

Study on the Regional Imbalance of China's Educational Return Rate

-- Empirical Evidence from CGSS Data

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Abstract

This article uses the 2017 China General Social Survey data to analyze the regional imbalance of China's education return rate by using quantile regression and OLS model. The research found that: first, at the junior high school stage of 0.5 and 0.7 percentiles, the rate of return to education in the east is lower than that in the central and western regions, and the rest are higher in the eastern region than in the central and western regions; second, the rate of return to education is lower for low-income groups higher than high-income groups, and in the eastern region, the higher the education level, the higher the rate of return, while the central and western regions generally show that the rate of return of low-education groups is higher than that of high-income groups; third, from the perspective of gender, it is not completely It is in line with the majority view that females' education returns are higher than men's, but it shows differences in gender education returns by region and education stage. Afterwards, some explanations are given to the research conclusions, and relevant policy suggestions are put forward for the narrowing of the difference in China's regional education return rate and the imbalance of regional development.

Keywords

Return on education, Regional imbalance, Gender discrimination.

1. Introduction

The report of the Nineteenth National Congress of the Communist Party of China put forward the "implementation of regional coordinated development strategy", which pointed out the direction for solving the problem of regional imbalance. The Sixth Plenary Session of the Nineteenth Central Committee of the Party further stated that "promoting coordinated regional development in the new era is of great significance for grasping the new development stage, implementing new development concepts, building a new development pattern, and promoting high-quality development." At present, the problem of regional imbalance is Difficulties that urgently need to be overcome in the process of implementing the regional coordinated development strategy. Excessive regional imbalances will hinder national economic development and common prosperity. The regional coordinated development strategy is the key way to solve the contradiction between the people's growing needs for a better life in the new era and the unbalanced and inadequate development [1]. development, and is of great significance to the construction of a new development pattern and the solid promotion of common prosperity during the "14th Five-Year Plan" period.

As an important factor to alleviate the imbalance of regional development, education has been widely confirmed by scholars [2][3]. Education is the most basic element of human capital,

which is used to develop and improve the capabilities of current or future workers. Among them, the rate of return on education is an indicator to measure the relationship between education investment and income return [4], which affects economic development and labor market flows in different regions [5]. Relevant data show that there is a significant regional gap in the rate of return to education, with the rate of individual education return as high as 20.8% in the eastern region, 14.2% in the central region, and only 8.4% in the western region [6]. The regional imbalance effect of education return has exacerbated the regional income gap in China, but the income return brought by education can narrow the differences between different groups [7]. Therefore, it is a question worth pondering to explore the difference of China's education return rate from the perspective of regional imbalance.

This paper uses the 2017 China General Social Survey data, and uses quantile regression and OLS models to analyze the regional imbalance of China's education return rate. The specific marginal contributions are as follows: First, explore the mitigating effect of education return rate from the perspective of regional imbalance, which deepens the research perspective of education return rate. Second, quantile regression was used to analyze the dynamic trend of regional education returns, and it was found that the returns to education at different income levels showed regional heterogeneity, and the returns to education did not conform to the traditional view that women were higher than men. To a certain extent, it enriches the research conclusions. Finally, the article puts forward relevant suggestions based on the empirical results, which provides a certain reference for narrowing the educational return gap and promoting regional coordinated development.

2. Literature Review and Research Hypotheses

In view of the overall changes in the rate of return to education, existing scholars believe that the rate of return to education shows an upward trend year by year within a certain period of time [8][9][10]. Especially compared to the 1980s and 1990s, the rate of return to education in China has increased significantly [11]. However, some studies have also shown that the rate of return to education did not continue the growth trend from the 1990s to the beginning of the 21st century, but tended to be stable, and even showed signs of decline [12][13].

