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Internet technology usage and female employment: Evidence from a Chinese general social survey

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ABSTRACT

This study empirically analyzes the effect of internet technology usage on female employment and their wage income by constructing logit and quantile regression models to examine the moderating effect of years of education. The results show that internet technology usage significantly suppresses the likelihood of female employment and reduces their wage income before their years of education reach the target requirement but has a differential effect on the wage income of females at different levels. After females have reached their years of education target, internet technology usage significantly increases their likelihood of obtaining employment and improving their wage income. The positive effect of internet technology usage on female employment and their wage income is more obvious as the years of education increases. Therefore, this study proposes that females should be encouraged to strengthen their internet technology usage skills and improve their education level.

Contribution/Originality: Based on the examination of internet and information technology on female employment and their wage income, this study innovatively examines the moderating effect of years of education on the relationship between internet information technology and female employment and their earnings.

1. INTRODUCTION

In recent years, China's internet technology has shown rapid development and increasing popularity. According to the 49th statistical report on the development of China's internet, the number of China's internet users reached 1.032 billion as of December 2021, and the internet penetration rate is about 73.0%. The digital economy relies on the internet and has given a new dynamic energy to China's economic growth (Cao & Jiang, 2020). The internet has not only reshaped the way people live and work, it has also triggered a new labor allocation effect (Li, 2022), and the new economic formations derived from it have not only created more diverse forms of employment and a large number of job opportunities, it has also positively affected wage income (Atasoy, 2013; Zhang & Wu, 2021). The established literature has paid sufficient attention to the impact of the internet on overall employment size (Kuhn & Mansour, 2014; Qi & Chu, 2021; Wang, 2020), overall employment quality (Meng, 2021; Qi & Chu, 2021; Wang, 2020), and overall wage income (Goss & Phillips, 2002; Jiang & Zhao, 2022; Krueger, 1993; Lee & Kim, 2004; Luo & Liang, 2021; Xu, 2018; Yu, 2018), but relatively few studies have been conducted on the topic of females as a vulnerable group in employment.

China is now in a new stage of population aging and weakening demographic dividend (Li, 2022), and with the change of fertility policy and the intensification of employment discrimination, females' development has become a concern in political and academic circles. As a basic prerequisite for females' development, the importance of employment and wage income needs no elaboration, while the current academic circles mainly discuss this issue in terms of marriage, childbirth, and education (Chen & Qin, 2005; Ma & Zhu, 2021; Wu, 2010; Zhang & Gu, 2020). There are relatively few studies on the impact of the internet and the underlying technology of various digital technologies on female employment and their wage income, and the findings are highly variable (Ding & Liu, 2022; Feng, Gao, & Luo, 2021; Yan, 2021; Zhou, Li, & Meng, 2021; Zhuang & Liu, 2016). In addition, data from the 49th Statistical Report on the Development of the Internet in China shows that the number of female internet users in China reached 501 million as of December 2021, accounting for 48.5% of total internet users, highlighting the importance of studying the impact of the internet as a digital technology on female employment and their wage income.

Theoretically, along with the digital transformation of China's economy and society, the production and manufacturing industries will also undergo service transformation, which will, in turn, promote more diversified and flexible work styles. More jobs that fit females' occupational characteristics will be created in the labor market, e-commerce, the platform economy and the sharing economy, and other industries will continue to generate more flexible and diversified employment models. This creates a huge space for the further increase of the female labor force participation rate, and females' wage incomes will also increase (Gao, 2021a; Li, 2022). Increased female employment and higher wage income not only promote economic growth (Lechman & Kaur, 2015) but also have a positive impact on the future development of their children (Du & Dong, 2010). However, some scholars have expressed concerns about the possible negative effects of internet technology usage. After all, the internet requires a large knowledge base, especially in STEM (Science, Technology, Engineering, and Mathematics), and compared to males, females' learning ability and interest in this kind of knowledge is relatively weak, and the powerful information retrieval function of the internet also brings more precise gender discrimination. Whether internet technology usage can have a positive impact on female employment and wage income needs to be further examined (Ingram & Neumann, 2006; Jackson, Ervin, Gardner, & Schmitt, 2001; Moore, Griffiths, Richardson, & Adam, 2008; Yan, 2021).

