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Impact of Digital Economy and Internet on Non-agriculture Employment of Rural Labor Force in China

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Abstract: The Internet has extensively influenced all fields and levels of society as a communication technology. Employment in rural areas is also a controversial topic. This paper presents a brief literature review of the impact of the digital economy and the internet on non-agriculture employment of the rural labor force in China. The paper summarizes several technical articles and their Probit mode about the topic. The increased Internet penetration rate in rural areas helps reduce the income gap between rural and urban areas and the off-farm employment rate. The entrepreneurial income of rural households was significantly improved through the Internet. However, the overuse of the Internet will include the decline of non-farm employment intention behavior. The limitation and further research directions of internet and non-agriculture are also presented at the end of the paper.

Keywords: digital economy, non-agriculture employment, rural labor force

1. Introduction

The digital economy is a new driving force of economic development. Through analyzing the underlying mechanism based on a division of the digital economy into consumer internet and industrial internet, the writers of *Digital Economy, Non-agricultural Employment, and Division of Labor* found that "the development of consumer internet brought by the digital economy has promoted the flow of rural unskilled labor force into unskill-biased digital non-agricultural sectors, and the development of industrial internet brought by the digital economy has promoted the flow of rural skilled labor force into skill-biased digital non-agricultural sectors" [1].

By 2021, 509.79 million people will live in rural areas, accounting for 36.11 percent of China's total population. This shows that the peasant population occupies a considerable proportion of Chinese society, and the employment of a non-agricultural population among peasants is also a problem that cannot be ignored.

The contradiction between man and land reduces the ability of agriculture to absorb the rural labor force, enlarges the gap between urban and rural areas, weakens the ability of township enterprises to absorb employment, and the employment pressure of urban residents are mostly the contradictions faced by China's rural development [2]. As a communication technology, the Internet has extensively influenced all fields and levels of society. The following paragraphs will present a brief literature review on the impact of the digital economy and the Internet on non-agriculture employment of the rural labor force, as well as a limitation and further research directions about the topic.

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2. Literature Review

With the progress of science and technology and the development of industrialization, many mechanical operations have been adopted in agriculture so that the labor efficiency of agriculture has been continuously improved. The rapid development of industrialization will produce a significant surplus of the rural labor force. This surplus rural labor force is mainly transferred to the urban non-agricultural industry sector. However, no matter whether in emerging developed countries or established developed countries, the transfer of agricultural surplus labor force is generated and developed along with the promotion of industrialization, which means that non-agriculture and urbanization are accompanied by each other. It is also worth noting that the world's newly industrialized and old industrialized countries began to shift surplus agricultural labor at different times. For example, Britain had already realized the transfer of agricultural labor force before World War II. At the same time, Japan began the large-scale transfer of agricultural surplus labor force mainly after World War II [2].

The current situation of non-agricultural employment in rural China has four main problems worth noting. The first problem is that there is a large amount of surplus labor in rural areas, and the employment space within agriculture is shrinking. The second problem is that the employment structure of farmers is unreasonable, and the proportion of non-agricultural employment in the employment structure is low. The third problem is due to the differences in China's geographical environment, climate characteristics, and material resources, which lead to the regional imbalance of non-agricultural employment of farmers. Finally, the fourth problem is the poor employment environment of farmers, and farmers may suffer from unfair treatment in urban employment [2].

3. Analyzation and Result

With the development of technology and digitalization, the Internet has played an influential role in promoting the optimization, upgrading, and transformation of traditional industries with its characteristics. The Internet not only has an impact on people's lives but also has changed people's employment modes and employment structure. Firstly, the Internet has played a considerable complementary role in the workforce's education. Learning through the Internet can improve human capital by enabling labor to acquire new knowledge and skills at a lower cost and in a shorter time. Secondly, instant messaging on the Internet makes communication between people more convenient and information transmission more rapid, thus effectively expanding the social capital of the labor force and increasing the employment rate by expanding employment channels. Thirdly, the development of the Internet has created many new flexible jobs, such as online car-hailing and online sales, to attract more workers to participate in employment. There is still a huge potential for rural Internet penetration. Therefore, increasing the Internet penetration rate in rural areas can help the off-farm employment of rural labor and reduce the income gap between rural and urban areas [3].

