



Assessing the Impact of Poverty Alleviation on Reducing Gender Inequality in Education

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Abstract. This essay uses the data of China Household Panel Research website of Peking University, this paper takes Tianjin and Beijing in Hebei Province as the observation areas. To explore whether targeted poverty alleviation has eliminated educational inequality in North China. This paper is divided into three parts: First, the first part of the paper introduces the main research directions of previous studies. It is found that the existing papers lack the research on gender inequality in education expenditure of poor families after precision poverty alleviation, and the hypothesis which has been verified in the later stage for the conclusion of the paper. The second part of the article is to model logit based on selected data in the database. The results show that gender inequality in education exists among the poor population in North China and it is not only for the poor population as a single group, it is universal. Finally, the paper uses the difference in difference test to examine the impact of the implementation of the precision poverty alleviation policy on the correlation between the education expenditure and income and saving of the poor population, and finds that the precision poverty alleviation policy promotes the education expenditure. Finally, it is concluded that gender discrimination does exist in North China. Targeted poverty alleviation has boosted education spending among the poor population, but it has not completely eliminated gender inequality.

Keywords: Gender discrimination, Education, Targeted poverty alleviation in China.

1 Introduction

Poverty alleviation is a basic national policy of China, and China has made significant contributions to the process of poverty alleviation. Until 2020, China's 93.48 million rural population and 832 impoverished counties have been lifted out of poverty to achieve all-round prosperity [1]. In addition, China's contribution to poverty alleviation also belongs to the world [2]. China's 40 years of poverty alleviation efforts have lifted 7.339,000 people out of poverty, accounting for 70% of the world's poor population. These achievements can not be achieved without the targeted poverty alleviation policy

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H. M. Briel (ed.), *Proceedings of the 2024 SSEME Workshop on Social Sciences and Education (SSEME-SSE 2024)*, Advances in Social Science, Education and Humanities Research 864,

https://doi.org/10.2991/978-2-38476-289-7_6

alleviation approach from simple subsidies to increasing residents' income so that residents can create their wealth to achieve permanent poverty alleviation [3].

Through various literature, we found that the existing research on poverty alleviation policies mainly includes three aspects: first, the transformation of poverty alleviation policies from subsidies to targeted poverty alleviation; second, the impact of targeted poverty alleviation on poor population, society, and enterprises; third, the mutual impact of education and targeted poverty alleviation. However, no studies have focused on the consumption expenditure structure of the poor population after poverty alleviation, whether the proportion of education expenditure will increase, or whether there will be gender inequality in the distribution of education resources. In other words, targeted poverty alleviation increases the income of the poor population, which will change their living conditions. However, how much have their incomes increased? What is the difference between just meeting the food and clothing problem and being able to spend on investment areas? Is its spending ratio sexist? This paper takes northern China as the object of observation, focusing on the Research Center of Northern China after the targeted poverty alleviation in 2014.

The previous paper explored the role of education in poverty. In addition, the UN church organization refers to the positive correlation between education levels and productivity [4]. Compared with those without a degree, the productivity of a person with a bachelor's degree is 300 percent of those without a degree, 208% in middle and high school, and 143% in primary school [4]. It means low-income families can use education investment to increase productivity and relieve poverty. However, poverty alleviation is relative to industry. In the short term, poverty alleviation through education can not increase the income of the poor population and even has a negative effect [5]. Therefore, this shows that poverty alleviation through education is a policy that needs long-term observation. Therefore, for people with low incomes, the best way to increase personal income is employment, not education, which may lead the poor population to prioritize poverty alleviation through employment rather than through investment in education during the period of targeted poverty alleviation. Therefore, while the Chinese government may guarantee the right to education for the children of these families, these families may not be willing to invest in their children's education at that stage.

Through past literature, this paper focuses on explaining whether the social welfare of the poor population related to educational resources has increased after the end of targeted poverty alleviation, whether residents will spend more on education, whether there is gender discrimination in their spending process, and what is the family gap between the degree of discrimination and that of the average income group.

