Analysis of Gender differentials in the rate of return to education based on the gender wage gap

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Abstract. The rate of return to education has been paid much attention by the labor market in China. The mainstream literature maintains that women's rate of return to education is higher than men's. Based on the perspective of gender wage gap and discrimination, this study uses the CFPS 2018 data to examine the gender differences in the educational yields and the gender wage discrimination faced by women at different levels of education. Mincer income equation and Oaxaca-Blinder decomposition method are used to establish the following two major findings. First, the educational yields of Chinese urban female workers were about higher than that of male workers by 3.6 percent in 2018. Second, the unexplained part of the gender wage gap decreases with the increase of workers' years of education. Compared with male workers with the same educational level as female's, female workers with higher education face much less discrimination than those with lower education level. References are provided for education policy and construction of the labor markets.

Keywords: rate of return to education, gender wage gap, wage discrimination.

1. Introduction

Since the reform and opening up, with the gradual deepening of the market economy, China's economy has made remarkable achievements and created a world miracle. However, rapid economic growth has been accompanied by huge impact on Chinese women's labor participation, employment opportunities, and wage payment. As market mechanism plays a more important role in the pricing of labor wages, the average income level of women is much lower than that of men. Since the 1980s, the wage gap between genders in Chinese cities has been gradually widening, with the ratio of the average female wage to the average male wage dropping from 84.4% in 1988, 82.5% in 1995, 77.9% in 1999, and 77.2% in 2004(Li, Gustafsson, 1999; Li, Ma, 2006; Liu, 2008).

The causes of the gender wage difference are generally attributed to two factors: one is the gender difference in productivity component including but not limited to education background, working experience, industry type and position, and the other is gender discrimination. Most relevant studies use the Oaxaca-Blinder decomposition technique, which decomposes wage differences into two parts: the difference in wage caused by differences in productivity characteristics that can be explained and the difference in wages caused by non-productivity characteristics that can't be explained, which is often called wage discrimination (Blinder,1973). No matter what above-mentioned method is used to study the wage difference, the results show that based on data of Chinese urban labor market, the unexplained part of gender wage difference accounts for much more than the part explained by gender human capital characteristics. That is to say, there is significant gender discrimination in China's urban labor market.

Given a wage structure that favours men, it is generally expected that males have higher return rate on wage to all human capital variables, including education background and working experience than females. In fact, most domestic and foreign studies show that the rate of return to education, the increase in an educator's income as a result of an extra year of education, for women is higher than for men. These findings are consistent with many results based on major Chinese statistical data, including Urban Household Survey data from China's National Bureau of Statistics (Chen and Ju, 2004), CGSS (Lou and Cheng, 2009), CHIP (Chen and Hu, 2014). The most recent data used in research conducted by Chinese scholar is from 2014. Results based on data nearly ten years ago may not be consistent with the Chinese labor market in recent years. Therefore, the first objective studied

in this paper is to investigate whether the rate of return of women's receiving more advanced education is higher than that of men in the labor market in recent years by using the latest public data.

The higher rate of return to education for women can decrease gender wage gap, but reduced wage gap may not guarantee reduced wage discrimination. The gender discrimination reduces only when the difference in wage caused by unexplained non-productivity characteristics reduces. The second objective of this paper is to investigate whether the improvement of female education level can reduce the degree of discrimination for women in Chinese labor market. Since gender discrimination in Chinese labor market is pervasive, more and more women choose to receive higher education to address the status quo of gender wage discrimination. According to the Statistical Monitoring Report on the Implementation of the National Program for Women's Development (2011-2020) the average proportion of female graduate student from 2011 to 2020 is 50.9%, higher than its male counterpart. Therefore, whether the women's receiving more advanced education can reduce the wage discrimination, the unexplained part of wage gap, is an important issue worthy of discussion.

The contribution of this paper is as follows. First, based on the perspective of gender differential on rate of return to education rather than the perspective of the general return to education of the all workers, this paper aims to explore the how the direct effects of education on income increase varies between male and female, which provides a new view for the study of educational return rate. Second, many studies focus on rate of return to education (Wang and Jiang, 2020) and gender wage discrimination (Xie and Yao, 2005) individually, but few studies focus on the relationship between the two. Hence, this paper will analyse the gender differential on rate of return to education from the perspective of gender wage discrimination and explore the promotion effect of years of schooling on narrowing down such discrimination in a comprehensive framework. Third, the theory and conclusion of this paper have important policy implications. In view of the real-world background of China's widening income gap and the great importance attached to education by Chinese family, this paper provides policy suggestions on education and labor law for alleviate the detrimental impact of the gender discrimination and improving economic efficiency.

