Analysis of the Impact of Internet Use on China's Labor Participation Behavior

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Abstract. The development of the Internet has not only changed people's lifestyles, but also affected their employment choices. Based on data of Chinese General Social Survey (CGSS) 2015, the paper examines the impact of Internet use on China's labor participation behavior with Probit model. The study found that the use of the Internet can improve labor participation, and it shows heterogeneity in the level of education, it has a greater impact on people with higher education. Therefore, the paper suggests that in order to improve labor participation, it is necessary to strengthen the infrastructure of the Internet and mobile networks, expand the coverage of education and training, innovate education and training methods to improve the education level of the citizens, thereby increase the Internet usage rate.

1. Introduction

According to the 42nd Statistical Report on the Development of China's Internet of China Internet Network Information Center(CNNIC), as of June 30, 2018, the number of Chinese Internet users reached 802 million, and the Internet penetration rate was 57.7%. The Internet not only affects people's lives, but also changes people's labor participation behavior from both supply and demand. Compared with other countries, China's labor participation rate is relatively high, especially the participation rate of female. Nevertheless, due to the aging population, the gradual strengthening of China's social security and the strong employment pressure, China's labor participation has been declining year by year. [1] And the rise of the Internet has caused people to think something new about China's labor participation. From the perspective of labor demand, the development of Internet-related industries has created new employment opportunities, such as online car, online sales, take-out merchants and live web casts, as well as some new jobs, such as online customer service and couriers, shared bicycle administrators, etc, but it has also led to the decline of some traditional industries and reduced employment, such as the emergence of online car has seriously affected the interests of the taxi industry. From the perspective of labor supply, individuals using the Internet can increase production efficiency and increase human capital and social capital. At the same time, the emergence of the Internet has greatly reduced the information costs of people looking for job opportunities, such as the popularity of online recruitment and job hunting, Liepin.com, maimai.cn, LinkedIn and other recruitment websites, greatly improving the efficiency of supply and demand matching, enabling more workers to find desirable jobs at a lower cost. On the other hand, due to the rise of the Internet, those who do not work spend more time at home, using the Internet for entertainment, leisure, shopping, etc., such as more and more “house men” and “house women”. This situation will lead to a negative correlation between the use of the Internet and labor participation. So how does the widespread use of the Internet in China affect the national labor participation behavior?

2. Hypotheses

The theory of traditional labor supply mainly discusses the problem of individuals' time allocation between paid work and leisure to obtain maximum utility. According to the theory, labor supply depends mainly on the comparison between the value of wage work (salary) and the value loss due to lost leisure time (retention wage). [2] People only participate in labor when the market wage rate is

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greater than the retained wage. Studies have confirmed that Internet use has a positive impact on the increase in individual wage rates and the reduction in retained wages. [3] From the perspective of personal wage rate, personal use of the Internet can increase its production efficiency, enhance its human capital, and thus increase wages. Simultaneously, the Internet has increased the labor productivity of enterprises, and the technological advancement caused by it has promoted the increase of total factor productivity, which in turn has led to an increase in wage rates. From the perspective of retaining wages, the Internet can improve labor efficiency, increase the leisure time of laborers other than work and housework, and thus the marginal value loss due to lost leisure time will decrease, that is, the retention of wages decrease. In the meantime, according to the occupation matching search theory, the optimal career search time depends on the marginal revenue and marginal cost of the career search time. [4] The information on the labor market is incomplete, and the information search required to get a satisfactory job is costly. The wide application of the Internet improves the efficiency of supply and demand matching in the labor market, reduces search time, and reduces frictional unemployment. Therefore, more workers can find a satisfactory job, which relieves employment pressure, and thus increases the probability of labor participation. In addition, the popularity of Internet technology has promoted the diversification of employment patterns, and the online work modes such as e-commerce and platform employment derived from it have made it a new trend to work at home and even anywhere, and this flexible employment method has attracted a large number of self-employed entrepreneurs and laborers. Therefore, this paper proposes the hypothesis that the higher the frequency of Internet use, the higher the probability of labor participation.

In addition, this paper assumes that the impact of Internet use on labor participation is heterogeneous. For instance, some scholars believe that there is a gender difference in the impact of Internet use on labor participation. Due to the traditional Chinese concept and the comparative advantages of women in housework, more domestic work is carried out by women and takes a lot of time, thus excluding some women from the labor market. Internet use such as online shopping, online take-out and online payment can reduce the time of housework, so that women have more energy to work. [1] Urban and rural areas have different degrees of access to the Internet because of the popularity of Internet devices, and the impact on the resulting labor participation behavior will also be heterogeneous. In addition, the diverse of education makes the degree of acceptance of emerging Internet knowledge greatly different. In some groups with lower academic qualifications, the Internet may be difficult to exert its positive effect on labor participation. [5] In response to these different personal characteristics, this paper focuses on the heterogeneity of education.

