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The impact of education on relative poverty and its intergenerational transmission —— Causal identification based on the Compulsory Education Law

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ABSTRACT

Using data from the Chinese General Social Survey (CGSS) and the China Statistical Yearbook, we explore a "quasi-natural experiment" made possible by the enactment of China's 1986 Compulsory Education Law to study the causal relationship between education and decrease in the incidence of relative poverty, as well as that between education and decrease in the intergenerational transmission of relative poverty. By applying a difference-in-differences estimation, we find the following: i. The probability of the offspring experiencing relative poverty decreases by 6–8% as the duration of their eligibility for compulsory education increases by 1 semester; education can block the intergenerational transmission of relative poverty. ii. The effects of education on reducing the incidence of relative poverty and blocking the intergenerational transmission of relative poverty are found mainly in rural areas and among female groups, while no significant effect is found in urban areas and among male groups. iii. High school graduation, labor market performance, and effort are three paths through which education reduces the incidence of relative poverty and blocks its intergenerational transmission.

1. Introduction

Poverty is one of the world's most acute social problems today, especially in developing countries. China has made remarkable progress in eradicating poverty (Fosu, 2017; Lou & Ping, 2020; Yan, 2020). On February 25, 2021, Chinese President Xi Jinping declared that China had accomplished the arduous task of eliminating absolute poverty according to the current national definition. In this context, China's focus on future poverty reduction would shift from eradicating absolute poverty to alleviating relative poverty (Wang & Feng, 2020). Although there is no consensus on the setting of the relative poverty line in China, the issue of relative poverty has received considerable academic attention. Studies have been conducted using different percentages of the median income to measure relative poverty, finding that China currently has a relatively high incidence of relative poverty (Gustafsson & Sai, 2019; Liu, 2020; Shen & Li, 2020; Xing, 2020; Yue, Li, Wang, et al., 2007; Zhang, 2013). For example, Gustafsson and Sai (2019) measured the

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incidence of relative poverty in China's urban areas from 1988 to 2013, and found that when the standard is set at 60% of the median income, the incidence of relative poverty in urban areas increases from 6% in 1988 to 20% in 2013. Shen and Li (2020) define the relative poverty line as 60%, 50%, and 40% of the median income, and find that at 60%, the incidences of relative poverty in rural and urban areas in 2018 are 23% and 21%, respectively. Establishing a long-term mechanism to solve relative poverty is the main goal of and a major difficulty in China's relative poverty reduction efforts and is highly important for ensuring social fairness and justice.

Education is an important way to reduce the incidence of poverty and block its intergenerational transmission (Betthäuser, 2017; Yi, 2016; Zhao & Gao, 2017). As education levels reflect human capital, a low education level is a significant reason why an individual may fall into poverty, while improving one's education level is a powerful means to escape poverty (Gao & Hao, 2018; Islam, Sayeed, & Hossain, 2017; Liu & Liu, 2017). Most studies have found a negative correlation between education and poverty (Thomas, 2021; Zhang, 2013), and that higher levels of education help prevent the intergenerational transmission of poverty (Su, Ma, & Lu, 2020; Zhao & Gao, 2017). However, some studies have found that education has no significant impact on poverty eradication and that its role may be minimal in lifting rural individuals, in particular, out of poverty (Lockheed, Jamison, & Lau, 1980; Simone, 2018; Teal, 2001; Wedgwood, 2007; Yang, Meng, & Shi, 2005). In addition, relevant studies suggest that a low education level caused by poverty in childhood will significantly increase the probability of an individual falling into poverty in adulthood (Luna & Michela, 2017).

Furthermore, it has been shown that higher levels of education help reduce the probability of individuals falling into relative poverty (Liu, 2020) and can stop the intergenerational transmission of relative poverty (Duan, 2020; Duan & Guo, 2021; Ma, Yang, & Han, 2018). However, some studies have also pointed out that education can only help the non-relatively poor group prevent their children from returning to poverty, while the impact on the relatively poor group is not significant (Chen, Zhang, & Shen, 2021).

On the whole, research on the impact of education on relative poverty and its intergenerational transmission is mixed, which is most likely due to endogeneity. For example, unobserved factors (such as the individual's ability) may affect the effect of education to lift the children of poor families out of poverty. The promulgation of the Compulsory Education Law of the People's Republic of China in 1986, however, provides a quasi-natural experiment and thus estimate the poverty-reducing effect of education. The estimation bias caused by endogeneity can be reduced as much as possible, and the impact of education on individual relative poverty and its intergenerational transmission can be estimated more accurately. The law stipulates that children over the age of six should receive nine years of compulsory education, and this education has gradually narrowed the gap in access to basic educational opportunities across social classes.

Therefore, in this study, we adopt the difference-in-difference (DID) method, and identify the causal effects of compulsory education on relative poverty and its intergenerational transmission by using the interprovincial differences in the timing of enforcing China's 1986 Compulsory Education Law and the differences between individual birth cohorts. The empirical results show that all else being equal, the probability of a child being in relative poverty decreases by 6–8% for each additional semester of compulsory education for which the child is eligible. Moreover, the intergenerational transmission of relative poverty in China is significant. Approximately 8% of children inherit the relative poverty of their parents, yet education can effectively block this intergenerational transmission of relative poverty. In addition, when we replace the number of semesters with a variable indicating whether the offspring are exposed to compulsory education, or use average parental income, subjective class assessment, and parental education level instead of the father's income level, the negative effect of education on poverty and its transmission remains robust.

We further explore the heterogeneity in the negative effects of education on poverty and the intergenerational transmission of relative poverty among different groups. The results show that the effects of education on reducing the incidence of relative poverty and blocking the intergenerational transmission of relative poverty were found in rural areas and among female groups, while no significant effect was found in urban areas and among male groups.

The mechanism study shows that high school graduation, labor market performance and effort level are three paths through which education reduces the incidence of relative poverty and blocks the intergenerational transmission of relative poverty. In the short term, the implementation of the Compulsory Education Law can improve the probability of individuals enrolling in and graduating from high school, allowing them to accumulate more human capital and escape from relative poverty. In the medium and long term, first, increased educational attainment brought about by the Compulsory Education Law can improve the offspring's knowledge, skills, and productivity, enhance their labor market performance, and thus block the intergenerational transmission of relative poverty. Also, due to the compulsory education policy, poor children are more likely to exhibit increased motivtion to exert effort in order to escape poverty.

The remainder of this paper is arranged as follows. The second section introduces the identification strategy and empirical methods. The third section introduces the data, defines the variables used in this paper, and provides a statistical analysis of the relevant variables. The fourth section shows the main empirical results. The final section summarizes the research conclusions.

2. Identification strategies and methods

2.1. Identification strategy

The Compulsory Education Law of the People's Republic of China was formally promulgated in 1986, marking a milestone in the development of China's educational system. Since then, compulsory education in China has had a special legal guarantee. Since the law came into effect, the gross enrollment rates of primary and junior high school have remarkably increased. In 1985, the rate of entering primary school was 68.4%, while that of entering junior high school was only 39.4%. By 2018, primary and junior high school enrollment rates rose to 99.5% and 95.7%, respectively (data from China Statistical Yearbook). After the official promulgation of the law by the central government, different provinces and regions formulated and introduced corresponding measures for

Table 1
Timeline of enforcement of the Compulsory Education Law in each province.

