Research on the Relationship between Education Mismatch and Family Education Expenditure—— Empirical Research Based on CFPS Household Data

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Abstract: As China's new labor enters the stage of higher education, the phenomenon of educational mismatch is becoming more and more serious. In order to explore the impact of parental education mismatch on family education expenditure, this paper uses regression model to conduct empirical research on CFPS2018 data. The results show that the incidence of educational mismatch in my country is relatively high at present, the degree of mother's educational mismatch is positively correlated with the family's educational expenditure, and the mother's years of over-education reflects the family's emphasis on education. Therefore, it is necessary to seek a balance between the mother's educational investment in the family and work, and further solve the problem of educational mismatch.

Keywords: education mismatch, education spending, human capital

1. Introduction

According to data from the Ministry of Education, in 2020, the average number of years of education for new laborers in the country will be13.8 years, and the proportion of people with higher education will reach 53.5%. The average education level of new laborers has entered the stage of higher education. From 2015 to 2020, the gross enrollment rate of higher education increased by 14.4%. Affected by the epidemic, the expansion of postgraduate enrollment in 2020 will increase by even more than 20%, and the average educational level in China has risen rapidly. The employment needs of enterprises are concentrated in the manufacturing, wholesale and retail industries, and there are fewer jobs that need to match high-level human capital; In addition, the structural slowdown of the economy has contributed to the concentration of human capital in the inefficient public sector, exacerbating the educational mismatch to a certain extent.[1]

The research on educational mismatch phenomenon first started in the United States in the 1970s, and was first proposed by Freeman (1976). At this time, Western countries were in the period of scientific and technological revolution, the scale of higher education expanded, and there was a phenomenon of educational occupational mismatch[2]. Some scholars believe this is due to a mismatch between workers' education and the level of education they need to perform their jobs. With the development of the theory, domestic scholars have found that there are certain differences in the mismatch of education between my country and foreign countries. The educational expansion in Western countries is manifested as "early-onset endogenous type"; my country is manifested as "late-onset exogenous type" [3], the university admission quota is relaxed by the central rigid power, and the industry cannot adapt in time, so the educational mismatch may last longer and have a more far-reaching impact.

Foreign scientists mainly study the impact of educational mismatch on individuals from the two dimensions of wage income and job satisfaction. With the implementation of the policy of expanding enrollment in higher education, China began to pay attention to the problem of over-education in the early 21st century. Domestic scholars have made statistics and calculations on the situation of over-education in China[4-5], and found that China's education mismatch The incidence rate is on the rise; and it has been verified that the wage penalty effect of education mismatch exists in China [6].

Human capital is an important element of economic growth and one of the keys to poverty alleviation. Except gifts, acquired education is an important factor that leads to the widening of intergenerational income gaps and the weakening of intergenerational income mobility in my country [7]. education investment is the primary way to improve human capital in poor areas[8]. Based on current research findings, educational mismatches may have an impact on household spending on education.

The intergenerational transfer of human capital includes two parts: gene and human capital investment. This article only discusses the part of human capital investment. Existing literature suggests that intergenerational transfer may be caused by parental exchange motives and altruistic motives. Exchange motive means that parents invest in human capital expecting a return on investment from their children, and altruistic motive means that parents invest human capital in consideration of their children's future welfare[9]. What kind of motivation drives the intergenerational transfer of human capital, there is no consensus in early foreign research. Scholars represented by Cox (1987) found that the number of intergenerational transfers was positively correlated with the pre-transfer income of offspring, which supported the hypothesis of exchange motivation; later researchers found evidence to support altruistic motivation[10-11].

