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Family Arrangements and Children's Education Among Migrants: A Case Study of China

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Abstract

As China is experiencing an urban revolution with massive rural-to-urban migration, millions of children are profoundly affected by their parents' migration and their decision on family arrangement. With the discriminatory Hukou system and harsh living conditions in cities, the dilemma migrant parents face is whether they should bring children to cities or leave them behind. This decision determines the household, school and community environment children live in, which in turn shapes their wellbeing. With a unique strategy of comparing "left behind children" to "migrant children" and a gendered perspective, this paper examines how different family arrangements among migrants and consequent housing conditions and gender dynamics affect children's educational wellbeing. Our findings demonstrate the complex impact of family arrangement on children, which is conditioned on wage income and the gender of absent parent and the child. We find that children from less favorable socioeconomic backgrounds benefit more from moving to cities. Children living with both parents and those living with mother and grandparents tend to do better. While the effect of housing conditions is marginal, family arrangement has a gendered effect on children. Related policy recommendations are provided.

Keywords

migration; migrant children; left behind children; children; education; family arrangement; gender; China

INTRODUCTION

Since the 1950s, the world has been experiencing the "second wave" of urbanization with rapid urbanization mainly in developing countries. According to UN Habitat, urban

population in developing countries grew 1.2 million per week in the past decade, with about three quarters of the growth in Asia (UNHabitat 2012). With the increasingly high mobility, there is a massive volume of children in migrant families (Whitehead and Hashim 2005; Bryant 2005; Hernandez et al. 2009). As people migrate to pursue opportunities, they often face a dilemma in family arrangement: whether they bring their children with them to cities or leave them behind in villages. With the challenges of living in cities on the one hand and difficulties from family separation and parental absence on the other hand, neither scenario is perfect; yet both can have a significant impact on children. Children's well-being especially their educational well-being has long-term consequences for social class positions when they become adults (Palloni, 2006). There is an increasing interest in children of migrants in developing countries among both scholars and policy makers, as indicated by a global research on children of migrant families recently launched by UNICEF (Hernandez et al., 2009; Bryant 2005; Salah 2008; Garza 2010).

China is at the forefront of the “second wave” of urbanization, experiencing the largest human migration in history (OMSM, 2010). In 2010, it was estimated there were over 200 million migrants living in cities and there were 97 million children of migrant families (ACWF, 2013). About 61 million of those children were so-called “left-behind children” (children living in villages with at least one parent away as migrant, hereafter “LBC”), and 36 million were “migrant children” who migrated with one or both parents to cities (hereafter “MC”)¹. Thus in rapidly urbanizing China, there is a huge population of children who might be profoundly affected by parents' decision on family arrangement. Due to the discriminative Household Registration (*hukou*) System in China, migrants in Chinese cities have generally been marginalized and they are denied basic welfare benefits in cities (e.g. access to public education, subsidized housing, and healthcare). This institutional context further complicates migrants' decision-making on family arrangement and thus impact on children's wellbeing.

With higher mobility and the large volume of children in migrant families, scholars and policy makers are increasingly concerned about their wellbeing (Feng et al., 2017). There is a small but growing body of literature on the impact of migration on children's wellbeing. This paper contributes to this literature by focusing on children's educational wellbeing. Education is particularly important to children in China, as it has also long been considered by Chinese the main path for social mobility. Especially with the ongoing *hukou* system, passing the college entrance exam not only allows students to pursue higher education but also allows rural students to change their agricultural *hukou* into non-agricultural *hukou*, which leads to better social economic entitlements and opportunities (Cheng and Selden, 1994). Thus educational wellbeing of children of migrant families, especially those from rural areas, deserves special attention.

Existing studies on children of migrants in developing countries tend to focus on the role of remittance. Remittance and higher family income help funding children's education, reduce school drop-out rate, and delay children's entering labor force and thus increase final level

¹Among LBC, 47% had both parents as migrants, 36% had a migrant father and 17% had a migrant mother (ACWF, 2013). LBC accounted for 38% of all rural children and 22% of all children in China.

of education (Edwards and Ureta, 2003; Bryant, 2005; Hanson and Woodruff, 2003). In fact the quest to earn sufficient funds for children's schooling is often a principal objective motivating parents' migration (Dreby 2010; Wan 2009; Yao and Shi 2009). Yet, the overall impact of migration on education can be negative due to factors such as the lack of parental involvement, the need to do house work, and the incentive system that discourages higher education (McKenzie and Rapoport, 2006; Hanson and Woodruff, 2003; Acosta, 2006).

In China, findings are also inconclusive. While some studies find LBC suffer significantly in their wellbeing due to parental absence (Xiang, 2007; Wen and Lin, 2012; Ye and Lu, 2011; Zhou et al., 2014), others find that LBC do not suffer in school enrollment and performance probably due to remittance and grandparents as surrogate care givers (Wu and Zhang, 2015; Xu and Xie, 2015). Similarly, some studies find that MC do fairly well academically compared to urban natives (Xu and Xie, 2015, Liang et al., 2008), while others find that MC may not benefit from the superior education resources and opportunities in cities (Meyerhoefer and Chen, 2011).

Existing studies tend to compare LBC with non-migrant children in origins, and compare MC with urban native children in destinations. While these comparisons are important, sometimes they may not be appropriate (Xu and Xie, 2015). For example, MC and urban native children grew up in very different socio-economic environments such that the comparison of their educational wellbeing may not be meaningful. Acknowledging the importance of comparison between children of migrants and those of non-migrants, this paper focuses on children of migrants only and studies how different family arrangements among migrants impact their children, comparing children of "split" and "together" migrant families. To migrant parents, one of the most challenging decisions they have to make is whether they should bring their children to cities or leave them behind in villages. This decision on family arrangement shapes children's environment in multiple ways, ranging from the macro regional and community context, the quality of school, to the household environment, through which children's wellbeing might be affected.

Despite there is a large body of literature on the negative impact of poor housing conditions on children's physical, cognitive and social development in the *general* population (Breysse et al., 2004; Evans et al., 1998; South and Haynie, 2004; Vandivere et al. 2006), to our knowledge, no research has examined the role of housing conditions on children of migrants. In addition, existing studies tend to just compare boys and girls in conditions (e.g. Liang and Chen, 2007; Xu and Xie, 2015; Wu and Zhang, 2015), while fail to adopt a gendered perspective to examine how children of different sexes are impacted differently.

