this study; it is captured using the degree of factor market distortion. Referring to Chen et al. [45], the degree of market distortion is measured in terms of both capital and labor.

$$distK = \frac{\alpha Y_i}{Kr_{it}} \tag{1}$$

$$distL = \frac{\beta Y_i}{Lw_{it}} \tag{2}$$

$$dist = distK^{\frac{\alpha}{\alpha+\beta}} \cdot distL^{\frac{\beta}{\alpha+\beta}} \tag{3}$$

where *dist* is the degree of factor market distortion, *distK* is the degree of capital distortion, *distL* is the degree of labor distortion, and Y_i is nominal output measured using the current year's GDP, and using the perpetual inventory approach, K represents the capital stock, and L is the total labor force, using the current year's employed population instead, and the fixed asset investment index r_{it} represents capital pricing. The average wage is used to measure the price of labor w_{it}. Estimated capital output elasticity is α and labor output elasticity is β using the C-D production function. A higher degree of factor distortion indicates a less efficient allocation of resources in the region.

4.1.4. Control Variables

This article has been referenced by Xiang et al. [46] regarding the selection and ideas of control variables. The variables considered included: the level of opening up to the outside world (X_1), measured as the ratio of the actual amount of foreign capital used in the year to GDP; the level of financial development (X_2), measured as the ratio of the loan balance of financial institutions to GDP; the level of industrialization (X_3), measured as the logarithm of the number of industrial enterprises above a certain scale; human capital (X_4), measured as the logarithm of the number of students in higher education; and unemployment rate (X_5), measured as the ratio of the number of unemployed people to the total population.

4.2. Data Sources

The data of the paper are drawn from 284 cities in China between 2011 and 2020. The data are from the China City Statistical Yearbook, the EPS database, and the official websites of city statistical bureaus, and a few missing data are filled by interpolation to ensure the accuracy and completeness of the data.

4.3. Model Construction

4.3.1. Baseline Regression Model Setting

To test the above set of hypotheses, this study initially builds the benchmark regression model shown below.

$$cp_{i,t} = \alpha_0 + \alpha_1 dige_{i,t} + \sum \alpha_c X_{i,t} + \varepsilon_{i,t} \quad (4)$$

where i, t represent cities and years, the degree of common prosperity is $cp_{i,t}$; $dige_{i,t}$ represents the digital economy, $X_{i,t}$ is a group of control variables, and $\varepsilon_{i,t}$ is the random error term.

4.3.2. Threshold Model Setting

It is also considered that with the increase in the stage of digital economy development, the influence of the digital economy on common prosperity might be nonlinear. The promotion of common prosperity by the digital economy may vary in various areas, so the article builds the following threshold regression model.

$$cp_{i,t} = \beta_0 + \beta_1 dige_{i,t} \times I(dige_{i,t} \le \theta) + \beta_2 dige_{i,t} \times I(dige_{i,t} > \theta) + \sum \beta_c X_{i,t} + \varepsilon_{i,t} \quad (5)$$

Equation (5) is a single-threshold model where the digital economy development is the threshold variable and I is the indicator function. The indicator function is 1 if the condition is met; otherwise, it is 0. The model can be expanded to a multi-threshold form.

4.3.3. Spatial Durbin Model

To explore the spatial spillover effect of the digital economy, a Durbin model has been created as follows.

$$cp_{i,t} = \rho_0 + \rho_1 Wcp_{i,t} + \rho_2 Wdige_{i,t} + \sum \rho_c X_{i,t} + \varepsilon_{i,t} \quad (6)$$

W is the spatial weight matrix, w_1 is the adjacency matrix, w_2 is the spatial inverse distance matrix, and w_3 sets up the economic geography nested matrix by referring to Han Feng et al. [47]

4.3.4. Mediated Effects Model

Based on the above analysis and hypotheses, and drawing on the work of Wen et al. [48], it is known that resource allocation efficiency is the mediating variable in this paper. The following mediating role model is set up to test Hypothesis 4.

$$dist_{i,t} = \gamma_0 + \gamma_1 dige_{i,t} + \sum \gamma_c X_{i,t} + \varepsilon_{i,t} \quad (7)$$

$$cp_{i,t} = \delta_0 + \delta_1 dige_{i,t} + \delta_2 dist_{i,t} + \sum \delta_c X_{i,t} + \varepsilon_{i,t} \quad (8)$$

$dist_{i,t}$ is the resource allocation $dist_{i,t}$ efficiency, and Equations (4), (7), and (8) may be used to investigate the transmission mechanism of resource allocation in the process of the digital economy impacting common prosperity. Where α_1 represents the whole impact of the digital economy on common prosperity, δ_1 represents the direct effect of the digital economy, and $\gamma_1 \cdot \delta_2$ denotes the indirect effect of resource allocation efficiency on common prosperity. The mediating effect can also be tested by the bootstrap method.