Effective date	Province (specific year and month of official enactment)	Number of provinces
Second half of 1985	Shanghai (1985.9), Zhejiang (1985.9)	2
First half of 1986	Jiangxi (1986.2), Ningxia (1986.3)	2
Second half of 1986	Beijing (1986.7), Hebei (1986.7), Liaoning (1986.7), Heilongjiang (1986.7), Shanxi (1986.7), Sichuan (1986.7), Chongqing (1986.7), Shandong (1986.7), Guangdong (1986.9), Jiangsu (1986.9)	10
First half of 1987	Henan (1986.10), Yunnan (1986.10), Tianjin (1986.11), Jilin (1987.2), Hubei (1987.3)	5
Second half of 1987	Anhui (1987.9), Shaanxi (1987.9)	2
Second half of 1988	Fujian (1988.6), Xinjiang (1988.5), Qinghai (1988.9), Inner Mongolia (1988.9)	4
After 1989	Gansu (1990.9), Hunan (1991.8), Guangxi (1991.6), Hainan (1991.12), Tibet (1994.2), Guizhou (1994.11)	6

Notes: The timing of implementing the Compulsory Education Law in each province is taken from the provincial government portal website.

Table 2
Number of semesters during which individuals in different birth cohorts should have received compulsory education.

Birth cohort / Enforcement timing	1969.9–1970.8	1970.9–1971.8	1971.9–1972.8	1972.9–1973.8	1973.9–1974.8	1974.9–1975.8
Second half of 1985	0	2	4	6	8	10
First half of 1986	0	1	3	5	7	9
Second half of 1986	0	0	2	4	6	8
First half of 1987	0	0	1	3	5	7
Second half of 1987	0	0	0	2	4	6
Second half of 1988	0	0	0	0	2	4
After 1989	0	0	0	0	0	0

implementation in light of their actual conditions, so there are timing gaps in policy implementation. Most provinces issued their own implementation measures in the same year the law was promulgated, but some provinces earlier or later than 1986. The specific timeline of enforcement is summarized in the following table: Table 1.

The 1986 Compulsory Education Law, despite the difference in the implementation time across provinces and regions, clearly stipulates that (1) the state shall implement a nine-year compulsory education; (2) all children who have reached the age of six, regardless of gender, ethnicity or race, shall receive a compulsory education; (3) the state shall exempt students who receive compulsory education from tuition and establish grants to help poor students; and (4) parents or other guardians must send their school-age children or wards to school on time to receive compulsory education. It is prohibited for any organization or individual to recruit for employment those school-age children or adolescents who should receive compulsory education. The law is mandatory and universal, and thus effectively helps that individuals to complete secondary education. To minimize confounding from other policies, we limit our analysis to a period of six years ranging from before to after the promulgation, where the offspring involved were born between September 1969 and August 1975. China's academic year runs from September 1st each year to July 31st of the next year, and is divided by the winter vacation into an autumn and a spring semester. According to the enrollment policy for school-age children, children over the age of 6 will attend primary school and complete their nine-year compulsory education at 15. Therefore, the independent variable, the number of semesters of compulsory education that an individual should have received (hereafter referred to as "the number of semesters"), is jointly determined by the enforcement time of the Compulsory Education Law in the individual's province of residence and his or her birth year. For example, individuals born between September 1972 and August 1973 should have graduated from junior high school in July 1988, for they should have attended primary school at 6 in September 1979, instead of 1978. The number of semesters for which individuals in different birth cohorts were eligible for compulsory education is shown in Table 2; individuals born from January 1969 to August 1970 were not affected by the Compulsory Education Law and compose the control group in this paper.

2.2. Empirical methods

The three common empirical strategies in studies exploring the impact of education rely on identical twins, adoptees, and instrumental variables (IV), respectively, the first two of which are more demanding on data. With the IV identification strategy, educational reforms are often used as an instrumental variable for education (Holmlund, Lindahl, & Plug, 2011). China's education reforms, such as the enforcement of the Compulsory Education Law in 1986 and the free compulsory education reform in 2006, satisfy the assumptions of instrumental variables and are therefore considered reasonable and applicable instrumental variables (Liu, Zhou, & Hu, 2016; Shi, 2012; Zhao, 2017). Moreover, there are provincial differences in the timing of China's education reforms, and thus a number of recent studies use DID identification strategies to reduce potential bias (Chen et al., 2021; Huang, 2015; Lin & Li, 2020; Tang, Zhao, & Zhao, 2020; Xiao, Li, & Zhao, 2017).

In this study, we refer to the difference-in-differences (DID) identification strategies adopted by Xiao et al. (2017) and Tang et al. (2020), and use the differences in the enforcement time of the 1986 law across provinces and in individual birth cohorts to identify the causal impact of compulsory education on relative poverty status and the intergenerational transmission of relative poverty. We use the full sample to identify the effect of compulsory education on the incidence of relative poverty and the subsample to identify the effect of compulsory education on the intergenerational transmission of relative poverty. The regression model is set as follows:

$$Y_{ipt} = \alpha Term_{ipt} + \beta X_{ipt} + \gamma_t + \theta_p + \delta_m + \theta_p{*}t + S_p{*}\gamma_t + \varepsilon_{ipt} \quad (1)$$

Y_{ipt} in model (1) represents the relative poverty of child i who was born in year t and whose household was registered in province p. $Term_{ipt}$ represents the remaining number of semesters during which child i should receive a compulsory education when the compulsory education law took effect in province p. The coefficient α measures the causal relationship between a one-semester increase in eligibility and the relative poverty of individuals. An intention-to-treat (ITT) analysis is conducted here, as we adopt the number of semesters of compulsory education an individual should have received rather than that actually received. X_{ipt} indicates a group of control variables reflecting individual- and family-level characteristics, including gender, age, ethnicity, self-rated health, marital status, occupation type, household registration, and the father's relative poverty status.

We add birth cohort fixed effects γ_t to model (1) to control for the common cohort trend in the relative poverty of individuals in all provinces. and the province fixed effects θ_p to control for time-constant factors that may be associated with the date of the compulsory education reform and the relative poverty status of individuals. We use $\theta_p{*}t$ to control for linear cohort trends in all provinces.

$Term_{ipt}$ is determined by the date of enforcement of the compulsory education reform and the individual's date of birth. For individuals born in the same province in the same year, the number of semesters of compulsory education depends on their month of birth. Specifically, individuals born between September and December of the same year are eligible for two more semesters of education than those born between January and August, since the former group should have attended school one year later. As a result, the treatment effect estimates may also be derived from systematic differences in the probability of individuals in the same birth cohort born earlier and later in the year experiencing relative poverty. To address this issue, birth-month fixed effects δ_m are added to model (1).

In addition, to allow the cohort trends in outcome variables to vary with provincial characteristics before the law, we add the interactions between the provincial characteristic before the law's enforcement denoted by S_p and the birth cohort fixed effects γ_t. Subsequent to the decentralization reform of education finance in the 1980s, regional economic development levels started to play a larger role in educational inputs, and unbalanced regional economies led to unequal opportunities in educational development between regions (Wei & Yang, 1997), as well as significant regional difference in educational development levels and in cohort trends (Hannum & Wang, 2006). In this study, the provincial characteristic variables include the natural logarithm of the five-year (1980–1984) mean GDP per capita, the natural logarithm of the total population, the natural logarithm of the fiscal expenditure, and the proportion of government expenditure on science, education and health in each province. Finally, in the regression, standard errors clustered at the provincial level are used to account for possible correlations between individuals in the same province.