To a large extent, the reason for the divergence in the changing trends of education returns may be due to the neglect of regional imbalances. The income in the eastern region is higher than other regions, and the western region is the lowest [14]. When measuring the regional education return rate, the eastern region is higher than the central and western regions [6][15]. Asadullah and Xiao compared the 2010 and 2015 data and found that compared with the inland regions (4.2% vs. 4.8%) and the western regions (4.4% vs. 5.4%), the eastern region continued to enjoy a higher rate of return to education, but the values were in the decreased (9.9% vs. 7.8%) [16]. Zhao Xianzhou proposed that the central government should give more financial preference to the central and western regions, and increase the rate of return on education in the central and western regions, especially the rate of return on higher education, so as to alleviate the current situation of unbalanced regional development [5]. Some scholars have studied the regional return to education in the United States and found that the change in the return to education is consistent with the differences in regional resource endowments, specifically showing that the return rate in the Midwest and Southwest is higher, but the return rate in the South and West is lower [17]. O'leary and Sloane found that the return to graduate education in London and the south-east of the UK was much higher than in other regions [18]. In addition, some scholars have investigated from the perspective of urban and rural areas and found that the rate of return to urban education is always higher than that of rural areas [20], showing a trend of increasing year by year [21]. However, some scholars have found that in the late stage of the expansion of colleges and universities, the rate of return of rural higher

education surpassed that of urban [22], that is, the expansion of college enrollment has a significant impact on narrowing the gap in the rate of return of urban-rural education [23][24]. This also reflects the regional imbalance in the rate of return to education from the side.

As far as theoretical inference is concerned, the productivity and marketization maturity of the eastern region are significantly higher than those of the central and western regions, and all regions focus on the development of relatively advantageous industries[25]. In the western region, public management and social organizations are the fastest-growing industries in the tertiary industry[26], and most high-productivity industries are concentrated in the eastern region. High-educated and highly skilled personnel accumulate high-end industries, and their wage income is higher. Therefore, the rate of return to education in the eastern region increases as the level of education increases [27]. However, in the central and western regions, due to the relatively dispersed scale of the industrial economy and the relatively low degree of development of the labor market, there are groups with higher education in sectors with low productivity, which reduces the rate of return to higher education [5].

Looking at the above studies, the research results of scholars have enriched the research on the rate of return to education, but most of the literature focuses on the trend change of the rate of return to education and the difference in the rate of return to education between urban and rural areas. Few literatures specifically study the rate of return to education in regions. In particular, the Nineteenth National Congress of the Communist Party of China proposed the implementation of the regional development coordination strategy, which raised the research on regional imbalance to a new height, which also provides an expansion direction for this paper to study the regional differences in the rate of return to education. Accordingly, this paper proposes Hypothesis 1:

Hypothesis 1: There is a significant regional imbalance in the rate of return to education, and the rate of return to education in the eastern region is higher than that in the central and western regions.

In addition to the regional differences in educational benefit rates, the relationship between education and regional income gaps is also a hot spot in academic circles [27][28]. Studies have shown that there is heterogeneity in the return to education under different income dimensions [29]. Low-income families are often in the stage of maintaining survival data, and it is a rational choice to invest in their children's education to improve their future self-development ability; while in high-income groups, in addition to the return on investment in education, their family endowment, social capital, and interpersonal network are all important factors. It can promote the growth of children's income, and some scholars have also found that the more in the high-income groups, the stronger the role of ability factors in income determination may be [30], and the marginal benefit of the return on education obtained by low-income families On the contrary, it is bigger. Therefore, in different regions and under different income dimensions, the rate of return to education may show different trends.

At the same time, gender differences in education returns are also worthy of attention. Some scholars believe that due to gender discrimination in the labor market [31], female education returns are generally higher than males [31][32][33]. When women independently accept more educational opportunities, the degree of gender discrimination in the labor market can be reduced and higher wages can be obtained [34]; and because the average level of education of men is higher than that of women, the scarcity of women in highly educated positions Sex will bring them a higher rate of return[35]; in addition, my country's labor force structure has resulted in a shortage of low-educated labor, and men have more advantages in the low-educated labor market, thus increasing the income of low-educated men, thus promoting men The overall return to education has declined [32]. However, studies have shown that when women who receive higher education and are in high-income quintiles are in developmental self-employment (entrepreneurial employment), their educational returns are not necessarily

higher than those of men [36]. When studying the gender difference in the rate of return to self-employment education of the rural floating population, the rate of return to education of female self-employed in the eastern region is higher than that of men, and on the contrary in the western region, there is no significant gender difference in the central region [33]. Due to factors such as inter-regional industrial structure, labor market maturity, education level, and population preference, the gender difference in the return to education at all levels may show regional heterogeneity [37], that is, in different regions and at different stages of education, female education benefits rate is not necessarily higher than that of men. Accordingly, this paper proposes Hypothesis 2:

Hypothesis 2: There are income and gender heterogeneity in the return to education in different regions.