5. Empirical Analysis

5.1. Descriptive Statistics

According to Table 2, the common prosperity's average for 284 cities is 0.1311 The values range from 0.0455 to 0.4013, showing that there is a significant disparity in the common prosperity. The digital economy also shows the characteristic of "small mean value and large standard deviation". The mean value of resource allocation efficiency is 2.1017, and ranges from 0.2257 to 8.6133, which also shows a large regional difference. The control factors also varied significantly.

Table 2. Results of descriptive statistics of variables.

Variables	Number of Observations	Average Value	Standard Deviation	Maximum Value	Minimum Value
cp	2840	0.1311	0.0509	0.4013	0.0455
dige	2840	0.1181	0.0639	0.6193	0.0119
dist	2840	2.1017	1.3352	8.6133	0.2257
X_1	2840	0.004	0.0063	0.0646	0.0001
X_2	2840	1.0211	0.6254	9.6221	0.118
X_3	2840	6.5785	1.0938	9.3843	2.9957
X_4	2840	10.5775	1.3312	14.0834	4.7622
X_5	2840	0.012	0.2249	10.0722	0.0011

5.2. Impact of the Digital Economy on Common Prosperity

5.2.1. Baseline Regression Results

The test statistic of the Hausman test is 46.99 with a p-value of 0.000, indicating that the fixed effects model should be used. Table 3 displays the baseline regression result. Without introducing additional control variables, Column (1) shows the direct impact of the digital economy, with a significantly positive coefficient, and the digital economy is positively correlated with common prosperity. After joining the control variable as a result, such as in Column (2), the digital economy still promotes common prosperity, and the significance level is 1%. The R^2 coefficients of Columns (1) and (2) are above 60%. The results verify Hypothesis 1, which means the digital economy boosts common prosperity.

Table 3. Baseline regression results.

	(1)	(2)
	cp	*cp*
dige	0.5308 ***	0.4690 ***
	(20.2913)	(15.0596)
X_1		0.1539
		(1.6178)
X_2		0.01095 ***
		(2.9022)
X_3		0.009222 ***
		(4.6148)
X_4		0.003852 ***
		(3.7735)
X_5		0.001676 ***
		(8.9364)
Constant term	0.06843 ***	−0.03749 **
	(22.1586)	(−2.3025)
N	2840	2840
R^2	0.6385	0.6685

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

5.2.2. Nonlinear Effect Analysis of the Impact of the Digital Economy on Common Prosperity

According to the theoretical research presented above, the impact of the digital economy on common prosperity may be nonlinear. Therefore, this study investigates the nonlinear effect using threshold regression.

500 samples were taken using "Bootstrap's technique" before the threshold regression. The findings demonstrated that the digital economy passed the single and double thresholds but failed the triple threshold. Therefore, based on the test results, the article sets the threshold regression model, and the results are displayed in Table 4. In the form of a single and double threshold, respectively, Columns (3) and (4) demonstrate the nonlinear impact of the digital economy. Overall, the contribution of the digital economy has an obvious nonlinear feature of diminishing marginal impact, which means as digital economy development increases, its benefits to common prosperity decrease. Specifically, Column (3) shows that the single threshold value is 0.2188 and the coefficient of the digital economy is 0.5343 when the threshold variable is less than 0.2188, while the coefficient decreases to 0.4317 when the threshold variable is greater than 0.2188. Column (4) shows the double threshold values are 0.2014 and 0.2857, respectively, and the coefficient of the digital economy decreases to 0.5561, 0.4867, and 0.4167 in order with the increase of the threshold variable. Hence, during the early stages of digital economy development, it played a significant role in promoting common prosperity. However, as the digital economy develops in its middle and latter stages, continuing to increase investment in the digital economy may reduce its contribution to common prosperity. Hypothesis 2 holds.

