The Relationship between Regional Educational Resource Inequality and Income Inequality: The Case of China

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Abstract. The relationship between intra-regional inequality in educational resources and income inequality has always been the focus of social development and equity issues. Using the education Gini coefficient as the main indicator for portraying educational inequality, this paper selects relevant provincial panel data to study the relationship between inter-regional educational inequality and the widening of the income distribution gap in China, and finds that: 1) China's inter-regional educational inequality is positively correlated with the income distribution gap; 2) Over time, the effects of unequal access to education and widening economic disparities are becoming more pronounced. In order to stop the income gap from expanding due to educational inequality, the government should invest more in education, boost the rate at which educational resources are used, and support the coordinated growth of interregional education. This article fills the research gap on the relationship between educational resources and income in the last decade and contributes to the national education field.

Keywords: education resource inequality, income disparity, education gini coefficient.

1. Introduction

1.1. Research Background

In recent years, with globalization and economic development, the problems of inequality in educational resources and income disparity have become more pronounced. As a result, the relationship between interregional inequality in educational resources and income inequality has attracted widespread attention and research interest. In many countries and regions, there are obvious interregional educational resource imbalances, and China faces the same situation. Objectively speaking, good educational resources can help to improve individuals' knowledge, skills and abilities and thus enhance their employment opportunities, so interregional inequality in educational resources may have a direct impact on the level of personal income in the region. Interregional disparities in educational resources and wealth inequality are intricately intertwined. Inequality in educational resources between regions may hinder the realization of social equality in the region. In turn, the widening gap in per capita disposable income between regions may further exacerbate inequality in educational resources between regions, creating a vicious circle.

The relationship between education and the economy is also reflected in the human capital theory. The theory of human capital considers investment in education as the main part of human investment. Since the economic benefits of this kind of investment are significantly greater than those of material investment, the replication of human capital should be seen as an investment rather than just a type of consumption. And since investing in education is the most fundamental way to increase human capital, the issue of investing in education may also be seen as a problem with human investment, which is why the study presented in this paper is so important. Less research has been done on the effects of inequality in education expenditure on the per capita income of the region under different

regions, and the majority of the literature on this topic has only examined the relationship between household education expenditure and educational equity or with or from the relationship between public education expenditure and income distribution. In addition, in terms of the measurement of the degree of inequality of educational resources, the main choice is the degree of inequality of family education expenditure, less consideration of the degree of inequality of expenditure of educational resources in the finances of different regions. Therefore, studying the relationship between inequality in educational resources and income inequality among regions will enable us to comprehend the mechanism of interaction between the economy and education better and provide a theoretical basis and policy recommendations for formulating equitable educational policies and promoting sustainable economic development.

1.2. Research Significance

This study promotes the coordinated development of interregional educational resources and thus economic coordination by examining the relationship between inequality in educational resources and income inequality within the region.

1.3. Research Main Content

Relationship between inequality in educational resources and income inequality in different regions.

2. Literature Review

The American economist Walsh first introduced the concept of human capital in 1935 in his book Human Capital Perspective and calculated the economic benefits of education by comparing the cost of individual education with the benefits to the individual. Education is an important factor in the formation of human capital and the improvement of labour productivity of individuals. The level of education affects the level of income of workers. Low-income groups have the chance to progressively close the gap with high-income groups if overall education quality and years of schooling continue to rise.

Wang Xiaolu and Fan Gang argue that China’ s high-income groups have more access to education, and that the increase in the per capita education level of urban residents has widened the degree of income inequality[1]. Wu Fangwei and Zhang Jinhua find that reducing educational inequality is conducive to reducing the income disparity and improving the living conditions of low-income groups[2]. According to Bian and Zhang, through the analysis of the annual income of urban residents and the characteristics of individual residents, there is a relationship between an individual's income and their level of education, age, gender, political status, and other characteristics. This relationship is particularly strong for individuals who are younger, female, or of lower socioeconomic status. Particularly, the greater the education degree of a person, the higher their income level[3]. Huang Xiao measured income mobility in China during 1989 to 2006 from the perspectives of relative income position change perspective, income share change perspective, and social welfare perspective[4]. Chen Xiaodong examined how education affects income inequality in China from the standpoint of opportunity equality. The measurement results revealed that there was significant age variation in the coefficient of the income inequality driven by educational characteristics, which was 50.87% of the overall income inequality[5]. Shan Depeng and Zhang Yongqi adopted various regression methods such as decentralized influence function (RIF), and found that the offspring education stimulated the widening of rural households’ income disparity, while the offspring education promoted the income inequality of rural families mainly through the mechanism of income growth effect and poverty reduction effect[6]. Liao Yi, Zhang Wei, Wang Ke , based on actual data from 43 countries, select five indicators: national income difference, This study investigates the relationship between public education investment and national income disparity, taking into account public education investment's size, structure, rate of regional economic development, and state of

regional economic development, and finds that public education investment is the Percy Grainger factor of national income inequality, but national income inequality is not public education, says Percy Grainger[7]. The data about the recent years are not sufficiently researched, and this study will focus on the last ten years.

