Moving Back and Forth: A Longitudinal Study on the Educational Consequences of Child Migration in China

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Abstract

Internal rural-urban migration in China and its implication on children's educational attainment have long been the interest of scholars. However, previous studies that rely on cross-sectional data face the challenges of selection bias and oversimplification of the migration process. This study uses data from China Family Panel Survey(CFPS) 2010-2018 (N=4,494 persons; 11,734 observations) and two-way fixed-effect models to estimate the effect of migration on a child's school enrolment. First, this study highlights the importance of institutional segregation at the provincial level in shaping migrants' educational outcomes. Results show that interprovincial migration exerts an independent negative impact on individuals' school enrolment. Second, with panel data, this study considers and estimates the effect of various migration trajectories on educational attainment by taking the directions and frequencies of migrations into account. The combined impact of a transition is determined by the direction (to rural or to urban) of the transition, the type (intra-provincial or interprovincial) of transition, and the accumulated impact of previous transition(s). Finally, findings imply gender differences in the educational consequences of migration. Results show that while the interprovincial transition harms the school enrolment similarly for both genders, the impact of rural-urban transitions on education is driven by males.

(198 words)

Keywords Rural-to-urban Migration; Educational Attainment; China; CFPS

Introduction

China began experiencing a massive scale of internal migration after the 1980s economic reform. In 2007, about 10% of the population in China were rural-urban migrants (Kwong 2011), while in 2011, 29.7% of the population with a rural origin were living in the urban areas (China Social Science Institute 2012).

Child migration is a feature of the second wave of population migration in China that started in the 2000s. Compared to the first wave where most migrants were individual adult migrants, migration in a family unit with children is prevalent in the second wave. The number of rural-to-urban migrant children has increased rapidly since the 2000s. In 2010, 25% of the children aged 0 -17 living in the urban areas were migrant children (New Citizen Project: Report on China's Migrant Children 2014). In 2018, the proportion of migrant children among the child population grew to 36.8% (New Citizen Project: Report on China's Migrant Children 2020).

Considering the vast urban-rural inequality in China and the urban-rural institutional segregation structured by *hukou*[1], the household registration system, how the migration experience affects children's development has drawn substantial research attention (for example, Liang and Li, 2021; Sun, Liu and Schiller, 2020; Xu, Zhang and Dronker, 2018; Wu and Zhang, 2015). Previous studies reported mixed findings regarding the educational consequences of child migration. Results largely depend on the comparison groups and inference methods. Most results are from cross-sectional data that cannot sufficiently control

[1] *Hukou* refers to the household registration system in China. Under the household registration system, everyone is assigned a *hukou* (household registration certificate) at the time of birth. The *hukou* contains two folds of information. First, the category that one's *hukou* status falls in. The *hukou* status is divided into two categories, rural vs. urban or agricultural vs. non-agricultural. Second, the local administrative unit one's *hukou* is registered to. The *hukou* is required to register to one and only one administrative unit at the lowest available level as one's official/permanent residential place and under the supervision of all the administrative authorities level above.

for selection bias and overcome the endogeneity challenge due to a lack of pre-migration information. The first contribution of this study is to improve the inference strategies by using the nationally representative longitudinal data from China Family Panel Survey(CFPS) 2010-2018 and two-way fixed-effect models to account for individual-level time-invariant unobserved characteristics, and time-varying observed confounders.

Second, while the urban-rural inequality and segregation received much attention in previous studies, this study highlights the importance of another type of segregation: the institutional segregation between provinces, in shaping migrants' educational outcomes. Earlier works have presented descriptive evidence showing the growth of the interprovincial migrants, as the proportions of interprovincial migrants among all migrants increased from 28% in 1990 to 54% in 2000 (Liang and Ma, 2004). According to the 2000 census, interprovincial migrants accounted for more than 50% of the migrant population in 11 provinces. As for child migrants, based on data from 2010 population census, I plot the distributions of the within-province migrants and cross-province migrants in the child population by ages (0 – 17) in 2010. As shown in Figure 1, for each age group, interprovincial migrants account for 3% - 5% of the population. Though the proportion of migrants who move across provincial borders is growing, contrast to the well-studied urban-rural divide, whether and how the interprovincial migration experience affects migrants' development receive limited attention in the literature. This paper fills in the gap. In addition to the effect of moving from rural to urban areas, I also consider the effect of crossing provincial borders. I examine the consequences of two types of migrations: the intra-provincial migration and interprovincial migration. Results show that interprovincial migration exerts an independent negative influences on individuals' school enrolment. For rural-urban migrations, the interprovincial migration has a stronger impact on one's educational attainment compared to the intra-provincial migration.

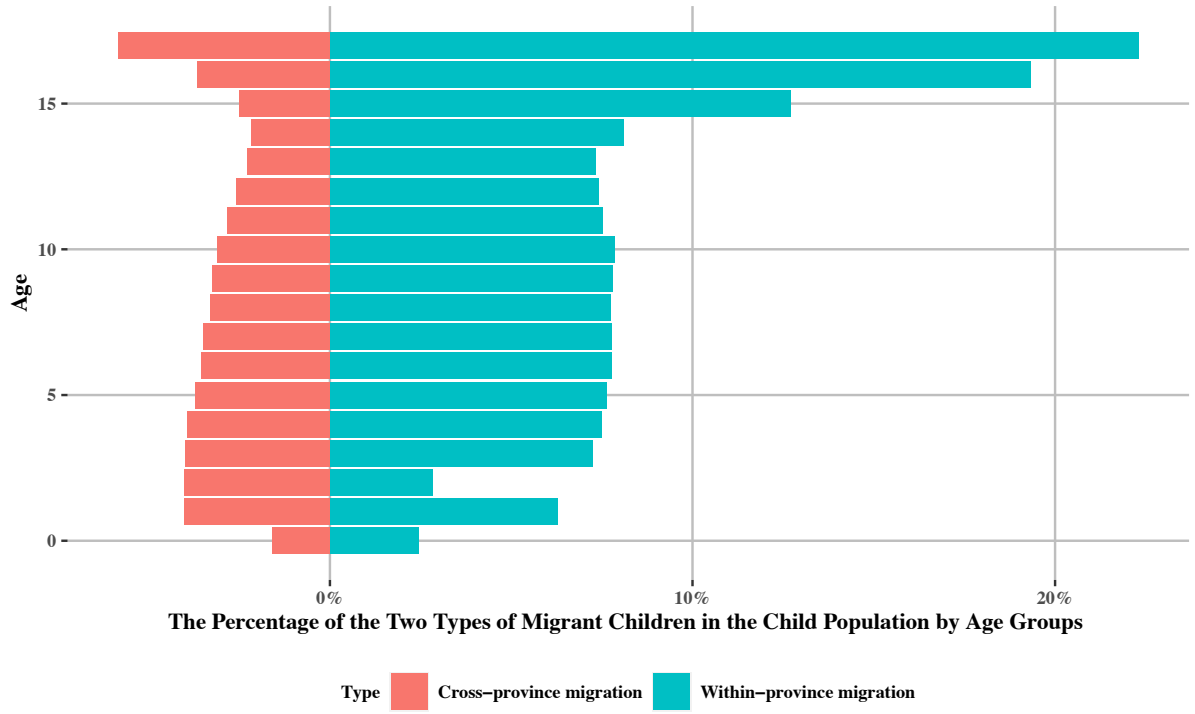

Figure 1. The Distributions of the Within-province Migrants and Cross-province Migrants in the Child Population by Ages (0 – 17) in 2010
Note: The percentages are calculated based on data from 2010 population census & New Citizen Project: Report on China's Migrant Children 2014

Moreover, when studying the consequences of migration, previous studies often treat migration as a one-off event. However, according to national statistics, the most common migration duration is three to five years (National Health and Family Planning Commission of China, 2013), which suggests most migrants would only temporarily live at their destinations. Some migrants might experience multiple rural-to-urban and urban-to-rural transitions over time. The directions and frequencies of migration are largely overlooked in the literature. However, as the human capital theory (Leibowitz 1974) suggests, acquiring human capital is a cumulative process that depends on the investments and inputs at various stages over one's life course. One's educational achievement is not only affected by one or the most recent migration, but by every geographical move the person experienced before. In this paper, with panel data, I consider and estimate the effect of various migration trajectories on educational attainment by taking the directions of migration, return migration, and multiple migrations into account.