This paper attempts to fill some of the voids in the literature by studying the impact of family arrangement among migrants, and by focusing on how housing conditions (including residential instability) and gender dynamics affect the education of children from migrant families. In the following sections, we will first review the literature, and set up hypotheses. Then utilizing the 2009 12-city Migrant Survey, an empirical study will be conducted, followed by conclusions and discussion.

LITERATURE REVIEW AND HYPOTHESES

There is a large body of literature on migration and child development, respectively, but there are limited overlaps. The former has focused on adult migrants and their economic strategies, with less attention to their children, while the latter has focused on the general population of children, with few attentions to children in migrant families. With the increasingly high mobility, there is a massive volume of children in migrant families especially in developing countries (Whitehead and Hashim 2005; Bryant 2005; Hernandez et al. 2009). While migration generally advances the family economically, it has profound long-term impact on children. Existing research on education suggests that many factors influence children's education, including the gender of the child (Brown and Park, 2002), family size (Li et al., 2008), family income (Adams and Hannum, 2005) and academic aptitude (Hannum et al., 2009). Yet migration and consequent changes in family arrangement have not been the focus of studies on children's education. Thus there is an urgent need to study the wellbeing of children in migrant families, and to bridge the two separate bodies of literature on migration and child development.

Compared to the large body of literature on children of immigrants in developed countries, studies on children of migrants in developing countries are limited. The limited existing studies tend to focus on the impact of migration on LBC, by comparing them with children of non-migrants. Findings are inconclusive as some studies found that parental migration, mainly through remittance, has a positive effect on children's education in Mexico, Philippines, and Nicaragua (Cox-Edwards and Ureta 2003; Bryant 2005; Hanson and Woodruff 2003; McKenzie and Rapoport 2005, 2006; Yang 2004), while others found negative effect (De La Garza 2010). In addition to the need for more research, this inconsistency shows that parental migration may have a varying influence on children according to the conditions under which migration occurs. While migration may have different impact on children depending on their family arrangement, virtually no comparison has been made between LBC and MC. Built upon existing literature, this paper aims to go beyond remittance, and study how different family arrangements among migrants affect children's educational wellbeing.

Whether to bring children to cities or leave them behind is such an important decision for migrant parents as it results in different household environments (such as parental absence, housing conditions, and economic conditions) and educational infrastructure (e.g. quality of school), which can significantly affect their children's school performance. First of all, different family arrangements among migrants lead to different types of parental absence. If children migrate with their parents, they will live with often both parents (sometimes one parent) and enjoy parental presence and monitoring, which can contribute positively to their school performance. However, migrant children will experience disruption in their education and lifestyle, and they are confronted by the challenges of adapting to a completely new environment, which can be alien and even discriminatory towards them. This new and sometime hostile environment can be detrimental, and MC may develop risky behaviors and thus compromise their school performance. In addition, bringing children to cities may impose additional challenges to migrant parents who themselves need to adjust to the new urban life. This may affect family dynamics and the time and money parents can devote to

children, which can impact MC's school performance indirectly. Research on MC in developing countries are relatively limited, as existing studies focus on LBC. While not completely comparable, research on immigrant children in the U.S. find they have better academic performance than children in native-born families despite their disadvantaged socio-economic status (Hernandez, 1999; Portes and Rumbaut, 2005; Kasinitz et al., 2008). Migration selectivity, strong family support, and strong motivation for upward social mobility among immigrants may explain this advantage.

In China, MC faces additional challenges in cities, which can hamper their educational wellbeing. With the persistent *hukou* system, MC and their migrant parents are usually registered back in origins, and they cannot access good public education in cities due to the lack of local registration in cities. School budget in China is allocated through municipal governments based on locally registered population. Thus allowing MC to attend urban public schools actually increases the city's financial burden (Liu et al., 1998). In the 1990s, urban public schools often charge migrants a prohibitively high "education endorsement fees" (Cao, 1997). In 2001, the Chinese government made it clear that local governments and local public schools are responsible for MC's education. However, implementation of this policy varies significantly by region (Yang, 2017). As a result, MC either are not enrolled in schools or have to enroll in so-called "migrant children schools", which are unlicensed, unregulated, poor quality private schools targeting MC only (Liang and Chen, 2007; Lu and Zhang, 2001; Liu et al., 1998). In recent years, with ongoing reforms, more urban public schools start to admit MC; yet many MC still cannot attend public schools in cities with stringent requirements they have to meet. Paradoxically, some studies find MC do fairly well compared to urban native children (Liang et al., 2008; Xu and Xie, 2015).

The restrictive policies on migrant children's access to local public schools certainly discourage some parents to bring their children to cities. In fact, a very large volume of children of migrants are being left behind at origins, a practice commonly adopted by migrant parents in many different countries. Because of uncertainty associated with migration, leaving children behind can shield them from challenges and disruptions their parents have to face in cities; yet LBC will suffer the absence of at least one and often both parents, and consequently the lack of parental care and monitoring in study. Parental absence due to migration has been found to have a negative effect on children's education, due to the lack of parental involvement, the loss of local labor and earnings, the need to do house work, and the psychological cost of family separation (McKenzie and Rapoport 2006; Hanson and Woodruff 2003; Acosta 2006; Antman, 2013; Battistella and Conaco, 1998). In addition, parental migration also increases children's prospect for migration and can result in an incentive system that discourages further education (Kandel and Kao, 2001). This is especially the case for adolescents who may forsake education to pursue migration themselves for short-term income gains (De La Garza 2010). However, studies also found that parental migration, mainly through remittance, has a positive effect on children's education, as it reduces school drop-out rate, helps funding children's education, and delays children's entering labor force and thus increases final level of education (Cox-Edwards and Ureta 2003; Bryant 2005; Hanson and Woodruff 2003). Empirical findings in Mexico (McKenzie 2005; McKenzie and Rapoport 2005, 2006), Philippines (Yang 2004), and

Nicaragua (Edwards and Ureta 2003) have supported the positive effect of parental migration on LBC's education.