In their article, Ma and Ning used China Family Panel Studies (CFPS) 2014 survey data to "analyze the influence of Internet use on the non-agricultural employment of rural labor force, and solve the endogenous problem by selecting two instrumental variables" [3]. Ma and Ning created a Probit mode which was $worker_i = \propto \cdot Internet_i + \beta \cdot X_i + \mu_i$ ($worker_i$ is whether the person is non-farm employment; $Internet_i$ is the core explanatory variable, that is, whether to use the Internet; X_i is another control variable, including demographic characteristics variables, household characteristics variables and regional characteristics variables; μ_i is the random error term). However, on the one hand, rural workers with off-farm jobs in China are more likely to be connected to the Internet if their incomes are higher, so the basic model is likely to overestimate the role of Internet use. On the other hand, the fact that people without jobs spend more time at home using the Internet leads to a negative relationship between Internet use and off-farm employment, so basic model estimates may also underestimate the role of the Internet. Therefore, the authors also added a model, which is $Internet_i =$

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$1[Z_i\delta + \beta \cdot X_i + v_i > 0]$ to address the existence of the endogenous problem. After the analysis, several important conclusions were drawn that using the Internet can enhance the probability of non-farm employment in the rural labor force, increase the probability of the rural labor force becoming wage gainers, and promote entrepreneurship [3]. This article enriches the field of research on the impact of the Internet on agricultural labor and off-farm employment.

Another study was "conducted to recognize the effect of internet use and social network on the possibility of non-agricultural employment by combining rural samples from CFPS" [4]. Cui used a multiple Probit model and Mixed Conditional Process (CMP) method to deal with endogenous and improve estimation. The article not only mentioned that the Internet could significantly improve the possibility of non-agricultural entrepreneurship of rural residents but also put forward the possibility of social networks contributing to the increase of wages and employment. Another article written by Zhou and Hua explored the effect of Internet use on household entrepreneurship in rural areas. The authors used a Probit model, which was $pr(y_i = 1) = \Phi(\alpha_1 Internet_i + \beta' x_i + \varepsilon_i)$to investigate the influence of the Internet on entrepreneurial decisions. Then they used the model, which was $q_i = \alpha_2 Internet_i + \gamma' x_i + \mu_i$to investigate further whether the Internet promotes the increase of entrepreneurial household income. The paper found that Internet use significantly influences rural households' willingness to start a business. Rural households without Internet access were 3.83% less likely to start a business than households with Internet access [3]. At the same time, the entrepreneurial income of rural households was significantly improved through the Internet. It is found that actively promoting rural Internet construction and making the substantial economy and the Internet economy superposition can narrow the urban-rural divide and promote the construction of the countryside [3].

However, the influences of the Internet on non-farm employment were not all positive. Pan, Cai, and Zhou explored the problem from a different perspective. Although Internet use played a positive role in rural women's off-farm employment, increasing the duration of Internet use rather than the frequency of Internet users had a negative impact. The overuse of the Internet will reduce non-farm employment intention behavior. In addition, "the Internet cannot improve the quality of rural women's non-agriculture employment" [5]. The Internet did not play a significant role in wages, working conditions, and welfare guarantees. Besides, the effect of internet use on rural women's non-agricultural employment also "exists the heterogeneity of rural women's characteristics, such as rural women's age, cultural level, family care intensity, the family economic situation" [5].

More related essays talk about the use of the Internet and unemployment. DiMaggio and Bonikowski studied the impact of Internet use on workers' employment from several viewpoints. They saw the Internet not only as a skill that could increase workers' productivity but also as a handy tool for expanding the capital of society. Workers can have a chance to gain more employment channels and increase the employment rate through online job searching/hunting and expanding private social networks. Internet use can also show employers that workers can use new technologies [6].

In another paper, Zhou and Cui used model-building methods to examine how Internet use affects the income growth of rural residents directly and indirectly [7]. The results showed that Internet use could directly boost rural residents' income growth. It also promoted the income growth of rural residents through non-agricultural employment and entrepreneurial indirectly [7]. The authors also came up with several policy implications, like strengthening the entrepreneurial knowledge of rural residents by training them how to use the Internet [7].

4. Conclusion

Expanding the demand for non-agricultural employment in rural and urban areas is the key to solving the problem of non-agricultural employment in the rural labor force. Although the absorption of the rural labor force by township enterprises is weakened, it is still an essential channel of non-

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agricultural employment for farmers. At the same time, the absorption capacity of the rural labor force in small towns is still weak, and large and medium-sized cities are the direction to solve the non-agricultural employment of farmers [2].

Last but not least, there are several pieces of advice about limitations and further research directions. Firstly, since non-agriculture employment and entrepreneurship played a part in mediating effect, Zhou and Cui suggested that it could be more fruitful if further study explores other potential intermediary variables or performs the robustness tests by using additional data and other methods [7]. Secondly, past essays focus more on how the consumer and industrial internet affect unemployment. There is a lack of studies combining consumer and industrial internet to discuss the relationship between the digital economy and unemployment [1]. Thirdly, there are not too many articles about the impact of the digital economy on non-agriculture employment structure and economic structure transformation, which is also a research direction [1].

To conclude, the Internet has positively promoted the non-agricultural employment of the rural labor force overall. Therefore, proper Internet use can promote employment in non-agricultural areas and economic development in rural areas.

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