The income disparity among citizens is primarily discussed domestically by academics from the angle of the rate of return on education. Lai Desheng verifies that there is an inverted "U" curve relationship between education expansion and income inequality of residents[8]. Chen Yuyu, Wang Zhigang and Wei Zhong analyse the changes in the contribution of education to the relative factors of wage income inequality. It is found that the correlation between education and income and the increase of educational return rate are the main factors that lead to the increase of educational interpretability, which in turn leads to the increase of income inequality of residents[9]. The difference of individual education level is the main reason for widening the income gap, and the improvement of average education level is helpful to narrow the income gap. However, Bai Xuemei finds that education expansion and income distribution are not always linear, and the income gap of residents will be widened in the initial stage of education expansion, and it will be narrowed only after the average number of years of education has increased to a certain extent[10]. This is mainly because China still faces the problem of unequal educational resources at this stage. Most of the studies rely on the measured average education level, but lack the research on the relationship between the inequality of educational resources and income in China from the local education funds and the national financial education funds. This research will study the relationship between the inequality of educational resources and income in China from the local education funds and the national financial education funds. Therefore, the contribution of this article is to fill the research gap and make a contribution to the national education field.

3. Research Hypothesis

The differences caused by the inequality of educational resources in the region make great differences in individual's emphasis on education, actual income of education, education level, personal ability, career choice and career development, which leads to income inequality due to individual's career choice, career planning, lifelong learning consciousness and sensitivity to the times. As a result, it is believed that there is a positive relationship between income inequality in the area and the disparity in educational resources. This study makes the assumption that income inequality in the area and educational resource inequality are positively correlated.

4 Research Design

The research method of this study: statistical analysis method;Data source used in this study: China Economic and Social Big Data Research Platform (data from 31 provinces in China from 2012 to 2019).

5 Experience Results and Discussion

Table 1. Descriptive analysis of each variable

Variable	Obs	Mean	Std.dev.	Min	Max
gini	248	0.4262	0.0468	0.3501	0.5086
edu	248	0.2273	0.0549	0.1601	0.5299
human capital	248	0.0195	0.0053	0.0085	0.0389
wage	248	11.0403	0.2965	10.5019	12.0246
labor	248	7.5380	0.8637	5.1591	8.8530
open	248	0.2584	0.2866	0.0127	1.4409
gdp	248	10.8172	0.4262	9.8494	12.0090

The variables in the sample data are statistically described in this table.

According to Table 1, obs denotes the observed value, Std.dev the standard deviation, edu the amount of money allocated to education, and openly the level of exposure to the outside world.

The largest variable in the mean is wages, with a specific number of 11.0403. The smallest variable in the mean is human capital, with a specific figure of 0.0195. There are three numbers whose mean is greater than 7 in the mean: 11.0403, 10.8172, and 7.5380. The remaining four numbers are all between 0 and 1. In standard deviation, All variables have standard deviations between 0 and 1, the variable with the smallest number is human capital, which is 0.0053, and the variable with the largest number is the labor force at 0.8637. In min, there are three variables with numbers greater than 5, and these three variables are wages, labor, and GDP, The three numbers are 10.5019, 5.1591, and 9.8494. The variable with the smallest number is open, the specific number is 0.0127, and the variable with the largest number is wage is 10.5019. There are three variables with a quantity greater than 8 in max, and these three variables are wages, labor, and GDP. The three numbers are 12.0246, 12.0090, 8.8530.

The sample data were subjected to a descriptive statistical analysis in the earlier section, and it was determined that the data were generally accurate and well-founded. We can first assess the level of correlation between variables and whether there is clear multicollinearity between variables through correlation analysis.

