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Digital Economy Mechanisms and Tests for Promoting Common Wealth

Baoxiang Fei [1], Liju He [2], Fangxia Liu [2], Biyang Li [3]

[1] School of Finance, Anhui University of Finance & Economics, Bengbu Anhui 233030, China

[2] School of Business Administration, Anhui University of Finance & Economics, Bengbu Anhui 233030, China

[3] School of Languages and Media, Anhui University of Finance & Economics, Bengbu Anhui 233030, China

Abstract: This paper focuses on the two development strategies of digital economy and common wealth, explores the effect, mechanism and spatial spillover effect of digital economy on common wealth, and further examines the heterogeneity of cities of different sizes and locations. The study finds that the digital economy can increase the level of common prosperity development by 37.1%, and effectively reduce the ratio of urban and rural per capita disposable income, and positively affect the level of common prosperity development in neighboring areas through spatial spillover effects. The mechanism test shows that public management, human capital, R&D and innovation play a significant positive mediating role in the development process of the digital economy affecting the common wealth. The study also confirms that the impact of the digital economy on shared prosperity decreases with the expansion of urban population size, and plays a greater advantage in the location of non-core cities.

Keywords: Digital economy, Common wealth, Spatial spillovers, Mediating effects, Urban heterogeneity.

1. Introduction

The Yangtze River Delta Digital Economy Development Report (2021) released by the China Academy of Information and Communication Research in conjunction with Zhejiang Tsinghua Yangtze River Delta Research Institute points out that in 2020, the digital economy scale of the Yangtze River Delta region will account for about 44% of the regional GDP, and account for about 28% of the total digital economy scale of the whole country, with the digital industrialization accounting for 26%, and the digitization of industries accounting for 74%, both of which will have a growth rate of 5% or more higher than the same period of GDP. With a growth rate of more than 5%, digital information as a key production factor has brought about a revolutionary impact on the change and enhancement of industrial organization structure and even the formation of brand-new business forms. The Yangtze River Delta (YRD) is one of the key regions for the development of China's digital industry, with a relatively solid economic foundation, relatively leading development of the digital economy, and high-quality industrial clusters that provide space for the mutual integration of digital technology and the real economy. In the context of the continuous improvement of digital infrastructure, further broadening of the digital trade system, and continuous enhancement of the overall competitiveness of the Yangtze River Delta urban agglomeration, how to play the role of the digital economy in regulating the productive forces and relations of production is the key to realizing the strategic goal of common prosperity. Based on the development of digital economy in the Yangtze River Delta region, this paper intends to analyze the impact and mechanism of digital economy on common prosperity from the perspective of the relationship between productivity and production relations, and then explore the realization path of common prosperity.

Does the digital economy promote shared prosperity? What is the mechanism and effect behind its influence? Theoretical studies have shown that the digital economy has a significant effect on common prosperity. The empowering effect of the digital economy promotes the in-depth change of products, business forms and development modes. In the context of the penetration and integration of the digital economy, the availability of means of production in many small and medium-sized cities has greatly improved, and the characteristics of small and medium-sized cities, such as low cost of production and living and strong spatial extensibility, are complementary to those of large cities, which enhances the attractiveness of small and medium-sized cities for the development of digital industries and the integration of digital industries and the real economy (Wei Shih-wei et al., 2022) [1]. The digital economy has shown a strong momentum in accelerating the marketization process of factors such as labor, capital, technology, and data, which promotes the efficient free flow of factors and regional economic agglomeration, and promotes the transformation and upgrading of the economic structure and the enhancement of total factor productivity (Ren et al., 2022) [2]. In addition, the inclusive effect of the digital economy can help alleviate multidimensional relative poverty, which is manifested in the reduction of factor resource constraints and the improvement of human capital, and the effect is more significant in the group of low-educated and rural residents (Wu Benjian et al., 2022) [3]. The research results of many scholars have confirmed that the digital economy has a significant positive impact on the real economy (Lu Fengzhi, 2022) [4], green innovation of enterprises (Wei Lin et al., 2022) [5], digital literacy of talents and the upgrading of the manufacturing industry (Chen Huichao et al., 2022) [6], agricultural development (Huang Zhuo, 2022) [7], and farmers' entrepreneurship (Li Shiyu et al., 2022) [8].