3. Data and variables

3.1. Data

We aim to explore the impact of education on lifting an individual out of relative poverty and blocking the intergenerational transmission of relative poverty. The Chinese General Social Survey (CGSS) data provide relevant details about adults and their families, enabling this study to be conducted. Therefore, CGSS data will be used for analysis in this study. The CGSS survey started in 2003, and data that contain survey information on both the "month of birth of the child" and "personal characteristics of the father when the child was 14 (or 18[1]) years old" were collected in 2006, 2010, 2012, 2013, and 2015, so data from the above five years are pooled cross-sectionally to form the sample in this paper.

The data was processed as follows: (1) We cleaned the required variables, including the major characteristic variables, such as month and year of birth, province of residence, personal income and gender of the child, as well as information on the education level, occupation type, unit type (ownership of the organization which one works for) and other characteristics of the father when the child was 14 or 18 years old. (2) Based on the offspring's province of residence, we control for the characteristics of each province before the promulgation of the Compulsory Education Law in 1986. The data source for the macro variables is the China Statistical Yearbook and the Compilation of Historical Statistics of Provinces, Autonomous Regions, and Municipalities Directly Under the Central Government in 1984. (3) We screened the necessary observations. The birthdate of the observations must fall in the 6 years before and after the law, i.e., September 1969–August 1975, so observations where the offspring's birth year was earlier than 1969 or later than 1975 were excluded. This provides a sample size of 5462 observations. (4) In view of the lack of paternal income in the primary sample, this paper draws on the research ideas of the double sample (Guo, Wang, & Su, 2017; Inoue & Solon, 2010) to construct a second sample based on CGSS 2005 data, makes full use of the parent information of the secondary sample, and assigns "potential" income to the parent of the child in the primary analysis sample. (5) We converted the income of the fathers and the offspring in each year to 2010 prices with the consumer price index, and winsorized the data at the 1st and 99th percentiles to protect against outliers and facilitate later

[1] Notes: The CGSS 2006 dataset contains information on the father only for the year when the offspring was aged 18.

Table 3
Number of semesters for members of different birth cohorts.

Semesters	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Total
	1969.9–1970.8	1970.9–1971.8	1971.9–1972.8	1972.9–1973.8	1973.9–1974.8	1974.9–1975.8	
0	1030	885	246	171	134	120	2586
1	0	32	172	0	0	0	204
2	0	70	410	64	49	0	593
3	0	0	46	164	0	0	210
4	0	0	62	387	56	40	545
5	0	0	0	43	191	0	234
6	0	0	0	71	326	33	430
7	0	0	0	0	43	167	210
8	0	0	0	0	52	315	367
9	0	0	0	0	0	29	29
10	0	0	0	0	0	54	54
Total	1030	987	936	900	851	758	5462

Notes: The authors collated the data from CGSS 2006, 2010, 2012, 2013 and 2015.

measurement of the relative poverty status of the parents and the offspring.

3.2. Variable description

3.2.1. Explained variable: relative poverty status of offspring

Relative poverty is a form of relative deprivation of individuals or households due to the inequitable distribution of resources (Runciman & Runciman, 1966; Townsend, 1979; Foster, 1998). In the practice of measuring the scale of relative poverty in China, some studies use individual income as a benchmark (Li, Li, & Li, 2020; Shen & Li, 2020; Wang, Wan, & Wu, 2020), while others use household income per capita (Fan & Zou, 2020; Guo, Qu, & Zhu, 2022; Wang & Sun, 2021). As we need to identify the intergenerational transmission of relative poverty, which makes individual income more feasible and applicable in identifying relative poverty and subsequently intergenerational transmission of relative poverty (Duan, 2020; Liu, Wen, & Liu, 2019; Zhang, 2013), so we chose individual income rather than household income per capitato measure relative poverty.

Many studies in developed countries define the relative poverty line as 50% or 60% of the median income (Joyce & Ziliak, 2019). However, when it comes to China, 40%, 50% or 60% of the mean or median income of residents is most often suggested by scholars and adopted in research as the relative poverty line (Yue et al., 2007; Zhang, 2013; Zhao & Wang, 2019; Shen & Li, 2020; Xing, 2020; Sun & Zhang, 2021), with some other standards based on assets or consumption (Ballabio, Filandri, Pacelli, & Verrecchia, 2020). To make our findings more comparable to previous studies and more in line with international standards, we define the relative poverty line as 40%, 50%, and 60% of the median income in our analysis.

Among domestic studies in relative poverty, some use the same measurement for both urban and rural areas, while some others use a separate measurement. Considering the still large gap between urban and rural development in China at this stage, which is difficult to eliminate in the short term, using the same relative poverty line for urban and rural areas is likely to cause over-estimation of the relative poverty incidence and lead to over- or under-identification of the intergenerational transmission (Fan & Zou, 2020). Besides, the economic and policy implications of the standard as well as the implementation status of the related policies are not clear (Shen & Li, 2020). Therefore, a separate measurement distinguishing between urban and rural areas has received more support (Wang & Sun, 2021).

The *entire Chinese* mainland is included in the *research scope* of our study. The relative poverty standard used to identify individual poverty status is determined as follows: drawing on general academic practices, all observations are categorized as either urban or rural; 60%, 50% and 40% of the median income in the parent and offspring subsamples are used as the cutoffs for "relative poverty" to account for different levels of relative poverty, and also to test the robustness of the results for each standard against each other.

If parental income is below a certain relative poverty cutoff, the parent is considered to be in relative poverty at that level (i.e., parental relative poverty = 1), and if the income of the offspring is below a certain relative poverty cutoff, the offspring is considered to be in relative poverty at that level (i.e., offspring relative poverty = 1). If not otherwise specified, the same percentage level is adopted as the relative poverty standard for both the parent and the offspring. For example, when the relative poverty standard is 60%, parental relative poverty = 1 means that parental income is below 60% of the median income among the parent observations, and offspring relative poverty = 1 means that the income of the offspring is below 60% of the median income of offspring observations.

Table 4
Descriptive statistics for the variables.

Variables	N	Mean	Std. Dev.	Min.	Max.
Individual annual income[a]	4934	25,615	30,849	231.1	184,958
Number of semesters	5462	2.409	2.850	0	10
Age	5462	38.78	3.453	31	46
Gender (Male = 1)	5462	0.494	0.500	0	1
Ethnicity (Han = 1)	5456	0.910	0.286	0	1
Self-rated health (Healthy = 1)	5457	0.744	0.436	0	1
Marital status (Married = 1)	5459	0.928	0.259	0	1
Mandarin level[b] (Skilled = 1)	4211	0.415	0.493	0	1
Type of occupation	5007	2.132	0.886	1	3
Household registration (Nonagricultural = 1)	5457	0.310	0.463	0	1
Log of the five-year (1980–1984) mean GDP per capita	5462	6.328	0.498	5.643	7.980
Log of total population	5462	8.217	0.707	5.283	9.221
Log of fiscal expenditure	5331	3.400	0.302	2.174	3.869
Proportion of government expenditure on science, education and health	5331	0.290	0.0425	0.164	0.352
Birth cohort	5462	3.335	1.691	1	6
Province	5462	15.44	8.880	1	31
Assigned parental income	2297	4421	6051	117.6	23,523
High school graduation	5462	0.392	0.488	0	1
Nonfarm employment	5144	0.800	0.400	0	1
Degree of effort	4194	0.113	0.317	0	1

Notes: The authors collated the data from CGSS 2006, 2010, 2012, 2013 and 2015.

[a] The Chinese General Social Survey (CGSS) directly inquires respondents about their total income in the previous year, which is then adjusted to CPI. Income is defined as an individual's total income in the previous year, including wage income, business income, asset income, transfer income, and other sources of income.