2 Literature Review

2.1 Diversified Approaches to Poverty Alleviation

Past literature has provided a variety of poverty alleviation methods to help poor populations get rid of poverty and become rich. Before targeted poverty alleviation in 2014, the Chinese government used the most direct subsidy method to alleviate poverty. Local

governments in China should set minimum living standards based on local minimum wage income and living needs [6]. Following this standard, minimum living security subsidies will be provided monthly to the local population that does not meet the standards. However, this subsidy is always lower than the local minimum wage and unemployment benefits [6]. After introducing targeted poverty alleviation policies in 2014, the Chinese government shifted from using poverty alleviation policies to subsidize poor populations below the minimum living standard to increasing the poor population's income. Among them, representative poverty alleviation methods include immigration poverty alleviation, industrial poverty alleviation, tourism poverty alleviation, financial poverty alleviation, education poverty alleviation, and e-commerce poverty alleviation. First, regarding relocation poverty alleviation, resettlement poverty alleviation refers to the Chinese government voluntarily moving the local poor population out of the area to eliminate China's most marginal and remote areas. poverty among the poor [7]. This policy compensates for demolition based on the cultivated land area of residents [7]. The relocated population shall enjoy the management rights of the original land and receive dividends from the enterprises operating on the land. In addition, the relocated population can also obtain further income by working in the new place of relocation [7]. Secondly, regarding industrial poverty, it provides technical support, infrastructure construction, and talent training to poor areas [8]. Photovoltaic targeted poverty alleviation is a typical example of industrial poverty alleviation [8]. Photovoltaic targeted poverty alleviation means that companies use solar panels on the roofs of houses and agricultural greenhouses where people live in poor areas to ensure residents' daily electricity consumption. Secondly, poor populations can sell excess electricity to the national grid [8]. It is conducive to reducing corporate costs and increasing the stable income of the poor population. Secondly, tourism poverty alleviation refers to the government's projects that encourage the development of small and medium-sized tourism enterprises (STEs) [9]. STEs belong to small and micro enterprises in the accommodation, hotel, and related industries. These small tourism entrepreneurs are locals who prefer to buy local raw materials and labor (80-90%). It means STEs can also gain income from close ties with local communities and employ local personnel to promote employment [9]. Financial poverty alleviation refers to financial poverty alleviation, which mainly provides complete financial infrastructure and services to the poor population through inclusive finance. The Chinese government set up bank branches, POS machines, and ATMs in villages and towns to ensure basic financial infrastructure in rural areas [10]. Secondly, financial services, financial institutions such as insurance, and banks need to provide services such as loans and insurance purchases to the poor population [10]. People in poor areas can avoid agricultural production risks by purchasing low-cost, natural disaster and other insurance [11]. Secondly, poor people can take a joint loan from three households, guaranteed by a professional guarantee company, and then let the bank lend [11]. Educational poverty alleviation refers to the Chinese government formulating education subsidy methods at different stages, from preschool to college, to ensure the smooth enrollment of students from families with financial difficulties [12]. Most of the preschool education is provided with government subsidies. After reaching higher education, funding methods will diversify, including scholarships, grants, loans, work-study, and exemption channels. Finally, e-commerce

poverty alleviation is using e-commerce platforms to sell agricultural products to poor areas and provide employment and vocational training. JD.com's e-commerce platform's support for poverty alleviation is a good example. JD.com builds a rural e-commerce platform for poor areas and provides sales channels for agricultural products in poor areas [13]. Currently, JD.com's e-commerce platform has facilitated the sales of more than 3 million items, bringing in more than 30 billion yuan in revenue. Secondly, in addition to increasing residents' income, JD.com provides farmers with education, training, financial, and employment support [13].

In conclusion, previous studies have studied the sustainable and creative ways of poverty alleviation in China. It provides jobs and a consistent income for residents. And it does vary from person to person, so the essay made the following assumption.

Hypothesis 1: Targeted poverty alleviation has improved the living standards and income of the poor population, and residents have the ability to spend more money on consumption beyond living expenses.

2.2 Poverty Alleviation has Changed the Living Conditions of the Poor Population

Previous studies have examined how targeted poverty alleviation improves living conditions for poor populations and reduces inequality. Precision poverty alleviation has greatly improved the material conditions and living conditions of poor areas [14]. From 2013 to 2017, poor residents' access to safe drinking water increased by 8.1 percent. Cable TV penetration increased by 17.3%; Internet penetration has increased by 40%. In addition, the penetration rate of bus service has increased by 12.4%. The penetration rate of primary schools in natural villages has increased by 8%, and the penetration rate of village-level clinics has exceeded 90% [14]. It has improved the living conditions basic access to education and the right to life of the poor population. Finally, targeted poverty alleviation has narrowed the gap between poor areas and other areas. Zhou, Wang, and Cheng (2023) pointed out that after targeted poverty alleviation, per capita disposable income in China's poor areas grew at the fastest rate compared with other regions. From 2013 to 2020, The average annual growth rate of per capita disposable income in poor areas is 9.5 percent. This is higher than urban (6.2%) and rural (8.5%) [12]. This also proves that targeted poverty alleviation reduces income inequality and regional disparities.

