# NO CHILD IS LEFT BEHIND? ——EDUCATION PROBLEMS OF LEFT-BEHIND CHILDREN IN CHINA

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## ABSTRACT

*Urbanization in developing countries has raised concerns about the education of left-behind children. Using the fixed effect model and the time-varying difference-in-difference model, we examine how left-behind experiences affect children's educational choices and identities. We find that left-behind children have an approximately 2% higher probability to drop out of school. They tend to report lower levels of education expectations and education expenditures. The negative effect of left-behind experiences on education outcomes is significant, particularly among middle-school students. Despite improved living conditions, these findings suggest that left-behind experiences have hindered many children from enjoying educational success.*

## KEYWORDS

*Left-behind children, Drop out, Education, Parental Migration*

## 1. INTRODUCTION

As per the 2018 Annual Report by UNICEF, there are approximately 69 million children residing in rural regions of China, who are classified as "left-behind children" (UNICEF, 2018). These children, who are below the age of 16, are left behind in their rural homes while their parents migrate to urban areas for work (Lu, 2012). The personal development of these children has long been a subject of social controversies and political debates. Their retention rate at the age of 14 is only 88%, compared to 93.4% for their city counterparts. Multiple factors have contributed to this notable gap. Growing up without their parents around, many of them have mental health issues (He et al., 2012). Inadequate supervision often results in left-behind children prioritizing leisure activities over their studies and other responsibilities. Furthermore, many of them devote a considerable amount of time to domestic responsibilities. Elder children, particularly girls, may have to shoulder the responsibility of caring for their younger siblings and grandparents from an early age (Chang et al., 2011). All these lead to a relatively high drop-out rate for left-behind children.

So far, studies have examined the effects of left-behind experiences on children's physical, mental, and academic performance, but primarily under the context of international migration. According to the World Migration Report 2020, there are 281 million international migrants (International Organization for Migration, 2020). Internal migration in China is substantially larger than the overall amount of international migration, reaching 376 million in 2021. In light of increasing urbanization and large scale of internal migration in emerging economies, it is important to investigate the consequences of left-behind experiences on the accumulation of human capital, taking China as a prime example.

This study aims to investigate the impact of left-behind experiences on the dropout decisions of children. While the implementation of education reforms in China has increased the rate of compulsory education enrollment, it is crucial to note that many children still choose to drop out. A competitive hypothesis to the high drop-out rates among left-behind children is the pre-existing high drop-out rates in rural areas of China. These areas often lack experienced teachers, sufficient school facilities, and have seen the closure of numerous rural schools (Brown and Park, 2002; Goodburn, 2009), which further undermines the quality of education provided. Dropout decisions could have long-term impact on children's lives, including early marriage and parenthood, limited job prospects, and social marginalization as street children. It is of significance to understand how to address the educational problem of left-behind children, given the adverse outcomes associated with their dropout decisions.

Primarily, this research is to investigate two research questions. First, do left-behind experiences hinder children's educational success? Second, whether the left-behind patterns, the education levels of parents, education expectations, or education expenditures have impacts on the negative effects. The next section provides a review of the relevant literature. Section 3 introduces the background information. Section 4 outlines the methodology and data used in the research. Section 5 presents the main findings. The final section is the conclusion part.

## 2. LITERATURE REVIEW

Prior research has addressed significant inquiries regarding left-behind children in China, such as their physical and mental health, educational achievements, and academic performance (He et al., 2012; Li et al., 2015; Lu, 2012). However, it remains controversial about the effects of left-behind experiences on children's education outcomes.

### 2.1. Left-Behind Children's Education

It is widely acknowledged that the left-behind experiences have disadvantaged children in education. Lu (2014) supports this with data of international and internal migration in the contexts of Mexico and Indonesia. In China, multiple factors contribute to the schooling problems of left-behind children. First, left-behind children devote more time to household chores than their peers (Chang et al., 2011). In rural areas, older siblings often find work early to provide additional support for the family and finance their younger siblings' education (Lu, 2012). Girls are less favored given their relatively shorter benefit periods due to fertility (Qian, 2008). Second, left-behind children have restricted access to quality education due to the Household Registration (hukou) system (Sieg et al., 2020). Though recent years have witnessed a decrease in education barriers, they have not been eliminated (Duan et al., 2018). Without a hukou, migrant children in cities could only choose between expensive private schools and schools intended for migrant children with low tuition fees but compromised education quality (Goodburn, 2009). The final straw is the requirement for many migrant children to take the college entrance exam in their registered permanent residences. As a result, most children are left behind in their hometowns with limited educational opportunities. Finally, left-behind children have relatively lower physical well-being levels and higher risks of getting mentally ill (Lee, 2011). Asis (2006) support that left-behind children are more likely to be angry, confused, and worried under the context of Philippines. Li et al. (2015) find the negative impact of lack of parental care on the physical health of left-behind children. Among them, girls and younger children appear to be more vulnerable. The situation would be worse for children with lower socioeconomic status and lower levels of social support (He et al., 2012).

## 2.2. Parental Effects on Left-Behind Children

The impact of parental migration on left-behind children's education outcomes has been a topic of discussion in the literature. Two primary viewpoints are the income effects and the parental care effects. As for the income effect, in China, parents migrate to bigger cities to get better-paid jobs (Lu Y., 2012). With improved financial status, parents tend to have higher education expectations on their children and increase their investment in children's education (Minello and Barban, 2012). Moreover, higher powers of migrant mothers in household choice-making is beneficial to their children's education (Goodburn, 2019). However, as suggested in Todaro & Smith (2013), the increase in income may not directly translate into increased investment in education given its costs versus benefits. In terms of direct costs of rural education, Gustafsson and Shi (2004) claim that the increase of expenditures on education and its share of income has pushed more people into poverty in the western and rural part of China. As for indirect costs, left-behind children composite an indispensable part in their household chores (Chang et al., 2011). Contrarily, the benefits of education are relatively backloaded and thus, being somehow underestimated in rural areas in China (Bhattacharya et al., 2013). Further, it would lower migrant workers' education expectations on their children and reduce investments in education. Conversely, a lack of parental care can negatively impact left-behind children's grades, as highlighted by Lu (2012). Grandparents often assume the role of educating these children, and their approaches can range from being overly strict to overly indulgent, which can lead to disobedient behavior and a higher likelihood of dropping out (Luo et al., 2009). Therefore, the effects of parental migration on children's education outcomes can be mixed and we would examine the total effects of left-behind experiences on children's probability of dropping out and its possible mechanisms.