2. THEORETICAL ANALYSIS

2.1. Relationship Between Internet Technology Usage and Female's Employment

Before entering the digital era, employers were constrained by limited information and could only predict the average productivity of the labor force based on directly observable information such as gender characteristics and education level. Employers could not access unobservable information such as personality or the communication ability of the labor force, and the expectations based on limited information usually had a large deviation from the reality. This information asymmetry was the root cause of gender discrimination in the labor market (Mao & Zeng, 2017; Phelps, 1972).

After entering the digital age, information is highly interconnected thanks to the internet. Through the power of the internet, the radius of information dissemination is expanded, the cost of searching for information is controlled, and the problem of information asymmetry in the labor market will be solved, which not only helps employers to use online job fairs and other forms to assess the unobservable information of the female labor force to hire effectively, but also helps to expand the job-seeking paths of the female labor force to improve the efficiency of their employment choices and increase females' chances of obtaining jobs (Kuhn & Mansour, 2014; Luo & Liang, 2021; Stevenson, 2008; Zhan, Wang, & Meng, 2018). In addition, the digital age is an important opportunity to manifest females' independent personalities, to break through the constraints of religious traditions and cultural practices on females' development, and to ameliorate gender bias against females (Gao, 2021b; Haraway, 2013). However, it is important to note that although the use of internet technology may bring the abovementioned convenience and advantages to females'

employment, their employment status is likely to be significantly negatively affected when they have fewer years of education, resulting in a lower knowledge base, especially if their STEM-related knowledge base is not sufficient to master internet technology. Based on this, the following hypothesis is proposed:

Hypothesis 1: Internet technology usage has a significant effect on females' employment status, but the direction and strength of the effect is moderated by their years of education.

2.2. Relationship Between Internet Technology Usage and Female's Wage Income

Internet technology is a classic task-biased technological advancement that will lead to the automation and economic servitization of manufacturing and will replace most of the programmable, repetitive, and routine manual labor easily. This means that creative, cognitive and social skills will be increasingly important in an increasingly digital work scenario (Acemoglu & Autor, 2011; Autor, Levy, & Murnane, 2003; Borghans, Ter Weel, & Weinberg, 2014; Weinberger, 2014).

According to the "muscle-brain" theory, the advantages of males' muscle strength and hormones will be largely eroded by the digital technology of the internet. Conversely, the labor market's demand for a female workforce with stronger creative, cognitive, and social skills will increase significantly, meaning that the advantages of females' more creative thinking and interpersonal and communication skills will be further amplified, and females will gain a relative advantage in employment and engage in increasingly unconventional mental work, thus their wage income will receive a higher market premium (Black & Spitz-Oener, 2010; Cortes, Jaimovich, & Siu, 2018; Plant, 1997; Stinebrickner, Stinebrickner, & Sullivan, 2018; Welch, 2000; Yamaguchi, 2018). In addition, the information-seeking advantage of internet technology not only helps females to search more efficiently for more compatible jobs, it also accelerates the accumulation of females' human and social capitals, which will also contribute to the growth of their wage income (Jiang & Zhao, 2022; Krueger, 1993; Kuhn & Mansour, 2014). However, it is also important to note that if females' fewer years of education lead to weaker creative abilities and lower cognitive levels, internet technology usage is likely to not only fail to give females a comparative advantage in employment but may instead have a significant negative impact on their wage earnings. Based on this, the following hypothesis is proposed:

Hypothesis 2: Internet technology usage has a significant effect on females' wage income, but the direction and strength of the effect is moderated by their years of education.

3. METHODOLOGY

3.1. Data Sources

The data for this study were obtained from the 2018 Chinese General Social Survey (CGSS), a survey project initiated and executed by the China Survey and Data Center of Renmin University of China. At present, more than 1,000 academic papers based on the CGSS have been published in academia, thus the data has considerable credibility. After eliminating the missing and invalid data, this study obtained a valid sample of 1,613.