5.2.3. Analysis of the Spatial Spillover Effect of the Digital Economy on Common Prosperity

Moran's I index is used here for verifying spatial correlation in common prosperity in each region; three weight matrices were used to conduct Moran's I test separately, and Table 5 shows the result. No matter what kind of matrix, the results of Moran's I with regard to common prosperity were more than 0 and significant, which shows that common prosperity across diverse locations is significantly positively correlated with space, and spatial econometric analysis can be used. The appropriate spatial econometric model was selected through correlation tests. Firstly, the Hausman test was used to judge the selection; then the LM test was used to judge whether there is a spatial error or spatial lag in the model; finally, the LR test was used to judge whether the model can be simplified to a

SAR or SEM model. Combining three matrices' test results, the fixed-effect SDM model was chosen.

Table 4. Threshold regression results.

Variables		**(3)** *cp*	**(4)** *cp*
Threshold value	θ_1	0.2188	0.2014
	θ_2		0.2857
$dige{\cdot}I(dige \leq \theta_1)$		0.5343 ***	0.5561 ***
		(21.2867)	(24.9628)
$dige{\cdot}I(\theta_1 < dige \leq \theta_2)$		0.4318 ***	0.4867 ***
		(14.6635)	(21.2938)
$dige{\cdot}I(dige > \theta_2)$			0.4167 ***
			(13.1143)
Control variables		There are	There are
N		2840	2840
R^2		0.6880	0.6923

*** $p < 0.01$.

Table 5. Results of Moran's I test for the development level of common prosperity 2011–2020.

Year	w_1		w_2		w_3	
	Moran's I	**Z-Statistic**	**Moran's I**	**Z-Statistic**	**Moran's I**	**Z-Statistic**
2011	0.144 ***	9.352	0.275 ***	15.552	0.391 ***	18.84
2012	0.133 ***	8.616	0.265 ***	14.936	0.373 ***	17.916
2013	0.132 ***	8.583	0.265 ***	14.983	0.382 ***	18.421
2014	0.135 ***	8.694	0.253 ***	14.223	0.33 ***	15.844
2015	0.146 ***	9.425	0.259 ***	14.589	0.34 ***	16.309
2016	0.135 ***	8.721	0.245 ***	13.849	0.319 ***	15.356
2017	0.178 ***	11.418	0.295 ***	16.587	0.385 ***	18.435
2018	0.185 ***	11.913	0.308 ***	17.311	0.403 ***	19.316
2019	0.186 ***	11.944	0.309 ***	17.34	0.4 ***	19.175
2020	0.195 ***	12.495	0.31 ***	17.39	0.378 ***	18.083

*** $p < 0.01$.

Table 6 reports the spatial Durbin panel model results. The findings indicate that, regardless of the matrix, the digital economy (*dige*) and the spatial lag term of common prosperity (*Wcp*) all have positive coefficients and are at the 1% level of significance. The findings show that a certain spatial spillover of common prosperity itself, and common prosperity in the area, rises, which benefits common prosperity around regions. The spatial lag term of the digital economy (*Wdige*) on common prosperity is significantly positive under both w_1 and w_2, and the effect is not significant under w_3. However, the digital economy's intra-regional spillover and inter-regional spillover also need to look at its direct and indirect effects, and the pure point estimation results may be biased. The results of direct effects are all at the 1% level of significance, meaning the digital economy can effectively promote common prosperity and there is a significant intra-regional spillover. As a novel form of economic structure, the digital economy gathers a large number of advanced intelligent technologies which help to reshape the industrial structure and develop new markets. Thus, developing the digital economy can effectively promote common prosperity in the area. The results of the digital economy indirect effect are significant in all three matrices, indicating that the improvement the digital economy in one area has an obvious promotion effect on common prosperity in the surrounding areas. The digital economy can break the information barrier and spatial limitations due to its wide permeability, enhance the economic and social ties between regions through various

information technology means, and promote common prosperity in the surrounding areas by "leading from the point to the surface". Hypothesis 3 is valid.

Table 6. Panel spatial econometric model regression results.

