Financial Engineering and Risk Management (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/ferm.2024.070416
ISSN 2523-2576 Vol. 7 Num. 4

High Quality Development of Urban Economy Driven by Digital Economy: Application and Empirical Research of Double Difference Analysis Model

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Keywords: Digital economy; high-quality development of urban economy; double difference analysis (DiD); economic growth

Abstract: The goal of this article is to investigate how the digital economy, as a new economic form, may successfully propel the urban economy toward high-quality growth. With the rapid development and widespread application of information technology, the digital economy has emerged as an important force in promoting the transformation and upgrading of the global economy, with a growing impact on urban economic structure optimization, innovation capability improvement, and resource allocation efficiency enhancement. Based on these two contexts, this research employs the double differential analysis (Difference-in-Differences, DiD) model to comprehensively investigate the unique mechanism and effect of digital economy on the high-quality development of urban economies through empirical analysis.

1. Introduction

In today's global economic system, the digital economy is rising at an unprecedented speed and has become an important force driving economic growth and social change. With the rapid development and deep integration of new-generation information technologies such as big data, cloud computing, artificial intelligence, and blockchain, the digital economy has not only altered traditional industries' production methods and business models, but has also spawned emerging industries and boosted the global economy. The structure has undergone significant changes. In this context, the city, as the primary driver of economic activity, has new opportunities and problems.

The high-quality growth of the urban economy is a key strategic path for China's economic development in the new era. It necessitates that cities focus more on optimizing economic structure, improving innovation capacity, protecting the environment, and improving people's livelihoods and well-being while preserving economic development. With its distinct advantages, the digital economy gives additional impetus to the high-quality growth of the urban economy. On the one hand, the digital economy can eliminate time and space constraints, promote efficient resource allocation and the free flow of elements, and improve the overall operating efficiency of the urban economy; on the other hand, the digital economy can stimulate innovation vitality and promote new technologies, formats, and models. The city's continued rise has infused new life into its economic

growth.

However, the precise route and influence of the digital economy on the high-quality growth of the urban economy must be further explored and proven. As a result, this paper selects "the high-quality development of urban economy driven by digital economy: the application and empirical research of double differential analysis model" as the research topic, with the goal of revealing the internal mechanism and actual effect of digital economy on the high-quality development of urban economy by constructing a scientific analysis framework and employing the rigorous empirical research method of double differential analysis model. This will not only help us better grasp the importance of the digital economy in fostering urban economic development, but will also serve as a vital reference for policymakers seeking to achieve the aim of high-quality urban economic growth.

2. Research Background and Theoretical Basis

2.1 Definition of Connotation and Characteristics

This research begins by precisely defining the terms digital economy and high-quality urban economic growth. Digital economy, as a new economic form, with digital knowledge and information as the key production factors, digital technology innovation as the core driving force, and modern information network as an important carrier, through the deep integration of digital technology and the real economy, constantly improve the digital and intelligent level of traditional industries, and accelerate the reconstruction of economic development and government governance mode[1].

The high-quality development of the urban economy implies that, in order to maintain sustained and stable economic growth, more attention is paid to the quality and efficiency of economic development, emphasizing the optimization and upgrading of the economic structure, significant improvement of innovation capabilities, continuous improvement of the ecological environment, and people's well-being. Continuous improvement. It is distinguished by the sustainability of economic growth, the rationality of industrial structure, innovative leadership, ecological harmony, and the inclusivity of people's livelihoods.

2.2 Literature Review at Home and Abroad

In order to deeply understand the internal relationship between digital economy and high-quality development of urban economy, this study systematically combs the literature in related fields at home and abroad. Foreign research focuses on the measurement method, development path and direct impact on economic growth of digital economy, and emphasizes the role of digital economy in improving economic efficiency and promoting industrial upgrading[2]. At the same time, some scholars have begun to pay attention to the far-reaching impact of digital economy on urban spatial structure and social governance model.

Domestic study delves extensively into the role of the digital economy in fostering high-quality growth of China's urban economy, drawing on international experience and blending it with our country's current condition. According to the report, the digital economy is a powerful driving factor for high-quality urban economic growth by encouraging technological innovation, improving resource allocation, and growing market demand. At the same time, domestic researchers are paying attention to the disparities in digital economy performance among regions and cities, as well as their implications for policymakers.