3.2. Variable Settings

3.2.1. Dependent Variables

The dependent variables in this study are employment status and wage income. The principles for assigning employment status (es) and wage income (wi) are referenced from Gao and Liu (2022). Employment status is assigned a value of 1 if the female respondent's wage income is not equal to 0, otherwise it is assigned a value of 0. Wage income is obtained by dividing the female respondent's annual work income by the number of hours she works in 52 weeks.

3.2.2. Independent Variable

The independent variable in this study is internet technology usage (itu). The principle for assigning internet technology usage is referenced from Gao and Liu (2022). Internet technology usage is assigned a value of 1 when the female respondent frequently uses internet technology, otherwise it is assigned a value of 0.

3.2.3. Moderating Variable

The moderating variable in this study is years of education (yoe). The principle for assigning years of education is referenced from Gao and Liu (2022). Specifically, when the female respondent has received no education, years of education is assigned a value of 0. When the female respondent has received elementary school education, years of education is assigned a value of 6. When the female respondent has received middle school education, years of education is assigned a value of 9. When the female respondent has received high school education, years of education is assigned a value of 12. When the female respondent has received a bachelor's education, years of education is assigned a value of 15. When the female respondent has received a master's education, years of education is assigned a value of 19.

3.2.4. Control Variables

Referring to the existing studies (Cao & Jiang, 2020; Li, 2022; Ma & Zhu, 2021; Mao & Zeng, 2017; Zhang & Wu, 2021; Zhuang & Liu, 2016) the control variables in this study include age (the actual age of the female respondent); health status (hs), the physical health status of the female respondent (healthy = 1, unhealthy = 0); household registration status (hrs), the household registration status of the female respondent (rural household = 1, urban household = 0); marital status (ms), the marital status of the female respondent (married = 1; unmarried, divorced, widowed = 0); minor children (mc), whether the female respondent has minor children at home (yes = 1, no = 0); annual household income (ahi), real annual household income of the female respondent); household property (hp), whether the female respondent owns household property (yes = 1, no = 0); household car (hc), whether the female respondent owns a household car (yes = 1, no = 0); household investment activity (hia), whether the female respondent engages in the household's investment activities (yes = 1, no = 0); father's years of education (fyoe), the female respondent's father's years of education, with the assignment principle consistent with years of education); and mother's years of education (myoe), the female respondent's mother's years of education, with the assignment principle consistent with years of education).

3.3. Model Selection

In this study, the logit model was chosen for the empirical analysis of females' employment status (es), and the quantile regression model was chosen for the empirical analysis of females' wage income (wi).

The logit model is considered to be applicable to the empirical analysis model for females' employment status because the dependent variable employment status (es) is a discrete binary variable. Compared to the traditional OLS model, the logit model can more accurately estimate the effect of each variable on females' employment status. The specific model is constructed as follows:

$$es_i = c + \beta_1 * itu_i + \beta_2 * yoe_i + \beta_3 * itu_i \times yoe_i + \beta_4 * age_i + \beta_5 * age_i^2 + \beta_6 * hs_i + \beta_7 * hrs_i + \beta_8 * ms_i + \beta_9 * mc_i + \beta_{10} * ahi_i + \beta_{11} * hp_i + \beta_{12} * hc_i + \beta_{13} * hia_i + \beta_{14} * hyoe_i + \beta_{15} * myoe_i + \mu_i \quad (1)$$

In Equation 1, es_i, itu_i, yoe_i, $itu_i \times yoe_i$, age_i, age_i^2, hs_i, hrs_i, ms_i, mc_i, ahi_i, hp_i, hc_i, hia_i, $hyoe_i$ and $myoe_i$ respectively represent the i-th female respondent's dependent variable employment status (es), the independent variable of internet technology usage (itu) and a set of control variables, c and μ_i respectively represent the constant term and the random disturbance term. In addition, in order to examine whether age has an inverted U-shaped effect on the employment status of the female respondent, this study also introduces age^2.