[b] The Chinese General Social Survey (CGSS) directly asks respondents "What level do you think is your ability to speak Mandarin?" The choice of responses includes "not at all", "poor", "average", "good", and "very good". We categorize "good" and "very good" as having a high level of Mandarin, and "not at all" and "poor" as having a low level of Mandarin.

3.2.2. *Independent variable: number of semesters*

The core explanatory variable, the number of semesters during which an individual should have received a compulsory education, is jointly determined by the timing of the law's enforcement in the province where the individual was living and the individual's birth date.[2] The number of individuals in different birth cohorts with different numbers of semesters is described in Table 3.

3.2.3. *Other control variables*

The control variables in this paper are measured mainly at the individual and family levels and include the following: gender, ethnicity, self-rated health, marital status, Mandarin level, occupation type (low-, medium- and high-skilled workers), and household registration. In addition, we include a group of provincial variables, i.e., the natural logarithm of the five-year (1980–1984) mean GDP per capita, the natural logarithm of the total population, the natural logarithm of the fiscal expenditure, and the proportion of government expenditure on science, education and health in each province in 1984. To further explore the paths and mechanisms through which education blocks the intergenerational transmission of relative poverty, we evaluate three paths, including high school graduation, nonfarm employment, and individual effort level.

3.3. *Descriptive statistics*

The statistical description of the main variables in this paper is shown in Table 4. The table shows that the mean annual income among offspring is 25,615 yuan, and the number of semesters of compulsory education the offspring should have received is distributed between 0 and 10, with a mean of 2.409. The gender of the overall offspring sample is relatively balanced, with slightly more female observations than male observations. Most offspring observations are Han Chinese, married, with mostly mid- or high-skilled occupations and good self-rated health.

We calculate the incidence of poverty under the different relative poverty standards. When the relative poverty line is set at 60% of the median income, the incidence of relative poverty among offspring is 26.20%; when the standard is 50%, the calculated relative poverty rate is 20.96%; and when it is 40%, the number is 14.28%. It has been noted that in order to establish a long-term mechanism to address relative poverty step by step, without the disruption from overly ambitious goals, 40% of the median income is the most

[2] Rural-to-urban migrants are an important group in China, and we have taken the effect of this factor into account. In the first place, Chinese people usually receive compulsory education at their *hukou* locations, the province of their household registration, so for an interprovincial migrant, we determined his or her length of exposure to the Compulsory Education Law based on the *hukou* location and the birth month. Also, the conditions of access to poverty reduction policies or *Dibao* policy are tied to the *hukou* type and *hukou* locations, so we identify relative poverty of rural-to-urban migrants based on their *hukou*. In particular, for migrants who changed their agricultural *hukou* to non-agricultural *hukou* before the enforcement of the Compulsory Education Law, we redefined their *hukou* type as agricultural *hukou*, following Duan (2020).

Table 5
Effects of education on relative poverty (baseline results).

Variables	Relative poverty (60%)	Relative poverty (50%)	Relative poverty (40%)
Number of semesters	−0.069**	−0.082***	−0.061***
	(0.033)	(0.030)	(0.022)
Relative poverty of the father	0.088***	0.099***	0.063***
	(0.019)	(0.022)	(0.018)
Age (standardized)	−0.092***	−0.105***	−0.014
	(0.031)	(0.034)	(0.026)
Gender	−0.166***	−0.131***	−0.099***
	(0.024)	(0.021)	(0.021)
Ethnicity	−0.007	−0.008	0.011
	(0.050)	(0.050)	(0.050)
Self-rated health	−0.113***	−0.103***	−0.073***
	(0.022)	(0.020)	(0.015)
Marital status	−0.017	−0.033	−0.031
	(0.042)	(0.038)	(0.037)
Mandarin level	−0.058**	−0.055*	−0.056***
	(0.027)	(0.028)	(0.017)
Low-skilled occupation[a]	0.125***	0.087***	0.083***
	(0.028)	(0.031)	(0.021)
Mid-skilled occupation	0.063	0.056	0.015
	(0.038)	(0.034)	(0.022)
Household registration	0.035	0.040	−0.007
	(0.038)	(0.035)	(0.023)
Birth month FE	Yes	Yes	Yes
Province char. * cohort	Yes	Yes	Yes
Observations	1720	1646	1646
Pseudo R^2	0.231	0.199	0.218

Notes: The coefficients reported in the table indicate the average marginal effects. Identification of relative poverty of the parental generation is based on the income of and the relative poverty line for the father. Province and birth-year fixed effects are included in all regressions. Robust standard errors, in parentheses, are corrected for clustering at the provincial level. Pseudo R^2 is the pseudo R-squared from the probit regression model. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

[a] Instead of simply classifying occupations into low-, medium-, and high-skill categories, we have adopted the International Standard Classification of Occupations (ISCO-88). The ISCO-88 divides occupations into nine major categories: "legislators, senior officials and managers," "professionals," "technicians and associate professionals," "clerks," "service workers and shop and market sales workers," "skilled agricultural and fishery workers," "craft and related trades workers," "plant and machine operators and assemblers," and "elementary occupations." Secondly, we have added "type of ownership" as a control variable, which includes six categories: party and government organs, state ownership or holding, collective ownership or holding, individual or private ownership or holding, Hong Kong, Macau, Taiwan or foreign ownership or holding, and other ownership. Based on a more detailed categorization of "type of occupation" in line with the International Standard Classification of Occupations (ISCO-88), we further incorporated the variable "type of ownership", so that we controlled for income inequality arising from the individual's occupation and the ownership of his or her work unit during China's transition from a planned economy to a market economy. It was found that the role of education in poverty reduction and blocking relative poverty remains robust.

appropriate standard for short-term identification of relative poverty (Shen & Li, 2020), and our empirical results prove this point. We find through calculation that 40% of the median income of the rural offspring is about 3300 RMB, which is 1.4 times the absolute rural poverty line (2300 RMB) set by Chinese government in 2010 and corresponds to a relative poverty incidence in rural areas of about 15.21%. In comparison, 40% of the median income of the urban offspring is about 9100 RMB, which is 3 times the national average of the urban *Dibao* ('social assistance') standard in 2010 (3014 RMB) and corresponds to a relative poverty incidence in urban areas of about 13.83%.

Furthermore, the incidence of intergenerational transmission of relative poverty under different standards is calculated. When 60% of the median income is taken as the relative poverty standard, the incidence of intergenerational transmission of relative poverty is 28.34%. When the standard is 50% of the median income, the incidence of intergenerational transmission is 24.47%. When the standard is 40% of the median income, the number is 15.56%. That is, with the lowering of relative poverty standards, the incidence of relative poverty in offspring and the incidence of relative poverty transmission between generations are reduced.

4. Results

4.1. Baseline results

Table 5 shows the baseline regression results for this study. Taking 60%, 50%, or 40% of the sample's median income as the standard for relative poverty, all else equal, for each additional semester of compulsory education for which the child was eligible, the probability of the child being in relative poverty significantly decreases by 6.9%, 8.2%, and 6.1%, respectively. Therefore, our study shows that education helps to reduce the probability of individuals falling into relative poverty.

In addition, the intergenerational transmission of relative poverty is significant. As the age of the offspring at the time of the survey

Table 6
Effects of education on the transmission of relative poverty (baseline results).

Variables	Relative poverty (60%)	Relative poverty (50%)	Relative poverty (40%)
Number of semesters	0.026	−0.040	−0.286***
	(0.060)	(0.066)	(0.103)
Birth month FE	Yes	Yes	Yes
Province char. * cohort	Yes	Yes	Yes
Observations	605	581	417
Pseudo R^2	0.273	0.253	0.455

increases, the probability of their falling into relative poverty decreases. Men are less likely to fall into relative poverty than women. Offspring with better self-rated health are less likely to experience relative poverty. Compared with offspring working in high-skilled occupations, offspring engaged in low-skilled occupations are more likely to experience relative poverty.