In conclusion, these documents emphasize the impact of anti-poverty policies on the living conditions of the poor. So this essay made the assumption as below

Hypothesis 2: Poverty alleviation not only ensures the basic living security of residents but also increases their disposable income. As a result, residents have more to spend on basic living expenses

2.3 Gender Inequality in Education in China

Gender inequality in educational resources has eased somewhat, but it still exists. There was no significant difference in the enrollment rate of college students in urban areas in China in 1990, which indicates that gender inequality in China has improved.

However, inequality in education still exists and is multi-dimensional [15]. About 66% of previous studies from the 1980s to the early 2000s found significant gender inequality in the distribution of educational resources for women. As we enter the 21st century, this phenomenon has decreased but it still exists [15]. The unequal distribution of educational resources can be based on multiple dimensions: urban and rural, ethnic, or time. The gender inequality caused by the rural-urban gap indicates that there is still a large gender gap in the distribution of education in rural areas compared to urban areas. Ethnic and gender inequality dimensions indicate inequality among ethnic minority students: the proportion of gender inequality among ethnic minority children is higher than that of Han children. The probability of gender inequality for minority female students is higher than that for Han female students. This means that there is indeed educational inequality in the distribution of educational resources in China. Although this phenomenon has been alleviated, it still exists In China, gender discrimination also exists at the level of higher education resources. In China's education resources, most doctoral candidates are men, and women tend to join families and workplaces earlier than men [16].

Therefore, there is a gender inequality in educational resources in China. But it will improve as the economy improves. So, I make the following assumption.

Hypothesis 3: Poverty alleviation boosts income growth, but gender inequality remains.

Hypothesis 4: Gender discrimination in education in China is not confined to a single group of the poor population; it may be widespread

To sum up, the usual research usually focuses on the methods of targeted poverty alleviation and the improvement of residents' living standards. In terms of gender discrimination, there are mainly qualitative articles and not many quantitative analysis articles. Therefore, this paper hopes to use quantitative methods to analyze whether gender inequality exists in Hebei Province after targeted poverty alleviation or whether gender inequality has been reduced after targeted poverty alleviation.

3 Research Design

3.1 Data Collection

This article uses 2014 as a starting point for observation because China put forward the targeted poverty alleviation policy in 2014. Secondly, consider the difference between the poor population and ordinary families in the data and the regional impact. We selected the income and expenditure of residents in the three Beijing-Tianjin-Hebei provinces, whether to establish archives, child gender, and other data, and took 2014 as the starting point for data observation. As shown in Fig. 1, we collected the income expenditure and gender of children of families in the Beijing-Tianjin-Hebei region after implementing poverty alleviation policies. Data from the China Household Panel Research website of Peking University.

3.2 Data Describe

Dependent Variable. This study takes the education expenditure in 2020 as a dependent variable. It is chosen as a dependent variable for two reasons. First, 2020 is used as the time point because China has achieved comprehensive poverty alleviation in 2020 (Government of the People's Republic of China, 2022), which means that the living standard of China's poor households has reached the highest stage in history at that time, so it is the most appropriate to use this as an observation point to determine the expenditure situation of residents after the end of poverty alleviation. Second, education expenditure is chosen as a dependent variable because the relationship between other variables and education expenditure can be used to observe the influence of different factors on education expenditure, whether it is positive or negative, and the degree and accuracy of such influence.

As shown in the Fig. 1, the education expenditure of Chinese families is mainly concentrated in the value of 0; that is, most families will not spend on the family, and the rest value is mainly concentrated in the range of 0-20000, which may be because the implementation of compulsory education in China guarantees the basic right of Chinese families to receive education, so Chinese families do not need to choose to spend on re-education. There are two main reasons for using logit to perform regression functions [17]. First, using logit function can reduce sparsity caused by a large number of zero-value data. logit model converts the results of linear model into probability through log-probability link function, to adapt to nonlinear relations in data. Second, this paper focuses on the research. This paper focuses on whether the poor population will have gender inequality in re-education expenditure. In other words, if the family income is not high, whether they spend on their daughters' education is a neither 0 nor 1 question. Therefore, the logit function can better observe the regression results and reduce the nonlinear relationship.