There are few studies on Chinese family education investment. Li Chao (2016) constructed an overlapping generation model(OLG)[12], proposing that aging and childcare burden shave a negative effect on family education investment and conducted an empirical test [13]. introduced personality characteristics as explanatory variables of private educational expenditures, and found that students with internal control received higher educational investment. Existing literature has not focused on the impact of educational misalignment on micro-human capital investment. Yan Min and Wang Weiguo (2018) estimated that over-educated workers face a wage penalty of 1.4%[14]. Obviously, family income is positively correlated with family education expenditure. Considering altruistic motives, parents' educational mismatch may make them think that the utility of education for their offspring will decrease, thus reducing educational investment; considering exchange motives, parents' educational mismatch may lead to wage penalty effect and low job satisfaction (Fang Hongyu, 2021) It reduces the expectations of the parents for the return on education investment [15], affects the individual's concept of education, and then reduces the investment in human capital. On the other hand, parental educational mismatch may serve as a human capital investment for parents, representing the time and energy that parents invest in their offspring. For example, the employment mobility of married women is negatively affected by pre-school children at home (Li, Zahniser, 2002). Families that value education more are likely to spend more on education than other households [16].

Therefore, the impact of educational mismatch on private educational investment is an issue worthy of attention. The purpose of this paper is to explore how education mismatch affects private education spending, and to provide a reference for education reform and public education policy formulation.

2. Variable setting and data processing

2.1 Variable setting

2.1.1 Explained variables

The explained variable of this paper is household hln_eduexpuman capital investment. In order to examine the impact of education mismatch on household human capital investment, this paper selects the logarithm of total expenditure on education (ln_eduexp) as a proxy variable for human capital investment.

2.1.2 Core explanatory variables

The core explanatory variable is education mismatch. Duncan and Hoffman (1981) decomposed the level of education received into the years of education required for work, the years of over-education and the years of under-education, which are expressed as follows

$$edu\_year = job\_edu + oedu - nedu \qquad (1)$$

Existing measurement methods for educational mismatch, including average method, mode method, job analysis method and self-assessment method, have their own merits. There is measurement error in any measure (Yan Min et al., 2017). Based on valid and feasibility, this paper chooses the self-assessment method to measure the education mismatch of laborers, and uses the respondents' opinions on the question "From knowledge and from the perspective of skills, what level of education do you think is actually required to be competent for this job?" and the actual education level of the worker to determine whether there is an education mismatch in the worker, and calculate the degree of education mismatch. The number of years of education required to be competent for the job of the respondent minus the years of education of the respondent is positive, and the resulting value is the number of years of overeducation (f_oedu，m_oedu). On the contrary, it is insufficient years of education (f_nedu，m_nedu).

2.1.3 Control variables

Drawing on the practice of Yu Jingwen (2021), the control variables include three main aspects, students, families, and parents: the control variables at students include age, gender and ability(ln_talent), the type of school they attend, and the nature of the class they attend. If the student is male, gender will be assigned1. The type of school ($elite\_school$) includes public schools and private schools, and the value is 1 when attending public schools. Class nature includes key class, ordinary class and ordinary class without distinguishing between key class and ordinary class. Class type is represented by two virtual variables, which represent ordinary class ($classtype0$) and key class ($classtype1$) respectively. When the two virtual variables are equal to 0, it means that the key class and ordinary class are not distinguished. The ability is represented by the logarithm of the sum of students' phrase test scores and mathematics test scores in the CFPS survey. The control variables at the family level include the logarithm of the per capita net income of the family (ln_fincom_per), and whether the urban household registration ($urban$), which is assigned as 1 when it is an urban household. Other characteristics of parents will also affect students' education investment. Therefore, the age of parents ($f\_age\ and\ m\_age$) and the years of education required for work (f_edujob, m_edujob) are taken as control variables.

2.2 Data sources and analysis

2.2.1 Data source and preprocessing

The data used in this article are mainly from the data released by the China Family Tracking Survey (CFPS) in 2018. In this study, Stata was used, and samples under the age of 18 were regarded as children, matched with parents with the same family number, and missing values and outliers were eliminated.

2.2.2 Descriptive Statistics

In order to ensure the intuitiveness of the data, the household income and household education expenditure shown in the descriptive statistics are data without logarithm.