The quantile regression model is deemed appropriate for the empirical analysis of the female wage income model because the distribution of the dependent variable of wage income varies greatly among females, and if this is not controlled for, there will be serious endogeneity problems, which will lead to biased estimation results. Compared to the traditional OLS model, the quantile regression model can better control for endogeneity due to differences in the distribution of dependent variables. The specific model is constructed as follows:

$$Q_{i\varphi}(wi_i|X_i) = X_i\beta_{i\varphi} + \varepsilon_{i\varphi} \quad (2)$$

Equation 2 represents the conditional quantile corresponding to the quantile φ for a given characteristic variable X_i. wi_i represents the hourly wage income of the surveyed female, X_i represents a set of eigenvectors including the independent variable itu_i, and the moderating variable is yoe_i. The product of the independent variable and the moderating variable is represented by $itu_i \times yoe_i$ and a set of control variables age_i, age_i^2, hs_i, hrs_i, ms_i, mc_i, ahi_i, hp_i, hc_i, hia_i, $hyoe_i$ and $myoe_i$ in Equation 1. In Equation 2, $\varepsilon_{i\varphi}$ represents the random disturbance term. Meanwhile, the 25th, 50th and 75th quantiles are selected for parameter estimation and defined as lower wage level, middle wage level and higher wage level, respectively. The coefficient estimates before each variable can be obtained by minimizing the equation for females' wage income at different quartiles. In addition, in order to examine whether there is an inverted U-shaped effect of age on females' wage income, the squared term of age is introduced into the series of control variables.

4. EMPIRICAL ANALYSIS

4.1. Descriptive Statistics

Descriptive statistics for each of the above variables are presented in Table 1. The results revealed that 58.8% of the female respondents are in employment and their wage income is 18.040 yuan (RMB, China's basic monetary unit) per hour on average, showing that the overall employment rate and wage income of the female respondents are relatively low. In terms of the independent variable, only 67.5% of the female respondents use the internet frequently, and the overall frequency of internet use by the female respondents is relatively low. In terms of the moderating variable, the mean value of years of education for the female respondents is 10.551 years, indicating that most of them have only received middle school education and their overall education level is relatively low.

Table 1. Descriptive statistics of the variables.

Variable	Code	Sample size	Mean value	Standard deviation	Minimum value	Maximum value
Employment status	es	1613	0.690	0.463	0	1
Wage income	wi	1613	18.040	55.710	0	1442.308
Internet technology usage	itu	1613	0.675	0.469	0	1
Years of education	yoe	1613	10.551	3.242	6	19
Age	age	1613	41.925	10.611	18	60
Health status	hs	1613	0.703	0.457	0	1
Household registration status	hrs	1613	0.549	0.498	0	1
Marital status	ms	1613	0.864	0.343	0	1
Minor children	mc	1613	0.460	0.499	0	1
Annual household income	ahi	1613	10.000	19.919	0	6000000
Household property	hp	1613	0.893	0.310	0	1
Household car	hc	1613	0.379	0.485	0	1
Household investment activity	hia	1613	0.104	0.305	0	1
Father's years of education	fyoe	1613	6.144	4.309	0	16
Mother's years of education	myoe	1613	4.463	4.249	0	16

In terms of the control variables, the mean value of age is 41.925 years, indicating that most of the female respondents are middle-aged. The mean value of health status (hs) is 0.703, indicating that most of the female respondents are in good health. The mean value of household registration status (hrs) is 0.549, indicating that there

are relatively more female respondents from rural areas. The mean value of marital status (ms) is 0.864, indicating that the majority of female respondents are married, while only a few are unmarried, divorced or widowed. The mean value for minor children (mc) is 0.46, indicating that 46% of the women surveyed had young children at home. The mean value of annual household income (ahi) is 100,000 yuan, the mean value of household property (hp) is 0.893, and the mean value of household car (hc) is 0.379, indicating that the average annual household income of the surveyed females is 100,000 yuan, 89.3% of the surveyed females' owned household property, 37.9% owned a car, and the economic conditions of their households are relatively good. The mean value of household investment activity (hia) is 0.104, indicating that 10.4% of the surveyed females' households are engaged in investment activities, and the willingness of their households to invest is relatively low. The mean values of father's years of education (fyoe) and mother's years of education (myoe) are 6.144 and 4.463, respectively, indicating that the fathers' and mothers' education levels of the surveyed females were low overall, with only elementary school education.