This review demonstrates the importance of family arrangement on children's education. While MC and LBC are affected by parental migration in very different ways, existing studies tend to focus on either group, and few compare them. One exception is Wu and Zhang (2015), which find that LBC children in China are more likely to enroll in schools than MC, while MC living with both parents are more likely to enroll in schools than those with one parent absent. Recognizing the unparalleled importance of parental involvement in children's well-being, we hypothesize that *MC generally have better school performance than LBC due to parental presence (H1)*.

In addition, it matters *which* parent is absent. While children may be affected by the absence of either parent, they are more vulnerable from mothers' absence (Vladicescu et al., 2008; De Le Garza, 2010). Mothers are usually the care takers, especially in developing countries, and it is more difficult for the extended family to substitute for the mother (Parreñas, 2005). Children with maternal absence experience greater disruption, especially when fathers are derelict in resuming broad parental responsibilities. When the mother is present to dispense remittances, the needs of children are generally well catered for, and children may experience relatively little disruption in life and they may not suffer much from father's absence (Kabeer, 1994). Even though children feel distanced from their absent fathers, they appreciate his economic contributions (Lloyd and Blanc, 1996; Parreñas, 2005). When the father does not send remittance, or does not send enough to sustain the household, their absence becomes more significant (De La Garza 2010).

In China, despite state sponsored gender ideology/equality during the socialist era, traditional gender roles with mothers as the main care takers and fathers as the main discipliners still prevail especially in rural areas. It is found that maternal and paternal absence had different impacts on LBC. Wen and Lin (2012) found LBC in mother-only migrant families had the worst school performance compared to those in other migrant families and those in non-migrant families. Duan and Wu (2009) found that school dropout rate was the highest among LBC living alone, followed by those with migrant mother and living with father, then by those with migrant father and living with mother, while children with two migrant parents and living with grandparents surprisingly had the lowest dropout rate. In other words, the gender of absent parent matters. We further hypothesize that *children living with both parents perform better than those with only one parent, and children living with mother do better than those with mother absent (H1.1)*.

Secondly, different family arrangements among migrants lead to very different housing conditions for children, which shape their study and living environment and thus can affect their school performance. It is well documented that migrants tend to live in poor quality housing, as indicated by massive slum settlements during rapid urbanization in many developing countries (Davis, 2005). They also experience frequent residential moves due to constant job changes (Ziol-Guest and McKenna, 2014). Thus if migrants bring their children to cities, their children have to live in poor housing, which may negatively affect their school

performance. In contrast, if children are left behind in villages, they can live in their own houses with stability and ample space for their study and living, which can be beneficial.

There is a large body of literature in the West on the negative effect of poor housing conditions on the general population of children. In addition to physical health and social wellbeing (Breyse et al., 2004; Evans et al., 1998; South and Haynie, 2004), poor housing conditions such as overcrowding and housing instability have negative impact on children's cognitive development and lead to lower educational attainment (Vandivere et al. 2006). Yet, existing studies on MC have largely ignored the role of housing conditions, especially in developing countries. Studies on immigrant children in the U.S. show that poor housing does not seem to negatively affect immigrant children's well-being (Hernandez, 1999). Yet, due to housing discrimination, immigrant children tend to live in poor housing in disadvantaged neighborhoods, and they are more likely to adopt adversarial attitudes and behaviors that can derail their educational success (Portes and Zhou, 1993; Zhou, 1997).

In China, the discriminatory *hukou* system adds additional constraints to migrants' housing conditions. Migrants without local registration in cities are not qualified for government subsidized housing (Huang, 2014). Consequently, they have to resort to the informal sector for affordable housing, and they tend to live in extremely crowded and poor quality housing (e.g. Wu, 2006; Wang et al., 2010; Huang and Yi, 2015; Huang and Tao, 2015). Thus if they bring children to cities, children will live in poor housing as well, which can be detrimental to their education. We hypothesize that *migrant children's school performance suffers from residential crowding and housing instability in cities (H2)*.

Third, different family arrangements among migrants lead to different gender dynamics in the family, which can result in different educational performances among children of different sexes. It is conventional wisdom that girls and boys mature and develop differently, and their needs for parental care and control differ, thus they may respond to family arrangements and parental absence differently. Yet, related research is very limited. In addition, migration causes disruption of gendered divisions of parenting roles with fathers as disciplinarians and mothers as the care givers (Parreñas, 2005), which may have different impact on children of different sexes. For example, in the case of a father's absence, the lack of role models negatively affects sons' academic performance, while daughters' appreciation of their mother's difficulties may cause them to study harder and perform better (Lloyd and Blanc, 1996). Yet, in the case of the maternal migration, it is found that left behind adolescent girls suffer more as they have to take over care-giving and house-maintenance roles traditionally performed by the mother, while adolescent boys are less responsive to the gender difference in parental migration (De La Garza 2010).

In China, gender inequality in education has been well documented, which has been worsened by the government's recent focus on economic development, even though girls' educational opportunities seem to be more responsive to better economic conditions (Hannum and Xie, 1994; Hannum, 2005). Thus it is imperative to better understand educational gender inequality among children of migrants during rapid urbanization. Zhou et al. (2014) found only left behind boys' school performance was adversely affected by two-parent migration, not girls'. In Gansu province, Lee and Park (2010) found that father's

migration has a negative effect on left behind son's school enrollment, but a positive effect on daughter's academic performance. In contrast, migrant boys may adjust to urban environment better than migrant girls as the latter tend to be more risk averse. The former may also have access to more resources than the latter due to son preference. Thus we hypothesize that *while girls generally perform better than boys, their educational wellbeing differs significantly depending on family arrangement (H3).*

Fourth, different family arrangements lead to different economic conditions, which can affect children's education. The general education literature associates higher household income with greater educational attainment (Brooks-Gunn et al 1997; Hanson et al 1997; Hannum and Park 2003). This is particularly important in a child's earlier years when environment and educational investment are critical in the development of cognitive and social skills (Cunha et al 2005; Heckman et al 2006). There is also ample research on the positive impact of economic improvement resulted from migration on children's education (e.g. Edwards and Ureta, 2003; Bryant, 2005; Hanson and Woodruff, 2003). A similar positive effect exists in China (Zhou et al., 2014). However, different family arrangements among migrants can result in different economic conditions. If migrants bring their children to cities, usually both parents work in cities, which means higher income. When migrants have more financial resources, they may hire tutors, buy books for their children, pay for more extracurricular activities, and even pay fees for their children to go to better schools, which have direct impact on their children's school performance. Yet, the cost of living in cities will be higher, and parents may have to work for more hours thus spend less time with MC, which can affect children's school performance. In contrast, if children are left behind, the cost of living in cities will be lower, and migrants may be able to send more money home to pay for children's education. Yet, in the case of one migrant parent, wage income will be lower. Thus different family arrangements can lead to a more complex implication than simply remittance on children's education. However, since schools are funded by local governments with local resources (Hannum and Park 2007), the quality of schooling in poor rural communities may be so bad that poor school performance prevails in these communities independently of economic conditions of individual families (Xiang 2006).