Table 1: Descriptive Statistics

VarName	Variable meaning	Obs	Mean	SD	Min	Median	Max
eduexp	Total expenditure on education in the past year (yuan)	1132	6856.62	9419.157	0	4000	151000
f_oedu	Father's years of overeducation	2495	3.16	3.997	0	0	16
f_nedu	Father's under-education	2495	0.75	2.069	0	0	22
m_delay	Mother's years of over-education	2595	3.16	3.839	0	0	16
m_nedu	Mother's under-education	2595	0.80	2.303	0	0	22
f_edu_job	Number of years of education required for father's occupation	2918	5.40	5.074	0	6	22
m_edu_job	Number of years of education required for mother's occupation	2730	4.92	5.131	0	6	22
age	age of children	3772	13.84	2.583	10	14	18
talent	children's abilities	3076	36.13	12.174	0	38	58
gender	child sex	3772	0.50	0.500	0	0	1
elite_school	The type of school the child attends	3254	0.91	0.285	0	1	1
classtype0	Whether the child's class is a regular class	3306	0.27	0.445	0	0	1
classtype1	Whether the child's class is a key class	3298	0.14	0.349	0	0	1
fincome_per	Household per capita income in the past year (yuan)	3713	18203.51	25026.617	0	12312.5	540000
Urban	Hukou type (rural = 0, urban = 1)	3268	0.19	0.391	0	0	1
f_age	father's age	3067	42.60	5.707	28	42	85
m_age	mother's age	3156	40.75	5.627	23	40	71

In the sample data, the incidence of educational mismatch of fathers is about 32.12%, and the incidence of educational mismatch of mothers reaches 34.03%, which is higher than the 27.09% and 28.58% of educational mismatches measured by Fang Chao (2018) in 2013. It can be seen that the phenomenon of educational mismatch in China is still quite serious, and the incidence of educational mismatch is still rising.

3. Research methods

3.1 OLS regression

OLS regression is the most commonly used measurement method to measure the influence of independent variables on dependent variables. It was proposed by the German mathematician Gauss in 1809 to minimize the residual value and then estimate the parameters of the regression model and conduct a significance test.

3.2 Econometric model

The econometric model of this paper is designed as follows

$$ln\_eduexp = \beta_1 f_{oedu} + \beta_2 f_{nedu} + \beta_3 m_{oedu} + \beta_4 m_{nedu} + \sum \beta_i X_i + \alpha \quad (2)$$

4. Empirical Analysis

4.1 Feasibility test

The Pearson correlation coefficients between the core explanatory variables and the control variables are all less than 0.2, indicating that there is no strong correlation. All explanatory variable VIF values passed the test, and there was no multicollinearity problem in the model. Indicates that the selected variables can be applied to the model

4.2 Empirical results

The main estimates are reported in Table 2. Columns (1) - (4) report the regression results of successively adding control variables. The estimated coefficient of m_oedu in column (1) is 0.06, which is significant at the statistical level of 1%. Columns (2) - (4) gradually add the control variables of children, family and parents, The m_oedu coefficient remained at about 0.067, which is still significant at the statistical level of 1%, indicates that under the same other conditions, the total expenditure on education of families with a high number of years of over education of mothers was higher. The total expenditure on education increased by an average of 6.7% for each unit of increase in the number of years of mother's over education. At this time, The estimated coefficient of m_nedu is negative, but it is not statistically significant. Therefore, the number of years of mother's insufficient education has no significant impact on the change of family education expenditure. For father's educational mismatch, The coefficient of f_oedu is negative, The coefficient of f_oedu is positive, which is not statistically significant, and the effect is less than that of mother's education mismatch.

From the control variables at the student level, the estimated coefficient of gender is not significant, indicating that there is no gender difference in household education expenditure; student age has a positive impact on education expenditure; students with stronger learning ability have higher education expenditure; School spending on education for students is significantly lower; total spending on education for students enrolled in regular classes is higher.

At the household level, the higher the per capita household income, the higher the education expenditure; the lower education expenditure of urban households may be due to the more comprehensive popularization of public-funded education in urban areas.

At the parent level, neither parent's age had a significant impact on education expenditure, and the results were basically in line with expectations.