4.2 Analysis of the Factors Influencing Females' Employment Status

Table 2 reports the estimated effect of each variable on female employment status (es) based on the logit model.

Table 2. Estimated results of the effect of each variable on females' employment status.

Employment status (es)	Coefficient	Z-value	Average marginal effect	Z-value
itu	-1.699*** (0.463)	-3.670	-0.302*** (0.081)	-3.728
yoe	-0.024 (0.042)	-0.571	-0.004 (0.008)	-0.500
itu×yoe	0.207*** (0.047)	4.404	0.037*** (0.008)	4.625
age	0.582*** (0.054)	10.778	0.103*** (0.008)	12.875
age²	-0.007*** (0.001)	-7.000	-0.001*** (0.000)	-12.941
hs	0.428*** (0.133)	3.218	0.076*** (0.023)	3.304
hrs	0.646*** (0.142)	4.549	0.115*** (0.025)	4.600
ms	-0.176 (0.210)	-0.838	-0.031 (0.037)	-0.838
mc	-0.630*** (0.163)	-3.865	-0.112*** (0.029)	-3.862
ahi	0.001 (0.006)	0.167	0.000 (0.001)	0.133
hp	0.135 (0.195)	0.692	0.024 (0.035)	0.686
hc	-0.003 (0.136)	-0.022	-0.001 (0.024)	-0.042
hia	0.020 (0.212)	0.094	0.004 (0.038)	0.105
fyoe	-0.041* (0.019)	-2.158	-0.007* (0.003)	-2.333
myoe	0.031 (0.019)	1.632	0.005 (0.003)	1.667
Constant	-10.002*** (1.158)	-8.637	-	-
Pseudo R^2	13.82%			
Sample Size	1613			

Note: *** represents $p < 0.001$, * represents $p < 0.05$. Standard errors are in parentheses.

In terms of the independent and moderating variables, the estimation results show that internet technology usage has a negative effect on females' employment status at 0.1% significance level, and the product of internet technology

usage and years of education (itu×yoe) has a positive effect on females' employment status at the 0.1% significance level, indicating that years of education has a moderating effect on the relationship between internet technology usage and females' employment status. Further calculation of its average marginal effect shows that frequent internet technology usage will only boost female employment when they have more than nine years of compulsory education, otherwise it will further inhibit their employment possibilities, which verifies Hypothesis 1. Specifically, frequent internet technology usage decreases the likelihood of employment by 30.2% and 8% for females with no education and elementary school education only, respectively, while frequent internet technology usage increases the likelihood of employment by 3.1%, 14.2%, 25.3%, 29%, and 40.1% for females with middle school education, high school education, junior college education, bachelor's education, and master's education, respectively.

Based on the above findings, Figure 1 shows that frequent internet technology usage does not directly increase females' likelihood of employment; rather, frequent internet technology usage only exerts a suppressing effect on females' likelihood of employment if they have not reached the required number of years of education, and this suppressing effect becomes stronger with fewer years of education. The reason for this influence may be that when females have fewer years of education, their knowledge is relatively low, especially STEM-related knowledge. Although frequent internet technology usage can bring them a large amount of information, their knowledge is insufficient to effectively use the information and they may be unable to distinguish the authenticity of such information, thus they are likely to be impacted by false information, leading them to make irrational decisions. When females have more years of education, their knowledge reserves are relatively large, and the amount of information obtained by frequent internet technology usage will be used more fully and effectively, leading them to make more rational decisions, such as making full use of the powerful search function of the internet to search for compatible jobs, which, in turn, has an obvious positive effect on their employment status.