Through literature review, this study clarifies the theoretical basis and current situation of the research problem. On the one hand, digital economy theory, innovation theory, and sustainable

development theory provide solid theoretical support for this study; on the other hand, the research results of domestic and foreign scholars in the field of digital economy and high-quality development of urban economy have laid a good foundation for the further investigation of this study[3]. On this basis, this study will focus on how the digital economy specifically drives the high-quality development of urban economy, and conduct empirical research by constructing a double differential analysis model, with a view to filling the gaps in existing research and providing a scientific basis for policy formulation.

3. The Level of Digital Economy Development

According to the white paper on the development of my country's digital economy, the digital economy is a key driver of my country's economic development at this time. The digital economy has increasingly grown. This is mostly apparent in its growing magnitude, which ranges from 2.6 trillion yuan in 2005 to 39.2 trillion yuan in 2020. The digital economy's development scale has significantly enhanced. Its economic power is primarily demonstrated by the fact that the digital economy's production value accounts for almost one-third of GDP, and the digital economy's growth rate exceeds that of GDP by more than three times. At the same time, in 2020, the State Council will write the data into the document as the new production factors of the factor market. Since the end of 2019, due to the impact of the new crown epidemic, data with information as an important output element has played a key role in ensuring the recovery and smooth operation of China's economy. Modern information technology such as digital intelligence will be deeply combined with traditional industries, promote the rapid growth of new economy and new business type, and bring a steady stream of new driving force to economic and social development. In addition, spatial spillover effect is also an important factor affecting the level of economic quality development. In China, the imbalance of infrastructure construction and application, big data technology research and innovation, and digital industry development in various regions has led to the spatial differences of digital economic development, so there are also differences in the spillover effects of digital economic development on surrounding cities[4]. High-quality development has involved all aspects of society and all fields. High-quality development is centered on innovation, coordination, greenness, openness, and sharing. Secondly, it is of great significance to attach importance to high-quality development, which can stabilize economic development and at the same time enable China to gradually realize the modernization of economic development. The degree of high-quality development is very important, but the rapid economic development of our country in the past has produced some unfavorable factors for the high-quality economic development in the new era, which makes the social structure, natural environment and development quality unbalanced. At present, the rise of China's digital economy provides us with new opportunities.

At present, China's digital economy has entered a new stage of development of inclusive sharing, standardized development and in-depth application. Digital technologies such as virtual reality, cloud computing, artificial intelligence and blockchain are increasingly infiltrating into various fields of China's economy and society, driving revolutionary changes in people's production and lifestyles and social industries. Therefore, we must seize the new engine of high-quality economic development, adhere to the strategy of improving quality and efficiency, and gradually increase all factor productivity in the factor market. At the same time, to enable both the digital and real economies, we must further support supply-side structural reforms[5]. Realize innovation and integration amongst them, resulting in the efficient growth of China's economy and society.

4. Research Design and Methods

4.1 Construction of Empirical Analysis Framework

This research develops a comprehensive and systematic empirical analytic approach to investigate the influence of the digital economy on high-quality urban economic growth. The framework uses quantitative analysis to investigate the multidimensional influence of digital economic development on the high-quality development of urban economies. Specifically, the indicators of high-quality urban economic development are refined into key dimensions such as economic growth rate, industrial structure optimization, innovation ability and green development, which together constitute a comprehensive index system to measure the level of high-quality urban economic development.

In constructing the framework, this study fully considers the internal relationship and interaction between the indicators, and strives to fully reflect the comprehensive effect of digital economy in urban economic development[6]. At the same time, in order to ensure the accuracy and reliability of the analysis results, this study also draws on the advanced experience and methods of relevant research at home and abroad, and repeatedly verifies and optimizes the construction and quantification methods of the index system.

4.2 Sample Selection and Data Sources

In order to ensure the representativeness and universality of the research results, this study uses panel data as the basic data of the analysis. In terms of sample selection, this study takes into account the economic scale, development level, industrial structure, geographical location and other factors of the city, and selects representative cities as the research sample. These cities are not only economically representative, but also in a leading position in the development of digital economy, which can better reflect the impact of digital economy on the high-quality development of urban economy.