2. Literature Review and Hypothesis Development

2.1 Gender wage gap and wage discrimination

The gender wage gap of urban workers in China showed a trend of widening in the late 1980s (Gustafsson and Li,2000; Maurer-fazio and Hughes,2002), and expanded rapidly after the mid-1990s. According to China Labor Statistical Yearbook in 2003, from 1995 to 2002 the ratio of the average female wage to the average male wage dropping from 84.4% in 1988, 82.5% in 1995, 77.9% in 1999, and 77.2% in 2004(Li, Gustafsson, 1999; Li, Ma, 2006; Liu, 2008). During the period from 2007 to 2013, women's wage raised slightly faster than men's, and the ratio of the average female wage to the average male reached 79% in 2013. (Luo et al, 2019).

There are two possible reasons for the gender wage gap. First, men and women have different individual characteristics. Second, women are discriminated against in the labor market. It refers to the fact that women are paid less than men even though men and women have the same individual characteristics. Most scholars believe that there is a certain degree of wage gender discrimination in China's labor market. Based on Urban Household Survey 2002, Xie and Yao (2005) found that individual characteristic and gender discrimination accounted for 54.4% and 55.6% respectively of the gender wage difference. Based on CHIP 1995, 2002 and 2007, female workers with low human resource endowment, poor occupation and poor industry are likely to face more discrimination. (Li et al, 2014) Considering the above reviews, this study proposes the following hypothesis:

H1: There is significant wage gap between women and men, and women suffer from wage discrimination.

2.2 Gender differentials in the rate of return to education

A large number of research results around the world show that: whether in developed or developing countries, it is common for women to have higher educational returns than men (Asplund, 1999; Dougherty, 2005; Psacharopoulos and Patrinos, 2004; Trostel, E al., 2002). Studies in China have also found that the return on the education of women is higher than that of men, and the difference persists over time (Chen and Ju, 2004; Zhang et al., 2005).

The measuring tool of the educational return rate and its gender wage difference in most studies in China is Mincer's wage equation and difference decomposition method. Those researches have different emphases. Based on the Chinese urban household survey data of six provinces released by the National Bureau of Statistics, the return rate of Mincer education return rate for female was significantly higher than male by 2 percent (Liu, 2008). Wu, et al. (2014) used CGSS 2006 to calculate the Mincer education return rate of different genders, and results found that the educational return rate of female (12.8%) was significantly higher than that of male (7.9%). The result based on CHIP 2013 also supported the above research conclusions that the return rate of education return rate for female was significantly higher than male. (Hu, 2019)

In reality, there is likelihood that only those who choose to receive more education know that the return to education is high out of ability, family background and other endogenous factors. Some other studies focus on the alleviation of such self-selection bias. Ge (2003) took into account the heterogeneity of educational returns of different groups, and then applied the partial Linear Model to make an in-depth study and has found that the return rate to the education of females is significantly higher than those of males regardless of age and levels of education. Yao et al. (2007) used the urban household survey data in 2002 (UHS) to calculate the impact of family background on children's educational return rate by using Mincer equation. The result showed that women's rate of return to education is still higher than men's after the family background is taken into account.

Referring to the difference of rate of return to education for women in different situation, based on CGSS 2006, though the return rate to higher education of women was generally higher than that of men, it decreased successively in the four industries. With the increase of industry entry threshold and income level, the effect of higher education on the increase of female income might be weakened (Huang, et al., 2017). Furthermore, the gender difference in the return rate of education decreased with the improvement of female education background (Li and Li, 2015; Yang and Wang, 2020). By using the 2013 China comprehensive survey data, study found out that for employees with junior college degree, the rate of return to education of men was lower than that of women. However, for employees with undergraduate degree, the rate of return to education of men was higher than that of women. (Song, 2021) Considering the above reviews, this study proposes the following hypothesis:

H2: The return rate of education of women is significantly higher than that of men.