## 3. BACKGROUND

## 3.1. The Household Registration System in China

The Household Registration System has been enforced in China since 1958 with the primary aim of prioritizing the development of heavy industries, but it has continued to limit migration into cities and maintain urban welfare (Lu, 2016). Entering the 1980s, China's reform and opening-up has created lots of vacancies in cities and have attracted millions of migrant workers. However, the influx of rural workers into cities has led to concerns about issues such as congestion, rising crime rates, and skyrocketing housing prices (Lu et al., 2021). To prevent the brain-drain and limit international immigration, countries would issue corresponding policies (Lu et al., 2021). Similarly, The Hukou System was useful during the underdeveloped period (Lu and Chen, 2004). With the rapid development of the economy, the Hukou system has hindered the free movement of laborers (Alfridi et al., 2015). Therefore, rural migrants, like other migrants, come to prosperous cities for better lives, but treated as 'guest workers' (Meng and Xue, 2020). They do not have equal access to the labor market, education, healthcare, and other public services as residents, nor do their children (Sieg et al., 2020).

In addition, rural migrants typically engage in physically demanding work and often have to work overtime, leaving them with little time to care for their children (An et al., 2020).Their incomes are often insufficient to cover the living expenses of their entire family in the cities. Therefore, they usually had to leave their children in their hometown. In China, migration is the main cause of children being left behind, other causes like divorce, and nonmarital fertility are relatively less common, particularly in rural areas (Lu, 2012). This is the beginning of the story of left-behind children.

### 3.2. Education in China

Compulsory education in China requires all citizens to complete nine years of schooling, consisting of five to six years of primary education and three to four years of junior secondary education (OECD, 2016). By law, children start primary school at the age of six or seven and their enrollment in junior secondary schools is usually based on their place of residence. Compulsory education has been provided free of tuition and miscellaneous fees, and in 2015, the price of textbooks was regulated to be at a marginal profit only (OECD, 2016). In rural areas, direct investments in education and funded special programs have significantly increased the enrollment rates of left-behind children and other rural children. Since 2010, the enrolment rate of primary-school-aged students has been above 99.7%. The retention rate of compulsory education has improved by 4.1%, reaching 95.2% in 2020 (National Bureau of Statistics of China, 2021). However, the urban-rural gap plus regional differences persist. Issues other than funding are yet to be solved. Better schooling environments with inadequate qualified teachers could not prevent migrant parents from sending their children to distant schools, forming a group of urban left-behind children (OECD, 2016). Some children remain left-behind because of the restrictions. Given that children have little autonomy in family decision-making, their options are often limited to accepting their parents' arrangements or seeking employment to gain autonomy (Goodburn, 2019). Admittedly, more actions should be taken to offer support for the migrant children.

## 4. DATA AND METHODOLOGY

### 4.1. Data Source and Participants

The study employs data from the Chinese Family Panel Survey (CFPS), a nationally representative social survey project that began in 2010 and is conducted biennially with approximately 16,000 households per wave. This paper utilizes the CFPS2010 to CFPS2018, constituting five-period panel data, and focuses on children aged 6 to 16 who reside with their parents for less than 2 to 4 months per year.

### 4.2. Measures

**Drop out**: Drop out was measured based on 'are you still at school?' or 'are your child still at school?' The index equals 1 when the participants are still at school and equals 0 when they are not in each wave. This measure excluded cases where children were on vacation.

**Education expectation**: Education expectation is measured with the question 'Which degree do you think you should achieve at least?' and 'Which degree do you think your child should achieve at least?' Respondents are asked to indicate their expectations, using a 9-point (11-point for the 2018 wave) rating scale.

Left behind: We identify children as left-behind children when they are living 2-4 months or shorter with their parents (Duan and Zhou, 2005; Liang et al., 2016). The left-behind index is coded as 1 for children who meet the criteria and 0 for those who do not. We have included urban left-behind children to further identify the effects of interest instead of mixing them up with the effects of being in rural areas.

A number of studies have examined the linkages between personal and family characteristics and education in rural China (Brown & Park, 2002; Zhang, Huang & Rozelle, 2002). Therefore, this research incorporates control variables to account for school, family and individual effects. The

school controls include key school and boarding school. The family controls include family size, average family income, total assets, father's age, father's education years, father's marital status, mother's education status, number of children at home and number of boys at home. We also include age, gender, minority group and hukou status as individual controls.

## 4.3. Descriptive Statistics

Table 1 presents details about the participants. There are in total 27,421 respondents and 34.7% of them are left-behind children. Left-behind children exhibit higher dropout rates and lower educational expectations compared to non-left-behind ones. On average, left-behind children have a dropout probability of 6%, which is 1.6% higher than their non-left-behind peers, and an education expectation of 5.621 years. The average education expenditure for left-behind children is also lower (measured in terms of log). The average age of left-behind children is 11.042 years and 63.9% are holding a rural hukou (11.6% higher than that among non-left-behind participants). 23% of them (compared to 20% of non-left-behind children) study in key schools, 37.9% attend boarding schools and have the option to reside in the dormitory, which is 9.7% higher than their peers. 28% of the left-behind participants in this research are left behind only by their fathers, accounting for about 10% of the whole sample (compared with 12% left behind only by their mothers, accounting for about 4% of the whole sample). Nearly 20% of the children's participants are left behind by both of their parents. The average age of the non-left-behind respondents is 10.556 years. Both the average father's education years and mother's education years of left-behind children are lower than those of non-left-behind respondents. So do the average family income and total assets. However, the average family size and number of boys at home for left-behind children are relatively higher.

