

## Research on the effect and mechanism of digitalization in bridging the urban-rural income gap

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### Abstract

**In the context of solidly promoting common prosperity, narrowing the income gap between urban and rural areas is an important element in realizing common prosperity in China. In recent years, with the continuous development of the digital economy, the impact of the digital economy on the urban-rural income gap has become a hotspot of concern for all walks of life. Accelerating the construction of digital infrastructure to help narrow the urban-rural income gap is an important strategic direction for comprehensively promoting rural revitalization in the new era. The relationship between the development of digital technology and the urban-rural income gap shows an inverted "U" shape. In the short term, the development of digital technology may exacerbate the urban-rural income gap, but in the long term, its sustained development will help narrow the gap between urban and rural areas. In promoting the digitalization process in the future, the Government should pay more attention to expanding the breadth of its application, introducing relevant preferential policies for the central and western regions, and encouraging the sharing of infrastructure in developed regions, so as to more effectively contribute to the narrowing of the urban-rural income gap, and solidly promote the common prosperity of the entire population.**

### Keywords

**Digital tools, common wealth, urban-rural income gap, mechanism study.**

### 1. Introduction

At present, China's Gini coefficient continues to be above the international alert level, the dual economic structure formed during the period of rapid economic growth has been highlighted, and the income gap between urban and rural residents is still wide, which has become a difficult problem that needs to be solved in the process of realizing common prosperity. The digital economy, with the data element as its core and relying on the profound application and continuous innovation of information technology, breaks the time and space constraints and realizes the optimal allocation and efficient use of resources. In the era of digital economy, information exchange between urban and rural areas is more convenient, and the market connection is getting closer, which provides favorable conditions for regulating the income gap between urban and rural areas. At the same time, the rapid development of digital technology has broken the previous way of resource allocation, and will change from the traditional factor-driven economic growth model to a development model driven by technological innovation, becoming the key conversion power for high-quality economic development.

The rapid development of digital technology not only helps to optimize the employment structure and promote the remuneration of middle- and low-skilled labour, but also contributes to the continuous improvement of the employment environment and the realization of high-

quality employment for rural migrant workers; moreover, in areas with a high degree of marketization and well-developed factor markets, the development of digital technology is able to significantly narrow the urban-rural income gap. Digital technology development has innovation as its key support, and existing research has not yet reached a consensus on the trend of the impact of the urban-rural income gap. The first view is that the digital economy can release digital dividends, which can not only narrow the urban-rural income gap by increasing employment opportunities, promoting the upgrading of the agricultural industry, and enhancing financial inclusion, etc., but also promote the convergence of the urban-rural income gap through the trickle-down effect; the second view is that we should not ignore the digital economy's digital dividend. The second view is that the digital divide brought about by the digital economy should not be ignored, and that the existence of the "Matthew effect" has led to uneven access to information and unequal access to skills, thus exacerbating the income gap between urban and rural areas.

## **2. Analysis of the basic theory of digital bridging of the urban-rural income gap**

### **2.1. Employment effects**

With regard to the employment effects brought about by the development of the digital economy, existing research has mainly focused on two aspects: first, how the digital economy reshapes the labor market and improves the quality of the workforce; and second, exploring the substitution effects of artificial intelligence and industrial intelligence on middle-skilled labor, and the resulting employment polarization. Specifically, on the one hand, the digital economy breaks down geographical constraints, enabling rural residents to have access to a wider range of employment information through online platforms, and thus have more opportunities to choose jobs that suit them". On the other hand, with the continued development of the digital economy, there is a growing demand for digitized talents in technology-intensive industries, leading to changes in the distribution of income for jobs in different skill sectors, thus exacerbating the problem of employment polarization.

### **2.2. Structural effects**

With regard to the structural effects brought about by the development of the digital economy, the core lies in how the digital economy has reshaped the industrial structure and urban-rural structure, thus indirectly affecting the income distribution structure of urban and rural residents. Specifically, for one thing, the digital economy has promoted the transformation and upgrading of traditional agriculture to modern agriculture, helping rural areas gradually get rid of traditional agricultural production methods and transforming to a modernized and diversified industrial structure. On this basis, the digital economy further promotes industrial revitalization. By expanding rural revitalization demonstration projects, focusing on specialty industries, agricultural product processing and new service industries, the digital economy helps promote the transformation and upgrading of regional industries to service-oriented and advanced, so as to achieve integrated development of urban and rural areas and narrow the income gap between urban and rural areas. Secondly, the digital economy has prompted rural youth to migrate to urban areas in pursuit of better education and employment opportunities, a phenomenon that has led to the "hollowing out" of rural areas, changing the urban-rural structure to a certain extent, and in turn affecting the stability and sustainable development of the rural economy.