Results show that while one transition from rural to urban areas has a positive impact on one's school enrolment, one transition from urban to rural areas has a negative impact on one's school enrolment. The combined impact of a transition is determined by the direction (to rural or to urban) of the transition, the type (intra-provincial or interprovincial) of transition, and the accumulated impact of the previous transition(s).

Finally, previous studies focus on other outcomes of migration, such as earnings (Cooke et al. 2009, Geist and McManus, 2012), fertility (Agadjanian, Yabiku and Cau, 2011), and intimate relationship (Goldberg, Tienda, and Adserà, 2016), suggest that migration is a gendered process. It affects females and males differently. In terms of educational attainment, previous studies on the impact of parental migration on rural left-behind children in China show that the effect of parental migration is stronger for boys than for girls (Zhou, Murphy, and Tao, 2014; Meng and Yamauchi, 2017; Shen, Hu and Hannum, 2021). However, little is known whether and how the children's own migration experience affects boys and girls differently. In this paper, I propose that the effect of migration on a child's education differs by gender from the family maximum utility perspective and cultural norm perspective. Considering the tradition of son preference in China, the gendered expectations of parents on sons' and daugthers' education might be exaggerated by the increased cost of education and more constrained resources after migration. I conducted the analysis by gender and found that while the interprovincial transition harms the school enrolment similarly for both genders, the impact of rural-urban transitions on education is driven by males.

The remainder of the paper is arranged as follows. I first review the literature on the consequences of migration, starting from the classic assimilation theory (Warner and Srole, 1945) and the social segregation theory (Park 1915). Then, I review empirical evidence

reported in China. Next, I point out three aspects that are overlooked in the literature: 1) the institutional segregation at the provincial level faced by interprovincial migrants; 2) the multiple transitions experienced by return migrants and temporary migrants; and 3) the potential gender differences. Then, I introduce the data and the analytic strategies. After presenting the results, I will conclude and discuss the implications of the results.

Literature Review

Theoretical background

Classic assimilation theory (Warner and Srole 1945) predicts that migrants will adapt to mainstream society after migration. Since migration happens mainly from less developed origins to more developed destinations, the assimilation theory suggests that migration is beneficial for the migrants. Social segregation theory (Park 1915) however argues that migrants are likely to be excluded from the mainstream society. Discrimination and institutional barriers hamper their integration at the destinations; thus, migration could lead to detrimental consequences. Both have been found to be true, depending on the migration outcome considered, such as employment (Harris & Todaro, 1970), psychological well-being (Lau and Li, 2011), and social mobility (Zuccotti et al., 2017). The results suggest positive impacts on some aspects but negative impacts on others, which indicates that migration could be beneficial and detrimental at the same time (Greenman and Xie, 2008).

As far as educational outcomes are concerned, according to the assimilation theory, migrants get access to educational resources of better quality. They have more educational opportunities than before, which should increase their educational attainment. Further, theories on the "beneficial brain drain" suggest that migration can improve educational attainment since education returns increase when migrating (Beine et al., 2001, 2008), thus, the incentives of

pursuing more education are enhanced. However, according to the theory of segregation, migration could also be detrimental to education. First, the institutional barriers may restrict migrants' access to the educational resources at the destinations, which leads to limited educational opportunities for migrants. Second, migrant children may face difficulties in adapting to the new environments with potential language barriers and discrimination from peers or teachers that harm their school performances and aspirations and, hence, decrease their incentives to pursue further education.

Mixed Findings from Previous Studies on Internal Migrants in China

Previous empirical studies reported mixed findings regarding the impacts of migration on educational attainment in China. Some reported evidence for positive effects. Migrant children are found to have comparable school enrolment rate as those urban-born children at destinations (Liang and Chen, 2007; Liang, Guo and Duan, 2008). They were also observed to have better performance in language skills than their urban peers (Xu & Xie, 2015). Others emphasized the restrictions and discrimination the migrants faced in the cities, which resulted in a higher risk of dropping out and lower chances of school enrolment (Wu & Zhang, 2015; Wang et al., 2017). Some studies also report no significant effects of migration on school performance (Lu & Zhou, 2013) and emotional well-being (Ren & Treiman, 2015).

The mixed results largely depend on the comparison groups and inference methods. While some studies examined the effects of migration by comparing migrants with urban children at the destination (Wu & Wang, 2014; Guo, 2002; Li & Placier, 2015), some examined the effects by comparing migrants with rural non-migrants at the origin (Liang & Chen, 2004; Xu & Xie, 2015; Wu & Zhang, 2015; Xu et al., 2018). Either way, the challenge is that migration is a highly selected process (Massey, 1990; Garip, 2008). Previous studies that rely on cross-

sectional data cannot sufficiently control for selection bias. Several studies use methods such as instrumental variables and propensity score matching, yet the analytical strategies are not satisfactory in overcoming the endogeneity problem. Some employed macro-level instrumental variable, such as the percentage of migrants among the working age population at the home communities, for the individual's propensity for migration (Chen and Feng, 2013; De Brauw & Gile, 2016). However, the macro-level IV is likely to correlate with aggregated level factors such as economic development, cultural norms, and others that affect the educational outcomes, thus, violates the exclusion restriction assumption. Some use the propensity score matching method where the migrant stock, i.e., who are migrants at the time of the survey, is matched with rural counterparts to estimate the effects of migration (Xu & Xie, 2015; Xu et al., 2018). However, with cross-sectional data, what can be controlled are the time-constant observed factors, like place of birth, gender and family origins. For the time-varying variables, such as parent's occupation and income, the information collected at the time of the survey for the migrant stock is already the consequences of migration, which cannot help control the time-varying characteristics prior to migration.

In this paper, I employ the nationally representative longitudinal data from China Family Panel Survey(CFPS) 2010-2018 and use two-way fixed-effect models to account for individual-level time-invariant unobserved characteristics and time-varying observed heterogeneity across individuals. Instead of comparing migrants with non-migrants at the origins or at the destinations, the fixed-effect model compares the outcomes of the same child before and after a transition in his/her residential areas. Thus, it can effectively control individual-level time-invariant unobserved confounders. And any time-varying observed confounder can be included in the model to further control the selection bias. Details of the methods and controls will be introduced in the Method section.

Two Folds of Segregations: Rural-Urban Segregation and Provincial-Level Segregation

In addition to the debate on methods and analytic strategies, the mixed findings also suggest that the effect of migration may vary across groups. Urban destinations, on average, have better educational resources and more opportunities than rural areas. The access to local resources for migrants is subjected to institutional regulations at the destinations. The degree of institutional segregation varies across regions (Lu, 2007; Xing & Wei, 2017; Zhang, 2016), which makes it reasonable to expect heterogeneous effects of migration on educational attainment for people heading towards different destinations. One way to gauge the heterogeneous effects is to investigate the differences between intra-provincial migration and interprovincial migration. These two types of migrations encounter different degrees of institutional barriers. Compared to intra-provincial migrants who only need to cope with urban-rural segregation, interprovincial migrants face additional segregation at the provincial levels on top of the urban-rural divide. Since the 1980s, the decentralized education-funding system transformed the responsibility for distributing fiscal expense on public education from the central government to provincial-level governments (Tsang, 1996). It gives provincial governments considerable power to arrange their own educational practices. Different provinces usually use different textbooks and have different examination papers for school enrolment. Thus, children who migrate between provinces need to navigate different educational systems. Moreover, due to the long-existing regional inequality (Shi et al., 2020), local governments are reluctant to provide people from other provinces with open access to their local educational resources. Therefore, children who migrate across provinces face two folds of setbacks: rural-urban segregation and interprovincial segregation. Based on the above, Hypothesis 1 is proposed as,

H1: Compared to the intra-provincial migration, the interprovincial migration has a stronger impact on one's educational attainment.

The Directions, Durations and Frequencies of Migration

Due to data limitations, previous studies often treat migration as a one-off event when studying the consequences of migration. However, according to national statistics, the most common migration duration is three to five years (National Health and Family Planning Commission of China, 2013), which suggests most migrants would only temporarily live at their destinations. Some studies point out that the duration of migration mediates the relationship of migration and educational outcomes, as rural-urban migrant children are more likely to be enrolled in school as they spend more time in the destinations (Wu and Zhang, 2015). Moreover, studies also stress that permanent migrants, defined as migrants who stay in their destinations for more than five years, are a highly selected group with even higher school enrolment rates than urban local children, and they have distinct experiences from temporary migrants, defined as migrants who stay in their destinations for less than five years (Liang and Chen, 2007).