Finally, migrants' family arrangement also directly impacts the school their children attend, which can significantly affect children's school performance. In general, urban schools are better than rural schools as the former have more resources and better qualified teachers especially in developing countries, and children in better schools tend to perform better. China is no different from other developing countries. Yet in China, due to the persistent exclusion of MC from urban public schools, private and unregulated schools targeting migrant children only emerged to meet the massive needs of migrant children. These migrant children schools tend to be worse than both urban and rural public schools as they lack funding, qualified teachers, and formal curriculum. Lu and Zhou (2013) found in Beijing MC attending migrant children schools have poorer academic achievement than similar MC enrolled in regular urban public schools. Thus it is expected that children attending migrant children schools perform worse than those attend public schools. In recent years, more MC are allowed to attend urban public schools, with or without "education endorsement fees". In a four-city study of MC, about half of MC who attended school did so

in urban public schools (Zou et al. 2005). In other words, not all MC can benefit from superior education infrastructure in cities due to the unique institutional context in China.

DATA and METHODS

Data

This project utilizes a 12-City Migrant Survey conducted in 2009. Sampled cities are located in four major urbanized regions in China – the Yangtze River Delta, the Pearl River Delta, the Bohai Bay Area, and Chengdu –Chongqing Region. In each of the four urbanized regions, one megalopolis (> 1 million population), one large city (500,000 – 1 million), and one small/medium-sized city (< 500,000) were randomly selected (12 cities in total). Sampled cities include Ningbo and Yueqing in Zhejiang province, Jiangyin in Jiangsu Province, Guangzhou, Zhongshan and Dongguan in Guangdong province, Chongqing, Nancong and Chengdu in Sichuan province, and Yanjiao in Hebei province, Jinan and Weifang in Shandong province (see Appendix 1 for sample sites). Due to a large number of migrants in megalopolis, only one urban district is randomly selected in each megalopolis, while in smaller cities all urban districts are included in the sampling frame. Then 200 migrants in each city (2400 migrants in total) were selected from the migrant registration list provided by local Public Security Bureau (About 70%-90% of migrants in each city were registered), using the systematic random sampling method. If the sampled migrant had moved away, the sampling is continued until the desired sample size was reached. The percentage of replacement ranged between 15% and 30%. Migrants are defined as people whose *Hukou* is not registered in the city they live in. Migrants come from 31 provinces and municipalities across China, with 62.39% of them married. There are 1515 children from 693 households, of which 72.21% are school-age (5–18) children. In this study we focus on children of rural-to-urban migrants (defined as those with agricultural *hukou* that is not registered at the destination city), and we further limit our sample to children aged 6–15 (elementary and middle school age) as China has a 9-year compulsory education system. We also exclude children with hereditary diseases (11 children). The final sample size is 753 children, of which 97% are enrolled in school, and 55% of those enrolled are LBC.

Dependent and Independent Variables

Dependent variables measure children's school performance. This survey is about migrants, not their children per se; thus children's school performance is reported by migrant parents. Three indicators are used: Chinese and math performance (ranked by parents on a scale of 1–5, with 1 being the poorest and 5 being the best), and whether the child received award from school for academic excellence (yes/no). While acknowledging parental report on children's school performance may not be entirely accurate and objective, we believe parents generally have a good sense of their children's wellbeing regardless where they are. Children have always been the focus of Chinese families, who receive close parental monitoring. Especially among migrants who desperately want their children to move up the social ladder, it is fair to assume that they are relatively well informed about their children, even though they may not be the actual caregivers in the case of LBC. The availability and prevalence of low-end cheap wireless technology in China has made it easier for migrant parents to keep in touch with and monitor their children back home (Qiu, 2009). Studies

have shown that mother's report of child health accurately predicts subsequent morbidity and mortality (Idler and Benyamini, 1997; Mare and Palloni, 1988) and use of medical services (Ferraro and Farmer, 1999). Studies on children of immigrants in the U.S. have also used mother's report of child wellbeing (e.g. Donato and Duncan, 2011). While we realize there are large variations between regions and schools, academic award is a fairly objective measure within the school. Thus we argue that the combination of the subjective and objective indicators can give us a fairly accurate picture of children's school performance.

The key independent variable is *family arrangement*. In addition to two major types of family arrangement: MC vs. LBC, detailed family arrangement indicating whom the child is living with will be used to test the effect of detailed family arrangement and the gender of absent parent (H1 and H1.1). Housing conditions is another key fact that can affect children's school performance through residential crowding and residential instability. Thus, *per capita living space* and *number of residential moves in the city* are included to test the effect of housing conditions (H2). While housing tenure potentially can be important, migrant children predominantly live with parents in rental housing, and LBC predominantly live in their owned houses. Our analyses also show that tenure has no significant effect on school performance. Thus we focus on the effect of residential crowding and instability on school performance. For MC, their housing information is the same as their migrant parents in cities. For most LBC, housing condition is not affected by their parents' migration unless LBC themselves moved to school dorms or a relative's house. For comparison, we use their rural per capita living space to measure their housing conditions, and there is no information on residential moves in the countryside.

Gender of the child is another key independent variable included to test the effect of child's gender on school performance (H3). In addition, interactions between child's gender and family arrangement and other risk factors are included to see if child's gender affects school performance differently among different family arrangements and by risk factors (H3).