In summary, most of the existing studies qualitatively explore the relationship between common wealth and digital economy development from the theoretical level, and most of the few quantitative studies are based on the provincial macro level and involve the construction of the common wealth

evaluation system that is not comprehensive enough. Based on this, this paper constructs the common wealth development index and digital economy development index of 41 prefecture-level cities in the Yangtze River Delta region from 2011 to 2019, explores the mechanism of the digital economy's impact on common wealth, constructs a spatial Durbin model to test the spatial spillover effect of the digital economy on common wealth, and adopts a mediation effect model to test the transmission effect of the digital economy on the common wealth through public management, human capital, R & D and innovation. The mediation effect model is used to test the conduction effect of digital economy on common wealth through public management, human capital, R&D innovation, and to further test the effect of digital economy on common wealth in cities of different sizes and locations.

2. Research Design

In order to verify the above theoretical assumptions and analyze the direct transmission mechanism of digital economy to common wealth, this paper sets the benchmark model as.

$$Compr_{i,t} = \alpha_0 + \alpha_1 Digec_{i,t} + \sum_{j=1}^{n} \beta_j Control_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t} \quad (1)$$

Where i represents city and t represents year. $Compr_{i,t}$ denotes the common wealth development index of city i in year t, the$Digec_{i,t}$ denotes the digital economy development index of city i in year t, and$Control_{i,t}$ denotes a set of control variables;γ_i is the city fixed effect, theδ_t is the time fixed effect, and$\varepsilon_{i,t}$ denotes a randomized disturbance term.

The digital economy has a time lag, that is, the level of development of the digital economy in the previous period has an impact on the current, and the region with a better level of development and its own degree of common wealth is relatively good, which will produce a certain estimation error. Dynamic panel model can not only reflect the dynamic change process of the digital economy, but also to a certain extent can solve the estimation error caused by endogeneity. Therefore, to address the endogeneity problem, this paper uses the lagged period of the digital economy development index as an explanatory variable, and the dynamic panel model is set as follows:

$$Compr_{i,t} = \alpha_0 + \alpha_1 Digec_{i,t-1} + \sum_{j=1}^{n} \beta_j Control_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t} \quad (2)$$

In order to further discuss the spatial spillover effect of digital economy development on the development level of common wealth, this paper introduces spatial interaction terms for the explanatory variables, the explained variables, and other control variables on top of model (1), further extending it into a spatial Durbin model (SDM):

$$Compr_{i,t} = \alpha_0 + \rho W Compr_{i,t} + \theta_1 W Digec_{i,t} + \alpha_1 Digec_{i,t} + \theta_j W \sum_{j=1}^{n} Control_{i,t} + \sum_{j=1}^{n} \beta_j Control_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t} \quad (3)$$

Where ρ represents the spatial autoregressive coefficient, the$W$ represents the spatial weight matrix, theθ_1 and θ_j are the elasticity coefficients of the spatial interaction terms of the core explanatory and control variables, respectively.

About spatial weight matrix design. This paper draws on the research method of Wang Shoukun (2013) [9] to examine the spatial correlation characteristics of common wealth using the following three spatial weight matrices. The first one is the geographic distance weight matrix (W1), i.e. $W_1 = 1/w(i,j)$ where $w(i,j)$ denotes the city i is the spatial distance between city j The second one is the economic distance weight matrix (W2), i.e. $W_2 = 1/|Ag_i - Ag_j|$ where $|Ag_i - Ag_j|$ denotes the spatial distance between city$i$ and city$j$ the absolute value of the difference between the annual GDP per capita of the city; the third is a nested weight matrix of geographic and economic distances (W3), i.e. $W_3 = \eta W_1 + (1-\eta)W_2$, $\eta \in (0,1)$, η denotes the proportion of geographic distance weight matrix (W1), and for the convenience of analysis, this paper η For the convenience of analysis, this paper takes 0.5 for calculation.