2.3 Rate of return to education and wage discrimination

In view of the hypothesis that women have higher rate of return than men, the gender wage gap can be narrowed by women’s improvement of education, which has been verified by many studies. (Han and Hou, 2020; Hu, 2019) However, reduced wage gap may not guarantee the reduced wage discrimination, which is only determined by the reduce of unexplained non-productivity characteristics. Many studies focus on rate of return to education (Wang and Jiang, 2020) and gender wage discrimination (Li, 2018) individually, but few studies focus on the relationship between the two (Huang, 2009), especially for studies about Chinese labor market in recent years. Some studies investigated the influence of education on gender wage gap and discrimination, but did not relate the rate of return to education. (Liu and Zhao, 2014) Other studies raised the hypothesis that the improvement of female education level could reduce the degree of gender discrimination to explain why higher rate of rate to education for women coexisted with the wage gap and discrimination, but did not verify it (Yuan, 2013). Hence, this paper will analyse the gender differential on rate of return to education from the perspective of gender wage discrimination. Thereby, this study proposed the following hypothesis:

H3: The improvement of female education level can reduce the degree of wage discrimination for women in the labor market.

3. Methodology and data

3.1 Model construction

3.1.1 The estimate of the rate of return on education

The rate of return to education is the income growth rate for each additional year or level of education, after striping the influence of other factors such as gender, work experience, region, ownership and so on.

The educational rate of return includes the private rate of return and the social rate of return. This paper focuses on the private rate of return. The most common way of researching the private rate of return on education is to estimate the Mincer rate of return, which represents the percentage increase in an individual's income resulting from each additional year of schooling. The basic form of the wage equation of estimated Mincer rate of return is:

$$\ln W = \beta_0 + \beta_1 SCHOOLING + \beta_2 EXP + \beta_2 EXP^2 + u$$

The model estimating the gender difference of return rate to education adopted by this paper is:

$$\ln W = \beta_0 + \beta_1 FEMALE + \beta_2 SCHOOLING + \beta_3 FEMALE\_SCHOOLING + \beta_4 EXP + \beta_5 FEMALE\_EXP + \beta_6 EXP^2 + \beta_7 FEMALE\_EXP^2 + u$$

If the value of female is 1, it indicates a female, and if it's 0, it indicates a male. FEMALE_SCHOOLING, FEMALE_EXP, FEMALE_EXP^2 respectively represent the interaction term of gender and the average schooling, gender and the work experience, and gender and the work experience squared. Similarly, other explanatory variables affecting wages and their interactions with gender dummy variables are also added in the model in the empirical analysis. β3 is the gender difference of return rate to education, and if β_3 is significantly positive, it indicates that female educational return rate is significantly higher than male.

3.1.2 The estimate of the degree of gender wage discrimination

The Oaxaca-Blinder decomposition method is generally used to study the determinants of wage difference (Dougherty, 2005). In order to analyse the relationship between wage gender discrimination and workers' educational level, this paper uses Oaxaca-Blinder decomposition to decompose the gender wage difference. $\overline{x_m}, \overline{x_f}$ are expressed as sample means of individual characteristics of men and women respectively. βm, βf are used to representing the estimates of regression coefficients of the male and female wage equations respectively. Then, the difference between the average logarithmic salary of men and women can be expressed as:

$$\overline{\ln W_m} - \overline{\ln W_f} = \overline{x_m}\beta_m - \overline{x_f}\beta_f = (\overline{x_m} - \overline{x_f})\beta^* + [\overline{x_m}(\beta_m - \beta^*) + \overline{x_m}(\beta^* - \beta_f)]$$

The first item represents the wage difference caused by the difference in individual characteristics between males and female (i.e., the difference in endowments, such as the difference in education level and work experience), indicating the wage difference in the absence of gender discrimination. The second and third items are the unexplainable parts, which is discrimination in wage against women under the condition of the same individual characteristics, (manifested by the difference in the coefficient of the wage equation between men and women). The second represents men's wage advantage, the third represents women's wage disadvantage, and these latter two together represent gender discrimination. β* (fm βm + ff βf), in which fm and βf here represent the proportion of male and female labor force in the total labor force respectively) is the weighted coefficient and represents the regression coefficient of the wage equation without discrimination. This paper will use this model to examine the unexplainable parts of the wage gap between men and women with different levels of

education, so as to test the hypothesis that the average wage difference between men and women gradually decreases with the increase of education level.

3.2 Data source

This investigation uses cross-sectional data in 2018 from the China Family Panel Studies (CFPS) by Institute of Social Science Survey (ISSS). CFPS aims to reflect social, economic, demographic, educational and health changes in China, investigating a variety of research topics including economic activity, educational access, family relationships and family dynamics, population migration, and physical and mental health. Its information includes age, education, gender, industry and salary.