3. Data Source, Variable Setting and Measurement Method

3.1. Data source

The data in this article comes from the Chinese General Social Survey released by the China Survey and Data Center of Renmin University of China. This survey is China's first national, comprehensive and continuous large-scale social survey project. Systematically collect data on Chinese people and various aspects of Chinese society, summarize social change trends, discuss social issues of great theoretical and practical significance, and provide data for government decision-making and international comparative research. This article uses the CGSS2017 data, with a total of 12,582 valid samples. The relevant variables are mainly selected from module A (core module), covering more detailed personal information, education information, income and other data information of 31 provinces and cities in China. The calculation and analysis of the rate of return provides data support.

3.2. Variable setting

The explanatory variable in this paper is salary income, so the survey item selected in the database is "What was your annual/occupational labor income last year?" Eliminate missing values and samples with income of 0, and according to the national statutory retirement age, the male sample age The age of the female sample is controlled within the range of 18-60 years old, and the age of the female sample is controlled within the range of 18-55 years old to ensure the accuracy of the research sample. Specific values are represented by logarithms in the regression process. The data shows (as shown in Table 1) that the logarithmic average of the annual income of the national overall sample is 10.28, that of the eastern region is 10.62, and that of the central and western regions is 9.813.

The explanatory variables in this paper are years of education, work experience and the square of work experience at each stage. According to Mincer's classic equation, the explanatory variables include education, work experience, and the square of work experience. When dealing with the core variable of educational factors, this paper studies the rate of return to education at all levels, drawing on the methods of Zhang Qinggen and Shen Hong, and takes the level of education, that is, the highest educational diploma obtained by an individual, as a proxy variable for the educational factor variable. Samples with no education, elementary school graduation, elementary school graduation, and junior high school graduation are defined as "elementary school and below", samples of junior high school graduation and high school graduation are defined as "junior high school", and samples of high school graduation and university graduation are defined as "high school", the sample of university graduates and above is defined as "university and above", and "elementary school and below" is used as the reference group [37]. Work experience is calculated by "age - years of education - 6" [36].

The selection of control variables in this paper is whether either parent has received higher education, political affiliation, job nature, and health. The control variables were all set as dummy variables, and the reference groups were neither parents received higher education, party members, management positions, and health.

3.3. Sample distribution and descriptive statistics

Table 1 describes the distribution of variables in the country, the eastern region, and the central and western regions. Through calculation, the average annual income in the eastern region is significantly higher than that in the central and western regions by about 120% (e10.6175-9.8136-1), which reflects the excessive regional income gap in China, and the average years of education in the eastern region is also significantly higher than that in the middle and western regions. Western phenomenon. However, from the perspective of all levels of education, the average value of the national sample is similar to that of other stages except for high school, which is slightly lower. From a regional perspective, the proportions of elementary school and below, junior high school, high school, and university and above in the eastern region were 19.27%, 24.%, 19.98%, and 36.75%, respectively, and the proportions in the central and western regions were 35.98%, 28.41%, and 18.59%, respectively. %, 17.01%. In terms of mean performance, the eastern region shows the largest number of people with college degrees and above, while the mean values of all levels of education in the central and western regions show a trend from high to low. The average work experience shows that the eastern region has nearly 3 years less than the central and western regions, which may be because the eastern region has more highly educated talents, while the central and western regions have more low-educated groups such as elementary school and below, junior high school, etc., and they will enter the country earlier after graduation. caused by employment in the labor market. Among other sample survey items, all survey items show the characteristics that the east is higher than the central and west, showing the imbalance of regional development.