	(5)	(6)	(7)
	w_1 *cp*	w_2 *cp*	w_3 *cp*
dige	0.130 ***	0.118 ***	0.161 ***
	(5.32)	(5.39)	(8.60)
Wdige	0.063 *	0.071 **	−0.035
	(1.70)	(2.10)	(−1.33)
Wcp	0.733 ***	0.735 ***	0.709 ***
	(14.08)	(15.30)	(19.80)
Direct effect	0.141 ***	0.131 ***	0.167 ***
	(5.68)	(5.92)	(8.65)
Indirect effects	0.579 ***	0.580 ***	0.262 ***
	(10.02)	(11.29)	(5.59)
Total effect	0.720 ***	0.711 ***	0.429 ***
	(13.43)	(14.53)	(8.21)
Control variables	There are	There are	There are
N	2840	2840	2840
R^2	0.406	0.427	0.488

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.3. Analysis of the Mechanism of Action

Table 7 displays the findings that demonstrate the digital economy's mechanism for fostering common prosperity. Column (8) shows that the digital economy promotes efficiency of resource allocation. Combining the results of Columns (2), (8), and (9), one can find that the digital economy fosters common prosperity by enhancing resource allocation effectiveness. The digital economy breaks the information imbalance, makes markets more open and transparent, increases resource allocation efficiency, reduces the imbalance of regional development, and promotes common prosperity. Meanwhile, to verify the result, this article uses the "bootstrap method" repeated sampling 1000 times at the 95% confidence level; the model calculation results are shown in Table 8. These test findings are consistent with those from the regression model. Hypothesis 4 is verified.

Due to the spatial spillover, resource allocation efficiency is added in the spatial Durbin model for analysis in order to better examine the mechanism of the digital economy, and the results are presented in Table 9. In the w_2, resource allocation efficiency (*dist*) and its lagged term (*Wdist*) coefficients are not significant. The regression results remain consistent with the results in Table 7 above. By impacting the effectiveness of resource allocation, the digital economy may foster common prosperity.

Table 7. Intermediation effects results.

	(8)	(9)
	dist	*cp*
dige	−2.7009 ***	0.4591 ***
	(−9.9127)	(51.9781)
dist		−0.003670 ***
		(−5.8262)
Control variables	There are	There are
N	2840	2840
R^2	0.1391	0.6728

*** $p < 0.01$.

Table 8. Bootstrap test results.

	Path Factor	Standard Error	Estimated Value	*p*-Value	Confidence Lower Limit	Confidence Limit
Indirect effects	0.005284	0.002376	2.22	0.026	0.000627	0.009941
Direct effect	0.580028	0.023273	24.92	0.000	0.534414	0.625643

Table 9. Mechanism of action spatial regression results.

	w_1		w_2		w_3	
	(10)	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**
	dist	*cp*	*dist*	*cp*	*dist*	*cp*
dige	0.437	0.077 ***	0.373	0.134 ***	−0.167	0.151 ***
	(1.15)	(11.16)	(0.96)	(16.55)	(−0.47)	(17.14)
dist		−0.000		−0.000		−0.000
		(−0.85)		(−0.97)		(−0.92)
Wdige	−3.091 ***		−2.541 ***		−1.218 ***	
	(−5.69)		(−4.76)		(−3.03)	
Wdist		0.009 ***		0.001		−0.003 ***
		(8.19)		(0.82)		(−3.01)
Wcp	0.426 ***	1.020 ***	0.489 ***	0.806 ***	0.417 ***	0.656 ***
	(9.97)	(253.17)	(12.69)	(55.79)	(13.99)	(45.53)
Control variables	There are	There are	There are	There are	There are	There are
N	2840	2840	2840	2840	2840	2840
R^2	0.456	0.072	0.421	0.438	0.382	0.473

*** $p < 0.01$.

5.4. Robustness Tests

5.4.1. Substitution of Dependent Variables

To verify the reliability of the article's empirical results, the following principal component analysis is used to reduce the dimensionality of the index and bring it into Equation (4) for re-regression. The results are shown in Column (16) in Table 10. After replacing the dependent variable, the digital economy's coefficient is still significant. The results are robust.

5.4.2. Periodic Regression

In 2015, China issued the "Guiding Opinions on Actively Promoting the "Internet + Action". This paper takes 2015 as the demarcation point for the digital economy, segmenting the sample into two parts according to time: 2011–2015 and 2016–2020. The results are in Columns (17) and (18) of Table 10. The impact coefficient of the digital economy is significantly positive in both periods, and the results are robust.