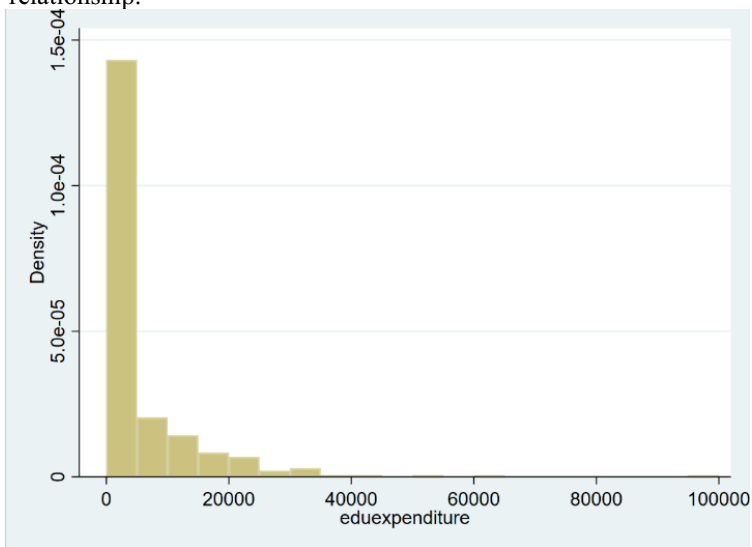


Fig. 1. The normal distribution of education expenditure.

Independent Variable.

Table 1 shows the variable which research needed, the variable name and explanation has shown as below

Total income.

Total income refers to the average annual household income of the observed family, and this variable is set to test the first hypothesis, whether the increase of family income can increase the family's education expenditure

Subsidy

Social subsidies refer to the observation of whether families will receive government subsidies and the amount of subsidies. This variable is set to verify the impact of government subsidies on education expenditure, and whether families receiving subsidies are willing to invest the amount of subsidies in education. It's still used to subsidize food and clothing.

Social donate

Social donation refers to the observation of whether the family will receive social donation subsidy amount. This variable is first to verify the impact of social donation on education expenditure. Second, this variable is set mainly to verify the difference between social subsidies and government subsidies. Social subsidies are mainly to alleviate the unsolvable special circumstances encountered by families, while government subsidies are to ensure the food and clothing of chronically poor families. These two variables were used to see whether families experiencing family changes or chronic poverty would be willing to invest in household expenditures

Food

We use food as the independent variable because a family's basic expenditure should be food expenditure. It can test whether Chinese households will lower their food expenditure because of basic household expenses

Population income

We want to use the income of poor people as a dummy variable to test whether poor families are willing to invest more in education compared with average income families.

Saving

The purpose of this variable is to explain whether families will reduce family education expenditure because of savings, and to observe whether Chinese families will be affected by traditional consumption concepts with the increase of income.

Poor family who has a girl

This variable is used as dummy variable to compare whether the education expenditure of families with daughters is different from that of families with children in poor households. The value in this variable is 1 instead of 0, mainly to study whether there is gender inequality in the gap between sons and poor households.

Average family who has a boy

This variable is used as dummy variable for comparison. In this variable, 1 is not 0. Compared with families with children in poor households, what is the impact of income on family education expenditure

Average family who has a girl

This variable is used as dummy variable for comparison. In this variable, 1 is not 0. Compared with a poor family with a boy, what is the income gap between a normal income family with a daughter and a poor family with a son? First, the impact of income on family expenditure can be studied. Second, coefficient can be used to observe the education expenditure gap between normal-income families with daughters and normal-income families with sons, so as to better study the impact of gender inequality in different income groups.

Table 1. Variable names, explanations, and data sources needed to build the model.