Table 1. Descriptive Statistics of Variables

Variables	Definition	The whole country		Eastern Region		Middle and Western Regions	
		Mean	SD	Mean	SD	Mean	SD
Logarithm of Annual Income	Continuous variable of yearly occupational/labor income (logged)	10.282	1.167	10.618	1.055	9.814	1.154
Years of education	Continuous variable of years of education	10.851	3.961	11.688	3.990	9.683	3.609
Elementary school and below	Reference group	0.263	0.440	0.193	0.395	0.360	0.480
Junior high school	Junior high school=1, otherwise=0	0.258	0.438	0.240	0.427	0.284	0.451
High school	High school=1, otherwise=0	0.194	0.395	0.200	0.400	0.189	0.390
College and above	College and above=1, otherwise=0	0.285	0.452	0.368	0.482	0.170	0.376
Work experience	Age - Years of education - 6	23.898	12.133	22.536	12.042	25.798	12.007
Squared work experience	Square of "age - years of education - 6"	718.309	566.488	652.810	549.601	809.661	577.062
Higher education of parents	Parents received college education or above=1, otherwise=0	0.060	0.238	0.080	0.271	0.033	0.178
Party member	Party member=1, otherwise=0	0.109	0.312	0.130	0.336	0.080	0.272
Managerial position	In a managerial position=1, otherwise=0	0.231	0.421	0.292	0.455	0.145	0.352
Health	Healthy=1, otherwise=0	0.895	0.307	0.927	0.260	0.851	0.357

Note: Eastern region includes 11 provinces and cities including Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan. Middle and Western regions include 20 provinces and cities including Shanxi, Heilongjiang, Anhui, Jiangxi, Jilin, Henan, Hubei, Hunan, Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang. Hong Kong Special Administrative Region of China, Macau Special Administrative Region of China, and Taiwan Province of China are not included in the survey."

3.4. Model construction

The rate of return to education is usually estimated by the Mincer income equation, and its standard model was proposed by the American economist Jacob Mincer in 1974 [39]. In this paper, the standard Mincer equation (1) is adjusted to an extended Mincer income equation, such as formula (2).

$$\ln y = \alpha + \beta_1 \text{edu} + \gamma_1 \text{exp} + \gamma_2 \text{exp}^2 + \sigma * \text{CONTROL} + \varepsilon \quad (1)$$

$$\ln y = \alpha + \beta * \text{EDU} + \varphi \text{District} + \delta * \text{District} * \text{EDU} + \gamma_1 \text{exp} + \gamma_2 \text{exp}^2 + \sigma * \text{CONTROL} + \varepsilon \quad (2)$$

In formula (2), *EDU* is the comprehensive variable vector of each education stage, which is composed of three dummy variables of "junior high school", "high school" and "university and above", "elementary school and below" is set as the reference group, and β is the coefficient Vector, representing the educational return rate of each education level in the eastern region, defined as the educational return rate of the group who has received junior high school, high school, university and above in relation to "elementary school and below"; *District* is a regional dummy variable, and the eastern region is used as a reference group, assigned as 0, the midwest is assigned a value of 1; *District * EDU* is the interaction item between the region and the education stage, δ is the coefficient vector of the interaction item, which is expressed as the regional difference in the rate of return to education under different education stages; *CONTROL* is control variable vector, includes the parents' education Higher education, political status, job nature, and health status, σ is its coefficient vector, reflecting the degree of influence of each control variable on the logarithm of annual income.

In (1) and (2), the value of β represents the assumption that all people have the same rate of return to education. Considering that there may be differences in the return to education of different income groups, this paper uses the quantile regression method to study the regional differences in the return to education at different stages of education under different income dimensions, and the model is shown in formula (3). Among them, θ is the different quantile points of income, and 0.1, 0.3, 0.5, 0.7, and 0.9 correspond to low-income groups, low-middle-income groups, middle-income groups, middle-high-income groups, and high-income groups.

$$(\ln y)^{(\theta)} = \alpha^{(\theta)} + \beta^{(\theta)} * \text{EDU} + \varphi^{(\theta)} \text{District} + \delta^{(\theta)} * \text{District} * \text{EDU} + \gamma_1^{(\theta)} \text{exp} + \gamma_2^{(\theta)} \text{exp}^2 + \sigma^{(\theta)} * \text{CONTROL} + \varepsilon^{(\theta)} \quad (3)$$

In addition to using quantile regression, in order to study the regional differences in the return to education under different genders, this paper also performs group OLS regression on the male and female educational returns in the eastern and central western regions to compare the gender differences in the educational return between regions. Finally, according to the above quantile regression results and gender difference regression results, relevant suggestions are put forward to alleviate the regional imbalance in the rate of return to education in eastern and central China and narrow the regional income gap.