The results in Table 5 show a clear intergenerational transmission of relative poverty, so we further focus on whether compulsory education can block this intergenerational transmission of relative poverty. We use the data on parents falling into relative poverty to estimate the impact of the number of semesters of compulsory education on the relative poverty of the offspring. The regression results are displayed in Table 6. As relative poverty deepens, the negative effect of compulsory education on the intergenerational transmission of relative poverty gradually strengthens. When the standard is 40% of the median income in the sample, each additional semester eligible results in a significant decrease of 28.6% in the probability of the offspring remaining in relative poverty.

4.2. Validity of the DID strategy

4.2.1. Test of the parallel trends assumption

The effectiveness of the DID strategy depends on the satisfaction of the parallel trends assumption, which states that in absence of the compulsory education policy, there would be no differential trend between members of the same birth cohort residing in provinces with different implementation timings (i.e., different province groups). Since this counterfactual situation cannot be observed, the parallel trends assumption is tested by drawing from the literature (Xiao et al., 2017) and examining whether the trends for individuals in the same birth cohort but different province groups were similar to those before the implementation of the policy. First, the individual birth cohorts are restricted to September 1963–August 1969; the individuals born during these six years were not affected by the compulsory education policy. Individuals with a birth date from September 1963–August 1964 are categorized as 'birth cohort 1', those with a birth date from September 1964–August 1965 are categorized as 'birth cohort 2', and so on, up to 'birth cohort 6', which includes individuals born between September 1968 and August 1969. Second, a set of dummy variables are generated based on the timing of enforcing the Compulsory Education Law in different provinces. Third, the birth cohort dummies are interacted with these enforcement-timing dummies. As Table 7 shows, the coefficients on the interaction terms are largely insignificant, which provides evidence of parallel trends in the outcome variables for individuals with the same birth cohort in different province groups.

4.2.2. Placebo tests

A placebo test of the pretreatment parallel trends is another way to demonstrate the effectiveness of the DID strategy. In the placebo test, we assume that the compulsory education reform was implemented six years earlier than its actual time, and select observations from the corresponding birth cohorts to construct the "placebo number of semesters" based on the placebo timing of the education reform in each province and the birth date of each individual. These individuals were not actually affected by the compulsory education reform when they were 6–15 years old. We estimate the coefficient on the placebo number of semesters by fictionalizing the timing of the policy implementation. If the estimated coefficient is still significant, the changes in relative poverty may be driven by another policy or random factors.

As shown in Table 8, when the compulsory education policy is assumed to have taken effect 6 years earlier than it did, the increase in the number of semesters of compulsory education changes the probability of the offspring experiencing relative poverty, but statistical significance is never observed. Thus, the placebo test results met expectations.

4.2.3. Confounding factors

The DID strategy also assumes that no other shocks that might have affected the outcome occurred when the 1986 Compulsory Education Law was in effect. To test this assumption, we re-estimate the baseline regression while accounting for the impact of concurrent events that may have confounded our results.

In 1986, the Chinese government established a "development-oriented poverty alleviation" policy and implemented a series of major measures to enhance poverty alleviation efforts. Poverty alleviation and economic development efforts during this period may have helped families in areas classified as "poverty-stricken counties" obtain more income, thus affecting their decisions regarding investment in their children's education. If this policy affected the probability of offspring obtaining an education and overlapped with the Compulsory Education Law in terms of timing, the policy effect estimates may be biased. Therefore, we use interaction terms between the number of poverty-stricken counties in each province, measured in 1994, and the birth cohorts to control for the impact of poverty alleviation and development efforts, before re-estimating the baseline regression. As shown in Table 9, after excluding the impact of contemporaneous policies, the probability of experiencing relative poverty is still significantly reduced as the number of

Table 7
Parallel trends test.

Variables	Relative poverty (60%)	Relative poverty (50%)	Relative poverty (40%)
(Enforcement year = 1986b) * (Cohort 2)	0.047	−0.020	−0.088
	(0.183)	(0.172)	(0.147)
(Enforcement year = 1986b) * (Cohort 3)	−0.036	−0.047	−0.138
	(0.207)	(0.194)	(0.166)
(Enforcement year = 1986b) * (Cohort 4)	0.179	0.072	−0.034
	(0.264)	(0.248)	(0.212)
(Enforcement year = 1986b) * (Cohort 5)	−0.106	−0.040	−0.207
	(0.327)	(0.308)	(0.263)
(Enforcement year = 1986b) * (Cohort 6)	0.128	0.143	−0.017
	(0.300)	(0.282)	(0.241)
(Enforcement year = 1987a) * (Cohort 2)	−0.016	0.015	0.030
	(0.123)	(0.116)	(0.099)
(Enforcement year = 1987a) * (Cohort 3)	−0.099	−0.035	−0.060
	(0.176)	(0.166)	(0.142)
(Enforcement year = 1987a) * (Cohort 4)	−0.229	−0.062	−0.022
	(0.241)	(0.226)	(0.193)
(Enforcement year = 1987a) * (Cohort 5)	−0.274	−0.157	−0.102
	(0.309)	(0.290)	(0.248)
(Enforcement year = 1987a) * (Cohort 6)	−0.326	−0.224	−0.185
	(0.362)	(0.340)	(0.291)
(Enforcement year = 1987b) * (Cohort 2)	0.088	0.097	0.027
	(0.110)	(0.103)	(0.088)
(Enforcement year = 1987b) * (Cohort 3)	−0.016	0.039	0.003
	(0.119)	(0.112)	(0.095)
(Enforcement year = 1987b) * (Cohort 4)	−0.021	0.093	0.018
	(0.139)	(0.130)	(0.111)
(Enforcement year = 1987b) * (Cohort 5)	−0.074	0.053	0.063
	(0.139)	(0.131)	(0.112)
(Enforcement year = 1987b) * (Cohort 6)	−0.101	−0.009	−0.003
	(0.153)	(0.143)	(0.123)
(Enforcement year = 1988a) * (Cohort 2)	0.240	0.210	0.065
	(0.158)	(0.148)	(0.127)
(Enforcement year = 1988a) * (Cohort 3)	0.088	0.125	0.005
	(0.184)	(0.173)	(0.148)
(Enforcement year = 1988a) * (Cohort 4)	0.169	0.167	−0.021
	(0.225)	(0.212)	(0.181)
(Enforcement year = 1988a) * (Cohort 5)	0.132	0.171	0.047
	(0.283)	(0.266)	(0.228)
(Enforcement year = 1988a) * (Cohort 6)	0.160	0.150	−0.059
	(0.257)	(0.242)	(0.207)
(Enforcement year = 1988b) * (Cohort 2)	0.216	0.234	−0.120
	(0.239)	(0.224)	(0.192)
(Enforcement year = 1988b) * (Cohort 3)	0.432	0.439	−0.098
	(0.388)	(0.364)	(0.312)
(Enforcement year = 1988b) * (Cohort 4)	0.264	0.301	−0.370
	(0.552)	(0.518)	(0.443)
(Enforcement year = 1988b) * (Cohort 5)	0.285	0.408	−0.287
	(0.763)	(0.717)	(0.614)
(Enforcement year = 1988b) * (Cohort 6)	0.389	0.485	−0.380
	(0.818)	(0.769)	(0.658)
(Enforcement year = 1989a) * (Cohort 2)	0.035	−0.025	−0.108
	(0.157)	(0.148)	(0.126)
(Enforcement year = 1989a) * (Cohort 3)	−0.177	−0.166	−0.199
	(0.217)	(0.204)	(0.175)
(Enforcement year = 1989a) * (Cohort 4)	−0.226	−0.224	−0.368
	(0.294)	(0.276)	(0.236)
(Enforcement year = 1989a) * (Cohort 5)	−0.310	−0.313	−0.350
	(0.393)	(0.369)	(0.316)
(Enforcement year = 1989a) * (Cohort 6)	−0.362	−0.355	−0.506
	(0.394)	(0.371)	(0.317)
Observations	3820	3820	3820
Pseudo R^2	0.183	0.182	0.147

Notes: The table reports coefficients instead of average marginal effects. In addition to the interactions between the birth cohort dummies and the enforcement-timing dummies listed in the table, the model includes province FE, cohort FE and the other control variables.