Control variables include those at individual, household and community levels. At the individual level, child's age is included. At the household level, mother's and father's education (years of schooling), number of siblings, and household wage income from nonagricultural employment in 2008 (taking the log form, in short wage 2008 in tables), and duration of migrant parents' stay in the city are included. It has been argued that migrant children are more likely to enroll in schools after they spend more time at the destination (Liang and Chen, 2007; Wu and Zhang, 2015). Thus duration of stay in cities is included as a control variable. For LBC, it's their parents' duration of stay in cities, which measures the duration of parental absence. At the community level, the type of school (urban public schools, rural public schools, urban migrant schools and others), and whether urban schools require fees for migrant children (yes/no) are included. Since LBC all attend rural public schools, these two community level variables are not included in models for LBC. Summary statistics for independent variables are listed in Table 1.

RESULTS

Descriptive Analysis

According to Table 1, about 46% of the sample are MC and 54% are LBC. Among MC, the majority of them live with both parents in cities (95%) while only a very small percentage live with only one parent in cities. Among LBC, most are living with grandparents only (29.42%), followed by living with others (13.30%), living with mother only (8.76%), and living with fathers only (2.82%)². This demonstrates the complex family arrangements among children of migrants, which requires more nuanced analysis than the binary migrant children vs. left behind children scenario.

There are more boys (58.85%) than girls in the sample, whose mean age is about 10.47. About one third of them attend public schools in cities, 13.69% attend migrant schools and other private schools in cities, and about 55% attend rural public schools. About 90% of children have parents living in cities where urban public schools require additional fees for migrant children. Thus despite the central governments' call for equal treatment for migrant children in school admission years ago, most urban public schools continue to discriminate migrant children by requiring additional fees. Yet, more than two thirds of MC attend urban public schools, which is a huge progress than before.

Migrant parents generally have low education with the mean years of schooling is 6.36 for mother and 7.57 for father. They have stayed in the city for 7.77 years on average, and have moved 2.2 times in the city. While the mean for living space is rather high (56 m² per capita) probably because it is dominated by LBCs in our sample often in countryside.

Migrant parents report their children's school performance mostly in the category of "medium" and "upper medium", while few report "poor" (Table 2). For example, for Chinese, 41.48% is in "medium", 28.64% in "upper medium", and 16.80% is in "very good", while only 2.74% is in "poor" category. The distribution is similar for math. Yet, LBC tend to be more spread out with higher percentages in "poor" and "very good", while MC are more likely to be concentrated in "medium" category. The differences in proportions between LBC and MC are statistically significant for the category of "poor" and "medium" for Chinese, and for "poor", "medium" and "very good" for math. In other words, LBC are more likely to be in "poor" but less likely to be in "medium" category than MC for both math and Chinese. Yet, LBC are significantly more likely to be in "very good" category for math than MC. In addition, more than half of all students receive academics awards from schools. Yet, there is virtually no difference between LBC and MC regarding awards.

Among MC, surprisingly, those living with both parents do not necessarily perform better than those with only one parent³. We suspect this is because of small number of cases for children from one parent families.

Among LBC, those living with mother only seem to perform better than those with father only. For example, for Chinese, LBC living with mother only are much less likely to be in

²Due to small frequencies, LBC living with fathers only are combined with those living with others in the following analyses.

³For MC living with only parent, the other parent may live in the origin, in another city, or is dead.

“poor” (2.08% vs. 5.56%) but more likely to be in “very good” (18.75% vs. 16.67%) than LBC living with father only. The former are also the most likely (66.67%) of all (including MC), while the latter are the least likely (38.89%) to receive awards for academic excellence. This clearly shows the benefits of maternal presence and damages of maternal absence. LBC with grandparents have a similar grade distribution to LBC living with others, except the former are much less likely to be in “lower medium” (8% vs. 18%) but more likely to be in “upper medium” (31% vs. 22%). Yet, they both are much less likely to receive awards than LBC living with mother. Interestingly, LBC living with grandparents seem to do better than MC living with both parents, as the former are more likely to be in “very good” and “upper medium”. These results show the impact of living arrangement on school performance is very complex, and LBC do not necessarily suffer academically due to parental absence.

Not surprisingly, there is a significant gender difference especially in Chinese. Boys tend to be more spread out in performance than girls, as boys are less likely to be “medium” in Chinese than girls (39% vs. 44%), while more likely to be in every other category. The test for difference in proportion is significant for every category. For math, boys are significantly more likely to be in the category of “poor” than girls; yet, there are no difference in other categories. There is no gender difference in awards either.

Statistical Analysis

Both binary logistic regression (whether children receive award: yes/no) and ordered logistic regression (performance ranking for Chinese and math: 1 – 5) are conducted⁴. Since the survey was a random sample of migrants, not children, and 59% of migrant families have two or more children, there might be a cluster effect among children from the same family. Generalized Estimating Equation (GEE) models are adopted for binary outcomes, and Generalized Linear Models (GLM) with multinomial distribution and cumulative logit link are adopted for ordered outcomes to control the cluster effect. Because of complex family arrangements among migrants, we adopt a two-step modeling approach: we first run models for all children, with a dummy variable indicating two major types of family arrangements -- MC vs. LBC -- to test the effect of family arrangement on children's school performance (H1). We then run two sets of models for MC and LBC, respectively, with detailed family arrangements indicating whom the child is living with. In addition to controlling very different macro environments of these two groups of children, this will further test the effect of the gender of absent parent (H1.1). For each outcome, two models are conducted: model 1 with main effects and interactions between family arrangement and key risk factors, and model 2 with interactions between child's gender and key risk factors. We introduce these interaction terms because of our earlier theoretical discussion leading to possible gender differences in educational outcomes. Regression results are presented in Table 3 (all children), Table 4 (MC) and Table 5 (LBC).

⁴Reverse causation is possible in this study: While children's family arrangements can have a significant effect on their school performance, family arrangements can also be a result of children's school performance. For example, migrant parents may decide to bring their children to cities because of children's poor school performance and their need for close parental monitoring; or they may leave their children behind because they are doing well academically. In other words, “family arrangement” might be endogenous to children's school performance. Three IVs are adopted to test the endogeneity and we did not find evidences for endogeneity in this case (see appendix 2).