4. Empirical Analysis of The Regional Imbalance in The Return to Education

4.1. Benchmark regression of return on education

As shown in Table 2, Model 1 is the standard Mincer equation regression, and Model 3 is the standard Mincer equation regression with control variables added. Model 2 is a regression that adds regional interaction items without control variables, and Model 4 is a basic regression that adds control variables on the basis of interaction items.

Table 2. Benchmark Regression for Education Rate of Return

	Model 1	Model 2	Model 3	Model 4
Junior high school	0.441*** (0.041)	0.249*** (0.052)	0.364*** (0.040)	0.211*** (0.051)
High school	0.825*** (0.044)	0.628*** (0.055)	0.672*** (0.043)	0.516*** (0.054)
College and above	1.497*** (0.044)	1.237*** (0.052)	1.145*** (0.047)	0.941*** (0.055)
Middle and Western Regions		-0.667*** (0.057)		-0.595*** (0.058)
Middle and Western Regions & Junior high school		0.254*** (0.077)		0.216*** (0.075)
Middle and Western Regions & High school		0.199** (0.080)		0.178** (0.079)
Middle and Western Regions & College and above		0.139* (0.072)		0.151** (0.071)
Work experience	0.053*** (0.005)	0.050*** (0.005)	0.042*** (0.005)	0.040*** (0.005)
Squared work experience	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Higher education of parents			0.234*** (0.057)	0.202*** (0.055)
Party member			0.015 (0.040)	0.025 (0.039)
Managerial position			0.620*** (0.030)	0.574*** (0.030)
Health			-0.347*** (0.050)	0.488*** (0.050)
Constants	9.229*** (0.062)	9.649*** (0.067)	9.358*** (0.061)	9.707*** (0.066)
Observations	5,630	5,630	5,630	5,630
R ²	0.296	0.343	0.347	0.383

Note: robust standard deviation in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The regression results show that the coefficients of all levels of education are significantly positive at the 10% significance level, indicating that education can improve the stock of human

capital to a certain extent; after adding the regional interaction item in models 1 and 3, it is found that, except for the junior high school education stage, the eastern The rate of return to education at each stage of education is significantly higher than that in the central and western regions, and the difference continues to expand as the level of education increases. After the control variables are added in Models 1 and 2, the coefficients of each education stage are significantly smaller, indicating that the selected control variables reduce the possibility of overestimation of the return on education; in addition, the control variables also affect changes in income to varying degrees. The coefficient of parental education is significant and positive, indicating that this variable can significantly increase the income level; the coefficient of management positions is significantly positive, indicating that employees in management positions have a significantly higher impact on income than employees in non-management positions; On the contrary, the coefficient value of one variable is not significant, indicating that this variable has no significant effect on increasing income; the value of health coefficient shows a significant negative feature, indicating that healthy groups have a greater impact on income than unhealthy groups. The coefficient values of work experience and work experience squared are both significantly positive.

4.2. Quantile Effect Test of Regional Differences in Education Return Rates

Table 3 shows the quantile effects of low-income (0.1), low-middle income (0.3), middle-income (0.5), middle-high income (0.7), and high-income (0.9) income levels. The results show that at the quantile point of 0.9, the interaction coefficients between the Midwestern region and high school, college and above are close to zero and not significant, indicating that the income groups with higher education in the Midwestern region have a weaker ability to explain income. Weak, the coefficient value of the junior high school education stage in the eastern region also shows no significant characteristics at this quantile point; but at other quantile points, the eastern region is significantly positive at each education stage and at different income quantile points, The coefficient values all expand with the improvement of education level. However, the value of the interaction item coefficient in the Midwest only shows this characteristic at the 0.1 and 0.3 quantile points, and then as the income continues to increase, the interaction item coefficient value decreases with the increase in education level and its significance also decreases; from Comparing the coefficient values of each education stage in the east and the central and western regions, except for the 0.5-0.9 quantile, the coefficient value of the junior high school education stage in the eastern region is lower than that in the central and western regions, and the education stages of the other quantile points are higher than those in the central and western regions. In the Midwest, the coefficient values are all significantly negative, which shows that the Midwestern region's ability to explain income is lower than that of the Eastern region. At this point, Hypothesis 1 is partially verified.