The fact that most rural-urban migrants stay temporarily at their destinations implies that most migrants experience migrations of two directions. They migrate to urban areas and later return to rural areas. However, the combined effect of migration and return migration on educational outcomes received limited attention. Return migration is often mentioned in studies on the health consequences of migration as a source of selection bias (Nauman et al. 2015), called the "salmon bias" effect. It is argued that return migrants are negatively selected on health status (Turra and Elo 2008). They are less healthy than those who manage to stay in the cities. Therefore, when estimating the effect of migration on health, failing to consider return migrants will lead to biased conclusions. Analogously, regarding the educational consequences of migration, migration returnees are likely to face a higher risk of school dropping out and should be considered separately as they are affected by both the rural-to-urban transition and the urban-to-rural transition.

Moreover, some migrants might experience multiple rural-to-urban and urban-to-rural transitions over time. The multiple transitions one experienced should lead to accumulated influences on educational attainment according to the human capital theory, yet previous studies using cross-sectional data are not able to take one's migration histories into account. The human capital theory contends that acquiring human capital is a cumulative process that depends on the investments and inputs at various stages over one's life course (Leibowitz 1974). In terms of the relationship of migration and educational achievements, it implies that one's educational achievement at time t is not only affected by one or the most recent migration experience, bur by every geographical moves the person experienced by time t. This cumulative process perspective has been adopted in previous studies examining, for example, the effect of multiple childbirths on earnings (Cook et al., 2009) and the effect of multiple parental migrations on children's health (Meng and Yamauchi, 2017). Regarding child migration experiences, current and past residential environments, alongside other educational resources and opportunities, should all play a role in forming the education outcome. In other words, educational attainment depends on current migration status and previous migration histories. Thus, the contemporaneous measure of migration in previous studies is likely to underestimate the effect of migration.

In this paper, with panel data, I consider and estimate the effect of various migration trajectories on educational attainment by taking the directions of migration, return migration, and multiple migrations into account.

Gender Differences

Finally, previous studies focus on other outcomes of migration, such as earnings (Cooke et al. 2009, Geist and McManus, 2012), fertility (Agadjanian, Yabiku and Cau, 2011), and intimate

relationship (Goldberg, Tienda, and Adserà, 2016) suggest that migration is a gendered process. It affects females and males differently. For instance, studies find ample evidence showing that migration harms wives' employment (Lichteer 1980) and their earnings (Cooke 2003), but not the husbands' (Cooke et al. 2009). In terms of educational attainment, studies on migrants from Mexico to the U.S. (Kanaiaupuni, 2000) find that due to the gender divisions on the internal and external labour markets, male Mexico migrants are educational negatively selected, while females are positively selected into migration. As for internal migrants in China, gender differences are recorded in studies on the impact of parental migration on their rural left-behind children. Results show that the effect of parental migration is stronger for boys than for girls (Zhou, Murphy, and Tao, 2014; Meng and Yamauchi, 2017; Shen, Hu, and Hannum, 2021). Scholars refer to the literature on the impact of family structure on education to explain the gender differences observed, which argue that boys are more vulnerable to non-parental care arrangements and psychological stressors. Parents absence, especially father's absence, exerts a stronger negative impact on boys' education compared to girls (Shen, Hu, and Hannum, 2021). However, little is known whether and how the children's own migration experience affects boys and girls differently.

Following the family maximum utility perspective and taking the son preference cultural norm in China into account, it is reasonable to expect the effect of child migration to be differed by gender. The family maximum utility theory is often used in previous studies to explain family migration decisions, especially the arrangement between couples (Bielby and Bielby 1992; Kanaiaupuni 2000). It argues that the family makes the migration decision to maximize the utility and benefits of the household as a whole. Due to the gendered division of labour in the household, males are more likely to migrate first and as a single traveller for economic gains, while females are more likely to migrate after their husbands settled in the destinations as a

tied migrant for family reunification. Following this line of argument, child migration is also a family migration decision. Parents who migrate with children should view this as a way to maximize the utility of the household. As reviewed, migrant families face various institutional barriers during the process, which requires parents to spend more effort in their children's education to secure a place in school and ensure the continuation of education progression. Thus, besides governmental regulations that affect all, migrant children's schooling will also depend on how their parents value the educational investment against the extra cost caused by the mobility and whether their parents perceive more years of child's education as an improvement of household utility. In rural-urban migrant families, parents tend to have different expectations for sons and daughters, considering that the rural-origin population in China holds relatively traditional gender norms and strong son preference (Murphy et al., 2011). Sons are expected to be economically successful and can support the family in the future, while daughters are expected to be dependent and focus on their relationship obligations (Zhou, Murphy, and Tao, 2014). Thus, rural parents are more willing to invest in sons' education rather than daughters'. After migration, we would expect the gendered expectations of parents on children's education to be exaggerated by the increased cost of education and more constrained resources. To maximize the utility of the household, parents would invest more in sons' education not only due to son preference but also as a way to help sons find a job on the labour market in the future. As for daughters, parents would lack the incentive to invest in their education but expect them to help with domestic work. It would be especially true if there are multiple children in the household, as previous studies suggest that daughters with siblings usually take on the role of "quasi-parents" and caregivers (Parish and Willis 1993, Chu et al., 2007), which exerts a negative impact on their education. Based on the above, Hypothesis 2 is proposed as,

H2: The impact of migration on educational attainment is more harmful to females than to males.

Data and Methods

Data

I use all the available five waves of the China Family Panel Survey (CFPS) 2010 – 2018 for the analysis. The CFPS is a nationally representative longitudinal dataset of Chinese communities, families, and individuals (Xie & Lu, 2015). The baseline survey was launched in 2010 when 15,000 families and nearly 40,000 individuals were interviewed. Respondents are tracked through follow-up surveys biennially.

CFPS has well-designed strategies to track respondents in the follow-up surveys, which facilitate tracing and studying migrants. If people migrate from their place of residence, there are several tracking strategies to keep them in the panel. For example, if migrants can be contacted via telephone, they will be interviewed by the Computer Assisted Telephone Interviewing(CATI)[2] questionnaires. If not, the available family member who is the most familiar with the migrants will complete a proxy report. Alternatively, a specialized follow-up team will follow the respondents to their new address[3]. In 2012, the adjacent wave retention rate[4] of the individuals in the baseline survey is 80.6%. The success rate of interviewing respondents at a new place is 69.0% (Hu et al., 2014). CFPS constructs individual panel weights to correct sample attrition and selection. Weights are applied in the analysis following the guidance in the CFPS user manual.

[2] CATI is the standard practice in CFPS follow-up surveys in response to the increasing migrant samples. The CATI questionnaires is adapted from the face-to-face questionnaires for telephone interviews.
[3] The follow-up strategies of CFPS are adjusted over time. The detailed instructions of how they follow-up respondents and the retention rates of every wave can be found in the User's Manual published on their official website. http://www.isss.pku.edu.cn/cfps/EN/Documentation/
[4] Adjacent wave retention rate is the proportion of completed cases among those completed from the last wave, excluding the exit families with only deceased members (CFPS User's Manual, 2017).

Analytic Samples

I select the analytic sample among rural non-migrants in 2010. They were born in rural areas and with rural *hukou* status, and lived in rural areas in 2010. I select rural non-migrant children aged 0-15 in 2010 and observe whether their places of residence change between rural and urban areas in the following waves. After excluding cases with missing values, the final analytic sample includes 4,494 respondents with 11,734 person-year observations. Among the 4,494 respondents, 767 cases experienced residential changes between rural and urban areas, and 115 cases migrated but returned to rural areas afterward, and another 18 cases migrated twice between rural and urban areas. Figure.2 provides a snapshot of the transitions between urban and rural areas for 300 random cases in the sample during the observational periods. As shown, while some migrated and stayed in urban areas, some moved back and forth between rural and urban areas. The latter scenario is rarely considered in previous studies but gets increasingly common among migrants. In this study, both the direction and frequencies of rural and urban transitions will be considered.