### **2.3. Innovation effects**

In response to the innovative effects of the development of the digital economy, in the long run, it is mainly reflected in how it provides space for innovation and development in rural areas with the help of new technologies and models.

First, the digital economy has promoted innovative and entrepreneurial activities in rural areas, encouraged and supported rural residents to be innovative and entrepreneurial, and fostered a group of new farmers with an innovative spirit and entrepreneurial ability. Through innovative and entrepreneurial activities, these new farmers have not only increased their own income opportunities, but also driven the economic development of the surrounding areas.

Secondly, the digital economy promotes institutional innovation and management innovation in rural areas, and provides a strong guarantee for the economic development of rural areas by optimizing the institutional environment and improving the management level. In addition, when the economic development of a region is relatively backward, all kinds of production resources are scarce, and the economy is in the stage of increasing marginal compensation of factors, at this time, the development of the digital economy pays more attention to the economic development of the place where the factors are laid out, coupled with the fact that the digital industry has obvious urban bias and regional bias, which helps to narrow the income gap between urban and rural areas.

Finally, as the economy continues to develop and enters the stage of diminishing marginal returns, various factors of production are in a state of partial saturation, and the differences between urban and rural areas in terms of infrastructure, education and skills gradually emerge, with regions that have higher human capital benefiting more from the development of the digital economy, leading to differences in the distribution of income, and the digital economy demonstrating a tendency to widen the income gap between urban and rural areas.

## **3. Analysis of the current situation and problems of digitalization for development in rural areas**

At a time when the wave of digitization is sweeping the world, rural areas are also gradually being brought into the orbit of digital development. Digitization has brought new opportunities and vitality to the development of rural areas, and has promoted economic and social change in rural areas in many ways. However, in this development process, many problems have been revealed, which need to be analyzed and solved in depth.

### **3.1. Status of digitalization for the development of rural areas**

#### **3.1.1. Digitalization helps to modernize agricultural production**

In the field of agricultural production, the application of digital technology is becoming increasingly widespread. The Internet of Things in agriculture improves the efficiency and quality of agricultural production by real-time monitoring of soil humidity, temperature, nutrients and other information through sensors to achieve precise irrigation, fertilization and pest control. For example, some large farms use intelligent greenhouse systems that can automatically adjust temperature, humidity, light and other environmental factors according to crop growth needs, which not only reduces labor costs, but also significantly improves the yield and quality of agricultural products. In addition, the application of drones in agricultural plant protection, seeding and mapping is becoming more and more common, providing more efficient and convenient services for agricultural production.

#### **3.1.2. Rural digital financial services are improving**

To meet the growing financial needs of rural residents, financial institutions have increased their digital presence in rural areas. Mobile payments are rapidly gaining popularity in rural

areas, and villagers can complete their daily financial services, such as paying utility bills and transferring money through their cell phones. At the same time, Internet financial platforms have provided rural microenterprises and farmers with more convenient financing channels, and some credit loan products based on big data have simplified the loan process and lowered the financing threshold, effectively easing the problem of difficult and expensive financing in rural areas.

### **3.1.3. Digital education and medical resources extended to rural areas**

With the help of Internet technology, high-quality education and medical resources have been delivered to rural areas. The online education platform provides rural students with rich and diverse curriculum resources, enabling them to enjoy nearly the same educational opportunities as urban students. Some rural schools have synchronized their teaching with prestigious urban schools through live remote classroom broadcasting, which has improved the quality of teaching. In the medical field, telemedicine consultation systems allow rural patients to receive diagnosis and treatment advice from experts remotely, avoiding the trouble of traveling long distances for medical treatment. In addition, some medical and health APPs provide rural residents with services such as health popularization and online consultation, enhancing rural residents' health awareness and the accessibility of medical services.

## **3.2. Problems in digitizing the promotion of development in rural areas**

### **3.2.1. Digital infrastructure still needs to be strengthened**

Although significant progress has been made in building digital infrastructure in rural areas, there is still a large gap compared with cities. Some remote mountainous areas have unstable network signals and insufficient bandwidth, affecting the development of online business. At the same time, ICT equipment in rural areas has been upgraded more slowly, and some old equipment is difficult to meet the demand for high-speed networks. In addition, the lack of a long-term and effective maintenance mechanism for rural digital infrastructure construction and the untimely repair of equipment failures have also to some extent constrained the effectiveness of digital development.