In order to describe in more detail the quantile effect of regional differences in educational returns at different levels of education, the coefficient values can be transformed into educational returns to draw relevant graphs for comparison, using the formula $\exp(\beta_i) - 1$ for reference from Zhang Chi and Ye Guang Calculate the exact value [38], β_i is the coefficient value of each education stage. According the result ,It can be seen that with the continuous increase of income quintiles, the rate of return to education in the eastern region shows a downward trend with the increase of income, and the rate of return of university education is higher than that of high school, and the rate of return of high school is higher than that of junior high school . The possible reasons for this are: first, in the eastern region, education affects different income groups in different degrees, and low-income families may work harder and more diligently in studying and working in order to get rid of the current social environment and mobility constraints of the family , it has greater potential to promote income growth by increasing investment in education, and the marginal benefit of education return is higher than that of

high-income groups. Second, the industrial scale in the eastern region is larger, and highly educated talents have more employment opportunities, and the return on education has also increased.

Table 3. Regional Differences in Education Rate of Return by Income Levels: Quantile Regression

	Q1	Q2	Q3	Q4	Q5
Junior high school	0.371*** (0.102)	0.324*** (0.066)	0.212*** (0.051)	0.115** (0.052)	-0.046 (0.073)
High school	0.757*** (0.110)	0.651*** (0.071)	0.484*** (0.055)	0.384*** (0.056)	0.304*** (0.078)
College and above	1.273*** (0.113)	0.980*** (0.073)	0.877*** (0.056)	0.859*** (0.058)	0.774*** (0.081)
Middle and Western Regions	-0.827*** (0.100)	-0.693*** (0.065)	-0.640*** (0.050)	-0.453*** (0.051)	-0.525*** (0.072)
Middle and Western Regions & Junior high school	0.250* (0.140)	0.245*** (0.091)	0.320*** (0.070)	0.165** (0.072)	0.153*** (0.100)
Middle and Western Regions & High school	0.275* (0.153)	0.298*** (0.099)	0.345*** (0.076)	0.150* (0.079)	0.177 (0.109)
Middle and Western Regions & College and above	0.421*** (0.147)	0.365*** (0.095)	0.224*** (0.073)	-0.054 (0.075)	-0.083 (0.105)
Other Variables	Control	Control	Control	Control	Control
Constants	8.308*** (0.133)	9.366*** (0.086)	9.904*** (0.066)	10.33*** (0.068)	10.77*** (0.095)
Observations	5,630	5,630	5,630	5,630	5,630

Note: robust standard deviation in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The changes in the rate of return to education in the central and western regions is at low and middle-low income levels, the rate of return to education increases with the level of education, while at high income levels, the rate of return to education shows the opposite trend. The rate of return of junior high school and high school shows an approximate "inverted U" shape trend with the increase of income, both showing the highest 0.5 percentile, and the rate of return of college and above education shows a downward trend with the increase of income. The reason for these changes may be that in lower-income families, those with high education have better job opportunities and quality than those with low education, and the return to education is relatively higher. However, due to the unbalanced and insufficient regional development in China, there are few high-end industries in the central and western regions and most of them are basic industries, which require relatively low educational background for the labor force. Therefore, high-education talents in high-income families cannot exert their value, resulting in a low return on education. On the contrary, those with low education can obtain higher return on education. Second, the return rate of junior high school and high school education in the

central and western regions is the highest at the 0.5 percentile. It may be that low- and middle-income families are likely to obtain high returns for this education group. The effect may be stronger [29]. Therefore, the rate of return to education shows a certain downward trend, and Hypothesis 2 that the rate of return to education has income heterogeneity among different regions has been verified.

4.3. Regional Gender Difference Test of Education Return Rate

Table 4 shows the regression results of gender returns at each educational stage. It can be seen that in the male samples, except for the junior high school in the east and the university and above in the midwest, the coefficient values of the other education stages are significant and positive, and the coefficient values of men in the eastern region are higher than those in the central and western regions. Except for the high school stage in the Midwest, the females are all significant. Similarly, the coefficient values of females in the eastern region are higher than those in the central and western regions. In order to compare the gender differences in educational return rates in different regions at the same education stage, we calculated the rate of return values based on the coefficient values in Table 3 for comparative analysis.