Table 2. Correlation analysis of each variable

	gini	edu	human capital	wage	labor	open	gdp
gini	1.0000						
edu	0.0360	1.0000					
human capital	0.0090	-0.531***	1.0000				
wage	0.0110	0.0840	0.267***	1.0000			
labor	0.0740	-0.517***	0.118*	-0.228***	1.0000		
open	-0.0040	-0.283***	0.265***	0.445***	0.112*	1.0000	
gdp	-0.0240	-0.323***	0.529***	0.723***	0.117*	0.662***	1.0000

There is a negative correlation between human capital, labor force, openness, GDP and education.From the results of correlation analysis, we can see that there are obvious negative correlations between human capital and edu, labor and edu, open and edu, gdp and edu, and labor and wage. Wage and human capital, labor and human capital, open and human capital, gdp and human capital, open and wage, gdp and wage, open and labor, gdp and labor, gdp and open show obvious positive correlation. Additionally, the absolute correlation coefficients of the variables utilized in this study are all less than 0.75, demonstrating the absence of multicollinearity between the variables and the validity of the empirical regression model used in this study.

Table 3. Basic regression results of each variable

	(1)	(2)	(3)	(4)	(5)
edu	0.3361	0.3439	0.3925	0.3816	0.4343
	(0.8252)	(0.8414)	(0.9179)	(0.8837)	(1.0119)
human capital		1.1947	1.2314	1.5196	-1.1066
		(0.3578)	(0.3679)	(0.4197)	(-0.2901)
wage			-0.0330	-0.0357	-0.0206
			(-0.3950)	(-0.4215)	(-0.2446)
labor				0.0211	0.1107
				(0.2118)	(1.0218)
open					0.1262**
					(2.0504)
_cons	0.3446***	0.3215***	0.6631	0.5302	-0.3095
	(3.7050)	(2.8330)	(0.7602)	(0.4926)	(-0.2705)
ind	Yes	Yes	Yes	Yes	Yes
time	Yes	Yes	Yes	Yes	Yes
N	248	248	248	248	248
R2	0.0166	0.0172	0.0180	0.0182	0.0379

Only two pairs of this set of tables have significant differences. Benchmark regression: Table (1) (2) (3) (4) (5) represent the five variables superimposed edu; hausman capical; wage; labor; open.cons with the first superimposed variable edu influence; -cons with the variable hausman capical of the second superposition influence.Edu has no correlation with the superposition variables hausman capical, wage, labor, and open. Our analysis shows that the education expenditure of each province reflects the level of economic development of each province and the importance attached to education.According to our inherent concept, education spending should be positively correlated with the level of human capital, the level of urban wages, the level of labor force, and the level of openness to the outside world, but according to our analysis, there is no clear correlation between them. We think that one of the key reasons may be that as China's economy develops, urbanization is accelerating and the nation is advancing the Central and Western Development Strategy. On the other hand, from the analysis, we conclude that the reason why the educational inequality between provinces is not obvious is that the educational inequality is mainly reflected in the urban-rural disparity, which makes the educational inequality between provinces not obvious.

Table 4. Robustness check of each variable

	(2) generalized least squares
edu	0.1459*
	(1.6742)
human capital	1.0483
	(1.3790)
wage	-0.0149
	(-0.4257)
labor	0.0069
	(1.4765)
open	0.0291
	(1.2572)
gdp	-0.0192
	(-1.2993)
_cons	0.6691*
	(1.9457)
time	Yes
N	248

The original regression model is changed using the robustness test-generalized least squares such that the random error term of the transformed model removes the autocorrelation, and the regression parameters are then estimated using the conventional least squares approach. We found that Edu showed significant robustness for one variable and no significant robustness for other variables. This proves our previous research results.In addition, there are two variables in this table showing a negative correlation.

6 Conclusion

After a series of analyses, our conclusion found that our selected variables showed non-significant relationships with each other, and now we are also working hard to adjust the data and model, and also did an analysis of the reasons for non-significance:

a). Data limitation:

The study may have used provincial data or data on the allocation of educational resources that are not comprehensive or accurate enough. In addition, some key measurable or non-measurable factors may have been omitted from the study.

b). sociocultural context:

The association between income inequality and the distribution of educational resources may be influenced by the particular sociocultural context within a region. For example, traditional attitudes

across regions may attenuate the correlation between income inequality and inequality in educational resources.

c). Economic structure:

The distribution of industries within a region and the economy's structural makeup could have a significant effect on how income is distributed. The relationship between income inequality and inequality in educational resources may lose significance if a region is heavily dependent on a high-income industry due to a concentration of high-income individuals.

d). Policy interventions:

Government policy interventions in the allocation of educational resources may mitigate or weaken the relationship between inequality in educational resources and income inequality, thereby reducing the correlation between income inequality and inequality in educational resources.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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