### **3.2.2. Low digital literacy of rural residents**

The relatively low overall level of digital literacy among rural residents has become a major obstacle to digital development. Many rural residents have limited knowledge of and ability to apply digital technology, and do not know how to use smartphones, computers and other devices to conduct online transactions, access information and other operations. During e-commerce training, it was found that some farmers have difficulties in understanding the rules and operating procedures of e-commerce platforms, making it difficult for them to carry out e-commerce business independently. In addition, there is a relative lack of digital education resources in rural areas, an imperfect digital skills training system for rural residents, and a lack of professional trainers and diversified training methods, leading to a slow improvement in rural residents' digital literacy.

### **3.2.3. Agricultural product e-commerce development faces many challenges**

Although agricultural e-commerce is developing rapidly, some problems have been exposed in the process of development. First, the low degree of standardization of agricultural products, the lack of uniform quality standards and branding, resulting in uneven quality of agricultural products on the market, affecting the consumer's purchasing experience and trust in agricultural products e-commerce. Secondly, the development of cold chain logistics for agricultural products is lagging behind, and the technology of preservation and cold storage is insufficient, which makes the loss of agricultural products in the process of transportation and storage larger, and increases the logistics cost and business risk. In addition, there is a shortage of agricultural e-commerce talents, and the lack of professionals in rural areas who understand

both agriculture and e-commerce operations restricts the further development of agricultural e-commerce.

### **3.2.4. Digital transformation of agriculture faces technical and cost challenges**

The digital transformation of agriculture requires a large number of advanced technical equipment and professional and technical personnel support, but at present, the research and development and application of agricultural digital technology still face many difficulties. On the one hand, the research and development of some agricultural digital technology is out of touch with the actual agricultural production needs, and the practicality and operability of the technology needs to be improved. On the other hand, agricultural digitalization equipment is expensive, and for most small-scale farmers, it is difficult to bear the cost of digital transformation. In addition, the promotion and application of agricultural digital technology lacks an effective technical service system, and farmers encounter problems in the process of using it that are difficult to be solved in a timely manner, affecting their acceptance of digital technology.

### **3.2.5. Difficulty in preventing and controlling rural digital financial risks**

With the rapid development of rural digital finance, financial risks have increased. Because of the imperfect construction of the credit system in rural areas, it is difficult for financial institutions to accurately assess the credit status of rural households and rural small and microenterprises, resulting in higher credit risks. At the same time, some unscrupulous elements take advantage of rural residents' lack of financial knowledge and weak awareness of risk prevention to cheat rural residents of their money through online fraud, illegal fund-raising and other means, causing economic losses to rural residents. In addition, there is a certain lag in the regulation of rural digital finance, and the regulatory authorities have insufficient knowledge of the emerging digital financial business models and risks, and the regulatory means and laws and regulations are not perfect enough to effectively prevent and resolve financial risks.

In summary, digitalization has made certain achievements in promoting the development of rural areas, but it also faces many problems. In order to further promote the digital development of rural areas and narrow the gap between urban and rural areas, it is necessary for the government, enterprises, society and other parties to make joint efforts to increase investment in the construction of digital infrastructure in rural areas, improve the digital literacy of rural residents, improve the eco-system of agricultural e-commerce, strengthen the research and development of agricultural digitalization technology and its application and promotion, and strengthen the prevention and control of rural risks, in order to inject a new impetus into the sustainable development of rural areas.

## **4. Policy recommendations to digitally bridge the urban-rural income gap**

With the continuous expansion of the scale of development of the digital economy, it is necessary to avoid the widening of income inequality between urban and rural areas, and to solidly promote the common prosperity of all the people, combining with the above research issues, the following aspects of the development of the recommendations are put forward:

### **4.1. Strengthening the digital infrastructure and building a solid foundation for development**

Given the stage-by-stage impact of the digital economy on the income gap between urban and rural areas, network coverage in rural areas should be actively promoted, network speed and stability should be enhanced, and the construction of new types of infrastructure such as data centers and cloud computing centers should be accelerated to ensure that information transmission is highly efficient, stable and secure, so as to provide a solid guarantee for the

development of the digital economy. At the same time, the construction of e-commerce platforms in rural areas should be strengthened to promote intelligent and precise agricultural production through the application of advanced technologies such as the Internet of Things (IoT), big data, and artificial intelligence, and to promote the upward movement of agricultural products and the downward movement of industrial products, so as to improve the efficiency of agricultural production and product quality. Rural e-commerce, rural tourism and other new forms of business should be vigorously developed to create more employment opportunities and sources of income for farmers, broaden their income-generating channels, and inject new vitality into the common development of urban and rural economies.