3. Method

3.1 Data source and variable selection

The data in this paper is based on the CGSS 2015. CGSS started in 2003 and is the earliest national, comprehensive and continuous academic survey project in China. It investigates once a year which covers 125 counties (districts), 500 streets (townships, towns) and 1,000 residences (villages), individuals in 10,000 households to collect data on social, community, family, and individual levels on a regular, systematic, and comprehensive basis. It summarizes the long-term trends of social change, and explores issues of major scientific and practical significance. The opening and sharing of domestic scientific research like CGSS provides data for international comparative research and serves as a multidisciplinary economic and social data collection platform. This data not only provides detailed inquiries about the core variables of the paper, namely whether to use the Internet, but also collects data of three levels of individuals, families and regions, which can be used as a good source of data for the study in this paper.

The explanatory variable in this paper is whether to participate in the labor market. The so-called “participation” includes not only employment, but also the unemployed who actively seek jobs. The measurement of this variable in this paper is based on the respondent's answer to the question “whether you spent more than one hour of labor (including joining the army) in order to earn income

last week". The core explanatory variable of this paper is whether or not to use the Internet from the questionnaire --- "the use of the Internet (including mobile Internet) in the past year", the degree is defined in terms of the answers "never", "rarely", "sometimes", "often" and "very frequently". Control variables include individual, family, and regional feature variables. The personal characteristic variables mainly include gender, age, nation, hukou , marital status, health status and education level; family characteristic variables are represented by family economic situation; regional characteristic variables are divided into urban and rural areas according to the survey area. The specific descriptive statistics are shown in Table 1.

Table 1. Descriptive statistics of main variables (mean and standard deviation).

Variable	N	mean	sd	Variable description
labor participation	8582	0.63	0.48	yes=1,no=0
Internet use	8582	2.66	1.67	never=1,rarely=2,sometimes=3,often=4, very frequently=5
gender	8582	0.47	0.50	male=1,female=0
marital status	8582	0.81	0.39	married=1,unmarried=0
age	8582	44.34	13.07	
age^2	8582	2136.68	1127.76	
nation	8582	0.92	0.27	Han=1minority=0
education	8582	2.19	1.22	illiteracy=0,primary school=1,junior high school=2 high school=3,college and above=4
health	8582	3.75	1.03	very unhealthy=1,less healthy=2,general=3, more healthy=4,very healthy=5
hukou	8582	0.43	0.49	non-agricultural=1,agricultural=0
economics	8582	2.66	0.71	far below average=1,below average=2,average=3, above average=4,far above average=5
region	8582	0.60	0.49	city=1,countryside=0

3.2 Model setting

The discrete selection model---probit model is adopted because of the explained variable is a discrete binary variable if it participates in the labor market. This paper sets the empirical model to:

$$L_i = \alpha \bullet Internet_i + \beta \bullet X_i + \mu_i. \quad (1)$$

Among them, L_i is the participation in labor, $Internet_i$ is the core explanatory variable, that is, whether to use the Internet, X_i is control variable, including population, family and regional characteristic variables, μ_i is the random error term, and α and β are the coefficients to be evaluated.

3.3 Empirical analysis

The sample of this study is mainly for the working-age population aged 18 to 65 years old. 8582 samples were obtained after removing the missing key information samples. The data is empirically analyzed using stata14.0. Table 2 shows the results of estimating the model using the probit model. From the results in the table, there is a positive correlation between the frequency of Internet usage and labor participation, that is, the use of the Internet can improve 4.37% labor participation rate. Even if various control variables are added, this basic conclusion has not been changed. The results of other control variables are basically in line with expectations. It can be seen from the estimation of gender variables that the gender difference in labor participation probability is very obvious, which may be related to traditional social concepts and family division of labor. Compared with women, the probability of male labor participation will increase by about 20.4 percentage points. Marital status has a significant negative impact on labor participation, indicating that married people show a lower probability of employment than unmarried. Age has an "inverted U" effect on labor participation. Compared with the Han nationality, ethnic minorities have a higher level of labor participation. It can be seen from the estimation of the degree of education that it has a significant positive impact on the probability of labor participation. As the level of potential compensation rises with the increase of education level, the positive impact of education level on the probability of labor participation reflects the positive effect of market compensation level on labor participation behavior. The higher

the degree of health, the higher the enthusiasm for labor participation. In addition, the labor participation probability of rural household registration is relatively high.