On the design of spatial correlation between urban common wealth and the level of digital economy development. If there is a spatial correlation between one of the variables of common wealth and the level of development of digital economy, the spatial econometric model can be used to study the impact and mechanism of digital economy on common wealth. Moran's I index is generally used to test the spatial correlation:

$$Moran's\ I = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} W_{ij}(Compr_i - \overline{Compr})(Compr_j - \overline{Compr})}{S^2 \sum_{i=1}^{n}\sum_{j=1}^{n} W_{ij}} \quad (4)$$

Among them. $S^2 = \frac{1}{n}\sum_{i=1}^{n}(Compr_i - \overline{Compr})$. $\overline{Compr} = \frac{1}{n}\sum_{i=1}^{n} Compr_i$. $Compr_i$ denotes the common wealth level of city i, n denotes the total sample size, and W_{ij} denotes the spatial weight matrix; similarly the Moran's I index of the level of digital economic development of city i can be measured.

3. Conclusions and Recommendations

As the "fifth major factor of production", data has been rapidly integrated into all aspects of social production, life and governance, and how to use the digital economy as a driving force for sustainable development and rational distribution under the current economic growth rate has become the focus of attention of the academic community. The findings of this paper are as follows: the impact of digital economy on the common wealth of the city scale marginal diminishing effect, showing an inverted "U" type relationship, the degree of impact on non-core cities is significantly greater than that of core cities. By exploring the effect of city scale and location in the impact of digital economy on common wealth, it provides theoretical insights for the expansion of city scale and development direction. In view of the above findings, this paper puts forward the following policy recommendations:

First, the construction and upgrading of digital infrastructure should be strengthened to optimize the integrated development system of the digital economy and real industries. Digital infrastructure will become an important supporting force for the transformation of old and new kinetic energy, so it is necessary to raise the "new infrastructure" to a strategic level, accelerate the construction of big data centers, communication network equipment, artificial intelligence, urban Internet of Things, lay a good

material foundation for the high-quality development of the urban and rural digital economy, and supervise and evaluate infrastructure construction projects to prevent bad projects and waste of resources. Preventing the creation of bad projects and waste of resources. Promote the construction of digital infrastructure in central and western China and small and medium-sized cities, give full play to the driving and spillover effect of high-quality digital economy model cities, promote the development mode of mutual assistance in the digital economy among regions, strengthen technical cooperation, give full play to the inclusive effect of the digital economy, and reduce the hidden threshold of the flow of factors of production between regions.

Second, improve the public management service system, enhance human capital and strengthen the level of R & D and innovation. First, we should use digital technology to extend high-quality public service resources to relatively backward regions, continuously improve the digitalization level of education, medical care, employment and other livelihood projects, and create a favorable competitive environment for the platform economy, expand the supply of high-quality public services, solve the problem of sharing, and continuously promote the mutual integration of urban and rural public management service systems and the two-way flow of high-quality urban and rural resources, so as to realize the "people-centered" common wealth. People-oriented" common wealth. Secondly, with the goal of narrowing the gap in education level between regions, we will strive to make up for the short boards in education, break down the barriers in the education system, further increase the cultivation of digital talents, arrange digital technology-related training at regular intervals, create a good environment for the integration of industry, academia and research, and at the same time, strengthen the rights and interests protection for the people engaged in the employment of digital platforms, perfect the training mechanism for the talents in innovative digital technology, and guarantee the supply of talents for the development of digital economy. The supply of talents for the development of digital economy is guaranteed.

Thirdly, the positive externalities of city size should be brought into full play, and differentiated regional development strategies should be implemented according to local conditions. Reasonable city size is an important foundation for the sustainable and healthy development of common wealth, and it is especially crucial to accurately grasp the order of priority development of large, medium and small cities, focus on the coordinated development of cities of different sizes, and improve and consolidate the digital advantages of medium and small cities and non-core cities, so it is necessary to rationally utilize land stock and coordinate the space for the development of cities of different sizes. As the spatial carrying capacity of core cities has limitations, the congestion effect caused by excessive population and industry gathering will reduce the regional scale efficiency and thus affect the development level of common wealth, so it is necessary to adjust the structure of digital economy development in core cities, strengthen technological and managerial innovation, and appropriately reduce the level of investment in the digital economy of core cities, so that part of the elemental resources can be transferred to non-core cities, and give full play to the digital economy of non-core cities for the common wealth of all people. The digital economy of non-core cities should give full play to the driving effect of the digital economy on the common wealth.

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