First of all, bringing children to cities by itself does not seem to have a significant effect on children's school performance. In Table 3, while the coefficients for "family arrangement" are positive across models, only one is significant (Model 1 for Chinese). Therefore, there is not strong evidence to support H1. However, when interactions between family arrangement and key risk factors are included, it seems that bringing children to cities is beneficial to children's school performance but only when wage income is relatively low (negative coefficients for interactions between MC and wage income). Feng et al's (2017) recent work in Shanghai reveals that migrant children from socioeconomically disadvantaged families benefit more from enrolling in local public schools than other households. We have similar results here in that children from disadvantaged families (measured by income) benefit more from moving to cities. However, as household income increases, the advantage of bringing children to cities begins to taper off. For Chinese, the tipping point is around 25,000 yuan per year, which is much lower than the mean (39,761 yuan) and median (33,180 yuan) of non-agricultural wage income. In other words, for the majority of migrants who make more than 25,000 yuan per year (about 65% of the sample), bringing children to cities does not help their children's academic performance in Chinese (The tipping point for math is approximately 49,000 yuan, which is placed at 79 percentile of the wage distribution. However, the results are less robust with $p < 0.1$).

However, detailed family arrangement matters. In Table 4, coefficients for "MC living with one parent only" are significantly positive while interactions between "MC living with one parent only" and wage income are significantly negative (for both Chinese and math). This means that MC living with two parents do better in Chinese than those living with one parent when wage income is higher than 18,000 yuan (for math, the tipping point is 19,560 yuan). In other words, for the majority of migrants, MC living with two parents do better than those living with one parent. Only for a very small percentage of migrants with the lowest wage income ($< 18,000$ yuan), MC living with one parent interestingly perform better than those with two parents. This might be a result of migration selectivity and small sample size for migrant children living with one parent. There is no difference in receiving awards. This offer some evidences for H1.1.

Among LBC (Table 5), those living with mother are significantly more likely to receive academic awards, while those living with grandparents do better in Chinese and math than LBC living with others (including fathers). This shows the importance of maternal presence and that grandparents offer a comparable, if not better care to LBC regarding school performance in rural China. This is consistent with Zeng and Xie (2014) who argues for the important role of grandparents in grandchildren's education. For LBC living with others/fathers, parents' nonagricultural income is positively associated with their school performance; but if they live with grandparents, such advantage of income disappears for Chinese and math performance (negative coefficients for interactions). These results suggest that while the performance of LBC living with others/fathers are quite sensitive to their parents' income, the protective effect of grandparents are relatively universal, and independent of parents' income. These findings also partially support H1.1.

Secondly, housing conditions seem to be marginal to school performance. Among MC (Table 4), residential space has a positive effect but it is significant only in model 2 for

Chinese and math, while residential move is not significant. This shows that less crowded living conditions can be beneficial, while migrants' housing instability does not seem to affect MC's school performance. These results partially support H2. One possible reason for the lack of significance of residential move is that number of moves indicates not only residential instability but also upward social mobility to better housing and neighborhoods, the latter of which can have positive effects on children and may offset the negative effect of residential instability. As expected, housing conditions are not significant among LBC (Table 5), as housing conditions are generally not changed with parents' migration.

Thirdly, child's gender has a negative effect on school performance, meaning boys generally do worse than girls (Table 3). This effect is significantly stronger for Chinese than for math and awards. Among MC, migrant boys living with one parent do worse in Chinese and math, and are less likely to receive awards than migrant boys with two parents, while migrant girls living with one parent do better in Chinese and math, and are more likely to receive awards than migrant girls living with two parents (Model 2 in Table 4). This shows migrant boys are more likely to be negatively affected by parental absence while migrant girls are not affected or even do better with one parent away. In contrast, there does not seem to be a gendered effect through family arrangement among LBC. This supports H3.

Although positive, the interactions between boy and wage income are not significant among either MC or LBC (Model 2 in Table 4, 5), which shows the economic improvement from migration does not necessarily benefit boys more than girls, a sign for weaker son preference among migrant families. Interactions between gender and housing conditions are generally not significant, except that the number of moves is positively associated with receiving awards for both girls and boys, and more so for boys (Model 2 in Table 3). As mentioned earlier, while the number of moves indicates residential instability, it could also be a sign for upward mobility for better housing, neighborhoods and schools, thus can be beneficial to children's school performance.

While not the key variable we test, wage income is significantly positive for LBC (Table 5), but less robust for MC (Table 4). This might be a result of migrants' relatively low wage income and high living costing in cities. Due to low wage, migrants often have to work long hours and multiple jobs to make more income. If children live with them in cities, they have to pay for children's living cost thus have less resources for education on the one hand, and they cannot spend much time with their children and monitor and help with their education on the other hand. This dilemma may offset the conventionally positive effect of income. In contrast, if migrants leave children behind, they can save on living cost, and send remittance home which can be invested in children's education. Thus despite parental absence, LBC benefit from high wage income.

In addition, children attending public schools do significantly better than those in private and other schools (Table 3). Among MC, those attending urban public schools perform significantly better than those in other schools (Table 4). These results are consistent with Feng et al. (2017) and offer strong evidences for a policy that allows children of migrants to attend urban public schools unconditionally.

CONCLUSION AND DISCUSSION

As the world is becoming increasingly urban with rapid urbanization in developing countries, there will be even more children in migrant families than today, who would be profoundly affected by their parents' migration and their decision on family arrangement. To migrant parents in China and elsewhere, one of the most important questions is whether they should bring their children to cities or leave them behind in the countryside to be cared by others. MC have to face disruption in their lives and challenges living in cities, while LBC suffer separation from one and often two parents. Neither is ideal. While all migrant parents have to confront this dilemma, migrants in China make their decisions in a discriminative institutional context that generally discourages them to bring their children to cities. This decision on family arrangement determines not only the household, but also the school and community environment their children live, which in turn can significantly shape their wellbeing. Thus there is an urgent need to understand the impact of family arrangements among migrants on children's wellbeing, especially in China.

Adopting a unique comparison strategy, this paper examines how family arrangements among migrants affect their children's school performance in China. MC do better than LBC in Chinese, but not in math or receiving awards. However, our results do show that children from disadvantaged families (measured by income) benefit more from moving to cities than other children. This is an important finding because it suggests that future education policies should especially target low income migrant households.

Our results also reveal that MC living with both parents generally do better than MC living with one parent, except those with the lowest wage income probably due to higher living and educational costs in cities. Liang and Chen (2007) also found that living with two parents increases the probability of school enrollment. Among LBC, those living with mother and grandparents tend to do better. This shows the importance of maternal caretakers to children's school performance, and in the Chinese context, grandparents can to some degree mitigate the impact of parental absence on children.