3.3 Data Description and preliminary results

Following previous practice, employers, self-employed, retirees, students, and domestic workers were excluded from the sample (Coleman, 1993; Mwabu and Schultz, 1996). According to the Labor Law of China, the minimum working age of citizens is 16 years old, so samples younger than 16 years old are deleted in this paper. Since most workers retire at 60, those older than 60 are not included. The income in this paper includes basic salary, bonus, allowance, and other labor income.

The CFPS data of 2018 used in this paper involves 31 provinces and cities, and the sample data can basically represent the situation of all different economic development areas in China. The respondents are households in urban areas and county areas, with a total of 37,354 people. The research objects were limited to employees aged 18-60 who were on the job in 2018, and the valid sample number was 5,440, including 3,039 males and 2,401 females.

Table 1. Descriptive statistics of relative variables.

Variable	male		Female		total
	frequency	Mean or proportion	frequency	Mean or proportion	
income (yuan/per year)	3039	53861.65	2401	38389.57	47032.28
age	3039	32.19622	2401	31.69086	31.97315
working experience (year)	3039	15.95426	2401	15.05998	15.55953
years of schooling (year)	3039	11.49619	2401	12.13591	11.77856
educational level (%)					
Primary school or below	332	11%	198	8.31%	9.82%
junior high school	941	31.19%	644	27.01%	29.35%
senior high school	655	21.71%	460	19.30%	20.64%
junior degree	536	17.77%	545	22.86%	20.01%
undergraduate degree	508	16.84%	492	20.64%	18.52%
postgraduate degree	42	1.39%	44	1.85%	1.59%
doctoral degree	3	0.10%	1	0.04%	0.07%
married	1850	61.32%	1639	68.75%	64.60%
party member	385	12.76%	234	9.82%	11.46%
Industry					
primary industry	581	19.26%	710	29.78%	23.90%
secondary industry	1731	57.39%	823	34.52%	47.29%
tertiary industry	492	16.31%	699	29.32%	22.05%
the fourth industry	211	6.99%	151	6.33%	6.70%
other industries	2	0.07%	1	0.04%	0.06%

Table 1 above shows descriptive statistics for the main variables in this analysis. Income refers to the annual wage of 2018, which contains of basic salary, allowance, bonus, commission, average overtime payment and so on. Working experience refers to potential work experience. Since CFPS (2018) only includes the information of the year when subjects leaved school, working experience is calculated as: 2018 minus the year out of school. Years of schooling refers to the number of years an

individual has spent in education, which is calculated from the highest degree written by the investigator. Married means the subject is married at the time of investigation and his/her spouse is alive. In the survey, the National Bureau of Statistics divided the employment industry of workers into 21 industries. This analysis divides these 21 industries into 4 categories according to their average salary from lowest to highest: The first category contains 5 industries, including residential and other services industry, mining industry, wholesale and retail industry, accommodation and catering industry, agriculture, forestry, animal husbandry and fishery industry. The average salary is between 10,000 yuan and 14,000 yuan; The second category contains 5 industries, including manufacturing industry, leasing and business services industry, construction industry, water conservancy industry, environment and public facilities management industry, transportation industry, storage and postal services industry. The average salary is between 14,000 yuan and 17,000 yuan. The third category contains 6 industries, including health industry, social security and social welfare industry, culture, sports and entertainment industry, education industry, real estate industry, electric, gas and water production and supply industry, public administration and social organizations. The average salary is between 18,000 yuan and 20,000 yuan. The fourth category contains 5 industries, including finance, military, scientific research and technical services, geological survey industry, information transmission, computer services and software industry, and international organizations. The average salary is between 21,000 yuan and 28,000 yuan.

According to Table 1, the average salary of women in 2018 was 71.27% of that of men. Relevant studies show that the ratio of women's average wage to men's average wage in urban areas of China is 84.4% in 1988, 82.5% in 1995 (Li, Gustafson, 1999), 77.96% in 1999 (Li, Ma, 2006), 78.66% in 2001 (Wang, 2005), 77.23% in 2004 (Liu, 2008) and 72.46% in 2012, indicating that the gender wage gap in urban areas of China has a tendency to expand. The average age of male is slightly older than female. In terms of human capital, on average, men have nearly 16 years of work experience, which is one year more than women. Men have an average of nearly 11 years of schooling, while women have an average of nearly 12 years, which is equivalent to high school level. In terms of industry distribution, both men and women are more likely to distributed in the secondary and tertiary industries.