In terms of data sources, this study mainly relies on the public data released by the National Bureau of Statistics, local statistical bureaus and authoritative research institutions to ensure the authority and accuracy of the data. At the same time, in order to make up for the lack of public data, this study also collected some supplementary data through questionnaires and expert interviews to improve the integrity and richness of the data.

4.3 Double Differential Model Construction

In order to effectively separate the net effect of digital economy on the high-quality development of urban economy and control the influence of other potential interference factors, this study uses the double differential analysis (Difference-in-Differences, DiD) model as the main empirical analysis method. The DiD model estimates the net effect of a policy or event by comparing the differences between the treatment group (I. e., cities with faster digital economic development) and the control group (I. e., cities with relatively slower digital economic development) before and after the occurrence of a particular policy or event (in this study, digital economic development).

In constructing the DiD model, this study first clarified the division criteria of the treatment group and the control group, and set the appropriate time node according to the actual data. Then, by introducing the development level of digital economy as a processing variable and combining with other control variables, a complete DiD model is constructed. Finally, the regression analysis of panel data is used to obtain the estimate of the net effect of digital economy on the high-quality development of urban economy, and the significance test and robustness test are carried out.

5. Empirical Results And Analysis

By constructing the DiD model and using the improved entropy method to measure the high-quality economic development and digital economy index of 285 cities in China, this paper analyzes the current situation of China's digital economy and high-quality economic development and the differences in various regions from the time dimension and spatial dimension respectively.

5.1 From the Time Dimension Analysis

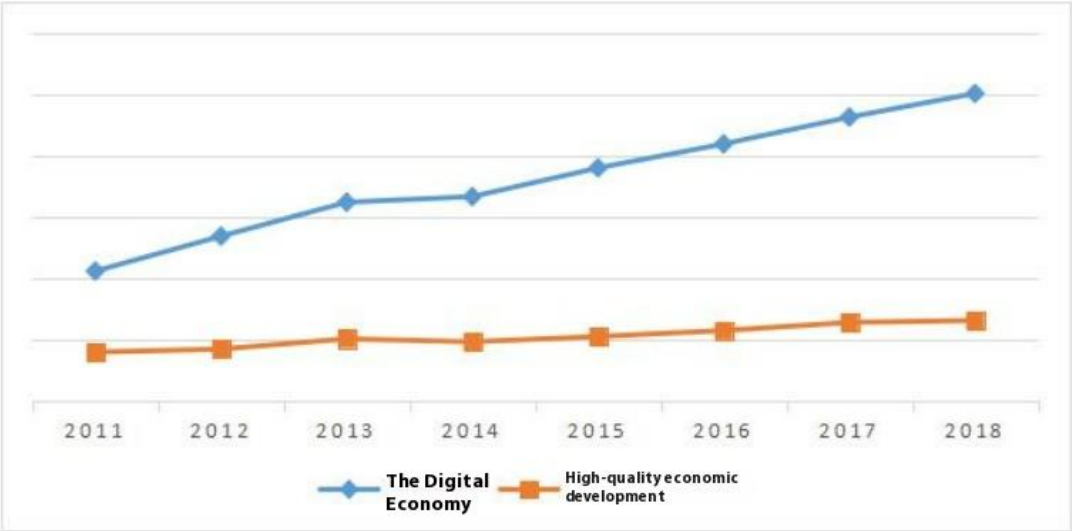

Figure 1: Trends in high-quality national economic development and digital economic indices

In this paper, the sum of the digital economy and economic high-quality development index of each city in the same year is taken as the digital economy and economic high-quality development index of this year. From Figure 1, it can be seen that from a national perspective, my country's digital economy index is increasing year by year. Trend, after 2010, my country formulated the "National New Urbanization Plan", which formulated the 1 new way of urban development-smart city. Internet + big data platform access to government services, the Internet began to integrate into all areas of social development. With the rapid development of the digital economy, China's e-commerce retail sales exceeded 7.2 trillion yuan for the first time in 2017, greatly stimulating residents.

Consumption, a large increase in jobs and work methods. After a year of development, the number of patents published in the field of big data in China has exceeded 1/3 of the world's total, ranking second in the world. In the era of rapid development of information, data has gradually become a 1 new factor of production to promote China's economic development, and plays an important role in promoting the high-quality development of China's economy.