Table 1 Descriptive Statistics

| Variable | Whole sample | | Left-behind children | | Non-left-behind children | |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD |
| **Explanatory variables** | | | | | | |
| Drop out | 0.050 | 0.22 | 0.060 | 0.24 | 0.044 | 0.21 |
| Education expectation | 5.707 | 1.40 | 5.621 | 1.39 | 5.752 | 1.39 |
| Log of education expenditure | 6.562 | 2.20 | 6.535 | 2.40 | 6.576 | 2.09 |
| **Predictor variables** | | | | | | |
| Left-behind children | 0.347 | 0.48 | 1.000 | 0.00 | 0.000 | 0.00 |
| Left-behind only by mother | 0.042 | 0.20 | 0.120 | 0.32 | 0.000 | 0.00 |
| Left-behind only by father | 0.097 | 0.30 | 0.280 | 0.45 | 0.000 | 0.00 |
| **Control variables** | | | | | | |
| Age | 10.725 | 3.13 | 11.042 | 3.30 | 10.556 | 3.02 |
| Gender | 0.526 | 0.50 | 0.521 | 0.50 | 0.528 | 0.50 |
| Minority group | 0.128 | 0.33 | 0.122 | 0.33 | 0.131 | 0.34 |
| Rural | 0.564 | 0.50 | 0.639 | 0.48 | 0.523 | 0.50 |
| Key school | 0.210 | 0.41 | 0.230 | 0.42 | 0.200 | 0.40 |
| Boarding school | 0.316 | 0.46 | 0.379 | 0.48 | 0.282 | 0.45 |
| Father's education years | 7.847 | 4.06 | 7.741 | 3.77 | 7.902 | 4.20 |
| Father's age | 39.104 | 6.02 | 38.844 | 6.16 | 39.239 | 5.94 |
| Father's marital status | 2.071 | 0.40 | 2.200 | 0.66 | 2.006 | 0.13 |
| Mother's education years | 6.633 | 4.50 | 6.355 | 4.30 | 6.775 | 4.60 |
| Log of average family income | 8.597 | 1.37 | 8.582 | 1.28 | 8.605 | 1.41 |
| Log of total assets | 14.765 | 0.22 | 14.735 | 0.22 | 14.781 | 0.22 |
| Family size | 5.126 | 1.90 | 5.159 | 1.99 | 5.109 | 1.85 |
| Numbers of children | 1.453 | 1.24 | 1.364 | 1.30 | 1.500 | 1.21 |
| Numbers of boys | 1.026 | 0.78 | 1.077 | 0.82 | 0.999 | 0.76 |
| Numbers of observation | 27,421 | 27,421 | 9,523 | 9,523 | 17,898 | 17,898 |

## 4.4. Empirical Models

First, we investigate the relationship between left-behind experiences and children's education. Given that our main dependent variable, the index of whether left-behind children drop out or not, is a dummy variable, we run the simple and practical linear probability regressions for the equation:

$$P(y_i = 1|x) = \beta_0 + \beta_1 L_i + X_i'\gamma + \epsilon_i \qquad (1)$$

Where $L_i$ is our main explanatory variable, index of 1 left-behind children. Our main coefficient of interest is $\beta_1$, X is a vector of covariates that affect all variables which we introduced in the last part. Then, we use the Fixed-Effect Model to control for the possible omitted variable bias:

$$Y_{ipt} = \beta_0 + \beta_1 L_{ipt} + \sum controls + \alpha_t + \lambda_p + \epsilon_{ipt} \qquad (2)$$

Where $Y_{ipt}$ is the index of whether child $i$ in province $p$ and year $t$ (from 2010 to 2018) drop out of school. $L_{ipt}$ is the index of whether child $i$ in province $p$ and year $t$ is left behind. We include year fixed effects $\alpha_t$ to control for the time-variant factors. Province fixed effects are included to

control for the time-invariant but location-variant omitted variables that may affect the likelihood for children to be left behind and to drop out of school. For instance, climate, geographical features, dialects, differences in the levels of economic development and education policies across provinces (OECD, 2016). $\sum controls$ denotes all the control variables we include. $\epsilon_{ipt}$ is the error term. Next, to isolate the effect of being left behind on dropping out, we introduce a time-varying difference-in-difference model given the different timing of children to be left behind. We run the regressions shown in Table 3 for the equation:

$$Y_{it} = \beta_0 + \beta_1 D_{i,t} + \beta * \sum controls + \lambda_t + \gamma_p + \epsilon_{ipt} \quad (3)$$

Where $D_{i,t}$ is the individual treated dummy variable which equals 1 if child $i$ has changed into a left-behind child in time $t$. $\lambda_t$ is the year fixed effect and $\gamma_p$ is the province fixed effect. Event study has been employed to test the parallel trends:

$$Y_{it} = \beta_0 + \sum_{j=-M}^{N} \delta_j L_{i,t-j} + \beta_1 D_{i,t} + \beta * \sum controls + \lambda_t + \gamma_p + \epsilon_{ipt} \quad (4)$$

$\delta_j$ captures the differences in outcome between the treatment and control groups in each survey year. $L_{i,t-j}$ is a dummy of the year when a child was left behind. To control for potential observable bias, we re-examine the effect using the generalized DID model on a detailed matched data with individual, family and school heterogeneity controlled. We first calculate the propensity scores of each observation and then match the treated group with the control group using nearest neighbors matching, setting the neighbor to be 4:

$$Y_{pt} = T_{pt}\beta + \theta_p + \lambda_t + \epsilon_{pt} \quad (5)$$

Where $T_{pt} = 1$ if the treatment is in place in province p and year t; $T_{pt} = 0$ otherwise. $\theta_p$ is the province effects and $\lambda_t$ is the year fixed effects. $\epsilon_{pt}$ is the error term. The pre-treatment trends are tested using the following equation:

$$Y_{pt} = T_{pt}\beta_0 + T_{pt+1}\beta_1 + \cdots + T_{pt+m}\beta_k + \theta_p + \lambda_t + \epsilon_{pt} \quad (6)$$

To further study the underlying mechanism, we used the causal step regression model. Based on the regression we have run, we added new regressions:

$$E_i = \alpha_0 + \alpha_1 D_{i,t} + X'_i + \epsilon_i \quad (7)$$
$$P(y_i = 1|x) = \beta_0 + \beta_1 D_{i,t} + \beta_2 E_i + X'_i\gamma + \epsilon_i \quad (8)$$
$$EE_i = \alpha_0 + \alpha_1 D_{i,t} + X'_i + \epsilon_i \quad (9)$$
$$P(y_i = 1|x) = \beta_0 + \beta_1 D_{i,t} + \beta_2 EE_i + X'_i\gamma + \epsilon_i \quad (10)$$

Where E denotes the measure of education expectation and EE denotes log of education expenditure. Controls are also included in the regressions. The heterogeneity section estimates equation (2) using the sample of primary school respondents and that of middle school respondents respectively. Independent variables were also changed into left behind only by mother and left behind only by father.