Table 8
Placebo tests.

Variables	Six years before		
	Relative poverty (60%)	Relative poverty (50%)	Relative poverty (40%)
Number of semesters	−0.006	−0.021	−0.009
	(0.033)	(0.031)	(0.016)
Birth month FE	Yes	Yes	Yes
Province char. * cohort	Yes	Yes	Yes
Observations	1738	1738	1738
Pseudo R^2	0.209	0.203	0.174

Table 9
Effects of education on relative poverty and the intergenerational transmission of relative poverty (excluding the impact of contemporaneous policies).

Variables	Relative poverty (60%)	Relative poverty (50%)	Relative poverty (40%)
Full sample: Effects of education on relative poverty			
Number of semesters	−0.069**	−0.082***	−0.061***
	(0.033)	(0.030)	(0.022)
Birth month FE	Yes	Yes	Yes
Province char.* cohort	Yes	Yes	Yes
Poverty alleviation and development policies	Yes	Yes	Yes
Observations	1720	1646	1646
Pseudo R^2	0.231	0.199	0.218
Subsample: Effects of education on the intergenerational transmission of relative poverty			
Number of semesters	0.026	−0.040	−0.286***
	(0.060)	(0.066)	(0.103)
Birth month FE	Yes	Yes	Yes
Province char.* cohort	Yes	Yes	Yes
Poverty alleviation and development policies	Yes	Yes	Yes
Observations	605	581	417
Pseudo R^2	0.273	0.253	0.455

Table 10
Effects of education on relative poverty and the intergenerational transmission of relative poverty (alternative independent variable).

Variables	Relative poverty (60%)	Relative poverty (50%)	Relative poverty (40%)
Full sample: Effects of education on relative poverty			
Compulsory education	−0.120**	−0.131**	−0.092*
	(0.059)	(0.064)	(0.051)
Birth month FE	Yes	Yes	Yes
Province char. * cohort	Yes	Yes	Yes
Observations	1720	1646	1646
Pseudo R^2	0.230	0.198	0.215
Subsample: Effects of education on the intergenerational transmission of relative poverty			
Compulsory education	−0.070	−0.166	−0.514**
	(0.120)	(0.131)	(0.245)
Birth month FE	Yes	Yes	Yes
Province char. * cohort	Yes	Yes	Yes
Observations	605	581	417
Pseudo R^2	0.273	0.254	0.449

semesters of compulsory education increases; the results of the baseline regression are relatively robust.

4.3. Robustness checks

4.3.1. Replacement of the core explanatory variable

In the baseline regression, the core explanatory variable, the number of semesters, refers to the number of semesters of compulsory education the individual should have received. To test the robustness of the results, a dummy variable called "compulsory education" is constructed to replace the number of semesters variable. When the number of semesters is greater than 0, the compulsory education dummy is assigned a value of 1, which means that the offspring was affected by the Compulsory Education Law; when the number

Table 11
Effects of education on relative poverty and the intergenerational transmission of relative poverty (Spatial price differences).

Variables	Relative poverty			Transmission of relative poverty		
	60%	50%	40%	60%	50%	40%
Panel A: After adjusting spatial price differences (Brandt & Carsten, 2006)						
Number of semesters	−0.081***	−0.058*	−0.070***	−0.028	0.004	−0.376*
	(0.029)	(0.031)	(0.024)	(0.062)	(0.068)	(0.214)
Observations	1720	1646	1646	620	580	468
Pseudo R2	0.219	0.193	0.187	0.249	0.267	0.376
Panel B: After adjusting spatial price differences (Biggeri et al., 2017)						
Number of semesters	−0.048	−0.064**	−0.069***	0.009	−0.056	−0.157**
	(0.036)	(0.028)	(0.018)	(0.060)	(0.056)	(0.062)
Observations	1723	1646	1646	618	587	483
Pseudo R2	0.225	0.184	0.191	0.242	0.244	0.386
Panel C: After adjusting spatial price differences (Chen, Zheng, Xu, & Sun, 2020)						
Number of semesters	−0.076**	−0.057**	−0.056***	−0.025	−0.044	−0.031
	(0.034)	(0.028)	(0.021)	(0.062)	(0.062)	(0.061)
Observations	1720	1646	1646	618	583	476
Pseudo R2	0.232	0.189	0.200	0.251	0.251	0.409

Table 12
Effects of education on relative poverty and the intergenerational transmission of relative poverty (alternative measures for parental relative poverty).

Variables	Relative poverty			Transmission of relative poverty		
	60%	50%	40%	60%	50%	40%
Panel A: Mean parental income						
Number of semesters	−0.056	−0.074**	−0.060***	−0.059	−0.177**	−0.205***
	(0.037)	(0.031)	(0.022)	(0.070)	(0.084)	(0.076)
Observations	1462	1452	1452	506	455	346
Pseudo R^2	0.211	0.196	0.222	0.284	0.257	0.428
Panel B: Subjective class assessment						
Number of semesters	−0.019	−0.023	−0.025**	−0.105**	−0.133***	−0.101***
	(0.016)	(0.019)	(0.011)	(0.046)	(0.031)	(0.035)
Observations	4603	4603	4593	955	955	940
Pseudo R^2	0.208	0.180	0.194	0.252	0.231	0.231
Panel C: Level of father's education						
Number of semesters	−0.020	−0.027	−0.026**	−0.068**	−0.099***	−0.085*
	(0.017)	(0.020)	(0.011)	(0.029)	(0.038)	(0.051)
Observations	4492	4492	4484	1191	1150	1140
Pseudo R^2	0.200	0.175	0.192	0.272	0.224	0.226
Panel D: Level of mother's education						
Number of semesters	−0.021	−0.031	−0.032***	−0.052***	−0.057**	−0.063***
	(0.017)	(0.020)	(0.012)	(0.020)	(0.023)	(0.022)
Observations	4539	4531	4531	2199	2191	2176
Pseudo R^2	0.202	0.174	0.188	0.205	0.174	0.176

equals 0, the compulsory education dummy is assigned a value 0, which means that the child was not affected by the Compulsory Education Law.

As shown in Table 10, we use the compulsory education dummy to replace the number of semesters and re-estimate the baseline regression. The regression results for the full sample show that when 60% of the sample's median income is the standard for relative poverty, all else equal, those offspring who were eligible to receive a compulsory education are 12.0% less likely to be in relative poverty than those who were not, and this result is statistically significant. The regression results for the other relative poverty standards are similar. The regression results for the subsample show that as parental relative poverty deepens, the negative effect of compulsory education on the intergenerational transmission of relative poverty increases, which is consistent with the baseline regression results. In summary, education can not only reduce the incidence of relative poverty among the offspring but also block the transmission of relative poverty.