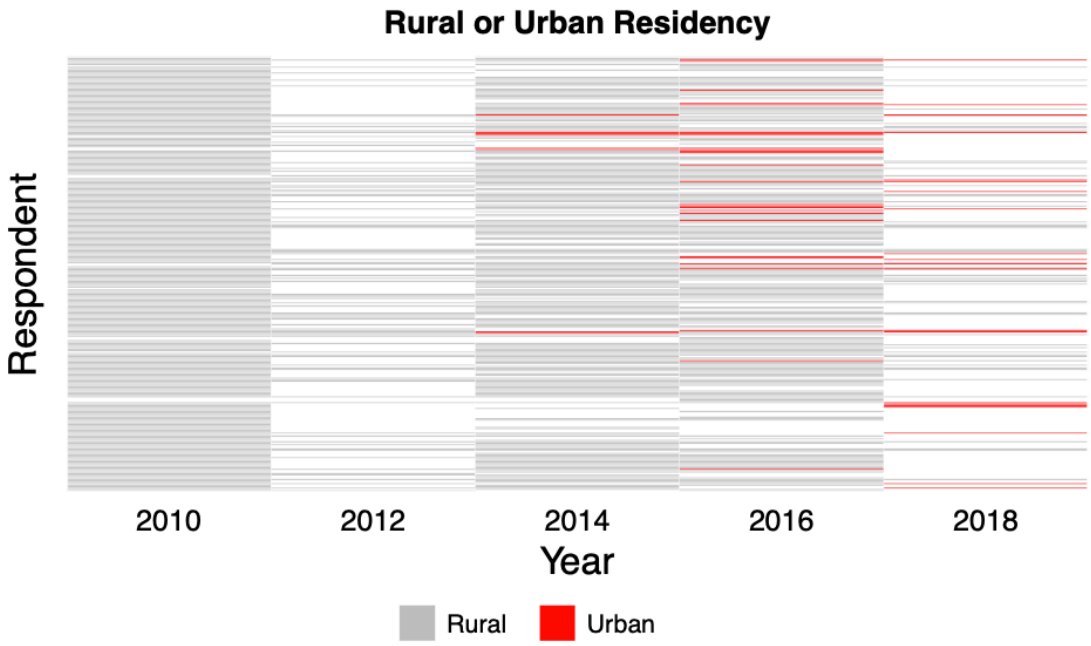

Figure 2. The Transitions Between Rural and Urban Residencies of 300 Respondents in the Sample.

Methods and Measurements

I use person-year two-way fixed-effects linear regression model to estimate the effect of migration, which has the benefit of accounting for individual level time-invariant unobserved characteristics and time-varying observed confounders. The educational outcome is model as,

$$y_{it} = \beta_1 Migration + \beta_2 N(rural - urban)_{it} + \beta_3 N(urban - rural)_{it} +$$

$$\beta_4 Interprovince_{it} + \gamma X_{it} + \mu_i + \eta_t + \varepsilon_{it} \text{ (Equation 1)}$$

where y_{it} denotes the educational outcome of interest for individual i at time t. It is measured by a binary indicator of whether the respondent is enrolled in school to receive education at the year of the survey (No=0; Yes=1). School enrolment is chosen as the educational outcome of interest because previous studies stress that the impact of migration on children's educational attainment largely depends on whether and what kind of schools the children can be admitted to after migration (Wu and Zhang, 2015). Institutional barriers make it hard for rural parents to register their migrant children in urban public schools. Thus, changes in school enrolment reflect the direct consequences of migrations.

Parameters, $\beta_1 - \beta_4$, in Equation 1 capture the effect of four key independent variables representing a person's migration status and take the direction and frequency of migration into account. They tell the corresponding changes in one's probability of school enrolment after a change in one's migration status. First, I include a dummy variable, $Migraiton_{it}$, indicating change in rural or urban areas of residence (0=Rural; 1=Urban) between t and $t-2$. Parameter of this variable, β_1, captures the immediate effect of a transition between rural and urban areas on education. Second, I count the total number of transitions the individual i experienced by time t to estimate the cumulative effects of migration. This modelling strategy is similar to previous study that explores the immediate and cumulative effects of child birth(s) and migration(s) on family earnings (Cooke et al. 2009). On this basis, I further distinct the effects of migration of different directions. I introduce two variables: $N(rural - urban)_{it}$

representing the total number of rural to urban transition(s) individual i experienced by the time t; and $N(urban - rural)_{it}$ representing the total number of urban to rural transition(s) experienced to the model. These two variables are set to zero at the baseline year and add a value of one at the year when a migration of the specific direction occurs but remain fixed at that value until the next migration of the specific direction happens. In other words, if the variable $Migraiton_{it}$ changes from rural to urban, $N(rural - urban)_{it}$, but not $N(urban - rural)_{it}$, will add a value of one. If the binary variable $Migraiton_{it}$ changes from urban to rural, $N(urban - rural)_{it}$, but not $N(rural - urban)_{it}$, will add a value of one. Third, as suggested in Hypothesis 1, intra-provincial migrants and interprovincial migrants are expected to experience different levels of impacts. I include a dummy variable, $Interprovince_{it}$, indicating change in the provinces of residence between t and $t - 2$ to capture the effect of interprovincial migration. This modelling strategy can help consider various migration trajectories. For instance, if individual i moved from rural to urban areas in another province between t and $t - 2$, and it is the second rural-to-urban move of this individual observed, which means that one rural-to-urban move and one urban-to-rural move were already observed. Then, the combined effect of this migration experience between t and $t - 2$ will equal to $\beta_1 + \beta_2 * 2 + \beta_3 * 1 + \beta_4$.

X_{it} represents a list of time-varying control variables including the child's age, age square, *hukou* status, log family income, employment experience, marital status and family size, which might confound the relationship between migration and one's educational attainment. Descriptive statistics for all the variables used in the analysis are presented in Table 1[5]. μ_i captures person fixed-effects, which adjust for unobserved unit-specific (but time-invariant) confounders, such as individual's inborn talents. η_t captures the year fixed-effects, which

[5] Descriptive statistics of variables by genders are presented in Appendix Table A.

adjust for unobserved year-specific (but individual-invariant) confounders, such as policies and regulations. ε_{it} is the idiosyncratic errors. Under the assumption that there is no unmeasured time varying confounders, results from the two-way fixed-effects should give unbiased estimates for migration effects. In the Sensitivity Analysis section, I will further discuss and test some of the potential threats to this assumption.

Table.1 Descriptive Statistics

	Mean	**S.d.**	**Min**	**Max**
Dependent Variable				
School Enrolment	.817	.387	0	1
Key Independent Variables				
Urban Residency (No=0;Yes=1)	.098	.297	0	1
Number of Transitions: Rural to Urban	.070	.258	0	2
Number of Transitions: Urban to Rural	.010	.099	0	1
Cross Province Migration (No=0; Yes = 1)	.015	.121	0	1
Control Variables				
Hukou status (Rural = 0; Urban=1)	.013	.114	0	1
Age	12.504	4.276	3	22
Age-square	174.636	108.612	9	484
Log Family Annual Income	9.950	1.174	0	14.00
Ever worked since last survey (No=0; Yes = 1)	.014	.117	0	1
Ever married (Never married = 0; Married = 1)	.011	.104	0	1
Family Size	4.409	2.393	1	19
Number of Observations		11,734		
Number of Persons		4,494		

Results

Table 2 presents results from fixed-effect regression analysis for the full sample. First, the baseline model, Model 1, considers only the effects of a transition between rural and urban residency on the probability of school enrolment. Results show that rural-urban migration is negatively related with one's educational outcome. After controlling other time-varying covariates, experiencing a transition of residency decreases one's probability of enrolling in school by 0.055 (s.e.=0.022, $p<0.01$). Next, in Model 2, the binary variable indicating interprovincial migration is introduced to capture the effect of migrating across provincial

borders. As shown, the coefficient for the interprovincial migration is negative. When holding other factors at constant, interprovincial migration decreases one's probability of enrolling in school by 0.131 (s.e. = 0.50. p<0.01). As shown, after including the indicator of interprovincial migration in the model, the magnitude of the rural-urban migration effect reduces from -0.055 to -0.044. Results from Model 2 confirms Hypothesis 1 that the internal migrants face different levels of impacts. According to the results from Model 2, experiencing intra-provincial rural-urban migration decreases one's probability of enrolling in schools by 0.044. However, an interprovincial migrant suffers extra punishment from crossing provincial borers, and the interprovincial rural-urban migration decreases one's probability of school enrolment by 0.175 (0.131+0.044), nearly four times stronger compared to the effect for the intra-provincial migration.