## 5. MAIN RESULTS

### 5.1. Left-behind Children and Education performances: Fixed Effect Estimates

Table 2 Fixed Effect Estimates

|  | (1) | (2) | (3) |
|---|---|---|---|
|  | Dependent variable: Drop out | | |
| Left behind | 0.021*** | 0.024*** | 0.020*** |
|  | (6.74) | (7.97) | (6.36) |
| Age | 0.009*** | 0.010*** | 0.010*** |
|  | (12.99) | (18.44) | (18.26) |
| Gender | -0.005 | -0.003 | -0.004 |
|  | (-1.36) | (-1.04) | (-1.23) |
| Minority group | 0.067*** | 0.065*** | 0.067*** |
|  | (12.34) | (12.84) | (13.09) |
| Rural | -0.000 | 0.002 | 0.004 |
|  | (-0.07) | (0.77) | (1.40) |
| Key school | -0.052*** | -0.051*** | -0.051*** |
|  | (-28.59) | (-15.05) | (-15.00) |
| Boarding school | -0.093*** | -0.099*** | -0.098*** |
|  | (-29.82) | (-30.79) | (-29.93) |
| Father's education years | -0.004*** | -0.003*** | -0.003*** |
|  | (-8.15) | (-8.04) | (-7.80) |
| Father's age | 0.001*** | 0.001*** | 0.001*** |
|  | (3.39) | (3.46) | (3.60) |
| Father's marital status | 0.010** | 0.009** | 0.011*** |
|  | (2.15) | (2.19) | (2.71) |
| Mother's education years | -0.002*** | -0.002*** | -0.002*** |
|  | (-4.00) | (-5.40) | (-4.74) |
| Average family income | 0.000 | -0.000 | 0.000 |
|  | (0.14) | (-0.14) | (0.15) |
| Total assets | -0.011** | -0.011 | -0.003 |
|  | (-2.12) | (-1.36) | (-0.31) |
| Family size | 0.000 | 0.000 | 0.001 |
|  | (0.44) | (0.53) | (0.74) |
| Numbers of children | 0.002 | 0.002* | 0.002 |
|  | (1.59) | (1.96) | (1.30) |
| Number of boys | 0.006** | 0.005** | 0.006** |
|  | (2.29) | (2.05) | (2.41) |
| Constant | 0.101 | 0.156 | 0.017 |
|  | (1.36) | (1.29) | (0.14) |
| Number of Observations | 24,181 | 24,172 | 24,172 |
| R-squared | 0.082 | 0.093 | 0.094 |
| Province Fixed Effect |  | YES | YES |
| Year Fixed Effect |  |  | YES |

Note: average family income and total assets are measured in log terms. Robust t-statistics in parentheses,*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2 shows the results to Equation (1) and (2). Overall, there is a strong positive correlation between children's left-behind experience and their probability of dropping out of school. Left-behind experiences could explain about 9% of the variation in the probability of dropping out of school. Column (1) is the regression for equation (1). On average, the chances for left-behind children to drop out of school would be 2.1% higher than other students, which is significant at the confidence level of 1%. The effect has been magnified to 2.4% with province fixed effect controlled and becomes 2.0% with both province and year fixed effect controlled. This could be due to two reasons. First, the variable of left behind is measured with errors, which may lead to a larger attenuation bias with both fixed effects included. Secondly, without controlling for omitted year and province factors, we may observe a larger impact of left-behind experiences on dropout choices. The associations of other control variables are also statistically significant and have sensible signs and attitudes. Age is one among them and thus, it is crucial to categorize children into two groups: primary school students and junior secondary school students. Belonging to a minority group might increase the probability for a left-behind child to drop out of school. Moreover, the likelihood of a child dropping out of school would significantly increase if he or she is a left-behind child with divorced parents, an elderly father, and more than one brother at home. Contrarily, it is not surprising that being in a key school, boarding school, having well-educated parents and more family assets would significantly decrease the probability for a child to drop out of school. The magnitude and sign of the coefficients are consistent with province fixed effect and year fixed effect controlled.

## 5.2. Left-behind Children and Dropout Rates: Time-Varying DID Results

Table 3 Time-varying DID Results

|  | (1) | (2) |  | (1) | (2) |
|---|---|---|---|---|---|
|  | Drop out | Drop out |  | Drop out | Drop out |
| Left behind | 0.015*** | 0.021*** | Father's age |  | 0.001 |
|  | (2.80) | (3.86) |  |  | (0.35) |
| Age |  | 0.047*** | Father's marital status |  | -0.002 |
|  |  | (3.09) |  |  | (-0.17) |
| Gender |  | 0.016 | Mother's education years |  | 0.004** |
|  |  | (0.68) |  |  | (2.30) |
| Minority group |  | - | Average family income |  | 0.003** |
|  |  |  |  |  | (1.99) |
| Rural |  | -0.053* | Total assets |  | -0.018 |
|  |  | (-1.74) |  |  | (-1.48) |
| Key school |  | -0.050*** | Family size |  | -0.000 |
|  |  | (-13.47) |  |  | (-0.12) |
| Boarding school |  | -0.097*** | Numbers of children |  | -0.000 |
|  |  | (-16.49) |  |  | (-0.20) |
| Father's education years |  | -0.001 | Number of boys |  | -0.019** |
|  |  | (-0.40) |  |  | (-2.51) |
| Constant | 0.098 | -0.237 |  |  |  |
|  | (1.03) | (-0.70) |  |  |  |
| Number of Observations | 25,653 | 22,637 |  |  |  |
| R-squared | 0.010 | 0.056 |  |  |  |
| Time Fixed Effects | YES | YES |  |  |  |
| Province Fixed Effects | YES | YES |  |  |  |

Notes: per person income and total assets are measured in log terms. Robust t-statistics in parentheses,*** p<0.01, ** p<0.05, * p<0

Table 3 presents the results to Equation (3). Column (1) shows that left-behind children are more likely to drop out of school, with only fixed effects included. Adding more controls, the coefficient of interest becomes more significant and magnified. On average, once being left behind increases the probability for children to drop out of school by 2.1% at the significance level of 1%. This estimate is larger than the Fixed-Effects estimates reported in Table 2, with both fixed effects included. It further confirms that the negative effect of left-behind experiences outweighs its income effect and the effect is persisting. As age increases, this probability will also increase. Studying in key schools reduces the probability of dropping out by 5% and studying in boarding schools reduces the probability by 9.7%. The results are largely consistent with what we have got using the fixed-effect model. Contrarily, mother's education years and average family income are positively related to the probability of dropping out, while number of boys at home and holding a rural *hukou* is negatively related to our dependent variable of interest. This is probably due to the selection bias that some left-behind children are included in the control group in the survey year when they have not been left behind. We will try to solve this problem by introducing the propensity-score-matching model. To testify the assumption of parallel trend, we have employed event study and graphically represented the association between the dropout rate and year relative to left-behind year in graph 1. As shown by the graph, the coefficients of periods before treatment are all 0 at the 95% significance level, which justifies the parallel trend assumption. The coefficients of periods after treatment are all significantly greater than 0 at the significance level of 95%, which convinces the positive treatment effect of left-behind experiences on drop-out choices.
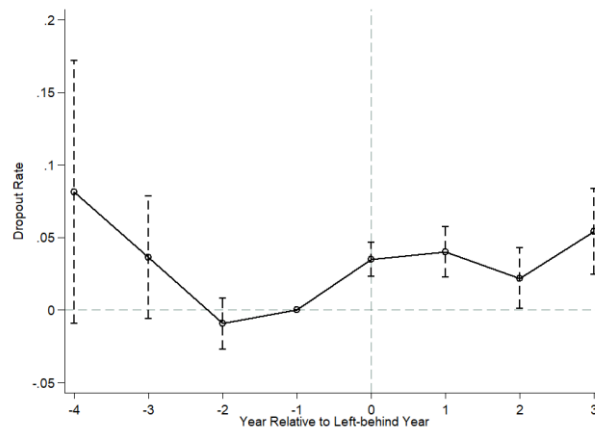