Variable	Measurement	Source
edu expenditure	Residents' expenditure on education	China Family Panel Studies
total income	Residents' total income	China Family Panel Studies
food	The food expenditure	China Family Panel Studies
subsidy	Annual government subsidy	China Family Panel Studies
Social donate	The number of social donate	China Family Panel Studies
female	Whether child is female, if yes=1, if no=0	China Family Panel Studies
poor population income	poor population's income	China Family Panel Studies
poor girl	The poor population has daughters	China Family Panel Studies
average family girl	The average family population has boys	China Family Panel Studies
average family boy	The average family population has daughters	China Family Panel Studies
Saving	total saving in family	China Family Panel Studies

3.3 Data Description

Table 2 provides an overview of the variables, their means, observations, and standard deviations. Variables include education expenditure as the dependent variable, and total income of residents, food expenditure, government subsidies, number of children, and savings as independent variables. Data on the gender of registered girls, poor income, and poor normal-income children are dummy variables.

Table 2. The number, mean, variance, maximum and minimum values of the variable.

Variable	Obs	Mean	Std. dev.	Min	Max
Edu expend	670	4435.059	8330.352	0	96000
total income	670	67012.48	75097.91	0	600000
subsidy	670	1770.53	23342.41	0	601644
saving	670	78616.81	180305.9	0	2200000
social donate	670	19.00888	335.0804	0	8400
food	670	18728.36	19367.33	0	240000
poor people	670	1010.811	5583.494	0	50000
poor girl	670	.035503	.1851843	0	1
average pay	670	.7100592	.4540706	0	1
average family	670	.5961538	.4910307	0	1

3.4 Method

We build a multiple linear regression model using the least square method. Dummy variable is added to MLR and log is used for regression [17].

$$\text{Log (Eduexpend)} = \beta_0 + \beta_1 D_{pg} + \beta_2 D_{ab} + \beta_3 D_{ag} + \alpha_1 \beta_{ti} + \alpha_2 \beta_{food} + \alpha_3 \beta_{subsidy} + \alpha_4 \beta_{sd} + \alpha_5 \beta_{savig} + \alpha_6 \beta_{pti}$$

We build a logit regression model using the least square method [17]. Dummy variable is added to log is used for regression, in which education expenditure is taken as dependent variable and food expenditure, total income, number of family members and social subsidy and saving are taken as independent variable. Poor population have a girl and poor population income and average family with boys or girls are used as dummy variables.

As shown in the Fig. 2, education expenditure depends on the increase in residents' income. By comparing the relationship between education expenditure and total income in 2014 and 2020, the data shows that the increase in residents' income is positively correlated with residents' education expenditure. It increases yearly, and its influence degree keeps increasing which tests hypothesis one. Therefore, the paper chooses education expenditure as the explained variable. Total income was selected as the explanatory variable.