From 2011 to 2018, due to the development of innovative technology, the continuous improvement of China's consumption level, the rapid development of the service industry, the enhancing quality of China's economic and social development, the continuous optimization of the consumption structure, and the concept of innovation and entrepreneurship, the national economy was guided towards sustained, healthy, and stable development. Supply and demand maintain a dynamic balance, factor marketization flows freely, the value chain continues to rise, the ecological environment continues to improve, and the improvement of the ecological environment has further improved the quality of economic development. The manifestation of economic growth is different

from the past, showing more inclusiveness.

5.2 From the Spatial Dimension Analysis

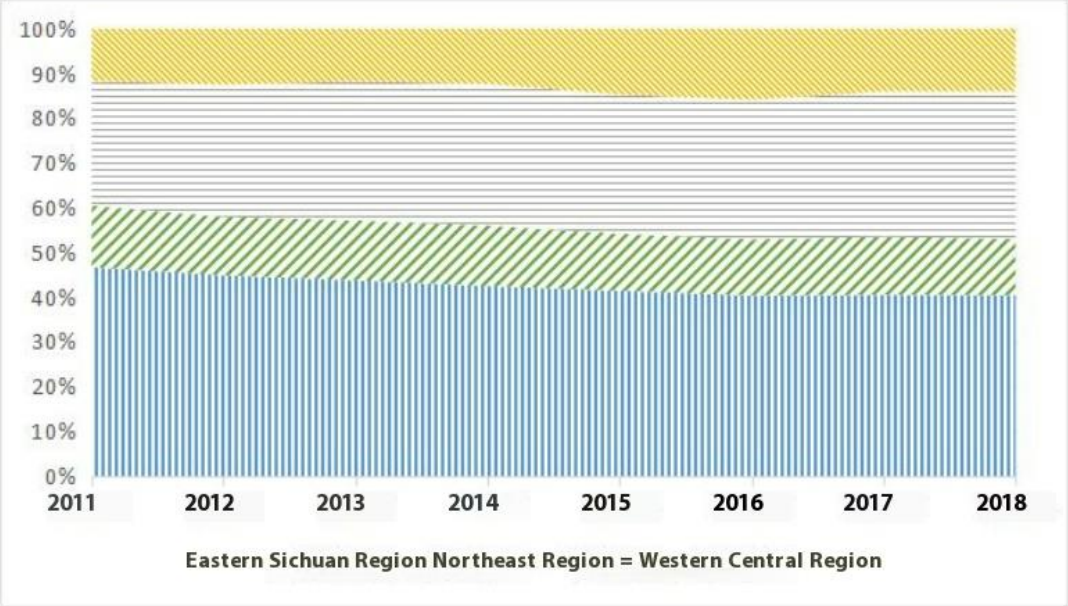

Figure 2: Contribution rate of regional digital economy to national digital economy development level

Due to the vast land area of our country, there is a gap between the quality of economic development in various regions and the level of digital economic development. This paper divides these cities into four regions and analyzes the development of each region.

As can be seen from Figure 2, the development of China's digital economy is not balanced in various regions. The eastern region has a higher level of digital economy and has the largest contribution to the national digital economy. This could be due to the large volume of the digital economy in the eastern region, the enrichment of talent elements, the gradual improvement of infrastructure, and other characteristics. These characteristics make the digital industry more diverse, and people's demand for digital is increasing by the day, so the role of the digital economy in the eastern region becomes more obvious. The digital economy in the center and eastern areas lags behind that of the eastern region, while the digital economy in the northeast and western regions is very underdeveloped. This may be due to the shortage of natural resources and talents in the northeast and western regions, the unsound new infrastructure, the slow circulation of digital resources as a factor, and the obvious lag behind the national average in the development of digital economy.

6. Conclusion

Looking to the future, with the continuous development of digital technology and the continuous expansion of innovative applications, the digital economy will play a more important role in the high-quality development of the urban economy. Therefore, we should continue to pay attention to the development trends and trends of the digital economy, strengthen theoretical research and empirical analysis, and provide a more scientific basis and reference for policy formulation. At the same time, we should actively respond to the challenges and problems that may arise in the

development of the digital economy, continuously improve the policy system and working mechanisms, and foster the in-depth integration and mutual promotion between the high-quality development of the digital economy and the urban economy.

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