Table.2 Two-Way (Person-Year) Fixed-Effects Linear Probability Regression Results

Dependent Variable		School Enrolment (No = 0; Yes =1)		
		Model 1	Model 2	Model 3
Migration This Year		-.055**	-.044*	-.109**
		(.022)	(.022)	(.038)
Number of Transitions: Rural to Urban				.086*
				(.044)
Number of Transitions: Urban to Rural				-.107*
				(.051)
Cross-Province Migration: Yes			-.131**	-.134**
			(.050)	(.050)
Fixed-Effects				
	Person	Yes	Yes	Yes
	Year	Yes	Yes	Yes
R-sq				
	Within	.358	.360	.361
	Overall	.329	.331	.329
Number of Observations			11,734	
Number of Person			4,494	

*Note: *** p<0.001, ** p<0.01, * p<0.05; Robust standard errors are in the parentheses. Coefficients for time-varying control variables, including hukou status, age, age square, log family income, employment experience, marital status and family size, are omitted. Individual panel weights are applied to correct for attrition and selection.*

Model 3 further takes the directions and frequencies of migrations into account by adding two variables representing the cumulative number of transitions from rural to urban areas and from

urban to rural areas. Results show that first, the direction of migration matters. The coefficients for these two variables show that every transition from rural to urban areas increases one's probability of school enrolment by 0.086 (s.e. = 0.044; p <0.05). And every transition from the urban to rural area decreases one's probability of school enrolment by -.107(s.e. =0.051; p<0.051). Second, the results from Model 3 highlight the importance of considering multiple transitions, which becomes increasingly common for internal migrants. According to the result, experiencing a rural-urban residency change itself decreases one's probability of school enrolment by 0.109 (s.e. = 0.038; p <0.01). If this migration brings up the total number of rural-to-urban transitions experienced, the negative effect of migration will be partially offset by the benefits of migration(s) to cities. However, if this migration brings up the total number of urban-to-rural transitions experienced, the person will suffer additional punishment of returning to rural areas. Moreover, the negative impact of interprovincial migration still holds in Model 3. It decreases one's probability of school enrolment by 0.134 (s.e. = 0.050; p<0.01).

Results from Model 3 allow us to consider various migration scenarios and gauge their implications on child's educational attainment. Figure 3 bears this out. I consider eight different scenarios and calculated their effects compared to staying in rural areas by combining relevant parameters in Model 3[6] and assuming that all other covariates are held at their means. First, for rural-rural migrants, while results from Model 3 suggests no effect on school enrolment for an intra-provincial move, an interprovincial rural to rural move decreases one's probability of school enrolment by 0.134 (s.e. = 0.050, p <0.01). Second, for the first rural-to-urban migration observed, there is no effect found for within-province migrants as the negative effect of moving cancels out with the positive effect of moving to the cities ($\beta = -.109 + .086 = 0.023$, s.e. = 0.025, p=0.373). However, the combined effect for cross-province migration is negative and

[6] Standard errors are calculated from the error-covariance matrix, using the STATA LINCOME procedure.

statistically significant. Interprovincial rural to urban migration decreases one's probability of school enrolment by 0.157 ($\beta = -.109 + .086 - .134 = -.157$, s.e. = 0.052, p <0.01). Next, for return migrants, both intra-provincial and interprovincial moves exert negative impacts on their school enrolments. For a within-province returnee, the process of migration from rural to urban areas then return to rural areas in combination decreases his/her probability of school enrolment by 0.13 ($\beta = -.109 + .086 - .107 = -.130$, s.e. = 0.067, p <0.05). As for a cross-province returnee, the migration process in combination decreases his/her probability of school enrolment by 0.264 ($\beta = -.109 + .086 - .107 - .134 = -.264$, s.e. = 0.073, p <0.000). Finally, I also consider the scenarios where the person experienced rural-urban migrations twice. Results suggest that multiple intra-provincial rural-urban transitions has no significant effect on one's probability of school enrolment, while interprovincial moves decrease one's probability of school enrolment by 0.178 (p<0.05). However, the results for the last two multiple transitions should be read with cautions because there are very few cases (N=18) in the sample migrated twice from rural to urban areas.

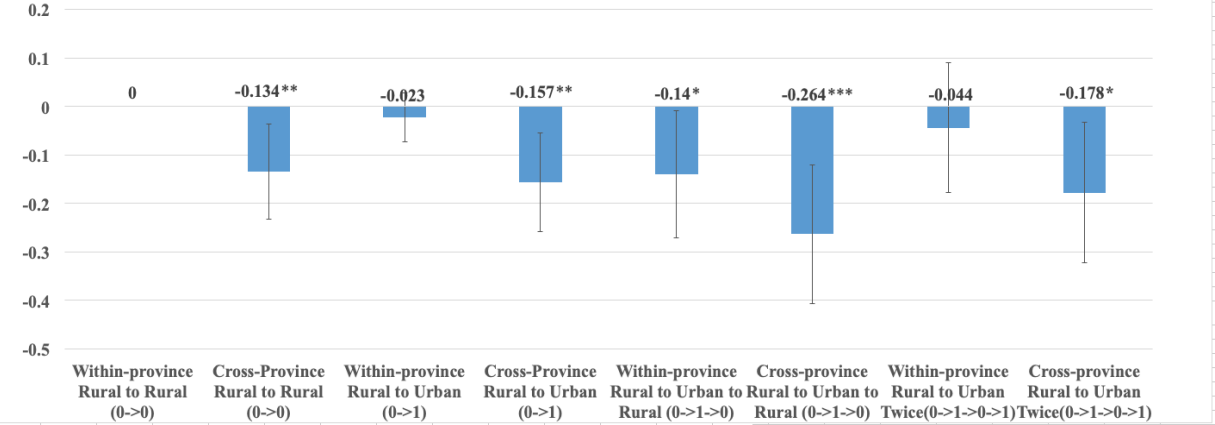

Figure 3. Estimated Effects of Different Types of Migration on the Probability of School Enrolment

Note: Estimates are obtained based on Results from Model 3 in Table 2. The X-axis presents different types of migration. Numbers in the parentheses represent residential status changes where 0 indicates living in rural areas and 1 indicates living in urban areas. Estimated effects are the sum of the relevant parameter estimates, i.e. variables indicating urban residency, number of transitions from rural to urban and from urban to rural, and cross-province migration. Standard errors are calculated from the error-covariance matrix, using the STATA LINCOM procedure.

The above results show that first, for a rural-origin child, a residential change between rural and urban areas has a negative impact on one's school enrolment. And an additional punishment on school enrolment is applied when the child moves across provincial border. Results from Model 3 and Figure 3 further illustrate that internal migrants suffer from different levels of impact depending on their migration directions, destinations and frequencies. Among the eight scenarios considered in Figure 3, all four types of cross-province migrations demonstrate a stronger negative impact on one's probability of school enrolment than within-province migrations (Hypothesis 1). And the rural to urban migration returnees experience stronger punishment on school enrolment compared to those stayed in the cities.

In addition to the main analysis, I also estimate Model 3 by gender to see whether the migration experience affect boys and girls differently. Results are presented in Table 3. As shown, the parameters for rural-urban migrations are only statistically significant for males but not for females. Among males, a transition between rural and urban areas decrease his probability of school enrolment by 0.154 (s.e. = 0.050; $p<0.01$). However, this decrease is partially offset by the parameter associated with the specific rural-to-urban migration, which indicates a statistically significant increase in school enrolment for each rural-to-urban migration of 0.110 (s.e. = 0.050, $p<0.5$). The parameters associated with the specific urban-to-rural migration are negative but not statistically significant for neither genders. The negative impacts from interprovincial migration hold for both genders. For females, experience a cross-province migration decreases her probability of school enrolment by 0.158 (s.e. = 0.71; $p<0.05$). And it decreases the probability of a boy by 0.103 (s.e.=0.051, $p <0.05$). Using the same strategy as explained for Figure 3, I plot the effects for the eight types of migrations by genders in Figure 4. As shown, for females, the impact of migration is driven by crossing provincial borders. Only interprovincial rural to rural migrants and rural-urban return migrants experience

statistically significant decreases in the probability of school enrolment by 0.158 (s.e.= 0.071, $p<0.05$) and by 0.286 (s.e. = 0.131, $p<0.05$) respectively. However, for males, they are affected by both rural-urban migrations and cross-province migrations. Among the eight types of migrations considered, except the first and last two types, the effects for other intra-provincial and interprovincial migrations are statistically significant for males. For rural to urban migrations, the intra-provincial migration decreases a boy's probability of school enrolment by 0.044 (s.e. = 0.02, $p<0.05$), while the interprovincial migration decreases a boy's probability of school enrolment by 0.148(s.e. = 0.076, $p<0.05$). As for rural-urban return migrants, the intra-provincial returnees experience a 0.147 (s.e. = 0.07, $p<0.05$) decrease in the probability of school enrolment, while the interprovincial returnees experience a 0.251 (s.e. = 0.087, $p<0.01$) decrease in the probability of school enrolment.