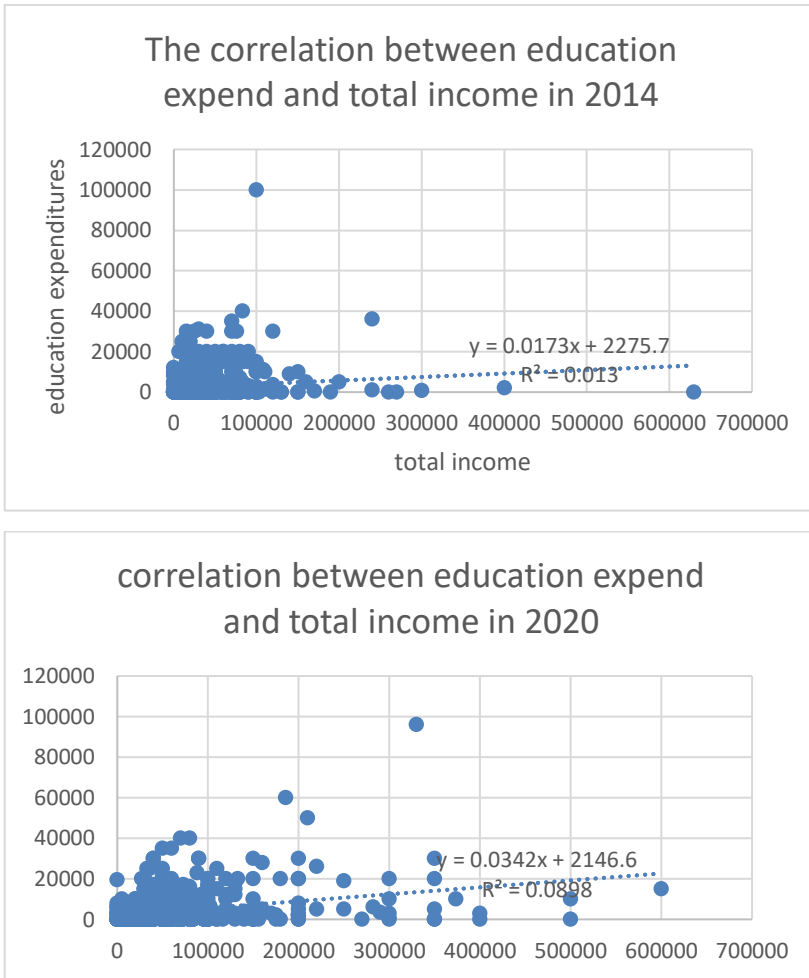


Fig. 2. Regression of education expenditure to income in 2014 compared to 2020.

4 Limitation

The data comes from secondary databases. It has 1 limitation. That data filtering and selection is difficult. initially, this means that a lot of time can be spent sifting through the appropriate data sources. Secondly, the data in the database can only be used after screening, and it needs to be processed to make reasonable use of it [18]. Therefore, this paper has three limitations. First of all, in terms of data, due to the proportional distribution of the questionnaire, only 5% of the population in this questionnaire is poor, a total of 30 people, which needs to be more significant. Second, the people lifted out of poverty may be influenced by some executive consciousness, such as consumption

philosophy. This situation leads to a lag in the change of consumption structure. That's not reflected in the variables. As a result, this can lead to inaccuracies in data analysis.

5 Estimation

Table 3 shows the result of the data. The fitting degree of the data is about 11%. As shown in the figure above, only the R^2 of the explained variables education expenditure and total income is roughly 10.81. In comparison, the result of this regression is 11%, which means that the added variables are meaningful and help the model be more accurate. It is not difficult to find that the coefficient of education expenditure and total household income is 8.70×10^6 . The two are positively correlated, that is, residents' education expenditure will increase with the increase of residents' income. Secondly, we find that in the dummy variable, the positive correlation between the income of the poor and the education expenditure is 0.0000428, which means that compared with the normal income families, the poor people may be more willing to invest household consumption in education, but this tendency is very limited and almost non-existent. In addition, the correlation between these two variables and education expenditure can reflect a kind of social consciousness. It shows that after targeted poverty alleviation, the disposable income of poor families increases, and in addition to meeting the food and clothing problem, education expenditure will be prioritized as the most important investment expenditure structure in the expenditure ratio.

In addition, an interesting aspect of the analysis is the finding that the relationship between education spending and savings is negatively correlated. This means that households are likely to spend less on education in order to save more. From an expenditure versus income perspective: Any expenditure, including education expenditure, reduces the amount of savings. Therefore, this regression result is a test of the second hypothesis, that is, the financial behavior of residents is affected by traditional factors leading to a delay in the adaptation of their consumption structure. However, residents of this assumption ignore a key piece of economic thinking: education increases productivity in preparation for rising incomes. In this way, residents can earn more income than before and can also be saved by more. This suggests that reducing expenditure alone may not be an adequate strategy for improving savings; Increasing income is also a key factor. In addition, the report also reveals that the relationship between social donations and government subsidies and education is different. Social contributions are positively correlated with education spending, but government subsidies are not. This pattern can be attributed to the nature of these government subsidies. Social donations are usually for temporary relief of family emergencies. However, in contrast to social contributions, government subsidies are a form of assistance for chronically poor families to ensure a minimum standard of living. But government subsidies can also lead to a different kind of "something for nothing" mentality, in which families are reluctant to invest their income in education.

Table 3. Regression result.

Y: log(education expenditure)					Pseudo R2 =
variable	Coefficient	Std.err	P> z	Number of obs	Pseudo R2
total income	8.70E-06	1.75E-06	0.000	670	0.1081
total deposit	-4.44E-07	5.32E-07	0.404	670	0.1081
food	0.0000153	5.79E-06	0.008	670	0.1081
government sub-sidy	-0.0001265	4.05E-05	0.002	670	0.1081
social donate	0.0020158	0.001161	0.082	670	0.1081
poor income	0.0000428	2.47E-05	0.083	670	0.1081
poor population girl	-0.6130564	0.890667	0.491	670	0.1081
average family girl	0.5434761	0.178404	0.002	670	0.1081
Average family boy	0.9522681	0.20641	0.000	670	0.1081
_cons	-1.620498	0.273526	0.000	670	0.1081