5.4.3. Removal of Municipalities

Beijing, Shanghai, Chongqing, and Tianjin are at the forefront of the country's common prosperity development level. Putting them into the sample may amplify the coefficient of the digital economy. Therefore, the sample data from the four municipalities were removed, and the regression wasrun once again. Column (19) of Table 10 is the result. It demonstrates that after excluding the four municipalities, the effect of the digital economy is still significantly favorable and the regression result is robust.

Table 10. Robustness test results.

	(16)	(17)	(18)	(19)	(20)
	Alternative dependent variable	2011–2015	2016–2020	Removal of municipalities	Tool Variables
dige	31.172 ***	0.4252 ***	0.2824 ***	0.4657 ***	0.6373 ***
	(15.3737)	(14.5011)	(9.8417)	(14.6649)	(12.3877)
Kleibergen-Paap rk LM statistics					46.980
					(0.000)
Kleibergen-Paap rk Wald F-statistic					19.622
					(16.38)
Control variables	There are	There are	There are	There are	There are
N	2840	1420	1420	2800	2840
R^2	0.6491	0.5893	0.3145	0.6676	0.6200

*** $p < 0.01$.

5.4.4. Endogeneity Issues

To determine whether the paper has an endogeneity issue, the instrumental variables approach is used here for treatment. The instrumental variables chosen were based on the work of Zhao et al. [43]. The number of post offices per 10,000 people in 1984 was used as the instrumental variable in this paper. However, the instrumental variable cannot be used directly because it consists of cross-sectional data. Based on the work of Nunn et al. [49], the number of internet users in the previous year was introduced and made to form an interaction item with the number of post offices per 10,000 people in 1984. This interaction item is a new instrumental variable. Table 10, Column (20) shows the results, which find that after considering endogeneity issues, the conclusion regarding the promotion of the digital economy still holds.

The Kleibergen-Paap rk LM statistic was 46.980 with a *p*-value of 0.000, the Kleibergen-Paap rk Wald F statistic was 19.622, and the critical value at the 10% level was 16.38, which is higher than the critical value, indicating that the cross term selected in this paper as an instrumental variable is more reasonable.

6. Conclusions

This paper explores the impact of the digital economy on common prosperity using 284 Chinese cities' data from 2011 to 2020 and using resource allocation efficiency as a mediating variable. This article also discovers the nonlinear effect and spatial spillover of the digital economy. The study finds:

1. The digital economy can effectively promote common prosperity, and this promotion effect is dynamic and nonlinear. The study results show that promotion decreases as the digital economy's degree of development rises.
2. The digital economy has a significant spatial spillover, and the digital economy can promote common prosperity in surrounding regions.
3. Resource allocation efficiency plays the intermediary role in the effect of the digital economy; that is, the digital economy indirectly affects common prosperity by providing resource allocation efficiency.

The following suggestions are made in this research based on the aforementioned findings:

1. Due to the significant role of the digital economy, we can promote economic growth, improve production efficiency, and seek common prosperity by increasing investment in information technologies to consolidate the digital dividend and dig deeper into the digital potential.
2. In rural and underdeveloped areas, we should increase investment in the digital economy, especially in digital infrastructure. The digital economy in rural and un-

derdeveloped areas is in its infancy; at this stage, the digital economy not only has great potential but also has a higher role in promoting common prosperity. Increasing investment in these areas can release its potential, reducing the disparity between urban–rural regions and places.

3. We should construct several digital economy demonstration zones. Given the digital economy's spatial spillover and the intermediary role of resource allocation efficiency, the new generation of digital technology should be used to build an effective market, realize the effective flow of factors, and open up a key link of resource allocation effectiveness. Several digital economy demonstrations and pioneer zones should also be built to form a point-to-surface situation.

This article uses data from 284 cities in China to explore the relationship between the digital economy and common prosperity and has made a certain contribution to the development of China and the world. The limitation of this article is that the evaluation system of common prosperity is not perfect, and it is thus important to further expand the indicators of common prosperity in the future. Meanwhile, it is necessary to further explore the spatial spillover of the digital economy.

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