Figure 1 Event study for Time-varying DID model

## 5.3. Robustness Checks

Table 4 Left-behind Effects: difference-in-difference estimates on the matched sample

|  | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
|  | Drop out | Drop out | Drop out | Drop out |
| $T_t$ | 0.048*** | -- | 0.051*** | -- |
|  | (3.49) |  | (3.51) |  |
| $T_{pt}$ | -- | 0.001*** | -- | 0.001*** |
|  |  | (3.55) |  | (4.05) |
| Age | 0.110*** | -0.004*** | 0.115*** | -0.006*** |
|  | (3.50) | (-3.01) | (3.32) | (-7.11) |
| Gender | 0.175** | -0.016*** | 0.199** | -0.017*** |
|  | (2.06) | (-2.79) | (2.05) | (-3.99) |
| Minority group | -- | 0.095*** | -- | 0.095*** |
|  |  | (8.46) |  | (10.88) |
| Rural | -0.092 | 0.006 | -0.097 | 0.004 |
|  | (-1.26) | (1.21) | (-1.38) | (1.08) |
| Key school | -0.067*** | -0.038*** | -0.068*** | -0.034*** |
|  | (-5.05) | (-9.65) | (-4.66) | (-11.79) |
| Boarding school | -0.097*** | -0.072*** | -0.092*** | -0.065*** |
|  | (-6.53) | (-15.05) | (-5.93) | (-18.67) |
| Father's education years | -0.001 | -0.003*** | -0.002 | -0.002*** |
|  | (-0.17) | (-4.22) | (-0.55) | (-4.46) |
| Father's age | -0.007 | 0.001 | -0.001 | 0.001*** |
|  | (-0.58) | (1.42) | (-0.09) | (3.27) |
| Father's marital status | -0.023 | 0.074** | -0.012 | 0.084*** |
|  | (-0.51) | (2.17) | (-0.29) | (3.01) |
| Mother's education years | 0.009** | -0.001* | 0.011*** | -0.002*** |
|  | (2.43) | (-1.66) | (2.63) | (-3.55) |
| Average family income | -0.006 | 0.000 | -0.007 | -0.001 |
|  | (-1.05) | (0.21) | (-1.17) | (-0.56) |
| Total assets | -0.003 | -0.007 | -0.012 | -0.015 |
|  | (-0.04) | (-0.37) | (-0.17) | (-0.95) |
| Family size | -0.007 | 0.001 | -0.006 | 0.000 |
|  | (-0.99) | (0.88) | (-0.84) | (0.35) |
| Numbers of children | -0.006 | -0.003 | -0.004 | -0.003* |
|  | (-1.09) | (-1.23) | (-0.63) | (-1.72) |
| Number of boys | -0.011 | 0.013*** | -0.009 | 0.009*** |
|  | (-0.58) | (2.81) | (-0.47) | (2.69) |
| Constant | -1.122 | 0.103 | -1.399 | 0.217 |
|  | (-0.84) | (0.34) | (-1.03) | (0.87) |
| Number of Observations | 12,573 | 12,572 | 22,315 | 22,314 |
| R-squared | 0.058 | 0.071 | 0.059 | 0.070 |
| Time dummies | included | included | included | included |
| Province dummies | -- | included | -- | included |

Note: All control variables are included in the analysis but some were omitted from the table.
per person income and total assets are measured in log terms. Robust t-statistics in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table 4 displays the results of Equation (5). We have first calculated the propensity scores for each individual and then match each treatment with a control group based on its weight to control for the possible observable bias. After matching, we get a sample of 12,573.Column (1) and column (2) strengthened the robustness of our main findings in Table 2 and 3. Once left-behind would increase the probability for the children to drop out of school with province and year fixed effect being controlled. Further, we have redone the process using a frequency weighted regression, expanding the sample size to 22,315. The results in column (3) and column (4) remain consistent with previous ones, with a bigger magnitude. Consistent with the results in Table 2, there is a negative correlation between parental education level and the likelihood of their children dropping out of school, where as the number of boys at home is positively related to our dependent variable of interest. Graph 2 is the plot for the event study testing the parallel trend for the PSM-DID model. Before treatment, according to the graph, the coefficients are 0 at the significance level of 5%. After treatment, the coefficients are significantly greater than 0. Thus, the assumption of parallel trend also justifies itself.
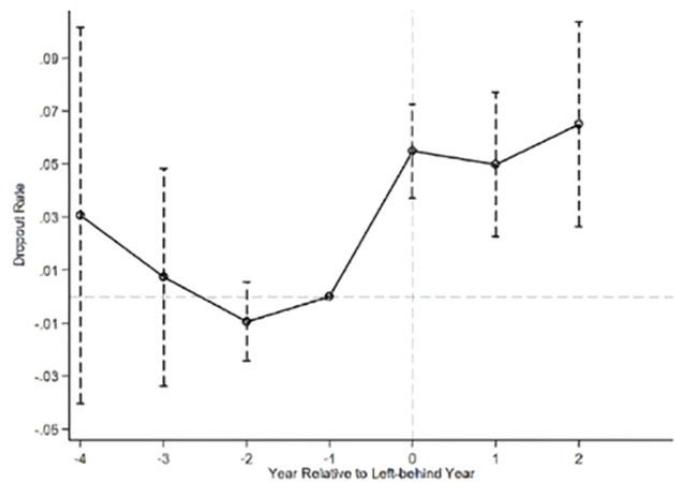


Figure 2 Event study for PSM-DID Model

## 6. MECHANISM

### 6.1. Education Expectations and Education Expenditure

Lower education expectations and inadequate investments in education can contribute to drop-out choices (Mughal et al., 2019). In this section, we investigate how left-behind experiences affect these two factors and thus affecting children's drop-out choices. Frist, as shown in Table 5, we replace dependent variables into education expectation and education expenditure. Column (1) and column (2) show that left-behind experiences have significantly lowered children's average education expectations by 0.062, with province fixed effect controlled. However, this effect becomes insignificant after controlling for year fixed effects, indicating that the differences in education expectations between left-behind and non-left-behind children become insignificant following the implementation of education reform. Education expenditure is significantly correlated with both fixed effects controlled. Here education expenditure is measured as amount actually paid, excluding other waivers. Column (5) shows that considering province differences, left-behind children have a significant 5.2% higher education expenditure. While column (6) shows that with time, left-behind children's education expenditure has been significantly reduced by 15.4%. One potential explanation is that the implementation of education reforms in rural

China has helped relieve the financial burden of left-behind children's parents. Another plausible explanation for the lower education expenditure among left-behind children is their higher likelihood of dropping out of school, which again justifies our main results. Therefore, the income effect of left-behind experience is partially refuted. Though left-behind children have no significant differences from their counterparts in terms of education expectations, they are disadvantaged in education by their left-behind experiences. Their parents migrate for a greater life, but it has not increased their children's education expenditure and their probability of education success. It is also noteworthy that the coefficient before our index of children holding a rural hukou becomes significant after including the time fixed effects. Concerns for education equity are yet to be addressed.