4. Results and interpretation

4.1 The significance test of gender wage difference and wage discrimination

Table 2. gender wage gap in Chinese labor market.

	Obs	Mean	Std.err.	Std.dev.	[95% conf. interval]
female	2,384	38389.57	680.2621	33214.63	(37055.6, 39723.53)
male	3,017	53861.65	867.7106	47660.94	(52160.29, 55563.02)
Combined	5,401	47032.28	579.6317	42598	(45895.97, 48168.59)
Diff =mean(female) - mean(male)		-15472.09	1148.269		(-17723.16, 13221.02)
H0: diff = 0			Degrees of freedom = 5399		
Pr(|T| > |t|) = 0.0000			t = -13.4743		

Table 3 shows the wage difference between men and women under the double-population T-test. The t-test statistic is -13.4743, and the P value is less than 0.01, which implies that from the CFPS 2018, the average wage of women is significantly lower than that of men in China's labor market.

In this investigation, the Oaxaca-Blinder decomposition method is used to decompose the gender wage gap through all samples. According to Personal characteristic Wage regression model (Oaxaca,1973), the individual characteristics (including years of education, work experience, marital status) are taken as explanatory variables.

Table 3. gender wage discrimination in Chinese labor market.

VARIABLES	Overall
male	10.62***
	(0.0152)
female	10.27***
	(0.0174)
difference	0.354***
	(0.0231)
explained	-0.0512***
	(-14.4%)
	(0.00993)
unexplained	0.405***
	(114.4%)
	(0.0220)
Observations	10.62***

Table 4 shows the decomposition results of Oaxaca obtained by using individual characteristic model. Wage differences are divided into 'explained' and 'unexplained'. The 'explained' is the wage gap between women who are perceived as men and real men, where the wage difference is due to the gap between men and women in productive factors. The "unexplained" is the income gap between women who are perceived as men and real women. Since the comparison objects are all women, the wage gap cannot be explained by the difference in productivity conditions between men and women. Therefore, it is related to the differential treatment or gender discrimination of women in the labor market. As can be seen from the table, the unexplained part accounts for 114.4% of the gender wage gap, while the explicable part accounts for -14.4%, which means that if women are perceived as men, they will earn more than real men instead of having a pay gap with them. The above-mentioned data shows that the gender wage gap in the labor market has reached a point that it cannot be explained by productivity at all, so gender wage discrimination is significant.

4.2 the investigation of gender differentials in the rate of return to education

The model used in this paper to estimate gender differentials in the rate of return to education is based on the Mincer income equation. Based on the theoretical model, this paper adds dummy variables of gender, industry and marriage, as well as the interaction terms between the main explanatory variables and gender dummy variables. Table 5 shows the rate of return to education and its gender difference. The explained variable is the logarithm of salary.

Model (1) is the theoretical model which is strictly in accordance with Mincer's income equation, which only includes the explanatory variables of gender, years of education, working experience and the square of working experience. As shown in the table, if other control variables are not taken into account, the return to education is about 7%. In model (2), dummy variables and control variables such as age, marital status, party membership, industry and intelligence level are added, and return to education is 6%. Model (3) is based on Model (1), the Mincer's income equation, adding gender dummy variable, interaction term of gender and years of schooling, and interaction term of female dummy variable and working experience. If other control variables are not taken into account, the return to education of women is 10.2%, and that of men is 6.69%. In this case, the return to education of women is significantly higher than that of men by 3.51 percent (the coefficient of interactive term of female dummy variable and years of schooling). Model (4) added control variables on the basis of Model (3). The regression results of model (4) showed that the educational return rate of female was significantly higher than that of male by 3.63 percent ($P < 0.01$), which is higher than the result without control variables. Besides, the coefficient of female dummy variable is -0.631, which means that in the case of low education level, women earn 63.1% less than men. However, the fact that return rate of education for female is higher than that of men indicates that the gender wage gap will gradually decrease with the improvement of women's education level.

Table 4. gender differentials in the rate of return to education.