#### **4.2. Localized policies to accurately promote development**

In view of the heterogeneous characteristics of the impact of the digital economy on the urban-rural income gap, differentiated and refined digital economy development policies should be formulated for the resource endowment, economic development level and industrial characteristics of different regions to promote the development and growth of local characteristic industries and advantageous industries, and to ensure that the effect of the policy is maximized. For example, for the economically developed and talent-concentrated eastern coastal areas, the focus can be on the development of high-end digital economy industries, such as big data, cloud computing artificial intelligence, etc., in order to drive the overall improvement of the urban and rural economy. For example, for the eastern coastal areas with developed economies and a concentration of talents, they can focus on developing high-end digital economy industries, such as big data, cloud computing and artificial intelligence, in order to drive the overall improvement of the urban and rural economies. For the western region, which is still in the development stage, it can rely on its rich agricultural resources and labor advantages to develop rural e-commerce, smart agriculture and other industries, so as to realize the organic combination of digital economy and agricultural modernization.

#### **4.3. Integration of urban and rural areas and digital transformation of industries**

Given the analysis of the mechanism of the digital economy's impact on the urban-rural income gap, on the one hand, the digital economy regulates the urban-rural income gap through urbanization. Urbanization can guide the orderly transfer of the rural population to cities and help rural residents integrate into urban life by providing employment opportunities and public services. On the other hand, the digital economy regulates the income gap between urban and rural areas through the upgrading of industrial structure. Upgrading industrial structure means transforming from traditional industries to high-tech industries, and in this process, the government can promote the digital transformation of traditional industries through policy guidance and technical support. Digital transformation not only improves the efficiency and quality of traditional industries, but also creates more employment opportunities, thus narrowing the income gap between urban and rural areas.

#### **4.4. Leveraging the digital engine to empower development across the board**

In view of the significant spatial spillover effect of the digital economy on the urban-rural income gap, the digital economy should be actively utilized for industrial clustering and radiation driving. Specifically, the construction of digital economy industrial parks and demonstration bases will attract enterprises to reside there, thereby forming industrial clusters that will create employment opportunities for local rural residents and drive the economic development of the surrounding areas. The implementation of these measures will effectively utilize the spatial spillover effect of the digital economy, strengthen urban-rural economic interaction and collaboration, help narrow the urban-rural income gap, and promote balanced urban-rural economic development and common prosperity.

## 5. Conclusion

This study provides an in-depth analysis of the effects and mechanisms of digitalization in bridging the urban-rural income gap. In terms of effects, digitalization has shown positive effects in multiple dimensions. In rural areas, the advancement of digital infrastructure has built bridges for rural residents to participate in the digital economy. The rise of rural e-commerce has broadened the sales channels for agricultural products, enabling farmers to directly connect to broad markets and increase their business income. At the same time, new employment forms spawned by digitization, such as rural logistics and distribution and e-commerce customer service, have provided rural laborers with more employment options and boosted their wage income. Digitalization has broken the information barriers between urban and rural areas through the information circulation mechanism, allowing rural residents to obtain timely market information and technical knowledge. The resource allocation mechanism has been optimized, and production factors such as capital and technology can flow more accurately to industries with rural advantages. The industrial integration mechanism promotes the deep integration of rural primary, secondary and tertiary industries, extends the industrial chain and enhances the added value of industries.

However, it cannot be ignored that there are still obstacles in the digitization process. Insufficient coverage of rural digital infrastructure in remote areas, an imperfect system of digital skills training for rural residents, and lagging support services for the development of agricultural e-commerce still constrain the full play of the role of digitization.

In the future, it is necessary to continue to increase investment in rural digitalization, especially in infrastructure improvement and talent training. The environment for the development of the digital economy should be further optimized, relevant policies and regulations should be improved, and digitalization should be promoted to play a more effective role in bridging the income gap between urban and rural areas, so as to facilitate the balanced and coordinated development of the urban and rural economies.

## Acknowledgements

This work is supported by Innovation and Entrepreneurship Training Project for College Students of Anhui University of Finance and Economics in 2024, Project number: 202410378213.

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