Table 5 Fixed Effect models with education expectation and education expenditure as dependent variables

|  | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent variable | Education Expectation | | | Education Expenditure | | |
| Left behind | -0.062*** | -0.062*** | 0.013 | 0.023 | 0.052* | -0.154*** |
|  | (-3.18) | (-3.17) | (0.66) | (0.81) | (1.85) | (-5.17) |
| Age | -0.098*** | -0.101*** | -0.099*** | -0.037*** | -0.042*** | -0.033*** |
|  | (-27.99) | (-28.89) | (-29.04) | (-7.41) | (-8.36) | (-6.70) |
| Gender | 0.001 | -0.020 | 0.007 | 0.099*** | 0.080*** | 0.070** |
|  | (0.03) | (-0.94) | (0.33) | (3.24) | (2.64) | (2.34) |
| Minority group | -0.035 | 0.005 | -0.031 | -0.588*** | -0.528*** | -0.553*** |
|  | (-1.30) | (0.15) | (-0.95) | (-15.07) | (-11.08) | (-11.71) |
| Rural | -0.001 | -0.021 | -0.072*** | -0.315*** | -0.278*** | -0.287*** |
|  | (-0.03) | (-1.07) | (-3.79) | (-11.08) | (-9.76) | (-10.12) |
| Key school | 0.264*** | 0.258*** | 0.264*** | 0.360*** | 0.392*** | 0.322*** |
|  | (12.09) | (11.86) | (12.62) | (11.17) | (12.35) | (10.18) |
| Boarding school | 0.176*** | 0.190*** | 0.157*** | 1.113*** | 1.149*** | 1.059*** |
|  | (8.62) | (9.11) | (7.74) | (37.19) | (38.03) | (34.87) |
| Father's education years | 0.042*** | 0.043*** | 0.040*** | 0.038*** | 0.037*** | 0.035*** |
|  | (15.40) | (15.43) | (15.30) | (9.50) | (9.51) | (8.94) |
| Father's age | -0.005*** | -0.001 | -0.002 | -0.005* | -0.005** | -0.010*** |
|  | (-2.82) | (-0.69) | (-1.05) | (-1.95) | (-2.14) | (-4.07) |
| Father's marital status | -0.025 | -0.029 | -0.087*** | -0.100*** | -0.148*** | -0.098*** |
|  | (-0.99) | (-1.15) | (-3.55) | (-2.70) | (-4.05) | (-2.69) |
| Mother's education years | 0.046*** | 0.049*** | 0.042*** | 0.065*** | 0.048*** | 0.043*** |
|  | (17.77) | (18.49) | (16.39) | (17.52) | (12.59) | (11.33) |
| Average family income | 0.010 | 0.014** | 0.005 | 0.119*** | 0.094*** | 0.093*** |
|  | (1.46) | (2.01) | (0.82) | (11.82) | (9.46) | (9.47) |
| Total assets | 0.282*** | 0.403*** | 0.117** | 0.811*** | 0.675*** | 0.527*** |
|  | (5.94) | (7.79) | (2.33) | (11.55) | (8.94) | (6.91) |
| Family size | 0.006 | 0.013** | 0.009 | -0.032*** | -0.007 | -0.017** |
|  | (1.12) | (2.24) | (1.55) | (-3.88) | (-0.80) | (-2.05) |
| Numbers of children | -0.052*** | -0.047*** | -0.014* | -0.038*** | -0.029*** | -0.015 |
|  | (-7.10) | (-6.44) | (-1.96) | (-3.58) | (-2.75) | (-1.34) |
| Number of boys | -0.118*** | -0.084*** | -0.115*** | -0.180*** | -0.131*** | -0.129*** |
|  | (-7.81) | (-5.47) | (-7.79) | (-8.21) | (-5.96) | (-5.90) |
| Constant | 2.205*** | 0.009 | 4.594*** | -6.168*** | -3.210*** | -1.311 |
|  | (3.19) | (0.01) | (6.03) | (-6.05) | (-2.82) | (-1.14) |
| Observations | 21,842 | 21,840 | 21,840 | 24,139 | 24,130 | 24,130 |
| R-squared | 0.153 | 0.164 | 0.236 | 0.182 | 0.211 | 0.226 |
| Province FE |  | YES | YES |  | YES | YES |
| Year FE |  |  | YES |  |  | YES |

Note: per person income and total assets are measured in log terms. Robust t-statistics in parentheses*** p<0.01, ** p<0.05, * p<0.1

## 6.2. Mediation Effects

To establish our mediator analysis, we followed Baron and Kenny steps (1986). Specific, we have to satisfy three criteria. The index of left-behind children we use here is the treatment we have constructed in the difference-in-difference section. First, left-behind experiences affect the probability of dropping out. Second, left-behind experiences are correlated with education expectations. Third, when both left-behind experiences and education expectations are included in the regression, the effect of left-behind experiences is reduced. We analyze the mediator effect by age groups given the age effect in previous results. Students are divided into primary-school-aged students (6-12) and middle-school-aged students (13-16). The results shown in Table 6 support for mediation with primary school students and middle school students. Column 1 shows the significant and positive relationship between left-behind experiences and children's probability of dropping out of school for middle school students. Column 2 confirms the validity of criteria 2. Finally, when including both education expectations and left-behind experiences, the coefficient before left-behind experiences reduces from 0.046 to 0.031, and the coefficient before both variables remain statistically significant at the confidence level of 1%. Therefore, education expectation does partially mediate between left-behind experiences and the probability of dropping out of school for middle school students. Following the same steps, we find support for the mediation with primary school students. As could be seen from column 4 to column 6, all the three criteria are satisfied (criteria 1: $b_1$= -0.011, p <0.01; criteria 2: $b_2$=-0.042, p < 0.1; criteria 3: $b_3$=-0.011, p<0.01, $b_4$=-0.006, p <0.01). However, different from middle school students, left-behind experiences are negatively correlated with the probability of dropping out of school for primary school students. Migrant parents could provide them with more financial support to go to school. Nevertheless, left-behind children studying in secondary high school tend to have lower education expectations and be more likely to drop out of school.