Table 4. OLS Regression on Regional Differences in Education Rate of Return by Gender

Variables	Male	Female
Junior high school	0.042 (0.066)	0.254*** (0.074)
High school	0.338*** (0.071)	0.576*** (0.080)
College and above	0.796*** (0.075)	1.016*** (0.080)
Middle and Western Regions	-0.558*** (0.068)	-0.667*** (0.068)
Middle and Western Regions & Junior high school	0.244*** (0.090)	0.191* (0.103)
Middle and Western Regions & High school	0.202** (0.098)	0.160 (0.112)
Middle and Western Regions & College and above	0.088 (0.097)	0.233** (0.104)
Other Variables	控制	控制
Constants	9.913*** (0.086)	9.521*** (0.095)
N	3115	2515
R ²	0.379	0.415
R ² _a	0.377	0.412

Note: robust standard deviation in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Combined with Table 4, we found that in the eastern region, except for junior high schools, the rate of return to education for women is higher than that for men; while in the central and western regions, the rate of return to education for men is higher than that for women only in the junior high school stage, and in the rest of the education stages. There is no gender

difference in educational returns. Therefore, this paper's hypothesis 2 that there is gender heterogeneity in the rate of return to education in different regions has been verified. Existing literature has analyzed gender differences in educational returns from an overall perspective, and has drawn a consistent conclusion that female educational returns are higher than males. [30][31][33] This paper breaks the traditional gender return conclusion from a regional perspective. In the eastern region, the rate of return of women in high school and college and above is higher than that of men. The reason may be that the phenomenon of gender discrimination will gradually weaken with the increase of education [32]; especially for women who have received higher education, they The tendency to choose self-employment will also be stronger; at the same time, the scarcity of women with higher education in the labor market will also bring them higher income, and the return rate of women's education is relatively higher. However, because the level of economic development in the central and western regions lags behind that of the eastern regions, education concepts are also relatively lagging behind compared with the eastern regions. The labor market discriminates against women relatively more, and men have more advantages in the low-education market. The existence of a competitive mechanism makes most women with low educational backgrounds less likely to be employed. Therefore, the rate of return to junior high school education for males in the central and western regions is higher than that for females.

5. Conclusions and Suggestions

Through the analysis of the above empirical results, this study draws the following conclusions: First, the rate of return to education in the eastern region is generally higher than that in the central and western regions, but at the junior high school stage at the 0.5 and 0.7 quantile points, the rate of return to education in the eastern region is lower than that in the central and western regions; Second, the rate of return on education shows that the low-income group is higher than the high-income group, and in the eastern region, the higher the education level, the higher the rate of return, while the central and western regions generally show that the rate of return of the low-education group is higher than that of the high-education group; Third, from the perspective of gender, it is not in line with the traditional view that females' education returns are higher than men's, but shows differences in gender education returns by region and education stage.

This article uses the data of CGSS2017 to estimate and compare the education return rates in the eastern and central western regions respectively. In view of the above conclusions, the following policy recommendations can be put forward:

First, with the development of the economy, alleviating regional imbalances can start with narrowing the gap in the regional education return rate. The central and western regions should increase their higher education return rate as soon as possible, and fully grasp the domestic industrial transfer with the help of the implementation of the regional coordinated development strategy. According to the opportunity, actively develop high-end industries, attract high-educated talents for employment, and improve the regional industrial base and market base. Second, the return to education of low-income groups is higher than that of high-income groups, and education can narrow the income gap between different groups. Therefore, we must adhere to the policy of strengthening the country through education, and at the same time increase educational support for low-income groups. Educational investment pressure for low-income groups. Third, regional gender differences in employment are often caused by traditional gender employment concepts. Therefore, it is necessary to establish a sense of gender equality and effectively protect the right to education of women, especially women in poor and remote areas. The society must re-examine the role of women. In the labor market, recruiting units can standardize the division of labor for various occupations and establish

scientific evaluations. The performance system ensures equal pay for equal work and equal promotion for equal work, reduces gender discrimination, and consciously provides equal employment opportunities for both sexes.

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