Table.3 Two-Way (Person-Year) Fixed-Effects Linear Probability Regression Results by Gender

Dependent Variable	School Enrolment (No = 0; Yes = 1)	
	Female	Male
Migration This Year	-.062	-.154**
	(.057)	(.050)
Number of Transitions: Rural to Urban	.051	.110*
	(.062)	(.050)
Number of Transitions: Urban to Rural	-.115	-.103
	(.108)	(.076)
Cross-Province Migration: Yes	-.158*	-.103*
	(.071)	(.051)
Fixed-Effects		
Person	Yes	Yes
Year	Yes	Yes
R-sq		
Within	.342	.387
Overall	.305	.354
Number of Observations	5,607	6,127
Number of Person	2,115	2,379

*Note: *** p<0.001, ** p<0.01, * p<0.05; Robust standard errors are in the parentheses. Coefficients for control variables, including hukou status, age, age square, log family income, employment experience, marital status and family size, are omitted. Individual panel weights are applied to correct for attrition and selection.*

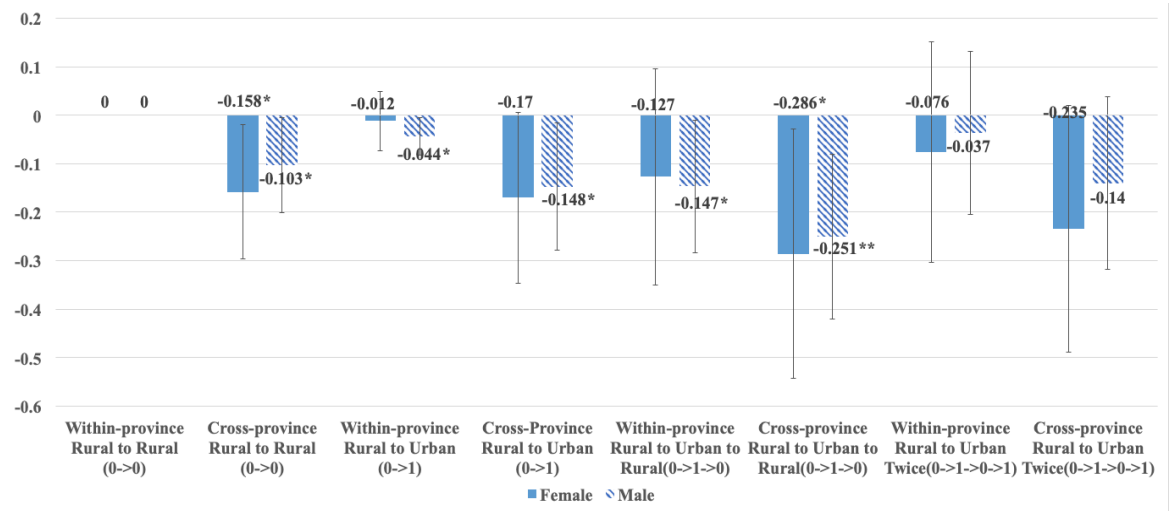

Figure 4. Estimated Effects of Different Types of Migration on the Probability of School Enrolment

Note: Estimates are obtained based on Results in Table 3. Solid blue bars show the effects for female and the dash-line blue bars show the effects for male. The X-axis presents different types of migration. Numbers in the parentheses represent residential status changes where 0 indicates living in rural areas and 1 indicates living in urban areas. Estimated effects are the sum of the relevant parameter estimates, i.e. variables indicating urban residency, number of transitions from rural to urban and from urban to rural, and cross-province migration. Standard errors are recalculated from the error-covariance matrix, using the STATA LINCOM procedure.

Sensitivity Analysis

Potential Time-varying Confounders

Although the fixed-effect model controls for unobserved time-invariant confounders, the results might still be affected by any unmeasured time-varying confounders. The results presented so far control for time-varying covariates, including changes in *hukou* status, child's age, age square, log annual family income, employments during each wave of surveys, marital status, and family size. Here, I examine whether the estimates are robust to including two potential time-varying variables that might confound the relationship between migration and school enrolment. The first is the annual educational expenditure that parents spend on the child's schooling. The second is a proxy of the time-varying ability of the child. These two variables are not included in the main analysis due to the high proportions of missing values.

First, parents' attitudes towards the children's education will affect their migration decision of whether to migrate with their children, and their investment in child's education after migration. And their attitudes may change over time, thus confounding the results. To measure parents' attitudes, I use the amount of educational expenditure parents spent as a proxy. In the data, information on parents' educational expenditure is collected annually. However, the variable suffers from 30% of missing values. I impute the missing values and include it in the model[7]. Results are shown in Appendix Table B Model A compared to results from Model 3 in the main analysis. Besides the time-varying covariates controlled in Model 3, Model A in Table B further considers log annual educational expenditure. Results show that annual educational expenditure increases one's probability of school enrolment and controlling for the time-varying family investment in education does not change the conclusions. There is little change in either the size or the significant level of the estimates of the effect of migration variables in Model A compared to the results from Model 3.

Second, children's ability and educational performance can confound the relationship between migration and their school enrolment. Although the fixed-effects model controls for any time-invariant intrinsic ability of the child, the time-varying ability may still confound the results. To measure the time-varying academic ability of the children, I use the children's academic performance in Chinese and mathematics exams collected annually. However, these two measures are only available for children aged between 6-15, which resulted in 39% of missing values in the sample. I impute the missing values and include the two measures in Appendix Table B Model B. As shown, exam grades are positively associated with the chance of school enrolment. One-unit increase in math and Chinese exam grades increase ones' probability of

[7] Multiple imputation estimates a set of values reflecting the variance around the true value that would have been observed if there were no missing. I first imputed five complete datasets using the chain equation (MICE) imputation algorithm. The multiple imputation is completed using the R package MICE (https://CRAN.R-project.org/package=mice). Then, I calculated the mean values over the five imputed datasets and included them in the model.

school enrolment by 0.042 (s.e. = 0.005, p<0.000) and 0.044 (s.e.=0.005, p<0.000) respectively. And controlling these two variables does not affect the effects of migrations. Controlling the proxy time-varying ability measures introduces little change to previous findings reported in Model 3.

Selection into Migration in 2010

For the main analysis, I selected the sample from rural residents in the baseline wave 2010 and followed their transitions in the following waves. However, among the rural-origin population, there are two groups. One is those who migrated before 2010 and managed to stay in urban areas in 2010. The other is those non-migrants in 2010. The analytic sample only includes the latter. In other words, only those who had not migrated yet or returned from their previous migrations in 2010 can be selected into the analytic sample. Although the fixed-effect model already partial out all time-invariant attributes, the concern is that if these two groups have differences in unobserved time-varying factors or the effect of migration varies by groups, the selection on migration status in 2010 might bias the results. Based on respondents' migration status in 2010, I gauge the influence of selection into non-migrants in 2010 by predicting the probability of being a non-migrant in 2010 and reweighting the data by its inverse[8]. The idea is to give respondents who are less likely to be selected in the analytic sample more weight in the analysis. I present the reweighted results in Table C Model C, compared to the results from Model 3. The reweighted results confirm the pattern reported in the main analysis. The sample selection incurs little impact on the estimations of the migration effects.

Conclusion and Discussion

[8] The predicted probabilities are from logit model with predictors including child's gender, age, age square, place of birth, parents' ages, education levels and family annual income.

In this study, I use data from China Family Panel Survey(CFPS) 2010-2018 and two-way fixed-effect models to estimate the effect of migration on a child's school enrolment. Findings demonstrate the complex process and heterogeneous consequences of internal rural-urban migration in China.

First, for a rural-origin child, a residential change between rural and urban areas has a negative impact on one's school enrolment. Results add evidence to the proposition that the restrictions and discrimination in cities dominate the impact of migration on educational attainment, which is detrimental for child's development. Second, this study highlights the importance of institutional segregation at the provincial levels in shaping migrants' educational outcomes. On top of the negative impact of a transition between rural and urban areas, in line with Hypothesis 1, results show that interprovincial migration exerts an independent negative influence on individuals' school enrolment. The interprovincial migration has a stronger impact on one's educational attainment compared to the intra-provincial migration. For females, experience a cross-province migration decreases her probability of school enrolment by 0.158. And it decreases the probability of a boy by 0.103. While the rural-urban divide received much emphasis in the literature, provincial-level segregation has largely been overlooked. The findings that the effects of migration are different for intra-provincial migration and interprovincial migration should encourage future work to look into the heterogeneity among migrants by their destinations. Though several studies mentioned that different destinations attract migrants with various motivations and strategies (Liang 2001; Ma and Xia 2001) and local regulations for migrants vary by regions (Lu 2007; Xing & Wei 2017), little is known how the variations among migration destinations shape the consequences of migration. Future studies should examine the effects of migration by the combinations of origins and destinations.