Left-behind experiences would have long-term effect on children. Our analysis using education expenditure as a mediator on the matched sample of middle school students confirms this relationship. Similarly, criteria are satisfied. Column 3 in Table 7 shows that left-behind children in middle school have significantly higher education expenditure, which has partially mitigated the negative impact of left-behind experiences on their education outcomes. However, no such mediation effect is observed for primary school students given the criterion one is not satisfied. The evidence indicates that placing primary-school-aged left-behind children in the same family conditions and school environment as their counterparts, their probability of dropping out of school would not be significantly different from their peers. Early intervention to support left-behind children would have long-term positive effects on their education outcomes.

Table 6 Causal step approach for education expectation by age groups

| variables | Criterion 1 for middle school students | Criterion 2 for middle school students | Criterion 3 for middle school students | Criterion 1 for primary school students | Criterion 2 for primary school students | Criterion 3 for primary school students |
|---|---|---|---|---|---|---|
| Left behind | 0.046*** | -0.129*** | 0.031*** | -0.011*** | -0.042* | -0.011*** |
| | (7.75) | (-4.00) | (5.51) | (-3.55) | (-1.70) | (-3.44) |
| Education expectation | | | -0.043*** | | | -0.006*** |
| | | | (-21.80) | | | (-5.85) |
| Observations | 8039 | 7725 | 7725 | 16,142 | 14,117 | 14,117 |

Note: Control variables are included in the analysis but omitted in this table. t-statistics in parentheses*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7 Mediation effect analysis for education expenditure by age groups on matched sample

| variables | Criteria 1 for middle school students | Criterion 2 for middle school students | Criterion 3 for middle school students | Criterion 1 for primary school students | Criterion 2 for primary school students | Criterion 3 for primary school students |
|---|---|---|---|---|---|---|
| Left behind | 0.050*** | 0.509*** | 0.014*** | -0.013 | 0.29* | -0.006*** |
| | (3.89) | (7.18) | (1.29) | (-1.03) | (4.17) | (-0.53) |
| Education expenditure | | | 0.014*** | | | 0.007*** |
| | | | (5.83) | | | (4.07) |
| Observations | 4,010 | 3,689 | 3,689 | 8,563 | 7,822 | 7,822 |

Note: Control variables are included in the analysis but omitted in this table. t-statistics in parentheses*** $p<0.01$, ** $p<0.05$, * $p<0.1$

## 7. HETEROGENEITY

### 7.1. Primary School Students versus Middle School Students

Table 8 Primary school students versus middle school students

|  | (1) Primary school | (2) Primary school | (3) Primary school | (4) Middle school | (5) Middle school | (6) Middle school |
|---|---|---|---|---|---|---|
|  |  |  | Drop out |  |  |  |
| Left behind | -0.011*** | -0.009*** | -0.001 | 0.046*** | 0.048*** | 0.021*** |
|  | (-3.85) | (-2.98) | (-0.26) | (7.48) | (8.11) | (3.11) |
| Age | -0.012*** | -0.011*** | -0.012*** | 0.055*** | 0.056*** | 0.055*** |
|  | (-13.53) | (-15.28) | (-16.23) | (19.26) | (21.53) | (21.05) |
| Gender | -0.011*** | -0.010*** | -0.011*** | -0.002 | 0.000 | -0.002 |
|  | (-3.14) | (-3.10) | (-3.25) | (-0.25) | (0.02) | (-0.31) |
| Key school | -0.021*** | -0.019*** | -0.012*** | -0.072*** | -0.073*** | -0.078*** |
|  | (-14.27) | (-5.10) | (-3.35) | (-19.84) | (-11.92) | (-12.84) |
| Boarding school | -0.033*** | -0.037*** | -0.029*** | -0.184*** | -0.201*** | -0.211*** |
|  | (-16.98) | (-10.25) | (-8.00) | (-28.93) | (-34.71) | (-36.02) |
| Father's education years | -0.003*** | -0.002*** | -0.002*** | -0.005*** | -0.005*** | -0.005*** |
|  | (-5.30) | (-5.03) | (-4.49) | (-6.01) | (-6.04) | (-6.35) |
| Father's age | -0.000 | -0.000 | 0.000 | 0.003*** | 0.003*** | 0.002*** |
|  | (-0.28) | (-0.28) | (0.96) | (5.22) | (5.34) | (4.02) |
| Father's marital status | 0.002 | -0.000 | -0.000 | 0.030*** | 0.029*** | 0.036*** |
|  | (0.48) | (-0.03) | (-0.09) | (2.92) | (3.77) | (4.70) |
| Mother's education years | -0.002*** | -0.002*** | -0.001** | -0.002* | -0.003*** | -0.004*** |
|  | (-4.20) | (-3.70) | (-2.09) | (-1.95) | (-4.27) | (-4.57) |
| Total assets | -0.006 | -0.013 | 0.006 | -0.032*** | -0.013 | -0.029* |
|  | (-1.12) | (-1.62) | (0.78) | (-2.82) | (-0.79) | (-1.68) |
| Number of boys | 0.008*** | 0.007*** | 0.008*** | 0.011* | 0.009* | 0.009* |
|  | (2.96) | (3.08) | (3.51) | (1.95) | (1.73) | (1.87) |
| Constant | 0.277*** | 0.445*** | 0.161 | -0.349** | -0.576** | -0.356 |
|  | (3.59) | (3.66) | (1.30) | (-2.06) | (-2.25) | (-1.37) |
| Number of Observations | 16,142 | 16,138 | 16,138 | 8,039 | 8,034 | 8,034 |
| R-squared | 0.061 | 0.076 | 0.087 | 0.218 | 0.243 | 0.256 |
| Province FE |  | YES | YES |  | YES | YES |
| Year FE |  |  | YES |  |  | YES |

Note: All control variables are included but some omitted. Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Previous results suggest that the impact of left-behind experiences varies across different age groups of children. We examine the heterogenous effects for primary school students and middle school students. Table 8 shows the findings. As shown in column (3), after controlling for both province fixed effect and year fixed effect, the effect turns insignificant for left-behind children in primary school. The coefficient of interest is only -0.001, not statistically significant nor large in magnitude. In contrast, left-behind children in middle school have a significant high probability to drop out facing increasing costs of entering middle school and the opportunity costs of taking jobs. Aging decreases the likelihood of dropping out for primary school students, but has the opposite effect for middle school students. Additionally, for primary school students, boys are

less likely to drop out while there is no significant gender difference for middle school students. Attending key schools or boarding schools could significantly decrease the probability of dropping out by 7% and about 20% respectively for middle school students. This is probably owing to higher-quality teachers and reduced transportation costs. Finally, middle school students' choices are more likely to be affected by family controls, except for the number of boys at home, which has a more significant effect on primary students' choices.