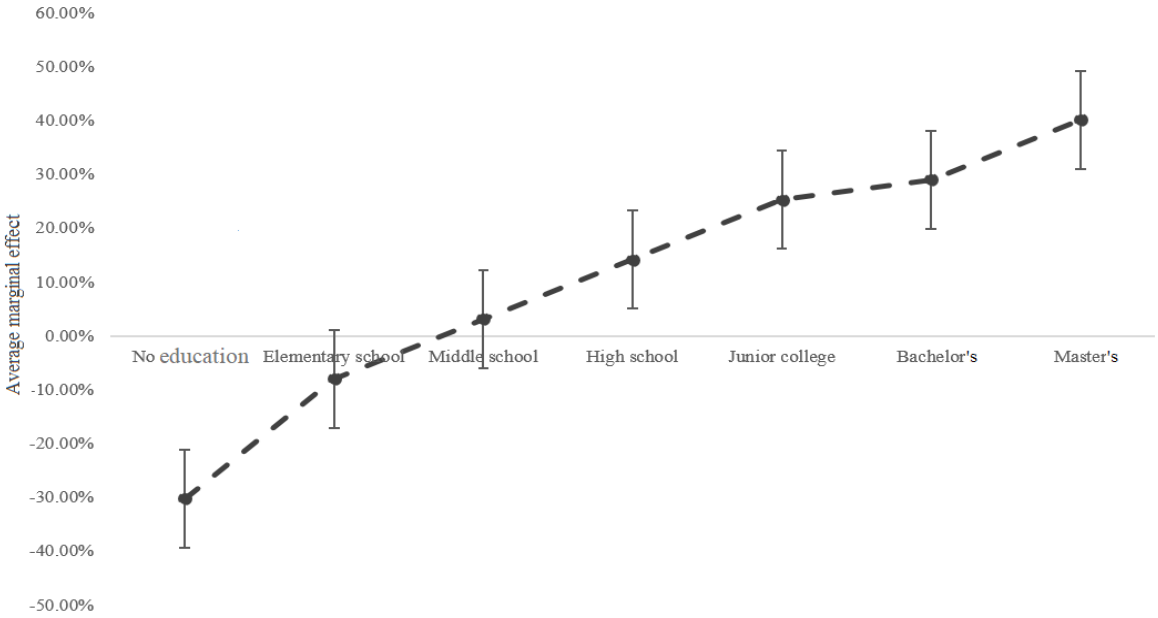

Figure 1. The effect of internet technology usage on females' employment status under varying years of education.

In terms of the control variables, the estimation results show that both age and age^2 have positive and negative effects on female employment status, respectively, at the 0.1% significance level, indicating that age has an inverted U-shaped effect on females' employment status. The likelihood of females' employment tends to increase and then decrease with age. Health status has a positive effect on females' employment status at the 0.1% significance level, with each unit increase in females' health status increasing the likelihood of employed by 7.6%. Household registration status has a positive effect on females' employment status at the 0.1% significance level, with females holding a rural household registration being 11.5% more likely to be employed than those holding an urban household registration.

Having minors has a negative effect on females' employment status at the 0.1% significance level, so females with minor children in the household are 11.2% less likely to be employed than females without minor children in the household. Father's years of education has a negative effect on females' employment status at the 5% level of significance, with each additional year of father's education being associated with a 0.7% decrease in the likelihood that a female will be employed. Although annual household income, household property, household investment activity and mother's years of education have a positive effect on females' employment status, it is not significant.

4.3. Analysis of the Factors Influencing Females' Wage Income

Table 3 reports the estimated effect of each variable on females' wage income (wi) based on the quantile regression model.

Table 3. Quantile regression results for females' wage income.

Wage income (wi)	Lower wage level	Middle wage level	Higher wage level
itu	-7.122***	-9.153***	-6.074**
	(1.940)	(2.417)	(2.336)
yoe	0.227*	0.273	0.368*
	(0.126)	(0.130)	(0.159)
itu×yoe	0.862***	1.135***	0.770***
	(0.210)	(0.253)	(0.259)
age	1.516***	1.822***	1.581***
	(0.234)	(0.283)	(0.297)
age^2	-0.019***	-0.023***	-0.020***
	(0.003)	(0.004)	(0.004)
hs	1.255***	1.126*	1.183
	(0.342)	(0.449)	(0.730)
hrs	0.797	0.777	1.522
	(0.491)	(0.638)	(0.639)
ms	-0.750	-2.111**	-5.399***
	(0.918)	(0.866)	(2.300)
mc	-1.305	-0.948	-2.113**
	(0.696)	(0.665)	(0.994)
ahi	0.064	0.701***	1.479***
	(0.116)	(0.219)	(0.192)
hp	-0.319	-0.078	1.091
	(0.790)	(0.716)	(1.131)
hc	0.092	-0.322	-0.080
	(0.524)	(0.788)	(0.844)
hia	1.313	7.007***	13.318***
	(1.545)	(1.930)	(3.572)
fyoe	-0.145**	-0.125	-0.109
	(0.071)	(0.069)	(0.071)
myoe	0.116	0.121	0.129
	(0.076)	(0.078)	(0.077)
Constant	-28.641***	-33.576***	-27.409***
	(4.350)	(5.360)	(5.105)
R^2	3.59%	17.45%	25.73%
Sample size	1613		