	(1) lnincome	(2) lnincome	(3) Lnincome	(4) lnincome
years of schooling	0.0778***	0.0614***	.06696***	0.0523***
	(0.00379)	(0.00490)	(0.000)	(0.00476)
female			-0.8259***	-0.6317***
			(0.000)	(0.000)
female#c.years of schooling			0.03515***	0.3631***
			(0.000)	(0.000)
exp	0.0484***	0.0362***	0.0472***	0.04254***
	(0.00492)	(0.00550)	(0.000)	(0.000)
female#c.exp			.0010214	-0.0241305**
			(0.757)	(0.011)
exp^2	-0.000947***	-0.00106***	-0.000914***	-0.0011785 ***
	(0.000124)	(0.000131)	(0.000)	(0.000)
age		0.0194***		0.0146115***
		(0.00379)		(0.000)
secondary industry		0.261**		0.1659083***
		(0.0302)		(0.000)
tertiary industry		0.0488**		0.0358089
		(0.0370)		(0.325)
the fourth industry		0.367**		0.3141792***
		(0.0495)		(0.000)
party member		0.104**		0.0549978
		(0.0365)		(0.131)
married		-0.0508**		0.0363893
		(0.0294)		(0.214)
levels of intelligence		0.0181***		0.0189861**
		(0.00895)		(0.030)
Cons	9.101***	8.663***	9.406***	9.009***
	(0.0732)	(0.0976)	(0.0717)	(0.000)
N	5343	5343	5343	5343
R-sq	0.100	0.129	0.157	0.157
Rmse	0.812	0.799	0.785	0.786

4.3 the analysis of gender wage discrimination under different education levels

Based on the result that the return rate of education of women is higher than that of men, this paper concludes that years of education will reduce the wage difference between men and women. Next, this paper will estimate whether the improvement of education level will reduce wage gender discrimination by conducting Oaxaca decomposition on the wage gap of workers with different years of education respectively. If the unexplained part of the wage gap decreases as years of education increase, then we can deduce that the degree of gender wage discrimination decreases. This investigation will decompose the gender wage differences of workers with four type of education levels, which is junior high school, senior high school, undergraduate degree and postgraduate degree.

Table 5. Wage discrimination faced by female with different education levels.

Blinder-Oaxaca decomposition	Overall	junior high school	senior high school	Undergraduate degree	Postgraduate degree
male	10.62***	10.49***	10.57***	11.00***	11.27***
	(0.0152)	(0.0265)	(0.0320)	(0.0343)	(0.183)
female	10.27***	9.985***	10.17***	10.77***	11.11***
	(0.0174)	(0.0313)	(0.0367)	(0.0314)	(0.110)
difference	0.354***	0.508***	0.398***	0.231***	0.155
	(0.0231)	(0.0410)	(0.0487)	(0.0465)	(0.214)
explained	-0.0512***	0.00314	0.00392	0.00337	0.0697
	(-14.4%)	(0.06%)	(10%)	(14%)	(45%)
	(0.00993)	(0.00413)	(0.00526)	(0.0131)	(0.0717)
unexplained	0.405***	0.505***	0.394***	0.227***	0.0851
	(114.4%)	(99.4%)	(90%)	(86%)	(55%)
	(0.0220)	(0.0412)	(0.0485)	(0.0445)	(0.196)
Observations	5,343	1,567	1,104	988	85

Table 6 shows the Oaxaca decomposition obtained by using the personal characteristics model. The explanatory variables of the 'individual characteristics' model include working experience, the square of working experience, party membership, and marital status. As can be seen from Table 5, women with low education level face greater discrimination. However, the higher the education level, the lower the ratio of the unexplained part to the wage difference, which means that the level of wage discrimination is lower. In particular, women with the postgraduate degree face much lower relative discrimination than women with the undergraduate degree or below. Compared with women with undergraduate degree, both the wage gap and wage discrimination for women with a postgraduate degree are significantly lower. In this way, we verify the hypothesis that the improvement of female education level can reduce the degree of discrimination for women in the labor market.