Secondly, in contrast to the significant impact in the general population in the West, the effect of migration induced poor housing conditions seem to be marginal to MC's school performance in China. While MC benefit from less crowded living conditions, they do not seem to suffer from residential moves. Despite residential instability, residential moves could also indicate migrants' and their children's upward housing mobility, which can be beneficial. This marginal effect of poor housing conditions on MC might be a result of the collectivist culture in China and the high density living Chinese are used to. Clearly more research with refined housing data is needed.

Third, family arrangement has a gendered effect on children, as girls and boys respond to family arrangements and other key risk factors differently. For example, migrant girls living with one parent do better academically while counterpart migrant boys do worse than counterparts living with both parents. Migrant girls also benefit from improved housing conditions (living space) and residential moves, while migrant boys do not or even suffer. In other words, boys seem to be more vulnerable to the negative impact of family arrangement

such as parental absence and poor housing conditions than girls. Interestingly, there is not a gendered effect among LBC.

These findings demonstrate the complex impact of family arrangements among migrants on their children's school performance through parental absence, housing conditions and gender. Wage income and quality of schools are important as well. More research is clearly needed on China and other developing countries where there is not institutionalized discrimination against migrants and their children. Our empirical findings in China offer strong evidences for policy change. Although providing access to public education for migrant children is an important component of China's New Urbanization Plan (2014–2020), it is important to design family-friendly policies to encourage migrants to bring their children to cities, encourage both parents to live with their children in cities, remove remaining hurdles for migrant children to attend urban public schools, allow migrants to access subsidized housing, and raise minimum wage to ensure migrants can afford decent housing and standard of living for their families, all of which have positive effect on children's educational wellbeing. While not studied in this paper, allowing migrants' children to take major exams such as high school entrance exam and college entrance exams at their destination city instead of their *hukou* registration place would also encourage migrants to bring their children to cities. It is inevitable for the government to phase out the *hukou* system, allow migrants to settle permanently in cities, and enjoy their right to the city in every aspect so that we can ensure the ultimate wellbeing of millions of children in migrant families. If children have to be left behind, migrants should be encouraged through educational programs to leave their children with mother, followed by grandparents, as children in these two family arrangements fair better. We realize that these policy recommendations are consistent with China's 2014–2020 New Urbanization Plan, in which the Chinese government pledges to give 100 million migrants local *hukou* status and thus access to local public services such as urban public schools and subsidized housing (Xinhuanet, 2014). It is time for the Chinese government to shift its focus from reaping migrants' economic contribution to care for the wellbeing of migrants and their children. Only then, the “urban dream” may be realized and a stronger society can be achieved in China.

This research has several limitations. Since the data we used is a survey of migrants, not their children per se, measures for school performance are limited. Using a cross-sectional data also prevents us from comparing children's school performance before and after parental migration. In additional, migration is often circular; thus the cross-sectional snapshot of family arrangement may not reflect the long-term arrangement, which can obscure the findings. Thus there is an urgent need to survey children of migrants, both LBC and MC, to collect more detailed, objective, and longitudinal information on their well-being and their environment to develop a clearer picture of the causal impact of family arrangement on children.

Nonetheless, this study makes a unique contribution to our understanding of the impact of family arrangement in migrant families on children, by comparing MC and LBC, and by examining the effects of detailed family arrangements. This research also contributes to the literature by examining the effect of housing conditions on children of migrants, and by

adopting a gendered perspective. While China's *hukou* system makes the current study somewhat unique, our research strategy could apply to children of migrants in other contexts as well. We believe that research strategies focusing on gender and housing conditions and the research design of comparing MC with LBC would yield important insights in studies of the impact of parental migration on children in general. In addition, this research contributes to the recent global interests in migration and children. It demonstrates the complexity of impact of family arrangement in particular and parental migration in general on the wellbeing of children, which calls for more research and better policy intervention.

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Appendix 1

Fig. A1.
Sample Sites for 12-city Migrant Survey in 2009

Appendix 2: Test for Endogeneity

Instrumental variables (IV) are often used to test the possible endogeneity and to address the selection bias (Winship and Morgan 1999; Song and Lin 2009). In addition, with cross-sectional data, the relationship between family arrangement and well-being may be artifact of reverse causation or incidental association. IVs allow us to identify the causality between family arrangement and children's well-being (Winship and Morgan, 1999; Song and Lin, 2009). IVs are expected to have significant impact on family arrangement but not on children's school performance directly except through the pathway of "family arrangement". There are three candidates for IVs: 1) "Presence of at least one grandparent in hometown" might greatly influence migrants' decision regarding whether leave their children behind as it is a norm for grandparents to take care of grandchildren in China. Yet, it should not impact children's educational achievement. 2) "Migrants' intention to stay in cities" will affect their family arrangements. For example, if they intend to stay in cities permanently, they are more likely to bring children to cities; alternatively, if they do not intend to stay in cities, they are more likely to leave children in origin. Yet, migrants' intention to stay in cities should not directly affect children's school performance. 3) "Number of relatives and friends in the

city” measures social support and social network migrants have in cities. With a larger number of friends and relatives in the city, migrants are more likely to bring their children to cities as they may have more information (on education) and enjoy more social support in childcare. Yet, it should not affect children’s school performance. In other words, these three variables are good candidates for IVs.

The endogeneity test results show that there is no endogeneity between whether bring children to the city or not and children’s school performance, by taking into account of any of the three IVs and all three combined (T2.1). A simple regression on two-category family arrangement (“migrant children” vs. left behind) against each IV reveals that while “presence of grandparents in hometown” and “migrant parents’ intention to stay in the city” are good candidates for IVs with large F-values, the “number of relatives and friends in the city” is not a good IV ($F < 0.62$). A two stage least squared regression (2SLS) was therefore performed for the first two IV candidates against “performance for Chinese”, followed by diagnostics. An overidentification test for the two IVs reveals that they jointly passed the exogeneity test (Sargan N^*R -sq test=0.618). However, they both failed the Durbin-Wu-Hausman test (p -value= 0.172), indicating that endogeneity is not a problem. We further test whether there is endogeneity between school performance and the six-category family arrangement, using the same two IVs. The results are similar, and we conclude that we did not find evidences for endogeneity.