Note: *** represents $p < 0.001$; ** represents $p < 0.01$; * represents $p < 0.05$. Standard errors are in parentheses.

In terms of the independent and moderating variables, the regression results show that regardless of whether females' wage income is at a lower, middle or higher level, internet technology usage has a significant negative effect on female's wage income, while years of education always has a significant moderating effect and can positively moderate the relationship between internet technology usage and females' wage income. Specifically, the moderating effect increases with the increase in females' years of education, which verifies Hypothesis 2. However, it is important to note that there are significant differences in the moderating effects of years of education on females' wage income at different levels, as well as significant differences in the direct effects of internet technology usage on females' wage

income at different levels. By calculating the combined effect of the two and plotting the results in Figure 2, it was found that frequent internet technology usage will reduce females' wage income by ¥7.122/hour, ¥9.153/hour and ¥6.074/hour at the lower, middle and higher levels if they had no education, respectively. If they only had elementary school education, frequent internet technology usage will reduce females' wage income by ¥1.95/hour, ¥2.343/hour and ¥1.454/hour at the lower, middle and higher levels, respectively. If they had middle school education, frequent internet technology usage will increase females' wage income by ¥0.636/hour, ¥1.062/hour and ¥0.856/hour at the lower, middle and higher levels, respectively. If they had high school education, frequent internet technology usage will increase females' wage income by ¥3.222/hour, ¥4.467/hour and ¥3.166/hour at the lower, middle and higher levels, respectively. If they had junior college education, frequent internet technology usage will increase females' wage income by ¥5.808/hour, ¥7.872/hour and ¥5.476/hour at the lower, middle and higher levels, respectively. If they had a bachelor's education, frequent internet technology usage will increase females' wage income by ¥6.67/hour, ¥9.007/hour and ¥6.246/hour at the lower, middle and higher levels, respectively. Finally, if they had master's education, frequent internet technology usage will increase females' wage income by ¥9.256/hour, ¥12.412/hour and ¥8.556/hour at the lower, middle and higher levels, respectively.

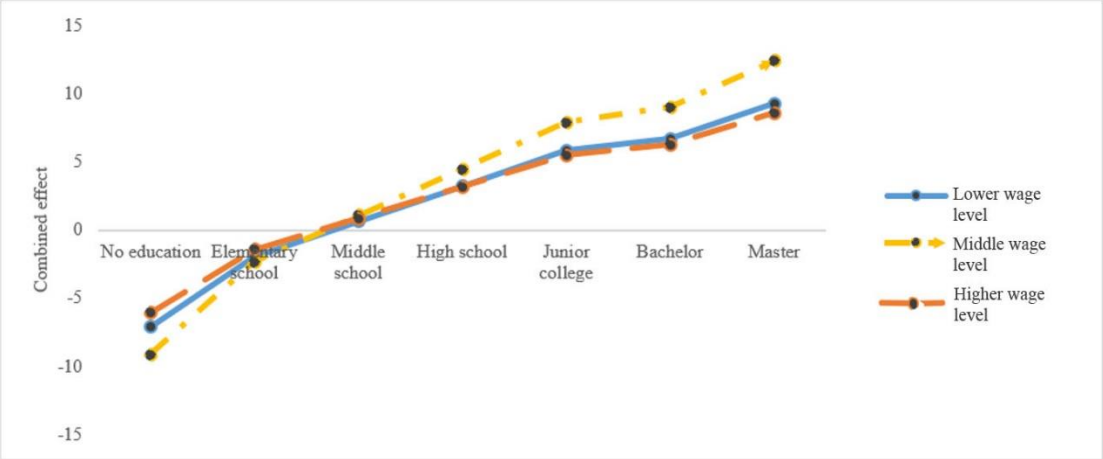

Figure 2. The effect of internet technology usage on females' wage income with different years of education.