Table 13
Heterogeneity in the effects of education on relative poverty and the intergenerational transmission of relative poverty.

Variables	Relative poverty (60%)		Relative poverty (50%)		Relative poverty (40%)	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Between urban and rural areas (Relative poverty)						
Number of semesters	−0.026	−0.077	−0.044	−0.080*	0.043	−0.111***
	(0.071)	(0.048)	(0.071)	(0.040)	(0.041)	(0.032)
Observations	626	1106	626	1106	626	1106
Pseudo R2	0.356	0.262	0.314	0.245	0.227	0.193
Panel B: Between urban and rural areas (Intergenerational transmission of relative poverty)						
Number of semesters	−2.175	0.015	−0.966	−0.011	0.546	−0.134**
	(1.548)	(0.062)	(1.830)	(0.076)	(0.901)	(0.061)
Observations	121	497	113	487	98	352
Pseudo R2	0.850	0.351	0.835	0.341	0.936	0.361
Panel C: Between genders (Relative poverty)						
Number of semesters	0.036	−0.055*	0.035	−0.082**	0.026	−0.076**
	(0.024)	(0.029)	(0.026)	(0.034)	(0.020)	(0.032)
Observations	1895	1713	1895	1713	1767	1667
Pseudo R2	0.199	0.196	0.188	0.193	0.225	0.200
Panel D: Between genders (Intergenerational transmission of relative poverty)						
Number of semesters	0.113	−0.131	0.070	−0.207	0.114	−0.523**
	(0.114)	(0.188)	(0.099)	(0.164)	(0.109)	(0.226)
Observations	341	277	328	272	249	201
Pseudo R2	0.404	0.424	0.390	0.448	0.524	0.557

Notes: *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

4.3.2. *Adjustment of spatial price differences*

Spatial price difference is a crucial issue, ignoring which may affect the results of poverty identification in China (Almås & Johnsen, 2018). Therefore, this paper uses the regional price parities measured by existing studies (Biggeri, Ferrari, & Zhao, 2017; Brandt & Carsten, 2006; Chen, Wang, & Rao, 2020) to adjust the income and then identify the relative poverty status of individuals. Generally speaking, there is no significant difference in the relative poverty incidence before and after adjustment. Panel A-C in Table 11 report the empirical results adjusted to Regional Price Parities (RPPs). Compared to the results without adjusting to RPPs (baseline regression), the coefficient on the number of semesters has slight fluctuation, but in general, education still has the effect of reducing poverty and blocking the intergenerational transmission of relative poverty.

4.3.3. *Alternative measures for parental relative poverty*

Accurate identification of relative poverty of the parental generation is a difficulty in the study of intergenerational poverty transmission. In the baseline regression, we determine the relative poverty status of the father's generation based on the father's income. To further validate the robustness of the results, in the section of robustness checks, we use other income variables in replacement of the paternal income to re-identify the intergenerational transmission of relative poverty. Specifically, mean parental income, subjective class assessments, and parental educational attainment are used to replace the father's income as the basis for identifying parental relative poverty, and the results are reported in Table 12.

First, mean parental income is used to replace the father's income and determine the relative poverty status of the father. The full-sample regression results in Table 12 show that the coefficient on the number of semesters remains negative though not significant when the standard is 60% or 50% of the sample median income, and that the probability of the offspring experiencing relative poverty decreases with each additional semester of compulsory education for which they were eligible when the standard is set at 40% of the sample median income. For individuals from relatively poor families, each additional eligible semester of compulsory education correlates with a reduced likelihood of remaining in relative poverty, indicating that education can block the intergenerational transmission of relative poverty.

Second, we use the offspring's subjective assessment of his or her family's class at age 14 to determine whether the parents were relatively poor. Specifically, the questionnaire asks, "What level do you think your family was at economically when you were 14?", with a score of "10" representing the top of the scale and "1" the bottom. In this paper, scores of 1 (lowest) and 2 (second lowest) are considered to represent parental relative poverty. The empirical results displayed in Table 12 show that the coefficient on the number of semesters and its significance vary with the different standards for offspring relative poverty. However, the results still support the conclusion that for each additional eligible semester of compulsory education, the probability of the offspring being in relative poverty decreases. Education can effectively block the intergenerational transmission of poverty among offspring who self-assessed their families as being in the lowest or second lowest class at the age of 14, which further illustrates the robustness of the empirical results of this study.

Finally, we use the education level of the father or mother to determine whether the parents of the individual were in relative

poverty. If the father or mother was illiterate, we assume the parents were relatively poor. The empirical results in Table 12 show that under different relative poverty standards, the probability of the offspring falling into relative poverty decreases with each additional semester of compulsory education, regardless of whether using the father's or mother's education to identify relative poverty. For offspring whose parents are illiterate, education can effectively block the intergenerational transmission of poverty, which further illustrates the robustness of the empirical results.

In summary, with 40% of the median income as the relative poverty line, education still has the effect of reducing poverty and hindering intergenerational transmission when other indicators are used in replacement of paternal income and as the basis for judging the relative poverty status of the paternal generation. Shen and Li (2020) also point out that the relative poverty standard most suitable for China's national conditions should be set based on 40% of the median income of urban and rural residents. Therefore, we believe that the results of this study are reasonable and robust.

4.4. Heterogeneity analysis

Due to the imbalanced development between China's urban and rural areas and thus the significant difference in educational resources, educational quality, and basic accessibility of education, the impact of education on relative poverty and the intergenerational transmission of relative poverty may be heterogeneous between regions.

In view of the disparity in high school enrollment between urban and rural areas, we add to the regression the interaction of the high school gross enrollment ratio[3] and the birth cohorts. Panel A-B of Table 13 show the results of urban and rural heterogeneity analysis. Column (1), (3), and (5) in Panel A show that one more eligible semester of compulsory education does not significantly help urban individuals to be lifted out of relative poverty, while Column (2), (4), and (6) show that education can help rural individuals reduce the probability of remaining in relative poverty. Columns (5) and (6) of Panel B reveal that education can assist rural individuals to break away from the intergenerational transmission of poverty. The results indicate that relative to urban areas, China's Compulsory Education Law plays a more important role in rural individuals' fights against poverty and against the intergenerational transmission of poverty.

Moreover, the concept of gender in traditional Chinese culture may affect a family's decisions regarding the educational investment in their child and thus affect the individual's labor market returns. Therefore, there may be gender-based differences in the impact of education on relative poverty status and intergenerational transmission of relative poverty.

The 1, 3, and 5 columns in Panel C-D show the effects in the male group, and the 2, 4, and 6 columns show the effects in the female group. The results indicate that education reduces the probability of falling into relative poverty more for females than for males. The poverty reduction effect is significantly stronger for women compared to men at the 60%, 50% and 40% relative poverty levels. For families with relatively poor parents, there is a significant gender difference in the negative effect of education on the intergenerational transmission of relative poverty. This may be because before the implementation of the Compulsory Education Law, gender discrimination made it easier for women to drop out of school, and the implementation of the law facilitated women's completion of their nine-year education. Therefore, the Compulsory Education Law brought greater benefits for women, which led to a stronger negative effect of education on the incidence of relative poverty among women than among men.

4.5. Mechanism analysis

Education is a critical way to invest in human capital and plays an essential role in helping the children of poor families overcome relative poverty. But what are the paths by which education reduces relative poverty and its intergenerational transmission?

After the enforcement of the Compulsory Education Law, dropping out of junior high school was no longer allowed, which in the short term should have improved the probability of individuals enrolling in and graduating from high school, thus enhancing the probability of accumulating more human capital in the long term and sending stronger educational background signals, which further reduces the probability of experiencing relative poverty.