Table 2: Regression results

	(1) ln_eduexp	(2) ln_eduexp	(3) ln_eduexp	(4) ln_eduexp
f_oedu	-0.003	-0.026	-0.030*	-0.028
	(0.87)	(0.14)	(0.09)	(0.12)
f_nedu	-0.033	-0.003	0.003	0.001
	(0.10)	(0.90)	(0.90)	(0.98)
m_delay	0.060***	0.070***	0.066***	0.067***
	(0.00)	(0.00)	(0.00)	(0.00)
m_nedu	-0.044**	-0.036	-0.036	-0.038
	(0.03)	(0.14)	(0.14)	(0.12)
f_edu_job	0.003	-0.026*	-0.029*	-0.027*
	(0.85)	(0.09)	(0.06)	(0.08)
m_edu_job	0.059***	0.063***	0.061***	0.062***
	(0.00)	(0.00)	(0.00)	(0.00)
age		0.075**	0.080**	0.070**
		(0.02)	(0.01)	(0.04)
ln_talent		0.856***	0.809***	0.813***
		(0.00)	(0.00)	(0.00)
gender		0.162*	0.159*	0.156
		(0.09)	(0.09)	(0.10)
elite_school		-0.720***	-0.675***	-0.654***
		(0.00)	(0.00)	(0.00)
classtype0		0.339***	0.357***	0.360***
		(0.00)	(0.00)	(0.00)
classtype1		0.209	0.180	0.191
		(0.13)	(0.18)	(0.16)
ln_fincom_per			0.252***	0.251***
			(0.00)	(0.00)
Urban			-0.298**	-0.323**
			(0.03)	(0.02)
f_age				0.012
				(0.41)
m_age				0.000
				(1.00)
_cons	7.882***	3.965***	1.737	1.310
	(0.00)	(0.00)	(0.11)	(0.25)
N	672	539	537	537
r2	0.055	0.182	0.207	0.210
r2_a	0.05	0.16	0.19	0.19

4.3 Analysis of results

The mother's years of over-education may come from two sources: First, in the fierce competition in the labor market, the mother is forced to choose a job that requires a lower education level due to family pressure. According to statistics, the job satisfaction rate of male graduates in the 2018 graduate group is 1.5 times that of female graduates. (Qiu Changjun, Xia Jie & Qiu Wenqi, 2020)

On the other hand, overeducation can be reflected to a certain extent in the situation of limited energy, the mother's work and family trade-off results. Women with high levels of over-education tend to have higher levels of education, and their spouses have correspondingly higher levels of education. At this time, if the mother's over-education is the result of active choice, that is, the mother reduces her investment in work and invests the corresponding time cost in the education of her children, then the "active" years of over-education actually reflect the family's emphasis on children's education explains the increase in family education expenditure under the mother's high over-education level.

5. Conclusions and recommendations

In order to explore the influencing factors and mechanism of parental education mismatch on family

human capital expenditure, this paper uses the OLS regression model to estimate the regression parameters, constructs the regression equation, and uses the CFPS2018 data for empirical analysis.

The results show that under the control of personal factors, other characteristics of parents and family factors, the number of years of mother's over education is significantly positively correlated with family human capital expenditure, and the family with higher degree of mother's over education has higher education expenditure. Compared with families whose mothers have a low degree of over education, the mothers of these families have reduced their investment in work, allocated more time resources to the family, paid more attention to the education of their children, and increased their economic investment in education. This also reflects that women in Chinese families are more inclined to choose families in their families and careers, resulting in a certain waste of human capital.

Based on this, this paper puts forward the following suggestions:

First, In terms of publicity and education, pay attention to married women with a high degree of educational mismatch, and call on spouses to provide support to professional women to alleviate the educational pressure of married women; Married women are encouraged to pursue career progress and seek a balance between the utilization rate of human capital of married and fertile women and the investment of family human capital.

Second, In view of the high incidence of educational mismatches, we should optimize the current educational policy system, shift to quality education, dynamically adjust educational content, improve the adaptability between educational content and social needs, and help workers correctly position themselves in the workplace.

Third, The family experience of professional women is closely related to their work performance [17]. Managers should pay attention to the working state of professional women, and implement flexible work system under appropriate circumstances to help women achieve family and work balance.

The main contribution of this paper is to take 10-18-year-old teenagers as a sample, introduce the parental education mismatch as the influencing factor of family human capital investment, and find that under the control of variables, mother's over education is positively related to family human capital investment, which provides a reference basis for the country to formulate employment policies.

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