Moreover, with panel data, this study considers and estimates the effect of various migration trajectories on educational attainment by taking the directions and frequencies of migrations into account. Results show that while a transition from rural to urban areas has a positive impact on one's school enrolment, a transition from urban to rural areas has a negative impact. Number of previous transitions impose cumulative impact on one's educational attainment. These findings stress that migration has accumulated influences on child's educational outcome. The educational attainment not only depends on current migration status but also previous migration histories. In other words, every transition one experienced exerts a long-term impact on his/her development. Previous studies that focus only on the contemporaneous measure of migration might introduce bias to the estimates. The combined impact of one transition is determined by the direction (to rural or to urban) of the transition, the type (intra-provincial or interprovincial) of transition, and the accumulated impact of the previous transition(s).

Furthermore, these results demonstrate that institutional restrictions hinder migrants' human capital development by imposing challenges for migrants to stay in their destinations. Though the transition from rural to urban areas can cumulatively benefit migrants' educational attainment, it is offset by the fact that most migrants are temporary migrants and move between rural and urban areas back and forth. In fact, results show that for those rural-to-urban within-province migrants who stayed in the cities during the observed periods, there school enrolment is not affected by migration. However, rural to urban migration returnees experienced the strongest decrease in their probability of school enrolment among all types of migration considered.

Here, a limitation is that the findings reported in this study can only be generalized to those children who migrated during the observed period and their observed migration experiences.

The observation period of this study is eight years. Although CFPS is the longest available longitudinal data with required information for migrant study, the relative short observation window has two implications which should be mentioned. First, during the observed period, a limited number of cases experienced twice or more times of rural-urban migrations, which limits the explanatory power of the results on the cumulative impact of multiple migrations. Yet, when longitudinal data with longer observational periods is available, the analytic strategy proposed in this study should facilitate future studies to examine the cumulative effect of one's complete migration histories. Second, the results from this study reflect the impact of migration on school enrolment during the observed period, which is a relatively short-term implication. To gauge the long-term implication of migration on education, future studies should seek data with long observation periods and other educational outcomes, for instance, the completed education.

Finally, findings imply gender differences in the educational consequences of migration. Results show that while the interprovincial transition harms the school enrolment similarly for both genders, the impact of rural-urban transitions on education is driven by males. Contrary to what is expected in Hypothesis 2, results suggest that rural-urban migrations affect only boys. There are two possible explanations. First, the no effect of rural-urban migrations for girls means that the probability of school enrolment does not change for girls before and after migration. As said, rural-origin parents hold relatively traditional gender norms and strong son preference (Murphy et al., 2011) and have different expectations for sons and daughters. It could be that, compared to boys, before migration, girls are already less likely to be enrolled in school; thus, no effect is found after migration. If so, the gender differences in the finding reflect the disadvantaged position of rural-origin females in educational attainment compared to males. Second, previous studies suggest that boys are more vulnerable to early-stage

stressors and changes in family arrangement (Brooks-Gunn, Han, and Waldfogel 2002). It could be the case that boys adapt less well to residential changes and are more likely to drop out of schools; thus, rural-urban transitions are found only to affect boys. It could be that, since girls tend to have better language and interpersonal skills, they are less likely to be discriminated due to accents and adapt to the new environment quicker than boys. If so, the gender differences found in this study should encourage future studies to investigate whether migrant boys and girls experience different levels of discriminations and their coping strategies, which will provide valuable insights to parents and teachers to develop targeted strategies to improve migrants' educational attainment.

Appendix

Table. A Descriptive Statistics by Gender

	Male Sample				Female Sample			
	Mean	S.d.	Min	Max	Mean	S.d.	Min	Max
Dependent Variable								
School Enrolment	.805	.396	0	1	.829	.376	0	1
Key Independent Variables								
Urban Residency (No=0;Yes=1)	.096	.294	0	1	.100	.300	0	1
Number of Transitions: Rural to Urban	.066	.253	0	2	.074	.264	0	2
Number of Transitions: Urban to Rural	.011	.106	0	1	.008	.090	0	1
Cross Province Migration (No=0; Yes = 1)	.017	.130	0	1	.012	.011	0	1
Control Variables								
Hukou status (Rural = 0; Urban=1)	.013	.114	0	1	.013	.114	0	1
Age	12.32	4.27	3	22	12.71	4.27	3	22
Age-square	169.97	107.42	9	484	179.74	109.68	9	484
Log Family Annual Income	9.96	1.16	0	12.94	9.94	1.19	.693	14.00
Ever worked since last survey (No=0; Yes = 1)	.015	.122	0	1	.013	.113	0	1
Ever married (Never married = 0; Married = 1)	.010	.100	0	1	.012	.108	0	1
Family Size	4.23	2.36	1	19	4.60	2.41	1	19
Number of Observations		6,127				5,607		
Number of Persons		2,379				2,244		

Table.B Two-Way (Person-Year) Fixed-Effects Linear Probability Regression Results with More Control Variables

Dependent Variable	School Enrolment (No = 0; Yes = 1)		
	Model 3	Model A	Model B
Migration This Year	-.109**	-.114**	-.124**
	(.038)	(.038)	(.037)
Number of Transitions: Rural to Urban	.086*	.096*	.097*
	(.044)	(.043)	(.041)
Number of Transitions: Urban to Rural	-.107*	-.122*	-.169**
	(.051)	(.063)	(.062)
Cross-Province Migration: Yes	-.134**	-.186***	-.152**
	(.050)	(.050)	(.047)
Log Annual Educational Expenditure (imputed)		.034***	
		(.003)	
Math Exam Grades			.042***
			(.005)
Chinese Exam Grades			.044***
			(.005)
Fixed-Effects			
Person	Yes	Yes	Yes
Year	Yes	Yes	Yes
R-sq			
Within	.361	.290	.387
Overall	.329	.237	.354
Number of Observations	11,734	10,631	11,734
Number of Person	4,494	4,259	4,494

*Note: *** p<0.001, ** p<0.01, * p<0.05; Robust standard errors are in the parentheses. Coefficients for time-varying control variables, including hukou status, age, age square, log family income, employment experience, marital status and family size, are omitted. Individual panel weights are applied to correct for attrition and selection*

Table.C Two-Way (Person-Year) Fixed-Effects Regression Reweighted Results

Dependent Variable		School Enrolment (No = 0; Yes = 1)	
		Model 3	Model C
Migration This Year		-.109**	-.121**
		(.038)	(.039)
Number of Transitions: Rural to Urban		.086*	.093*
		(.044)	(.046)
Number of Transitions: Urban to Rural		-.107*	-.119*
		(.051)	(.065)
Cross Province Migration: Yes		-.134**	-.100*
		(.050)	(.053)
Fixed-Effects			
	Person	Yes	Yes
	Year	Yes	Yes
R-sq			
	Within	.361	.358
	Overall	.329	.350
Number of Observations		11,734	11,079
Number of Person		4,494	4,180

*Note: *** p<0.001, ** p<0.01, * p<0.05; Robust standard errors are in the parentheses. Inverse probability weights are applied to correct for selection into migrant status in 2010. Coefficients for time-varying control variables, including hukou status, age, age square, log family income, employment experience, marital status and family size, are omitted.*

Reference

Agadjanian, V., Yabiku, S. T., & Cau, B. (2011). Men's migration and women's fertility in rural Mozambique. *Demography*, *48*(3), 1029-1048.

Beine, M., Docquier, F., & Rapoport, H. (2001). Brain drain and economic growth: theory and evidence. *Journal of development economics*, *64*(1), 275-289.

Beine, M., Docquier, F., & Rapoport, H. (2008). Brain drain and human capital formation in developing countries: winners and losers. *The Economic Journal*, *118*(528), 631-652.

Bielby, W.T. and D. Bielby. 1992. "I Will Follow Him: Family Ties, Gender-Role Beliefs, and Reluctance to Relocate for a Better Job." *American Journal of Sociology* 97:1241–67.

Brooks-Gunn, Jeanne, Wen-Jui Han, and Jane Waldfogel. 2002. "Maternal employment and child cognitive outcomes in the first three years of life: The NICHD study of early child care," *Child Development*, 73(4): 1052–1072.