Finally, the dummy variable which the study used to distinguish the difference in education spending between poor families with sons and poor families with daughters revealed a stark difference: poor families with daughters tended to spend 60% less on education than poor families with sons. This striking difference strongly supports the third hypothesis, namely the existence of gender-based educational inequality in China. This variation also exists when comparing normal-income families. Average income families with sons spend 95% more on education than poor families with sons, and almost twice as much as poor families with sons. When it comes to daughters, however, normal-income families increased their spending only 54 percent more than poor families with daughters. This difference indicates that educational inequality under gender differences exists in Chinese society regardless of family income. But households with higher incomes are likely to fare better than the poor population. In this analysis, the degree of inequality faced by poor families is highlighted, and how far this degree of inequality is from the average income level of households. This result shows that inequality is not only economic, but also social and cultural consciousness. This social awareness may be that when a family's educational resources are scarce, their priority is not the child's ability to learn, but the child's gender. In addition, according to the gap of children's education expenditure in the average income families, this phenomenon still exists, although the degree is reduced, and the gap is not large with the poor population, which means that family income is the element that affects education expenditure, but cultural consciousness is also. This is just the third and fourth hypothesis. Now this essay will test the results, and this test mainly uses the difference in difference test.

6 Empirical Evidence

6.1 DID Test

In our study, we sought to explore the efficacy of targeted anti-poverty programs in improving the incomes and savings of the poor, and thus their investment in education. Our hypothesis is that these targeted poverty alleviation efforts lead to higher living standards and savings among the poor, which in turn may stimulate their spending on education. To empirically test this hypothesis, we applied the Difference in Difference (DID) approach, a robust method for assessing the long-term impact of policy interventions.

In this equation, education expenditure (Eduexpenditure) is modeled as a function of treat, treat and post-intervention period (treat \times post), post-intervention period (post), and other control variables such as income and savings. Here, treat is whether a family belongs to a "poor population" family.

Basic Outcome Estimation. As is shown in the Table 4, with the implementation of the targeted poverty alleviation policy, residents' education expenditure and savings have increased. It's 2,985 and 17,998 yuan, respectively which test hypothesis 2. However, it is worth noting that the income of residents decreased by 4,109 yuan. This may be due to some targeted poverty alleviation policies. For example, the purpose of resettlement poverty alleviation is to negotiate for residents to leave their original residence, move into the town and retain the land use rights of their original residence. Relevant enterprises can rent land to build factories. As a result, residents' income mainly comes from rent and dividends. This amount will be low relative to the overall income of residents, but it will be stable and consistent. Secondly, residents may not have to spend too much after poverty alleviation. Because deposits are increasing. This shows that although the income of the residents has decreased, the expenditure has also decreased, and the ratio of the decrease of the expenditure of the residents may be greater than that of the income. This may be the precision poverty alleviation to ensure that all aspects of residents' lives are guaranteed, so that residents do not have dead weight loss. Therefore, residents do not have to increase their income to maintain their standard of living.

Table 4. Regression result in difference in difference.

variable	education expend	saving	total income
DID	2985.579	17998.32	-4109.873
Observation	667	667	667
R ²	0.0084	0.0325	0.029

Result Analysis by Introducing Control Variables. Based on the above model, a fixed effect model is adopted to introduce control. The estimated results of DID model were obtained by adjusting variables.

$$\text{Eduexpenditure} = \alpha + \text{treat} + \text{treat} * \text{post} + \text{post} + \alpha_1 \text{income} + \alpha_2 \text{Saving}$$

Table 5. Regression result of fixed effect model.

Y: log(education expenditure)					Pseudo R2 = 0.0691
variable	Coefficient	Std.err	P> z	Number of obs	Pseudo R2
total income	3.08E-01	3.84E-03	0.000	667	0.0691
total deposit	1.55E-03	1.75E-03	0.376	667	0.0691
post	610.499	4.41E+02	0.167	667	0.0691
treat	1435.378	2663.396	0.590	667	0.0691
DID	1213.818	3766.556	0.747	667	0.0691
_cons	1641.156	338.7513	0.000	667	0.0691

As shown in the Table 5, the relationship between education and training and total income and savings is positively correlated after targeted poverty alleviation, they are 0.03 and 0.001 respectively, and are significant at 1% and 40% confidence intervals. It means that policy has not only succeeded in raising the income level of the targeted families, but also encouraged them to invest more in education. It reflects a shift in these families' budgetary priorities, highlighting the potential for financial uplift to drive educational progress.