Table 2. The impact of Internet use on labor participation (Probit regression).

Variable	Coef	Std.Err	dy/dx
Internet	0.1392***	0.0139	0.0437
gender	0.6500***	0.0310	0.2041
marital status	0.0848*	0.0444	0.0266
age	0.2120***	0.0088	0.0666
age^2	-0.0026***	0.0001	-0.0008
nation	-0.1175**	0.0551	-0.0369
education	0.0327*	0.0177	0.0103
health	0.1024***	0.0157	0.0322
hukou	-0.2690***	0.0415	-0.0845
economics	0.0494**	0.0222	0.0155
region	-0.0848**	0.0393	-0.0266
_cons	-4.5988***	0.2094	
Number of obs			8582
Prob>chi2			0.0000
Pseudo R^2			0.1580

Note: *, **, and *** in the table are indicated at the 0. 1, 0. 05, and 0.01 levels, respectively, the table below is the same.

3.4 Heterogeneity of Internet use in labor participation behavior

In order to further clarify the impact of Internet use on labor participation, the heterogeneity impact of Internet use on labor participation behavior is examined based on the classification of education in the previous personal characteristic variables. The reason why the education level is selected as the classification criterion is that the educational level has a high correlation with the working status and income. Different academic workers have different reflections on the positive effects of Internet-driven labor participation due to different incomes, thus affecting the estimation results.

Table 3. The impact of Internet use on labor participation of different academic qualifications.

model	illiteracy	primary school	junior high school	high school	college and above
dy/dx	0.0420	0.0359	0.0152**	0.0349***	0.0378***
Std.Err	-0.0345	-0.0134	-0.0067	-0.0077	-0.0098

Table 3 shows the estimated results of regression according to the degree of education. First of all, the use of the Internet has no significant impact on the labor participation of “illiteracy” and “primary school”, especially in the case of “illiteracy”, the P value is too large to pass the significance test. The impact on the “junior high school” is also relatively small, only 1.52%, while the impact on “high school” and “college degree and above” is more significant, and the higher the education, the more the impact. The impact on “college degree and above” is 3.78%, which shows that the role of the Internet still needs to be based on certain human capital, and it is difficult for workers with lower education levels to play the positive role of the Internet in employment. The reason for this may be that the income of the low-education sample is lower, and there is no effective demand for the Internet. In addition, the higher the education level, the more employment choices, the higher the Internet technology they are exposed to, the more favorable it is for further study, the role of the Internet can be exerted to a greater extent, and thus the impact of Internet use on labor participation is more significant among those with higher education levels.

4. Summary

The development of the Internet has penetrated into every aspect of life, not only changing people's lifestyles, but also affecting people's labor participation behavior. The paper first analyzes the theoretical mechanism of Internet use affecting labor participation decision-making, and puts forward reasonable assumptions. The Probit model is used to examine the impact of Internet use on China's

labor participation behavior according to the CGSS 2015. Later, it also explored the heterogeneity effect of Internet use on different levels of education. The study found that the use of the Internet significantly promoted labor participation, showing an increase in the probability of using the Internet to drive the overall participation in labor by 4.37%. In addition, the impact of Internet use in the relatively high-education samples is more significant, and the higher the degree of education, the more the impact of the increase, it can be seen that the degree of influence of Internet use on labor participation is related to the level of human capital. With the continuous advancement of China's "Internet +" plan, the cross-border integration of the Internet and traditional industries has made positive progress, and the new economy and new business based on the network platform have gradually become the new economic growth engine. The rapid development of the Internet has brought new opportunities for the labor participation of Chinese nationals.

In response to the research conclusions of the paper, the following policy recommendations are proposed: First, the government needs to promote the reform of broadband speed-up and fee reduction, strengthen the construction of Internet infrastructure in remote areas to increase the Internet penetration rate. Secondly, China should attach importance to compulsory education, because improving education level can make it better to use the Internet to promote its participation in labor, which is of great significance for improving its economic vitality and driving people's income. At the same time, we must use the network technology innovation education and training model to improve the people's Internet use skills, thereby increasing the probability of their labor participation. Finally, efforts should be made to improve the environment of “Internet + entrepreneurship”. The Chinese government should further regulate the order of the entrepreneurial market, improve relevant laws and regulations, promote the healthy development of Internet entrepreneurship, and encourage more people to participate in labor through entrepreneurship. In the meantime, it is necessary to improve the employment service system, optimize the social security system, and strengthen the family-friendly policy to adapt to the new forms of flexible work system, paid work at home, telecommuting and work sharing, which is of great significance for realizing a free and flexible employment approach.

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