5. Implications & Concluding remarks

The main aim of the paper is to explain the gender differentials in the rate of return to education and the gender wage discrimination faced by women at different levels of education by CFPS in 2018. The paper also provides evidence to conclude that the return rate of education of women is significantly higher than that of men by 3.63 percent ($P < 0.01$), and there is a negative relationship between education level and wage gender discrimination. That is to say, the improvement of female education level can reduce the degree of discrimination for women in the labor market and reduce the wage gap between women and men. The reason may be that under the condition that both men and women have low educational level, physical strength may be the main factor in determining wages. In this case, women face greater wage gender discrimination. With the increase of years of schooling, education level plays an increasingly important role in determining wages, and the wage discrimination women suffer decreases to some extent. As a result, the wage gap between women with different levels of education is larger than that of men, resulting in a higher rate of return to education for women. It is worth mentioning that the results of this paper show that even when women achieve the same and very high level of education as men, and the gender wage gap and discrimination are significantly reduced, these phenomena still persist. Therefore, it is essential to establish and improve labor laws and policies aimed at reducing gender discrimination.

The research conclusion of this paper has certain reference value for Chinese government to formulate relevant policies for education development and labor market construction. First, the higher return t0 education for women than that for men means that education is much more important to women as a way to increase personal income. In reality, the income of men is higher than that of women, so improving the education level of women is of great significance for narrowing the income gap between men and women. On the other hand, this study shows that women with higher education level face lower wage discrimination, which means that the improvement of women's education level

can also help improve women's employment and gender discrimination in the labor market, which will achieve greater social equity.

References

[1] Wang Meiyan. "Gender wage gap in China's urban labor market" [J]. Economic Research. 2005, (12): 35-44.

[2] AlanS. Blinder. “Wage Discrimination: Reduced Form and Structural Estimates” [J]. The Journal of Human Resources. Vol. 8, No. 4, Autumn, 1973:436-456.

[3] Cotton, J., 1988. “On the Decomposition of Wage Differentials” [J], The Review of Economics and statistics.70(2). pp.246-243.

[4] Newmark.D.1988. “Employer Discriminatory Behavior and the Estimation of Wage Discrimination” [J]. The Journal of Human Resources 23(3) pp.279-295.

[5] Oaxaca.R.1973. “Male-Female Wage Differentials in Urban Labor Markets”. [J]. International Economic Review.14(3) pp.693-709.

[6] Brown R.S., Moon, M, B. S. Zoloth. “Incorporating Occupational Attainment in Studies of Male-Female Earnings Differentials” [J]. The Journal of Human Resources, 1980, (1).

[7] Appleton, S; Hoddinott, J. and Krishnan, P. “The Gender Wage Gap in Three African Countries.” Economic Development and CulturalChange, 1999.47(2), pp.289-312.

[8] Dougherty, C. “Why Are the Returns to Schooling Higher for Women than tor Men?” Journal of Human Resources. 40(4), pp.969-988.

[9] Psacharopoulos, G. and Patrinos, H.A, 2004, “Returns to Investment in Education: A Further Update”. Education Economics.2004, 12(2), pp.111-134.

[10] Trostel, P., walker, I and Woolley, P., 2002, “Estimates of Economic Return to Schooling for 28 Countries.” [J Labour Economics.9(1), pp1-16.

[11] Asplund R, Peter J S, loannis T. “Low pay and Earnings Mobility in Europe” [J]. Industrial and Labor Relations Review, 1999.53(1).

[12] Chen Liangkun, Ju Gaosheng. "An Empirical Analysis of Gender Differences in Education Mincer's Return Rate"[J]. Peking University Education Review. 2004, (03).

[13] Chen Xiaoyu, Min Weifang. The Impact of Cost Compensation on Equal Opportunities in Higher Education [J]. Education and Economics. 1999, (03).

[14] Ge Yuhao. "Research on the Heterogeneity of Educational Returns"[J].Southern Economics. 2007,(04).

[15] Yao Xianguo, Huang Zhiling, Su Zhenhua. "Family Background and Return to Education" [M]. Journal of Chongqing University (Social Science Edition) No. 2.

[16] Liu Zeyun. "Why is the education rate of return for women higher than that of men? - An analysis based on gender discrimination in wages" [J]. Economic Science. 2008,(02).

[17] Huang Zhiling, Yao Xianguo. "Research on Gender Differences in Return to Education" World Economy. 2009, (07): 74-83.

[18] Song Di. "Relevant Research on Return to Higher Education from the Perspective of Gender Differences" [J]. Market Weekly, 2021, 34(01): 185-188.

[19] Peng Jing. "Gender Differences in Return to Higher Education and Wages" [J]. Population and Economy. 2011, (04): 51-57.

[20] Mincer J. “Investment in Human Capital and Personal Income Distribution [J]. Journal of Political Economy.1958, 66(3).