Chen, Y., & Feng, S. (2013). Access to public schools and the education of migrant children in China. *China Economic Review*, *26*, 75-88.

Chu, C. Y. C., Xie, Y., & Yu, R. (2007). Effects of sibship structure revisited: Evidence from intrafamily resource transfer in Taiwan. *Sociology of Education*, 80, 91–113

Cooke, T.J. 2003. "Family Migration and the Relative Earnings of Husbands and Wives." *Annals of the Association of American Geographers* 93:338–49.

Cooke, T. J., Boyle, P., Couch, K., & Feijten, P. (2009). A longitudinal analysis of family migration and the gender gap in earnings in the United States and Great Britain. *Demography*, *46*(1), 147-167.

Department of Services and Management of Migrant Population, National Health and Family Planning Commission of China (2010) Report on China's Migrant Population Development 2010. (In Chinese)

Department of Services and Management of Migrant Population, National Health and Family Planning Commission of China (2013) Report on China's Migrant Population Development 2013. (In Chinese)

De Brauw, A., & Giles, J. (2016). Migrant opportunity and the educational attainment of youth in rural China. *Journal of Human resources*.

Garip, F. (2008). Social capital and migration: How do similar resources lead to divergent outcomes?. *Demography*, *45*(3), 591-617.

Geist, C., & McManus, P. A. (2012). Different reasons, different results: Implications of migration by gender and family status. *Demography*, *49*(1), 197-217.

Guo, F. (2002). School attendance of migrant children in Beijing, China: A multivariate analysis. *Asian and Pacific migration journal*, *11*(3), 357-374.

Goldberg, Rachel E., Marta Tienda, and Alícia Adserà. "Age at migration, family instability, and timing of sexual onset." *Social Science Research* 63 (2017): 292-307.

Greenman, E. and Xie, Y. (2008). Is assimilation theory dead? The effect of assimilation on adolescent well-being. *Social Science Research*, 37, 109–137

Harris, J. R., & Todaro, M. P. (1970). Migration, unemployment and development: a two-sector analysis. *The American economic review*, *60*(1), 126-142.

Kanaiaupuni, S. M. (2000). Reframing the migration question: An analysis of men, women, and gender in Mexico. *Social forces*, *78*(4), 1311-1347

Kwong, J. (2011). Education and identity: The marginalisation of migrant youths in Beijing. *Journal of Youth Studies*, *14*(8), 871-883.

Lau, M. and Li, W. (2011). The extent of family and school social capital promoting positive subjective well-being among primary school children in Shenzhen, China. *Children and Youth Services Review*, 33, 1573–1582.

Li, N., & Placier, P. L. (2015). The Impact of Changes in Chinese Government Policy on Rural-Urban Migrant Children's Schooling. *Asian Social Science*, *11*(18), 31.

Liang, Z. (2001). The age of migration in China. *Population and development review*, *27*(3), 499-524.

Liang, Z., & Chen, Y. P. (2007). The educational consequences of migration for children in China. *Social Science Research*, *36*(1), 28-47.

Liang, Z., Guo, L., & Duan, C. (2008). Migration and the well-being of children in China. *The Yale-China Health Journal*, *5*, 25-46.

Liang, Z., & Li, W. (2021). Migration and children in China: a review and future research agenda. *Chinese Sociological Review*, 1-20.

Liang, Z., & Ma, Z. (2004). China's floating population: new evidence from the 2000 census. *Population and development review*, *30*(3), 467-488.

Lichter, D.T. 1980. "Household Migration and the Labor Market Position of Married Women." *Social Science Research*, 9(March):83–97.

Leibowitz, A. (1974). Home investments in children. *Journal of Political Economy*, 82(Part 2), S111–S131.

Lu, Y. (2007). Educational status of temporary migrant children in China: Determinants and regional variations. *Asian and Pacific Migration Journal*, *16*(1), 29-55.

Lu, Y., & Zhou, H. (2013). Academic achievement and loneliness of migrant children in China: School segregation and segmented assimilation. *Comparative education review*, *57*(1), 85-116.

Ma, Z., & Xia, Y. (2021). Acculturation strategies, age at migration, and self-rated health: An empirical study on internal migrants in China. *Social Science Research*, *93*, 102487.

Massey, D. S. (1990). The social and economic origins of immigration. *The Annals of the American Academy of Political and Social Science*, *510*(1), 60-72.

Meng, X., & Yamauchi, C. (2017). Children of migrants: The cumulative impact of parental migration on children's education and health outcomes in China. *Demography*, *54*(5), 1677-1714.

Murphy, R., Tao, R., & Lu, X. (2011). Son preference in rural China: Patrilineal families and socioeconomic change. *Population and development review*, *37*(4), 665-690.

Nauman, E., VanLandingham, M., Anglewicz, P., Patthavanit, U., & Punpuing, S. (2015). Rural-to-urban migration and changes in health among young adults in Thailand. *Demography*, *52*(1), 233-257.

New Citizen Project (2014) Report on China's Migrant Children 2014 (In Chinese). Narada Foundation

New Citizen Project (2020) Report on China's Migrant Children 2014 (In Chinese). Narada Foundation

Park, R. E. (1915). The city: Suggestions for the investigation of human behavior in the city environment. *American journal of sociology*, *20*(5), 577-612.

Parish, W. L., & Willis, R. J. (1993). Daughters, education, and family budgets Taiwan experiences. *Journal of Human Resources*, 28, 863–898.

Ren, Q., & Treiman, D. J. (2015). Living arrangements of the elderly in China and consequences for their emotional well-being. *Chinese Sociological Review*, *47*(3), 255-286.

Shen, W., Hu, L. C., & Hannum, E. (2021). Effect pathways of informal family separation on children's outcomes: Paternal labor migration and long-term educational attainment of left-behind children in rural China. *Social Science Research*, *97*, 102576.

Shi, L., Chen, W., Xu, J., & Ling, L. (2020). Trends and characteristics of inter-provincial migrants in mainland China and its relation with economic factors: A panel data analysis from 2011 to 2016. *Sustainability*, *12*(2), 610

Sun, F. N., Z. Liu, and K. S. Schiller. (2020). "Parental Migration and Children's Educational Aspirations: China and Mexico in a Comparative Perspective." *Chinese Sociological Review* 52 (4):462–486.

Tsang, M. C. (1996). Financial reform of basic education in China. *Economics of Education Review*, *15*(4), 423-444.

Turra, C. M., & Elo, I. T. (2008). The impact of salmon bias on the Hispanic mortality advantage: New evidence from Social Security data. *Population Research and Policy Review*, 27, 515–530.

Warner, W. L. and Srole, L. (1945). *The Social Systems of American Ethnic Groups*. New Haven, CT: Yale University Press.

Wang, X., Bai, Y., Zhang, L., & Rozelle, S. (2017). Migration, schooling choice, and student outcomes in China. *Population and Development Review*, 625-643.

Wu, W., and Wang, G. 2014. Together but unequal: Citizenship rights for migrants and locals in urban China. *Urban Affairs Review*, *50*(6), 781-805.

Wu, Xiaogang and Zhuoni Zhang. 2015. "Population Migration and Children's School Enrollments in China, 1990–2005." *Social Science Research* 53:177-190.

Xie, Y., & Lu, P. (2015). The sampling design of the China family panel studies (CFPS). *Chinese Journal of Sociology*, *1*(4), 471-484.

Xing, C., & Wei, Y. (2017). Does migrating with children influence migrants' occupation choice and income?. *Journal of the Asia Pacific Economy*, *22*(1), 156-172.

Xu, H., and Xie, Y. (2015). The causal effects of rural-to-urban migration on children's well-being in China. *European Sociological Review*, *31*(4), 502-519.

Xu, D. D., X. Wu, Z. Zhang, and J. Dronkers. 2018. "Not a Zero-Sum Game: Migration and Child Well-Being in Contemporary China." *Demographic Research* 38 (26):691–726

Zhang, H. (2016). Literature Review on Educational Attainment of Migrant Children in China. *Open Journal of Social Sciences*, *4*(07), 190.

Zhou, M., Murphy, R., & Tao, R. (2014). Effects of parents' migration on the education of children left behind in rural China. *Population and Development Review*, *40*(2), 273-292.

Zuccotti, C. V., Ganzeboom, H. B., & Guveli, A. (2017). Has migration been beneficial for migrants and their children?. *International migration review*, *51*(1), 97-126.