## 7.2. Left Behind Only by Mother versus Left Behind Only by Father

Table 9 left behind only by mother versus left behind only by father with different dependent variables

|  | Whole Sample (1) | Whole Sample (2) | Whole Sample (3) | Whole Sample (4) | Whole Sample (5) | Whole Sample (6) |
|---|---|---|---|---|---|---|
| Panel A | Drop out | Drop out | Education expectation | Education expectation | Education Expenditure | Education expenditure |
| Left-behind only by mother | 0.015** (1.99) | -- | -0.097** (-2.06) | -- | -0.007 (0.97) | -- |
| Left-behind only by father | -- | -0.013*** (-2.81) | -- | -0.022 (-0.74) | -- | -0.076* (-1.71) |
| Age | 0.010*** (18.85) | 0.010*** (18.66) | -0.099*** (-29.07) | -0.099*** (-29.05) | -0.035*** (-7.15) | -0.036*** (-7.24) |
| Rural | 0.006** (1.99) | 0.006** (2.09) | -0.071*** (-3.72) | -0.071*** (-3.72) | -0.301*** (-10.67) | -0.299*** (-10.61) |
| Boarding school | -0.097*** (-29.69) | -0.097*** (-29.64) | 0.158*** (7.81) | 0.158*** (7.79) | 1.053*** (34.66) | 1.054*** (34.69) |
| Father's education years | -0.003*** (-7.64) | -0.003*** (-7.67) | 0.040*** (15.25) | 0.040*** (15.31) | 0.035*** (8.88) | 0.035*** (8.87) |
| Mother's education years | -0.002*** (-4.68) | -0.002*** (-4.75) | 0.042*** (16.35) | 0.042*** (16.39) | 0.043*** (11.33) | 0.043*** (11.29) |
| Number of boys | 0.006*** (2.66) | 0.006** (2.74) | -0.114*** (-7.76) | -0.114*** (-7.74) | -0.133*** (-6.12) | -0.132*** (-6.06) |
| Constant | 0.079 (0.64) | 0.092 (0.74) | 4.612*** (6.08) | 4.661*** (6.13) | -1.740 (-1.52) | -1.665 (-1.45) |
| Observations | 24,172 | 24,172 | 21,840 | 21,840 | 24,130 | 24,130 |
| R-squared | 0.093 | 0.093 | 0.236 | 0.236 | 0.225 | 0.225 |
| Province FE | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | YES | YES | YES | YES |

Note: All control variables are included but some omitted.
Robust t-statistics in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

In Table 9, column (1) shows the results for children left behind only by mothers as the explanatory variable, and column (2) shows the results for those left behind only by fathers. The main coefficient of interest in column (1) is positive and statistically significant, while that in column (2) is negative but also statistically significant. Though the magnitude of the effect of being left behind only by mother (0.015) is slightly larger than that of being left behind only by father (-0.013), the latter one is more significant (at the 1% confidence level). Having fathers working in cities and mothers caring for the family could significantly reduce the probability of left-behind children to drop out of school. Besides higher dop-out probabilities, children being left behind only by their mother on average have statistically significant 0.097 lower education expectations. However, they have no significant difference in terms of education expenditure. It

implies that fathers would fail to provide enough emotional support for their children. Less parental care, more time invented on household chores, and wishes to share the family financial burden could help explain the higher drop-out probabilities when left behind only by mothers. As for children left behind only by fathers, their average education expenditure is 7.3% significantly lower. Income earned by their fathers has not transferred into higher investment in education. Ye (2017) points out that many migrant workers perceive that the costs of education outweigh the benefits. What is worse, many busy working migrant parents might succumb to the "trap of attention" and become even more shortsighted.

## 8. CONCLUSIONS

This research examines whether and to what extent left-behind experiences disadvantaged children. Constituting more than a fifth of the Chinese children, left-behind children continue to face educational inequalities compared to their city counterparts, despite China's significant educational reforms. More actions are to be taken besides financing. Usually reluctantly separated from their parents, left-behind children have to cope with various stresses themselves. Understanding of informal channels might help alleviate this problem.

The first contribution of this paper is to provide further evidence about the unintended costs of migration, including the negative effects of left-behind experience on children's education outcomes, education expectations, and education expenditure. We find that being left behind would significantly increase children's probability of dropping out of school by 2.1%. Besides, the negative effects are shown to be long-standing. Growing older, the positive link between left-behind experience and the probability of dropping out of school becomes even more significant. Secondly, we provide an insight into how left-behind experiences results in drop-out choices. We find that left-behind children tend to have lower education expectations and education expenditures and thus a higher probability of dropping out of school. Contrary to common belief, on average, the negative impact of left-behind experiences on education expectations is not significant. One conjecture is that dropping out is not entirely an active choice but somehow a passive response to the limitations. However, our results also support that higher input in early education could mitigate the negative effect of left-behind experiences on children's education outcomes. A third contribution is to demonstrate the importance of fathers in children's education, beyond their role as financial providers. Parents are important sources of family education. Admittedly, mother and father may have different effects on children's education. Nevertheless, the results of this research support that the attitudes and deeds of fathers might have a more significant effect on their children, which is in line with previous researches that fathers' active engagement is important for children's development (Allport et al.2018; Offer and Kaplan, 2021).

The importance of equality in compulsory education cannot be overstated. Despite the improved education conditions throughout the years, problems of education for left-behind children cannot be resolved solely by increasing the financial input. Earlier intervention is imperative due to the lasting impact of the left-behind experience on children. It would be a lesson for migrant parents to learn to communicate with their children, especially adolescents. Teachers, and communities should also assume responsibility for connecting children being left behind in rural areas with their parents working away from home.

Though the research has some strengths (e.g., avoid subjective measures by using drop out as the main dependent variable, include urban left-behind children), there are several limitations. First limitation relates to the measure of education expectation. The data of education expectations for children under 10 years old in 2010 and 2012 are proxied by their guardians, whose credibility needs further refinement through more rigorous survey design. Besides, primary school students

tend to have higher education expectations. Chances are that the effects of left-behind experiences on education expectations have been underestimated. A second potential limitation is that we do not have sufficient evidence to identify whether children are voluntarily left behind in city areas or not. Many parents are sending their children to better schools in areas other than their hometowns. But some students are leaving their hometown out of the pursuit of a higher power in household decision-making. More work could be done to study whether being left behind means more autonomy for children and what causes them to think positively or negatively.

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