In terms of the control variables, the regression results show that at a 0.1% significance level, age and age^2 have positive and negative effects on females' wage income at low, medium and high wage levels, respectively, indicating that age has an inverse U-shaped effect on females' wage income regardless of whether they are at a low, medium or high wage level. At 0.1% and 5% significance levels, health status positively affects females' wage income at lower and middle wage levels, respectively, and has no significant effect on the wage income at higher wage levels. At 1% and 0.1% significance levels, marital status has a negative effect on females' wage income at middle and higher wage levels, respectively, and the strength of this negative effect increases the higher the wage income and has no significant effect on females' wage income at lower wage levels. At a 5% significance level, having minor children in the household has a negative effect on females' wage income at higher wage levels, and has no significant effect at lower and middle wage levels. At 0.1% significance level, annual household income and household investment activity both have a positive effect on females' wage income at the medium and higher wage levels, and the strength of this positive effect increases with a higher wage income. At a 5% significance level, father's years of education has a negative effect on females' wage income at a lower wage level and has no significant effect at middle and higher wage levels. Household registration status, household property, household car, and mother's years of education have no significant effect on females' wage income at different wage levels.

5. CONCLUSIONS AND DISCUSSION

Based on data from the China General Social Survey in 2018, logit and quantile regression models were constructed in this study to estimate the effect of internet technology usage on females' employment and wage income. The moderating effect of females' years of education on this effect was also examined, and the main findings are as follows:

1. When females have no education or only elementary school education, internet technology usage has a significant suppressing effect on their employment status; when a female has received middle school education, internet technology usage has a significant boosting effect on their employment status, and this effect becomes more pronounced as the number of years of education increase.

2. When females have no education or only elementary school education, internet technology usage will significantly decrease their wage income. The greatest negative impact is seen at the middle wage level, the second most negative impact is seen at the lower wage level, and the weakest negative impact is seen at the higher wage level. When females have received middle school education, internet technology usage will significantly increase their wage income, and the more years of education they have received, the more obvious this effect is, but there are differences in the effect of increasing wage income at different wage levels. Specifically, the most obvious effect of increasing females' wage income is at the middle wage level, the second most obvious effect is at the lower wage level, and the weakest effect is at the higher wage level.

The above findings have obvious policy implications. On the one hand, the government should strive to improve females' access to internet technology while accelerating the construction of internet infrastructure. Despite the rapid development of China's internet industry, which has already contributed greatly to the development of China's digital economy, the overall internet usage rate among Chinese females is still lower than the average in developed countries. Therefore, the government should not only continue to promote the development of the internet industry, but also actively increase internet usage rate among Chinese females. This can be done by lowering the cost of broadband and removing access barriers, thereby effectively leveraging employment promotion and the wage premium effects of digital empowerment for Chinese females. On the other hand, considering the positive moderating effect of years of education on the relationship between internet technology usage and females' employment status and their wage income, the government should consider supplementing the nine-year compulsory education to improve Chinese females' knowledge, especially STEM knowledge. Given that the rapid development of the underlying digital technology of the internet in the digital economy has placed higher demands on the capabilities of female users, internet technology usage will only have a positive impact on their employment and wage income if they receive nine years of compulsory education, otherwise it will have a negative impact. Therefore, governmental departments are trying to raise females' awareness of internet technology usage and improve their skills to bring out the employment and income enhancing effects of the internet. In addition, the government should also invest in supplementary education beyond the nine-year compulsory education so that the average number of years of education for all people can be effectively increased through mass education. There should also be a focus on enhancing internet technology usage awareness and skills training for females with low education levels to improve their internet technology usage literacy to reduce the usage gaps among females with different education levels.

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