Furthermore, our findings highlight the positive correlation between education spending and income and savings. This correlation suggests a virtuous cycle in which increased financial resources lead to more investment in education, which may lead to further economic benefits. As household incomes and savings grow, they seem more inclined to devote a greater share of their resources to education, seeing it as a way to improve life prospects and increase socioeconomic mobility.

This analysis not only confirms the effectiveness of targeted poverty reduction policies in increasing education spending among the poor, but also highlights the broader socioeconomic impact of such policy interventions. Increased spending on education by the poor, driven by rising incomes and savings, points to a gradual shift towards human capital development, which is critical to eradicating poverty in the long term and promoting sustainable economic growth.

Therefore, this means that hypothesis 1 and 2 are valid, and the best verification that targeted poverty alleviation improves residents' living standards is the increase in savings. Secondly, residents have the ability to invest their income in education expenditure, and the implementation of the policy makes the poor population invest 5000 more disposable income in education expenditure. This promotes the development of education.

6.2 Variable Selection Observation

In this report, we encountered a particularly intriguing phenomenon during the initial phase of our model construction. Initially, we considered the number of children in a family as one of the dependent variables, hypothesizing it might be a significant factor influencing our study's focus. However, upon analyzing the regression results, we made a noteworthy discovery. Contrary to our expectations, the inclusion of the number of children as a variable not only resulted in a diminished overall fit of the model but also

emerged as statistically insignificant. This was an unexpected turn, suggesting that the variable had minimal impact on the relationships we were examining.

Furthermore, an exciting aspect emerged regarding this variable's interaction with our primary area of interest – the education expenditure among impoverished families with female children. We observed that the presence of this variable in the model skewed the results of this specific demographic. It appeared to distort the clarity with which we could understand how education expenditure was affected in these households. This led us to a critical decision point in our analysis.

Table 6. Regression result in part 3.4 model with child number.

Y: log(education expenditure)					Pseudo R2 = 0.1069
variable	Coefficient	Std.err	P> z	Number of obs	Pseudo R2
total income	8.62E-06	1.77E-06	0	667	0.1069
total deposit	-4.44E-07	5.32E-07	0.404	667	0.1069
food	0.000015	5.84E-06	0.01	667	0.1069
government subsidy	0.0001269	0.0000405	0.002	667	0.1069
social donate	0.0020113	0.0011636	0.084	667	0.1069
poor income	0.0000408	0.0000252	0.104	667	0.1069
Poor population girl	0.5206221	0.9320589	0.576	667	0.1069
Average family girl	0.5519547	0.2139346	0.01	667	0.1069
Average family boy	0.9567268	0.2368458	0	667	0.1069
number of children	0.0012242	0.1322063	0.993	667	0.1069
_cons	1.615375	0.2981324	0	667	0.1069

As shown in Table 6. First, the significance level of the observed variable of file holders increased from 50% to 60%. Second, the significance level of the number of children is also low, with only about 1 percent probability of being significant. Given these findings, we concluded that retaining the number of children in the family as a variable would not only compromise the robustness of our model but also obscure the insights we sought about the educational investments in families with girl children.

Therefore, in pursuit of a more accurate and focused analysis, we decided to exclude this variable from our final model. Therefore, this adjustment was pivotal in enhancing the model's specificity and relevance to our research objectives, allowing us to more precisely gauge the impact of various factors on educational spending in underprivileged households with female children.

7 Conclusion

The research fields of previous literatures are different. This paper studies whether the gender inequality of the poor population will be solved with the increase of residents' income level after poverty alleviation, and whether the gender inequality is caused by the bias of consciousness or the lack of funds. The purpose of studying this field is because by 2020, China will have completed building a moderately prosperous society in all respects. After this goal is achieved, China is expected to successfully achieve socialist modernization by 2035. Therefore, socialist modernization cannot only stay in the material level of the goal of building a well-off society in an all-round way, but also in the field of humanistic and spiritual modernization. It means that poor people are lifted out of poverty, but their income and overall family living conditions are lower than those of ordinary families, and their life ideology will be weaker than that of normal-income families. Therefore, this study provides information on the consumption and living conditions of households with below average income in 2035, which will help the Chinese government to formulate better policies for this population and realize policies tailored to local conditions. We will fully realize socialist modernization and enhance our economic and cultural strength.

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