In the medium and long term, first, the attainment of a higher educational degree brought about by the implementation of the Compulsory Education Law can lead individuals to develop knowledge and skills, allowing them to obtain better benefits by improving their performance in the labor market, for example, nonfarm employment, and thereby preventing them from falling into relative poverty.

Second, education can help individuals break free from the shackles of poverty culture. We believe that individuals affected by the policy would become more willing to leave relative poverty and to continue self-learning and self-investment into adulthood, enabling themselves to discard the culture of poverty and escape from relative poverty. Therefore, we add the short-, medium- and long-term mechanism variables "high school graduation", "nonfarm employment" and "level of effort" to the baseline regression to determine whether the path is valid. In Table 13 below, Columns (1), (3), and (5) present the results of the baseline regression for different relative poverty levels, while Columns (2), (4), and (6) present the regression results after the addition of the mechanism variable.

[3] Considering the relatively large gap between urban and rural high school enrollment ratio, we use the data from the 0.95‰ National Population Sample Survey in 2000 to calculate, for urban and rural separately, the provincial five-year (1964–1968) mean of the percentage of high school completers among the population born in the year. Because individuals in the sample who dropped out of high school cannot be identified, the ratio calculated by this method may be slightly smaller than the actual high school gross enrollment ratio. The results show that the high school gross enrollment ratio for urban areas was about 56.96% while the number for rural ones was only 5.73%.

Table 14
Effects of education on relative poverty and the intergenerational transmission of relative poverty (Mechanism analysis).

Variables	Relative poverty (60%)		Relative poverty (50%)		Relative poverty (40%)	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: High school graduation (Relative poverty)						
Number of semesters	−0.069**	−0.064**	−0.082***	−0.076***	−0.061***	−0.057***
	(0.033)	(0.032)	(0.030)	(0.029)	(0.022)	(0.022)
High school graduation	–	−0.153***	–	−0.147***	–	−0.098***
		(0.030)		(0.032)		(0.027)
Observations	1720	1720	1646	1646	1646	1646
Pseudo R^2	0.231	0.250	0.199	0.220	0.218	0.233
Panel B: High school graduation (Intergenerational transmission of relative poverty)						
Number of semesters	0.026	0.039	−0.040	−0.036	−0.286***	−0.249**
	(0.060)	(0.055)	(0.066)	(0.064)	(0.103)	(0.103)
High school graduation	–	−0.258***	–	−0.248***	–	−0.150***
		(0.038)		(0.045)		(0.044)
Observations	605	605	581	581	417	417
Pseudo R^2	0.231	0.317	0.199	0.294	0.218	0.482
Panel C: Nonfarm employment (Relative poverty)						
Number of semesters	−0.069**	−0.069**	−0.082***	−0.081***	−0.061***	−0.056**
	(0.033)	(0.034)	(0.030)	(0.031)	(0.022)	(0.023)
nonfarm employment	–	−0.049*	–	−0.028	–	−0.038
		(0.030)		(0.037)		(0.026)
Observations	1720	1713	1646	1639	1646	1639
Pseudo R^2	0.231	0.234	0.199	0.201	0.218	0.223
Panel D: Nonfarm employment (Intergenerational transmission of relative poverty)						
Number of semesters	0.026	0.026	−0.040	−0.039	−0.286***	−0.268**
	(0.060)	(0.061)	(0.066)	(0.065)	(0.103)	(0.104)
nonfarm employment	–	−0.017	–	−0.001	–	−0.129***
		(0.054)		(0.045)		(0.040)
Observations	605	601	581	578	417	415
Pseudo R^2	0.231	0.272	0.199	0.253	0.218	0.471
Panel E: Effort (Relative poverty)						
Number of semesters	−0.069**	−0.064*	−0.082***	−0.078**	−0.061***	−0.058**
	(0.033)	(0.034)	(0.030)	(0.030)	(0.022)	(0.023)
effort	–	−0.147***	–	−0.120***	–	−0.107**
		(0.045)		(0.045)		(0.047)
Observations	1720	1718	1646	1644	1646	1644
Pseudo R^2	0.231	0.239	0.199	0.205	0.218	0.224
Panel F: Effort (Intergenerational transmission of relative poverty)						
Number of semesters	0.026	0.038	−0.040	−0.030	−0.286***	−0.260**
	(0.060)	(0.057)	(0.066)	(0.063)	(0.103)	(0.114)
effort	–	−0.289***	–	−0.286***	–	−0.165
		(0.095)		(0.104)		(0.141)
Observations	605	604	581	580	417	416
Pseudo R^2	0.231	0.209	0.199	0.271	0.218	0.446

Compared to the value in the baseline regression results, the results in Table 14 show that at each of the 60%, 50%, and 40% relative poverty levels, the absolute value of the marginal effect coefficient on the number of semesters falls after adding any of the three mechanism variables; furthermore, the marginal effect coefficient on the three mechanism variables is significantly negative. Therefore, we validate the mechanism that increased individual educational attainment due to the impact of policy leads to an increased probability of high school graduation, nonfarm employment, and effort, which further result in a reduced incidence of relative poverty and the blocking of the intergenerational transmission of relative poverty.

5. Conclusion and policy implications

In this study, our focus was to investigate the impact of education on reducing relative poverty and blocking its intergenerational transmission. To achieve this, we utilized data from the CGSS and the China Statistical Yearbook. Exploiting the difference in the enforcement time of the 1986 Compulsory Education Law across provinces and that in birth cohorts, we employed a Difference-in-Differences (DID) identification strategy, which effectively addressed endogeneity concerns and allowed us to establish a causal

relationship between education and the intergenerational transmission of relative poverty.

The study found that (1) all else being equal, an increase in the number of semesters of compulsory education for which the offspring were eligible can significantly reduce the probability of those individuals falling into relative poverty and block the transmission of relative poverty between generations. The role of education in reducing poverty and blocking the transmission of poverty is robust. (2) All else equal, the role of education in poverty reduction and blocking the intergenerational transmission of relative poverty is mainly found in rural areas and female groups, and no significant effects are found in urban areas and male groups. (3) The results of the mechanism analysis show that high school graduation, labor market performance and effort are the three ways through which education reduces the incidence of relative poverty and blocks the intergenerational transmission of relative poverty.

In summary, education does reduce the incidence of poverty and block the intergenerational transmission of relative poverty. Therefore, the government should continue to develop its basic education program and improve inclusiveness and fairness of basic education, which will not only help establish a long-term mechanism for solving relative poverty and block the intergenerational transmission of relative poverty, but also provide a sufficient internal impetus for national economic growth. Families, especially those from a disadvantaged socioeconomic background, need to carefully weigh the short-term benefits of dropping out to work against the long-term returns from an investment in basic education, making reasonable educational investment decisions for their children.

It is undeniable that there are still shortcomings to this paper. First, in this study, the identification strategy based on the enforcement of Compulsory Education Law estimates the effect of education on poverty reduction for those children who continue their studies due to the enactment of the law. As these children are likely to have poor learning ability and relatively poor family economic conditions, the effect of education on their poverty reduction may be different from the overall education poverty reduction effect. Second, although we are concerned about relative poverty and its intergenerational transmission, relative poverty is measured along the income dimension only, mainly due to the availability and quality of the current data. However, with the continuous evolution of poverty theory, a multidimensional description of poverty based on relative deprivation and ability is receiving increasing attention, and the intergenerational transmission of multidimensional poverty and its measures deserve further academic attention.

Data availability

The authors do not have permission to share data.

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