T2.1

Results for Endogeneity Test on Instrumental Variables (IVs)

	IV1: Presence of grandparents in hometown	IV2: Migrant parents’ intention to stay in the city	IV3: Number of relatives and friends in the city
<u>Family Arrangement (migrant children vs. left behind)</u>			
F-test (w/ children’s migration status)	7.10	16.53	0.62
2SLS diagnostics (using Chinese as an example)	P value		
Exogeneity Test (Sargan N^*R -sq test)	0.618		
Endogeneity Test (Durbin-Wu-Hausman test)	0.172		
<u>2SLS Diagnostics (ref: left-behind children living with others)</u>			
Exogeneity Test (Sargan N^*R -sq test)	P value		NA
Migrant Children with both Parents	0.271		
Migrant Children with one Parent	0.608		
Left-Behind Children with Father	0.539		
Left-Behind Children with Mother	0.757		
Left-Behind Children with Grandparents	0.505		
Endogeneity Test (Durbin-Wu-Hausman test)	P value		
Migrant Children with both Parents	0.422		
Migrant Children with one Parent	0.602		
Left-Behind Children with Father	0.732		
Left-Behind Children with Mother	0.583		

	IV1: Presence of grandparents in hometown	IV2: Migrant parents' intention to stay in the city	IV3: Number of relatives and friends in the city
Left-Behind Children with Grandparents	0.567		

References

- Acosta P. 2006 Labor supply, school attendance, and remittances from international migration: the case of El Salvador. World Bank Policy Research Working Paper. :3903.
- Adams, Jennifer; Emily, Hannum. 2005; Children's Social Welfare in China, 1989–1997: Access to Health Insurance and Education. The China Quarterly. 181:100–121.
- All-China Women's Federation (ACWF). 2013; Research Report on the Situation of Rural Left Behind Children and Rural to Urban Migrant Children. China Women's Movement. 6:30–34.
- Antman, Francisca. 2013 The Impact of Migration on Family Left Behind, in Antman, Francisca M. "16 The impact of migration on family left behind". International handbook on the economics of migration. :293.
- Battistella G, Conaco MCG. 1998 The Impact of Labour Migration on the Children Left Behind: A study of elementary school children in the Philippines. SOJOURN: Journal of Social Issues in Southeast Asia. :220–241.
- Breyse P, Farr N, Galke W, Lanphear B, Morley R, Bergofsky L. 2004 The relationship between housing and health: children at risk. Environmental health perspectives. :1583–1588. [PubMed: 15531446]
- Brown, Philip H; Albert, Park. 2002; Education and Poverty in Rural China. Economics of Education Review. 21(6):523–541.
- Bryant J. 2005 Children of International Migrants in Indonesia, Thailand, and the Philippines: A review of evidence and policies.
- Cao H. 1997; Where to put their school desks? China News Digest. 315:3–6.
- Chen, YP, Liang, Z. Educational Attainment of Migrant Children: the Forgotten Story of China's Urbanization. In: Hannum, E, London, A Park, editors. Education and Reform in China. New York: Routledge; 2009. 117–130.
- Cheng T, Selden M. 1994; The origins and social consequences of China's *hukou* system. The China Quarterly. 139:644–668.
- Davis M. 2005 Planet of Slums.
- Dreby, J. Divided by Borders: Mexican Migrants and Their Children. Berkeley: University of California Press; 2010.
- Donato KM, Duncan EM. 2011; Migration, social networks, and child health in Mexican families. Journal of Marriage and Family. 73(4):713–728.
- Duan CR, Wu LL. 2009; The status quo of rural left-behind-Children in China and its analysis [J]. Journal of Chongqing Technology and Business University (Social Science Edition). 1:006.
- Edwards CA, Ureta M. 2003; International migration, Remittances and Schooling: Evidence from El Salvador. Journal of Development Economics. 72(2):429–61.
- Evans GW, Lepore SJ, Shejwal BR, Palsane MN. 1998; Chronic residential crowding and children's well-being: an ecological perspective. Child development. 69(6):1514–1523. [PubMed: 9914637]
- Ferraro KF, Farmer MM. 1999 Utility of health data from social surveys: Is there a gold Standard for measuring morbidity? American Sociological Review. :303–315.
- Gao Y, Li LP, Kim JH, Congdon N, Lau J, Griffiths S. 2010; The impact of parental migration on health status and health behaviours among left behind adolescent school children in China. BMC Public Health. 10(1):56. [PubMed: 20128901]
- De La Garza R. 2010 Migration, development and children left behind: A multidimensional perspective. Social and Economic Policy Working Paper. :1–37.

- Feng, Shuaizhang; Yuanyuan, Chen; Jiaji, Jin. *The Future of City: The Shanghai Model of Migrant Children's Education*. Shanghai: Shanghai University of Finance and Economics Press; 2017.
- Hanson, GH, Woodruff, C. *Emigration and educational attainment in Mexico*. Mimeo: University of California at San Diego; 2003.
- Hannum E. 2005; Evidence on Gender Stratification and Development. *Demography*. 42(2):275–299. [PubMed: 15986987]
- Hannum, E, Park, A. *Education and reform in China*. Routledge; 2007.
- Hannum, E, Xie, Y. *Trends in educational gender inequality in China: 1949–1985*. University of Michigan; 1994.
- Hannum E, Kong P, Zhang Y. 2009; Family Sources of Educational Gender Inequality in Rural China: A Critical Assessment. *International Journal of Educational Development*. 29(5):474–486. [PubMed: 20161037]
- Hernandez, DJ, editor. *Children of Immigrants: Health, Adjustment, and Public Assistance*. Washington, DC: National Academy Press; 1999.
- Huang Y, Tao R. 2015; Housing migrants in Chinese cities: current status and policy design. *Environment and Planning C: Government and Policy*. 33(3):640–660.
- Huang Y, Yi C. 2015; Invisible Migrant Enclaves in Chinese Cities: Underground Living in Beijing, China. *Urban Studies*. 52(15):2948–2973.
- Idler EL, Benyamini Y. 1997 Self-rated health and mortality: a review of twenty-seven community studies. *Journal of health and social behavior*. :21–37. [PubMed: 9097506]
- Kabeer N. 1994 *Reversed Realities: gender Hierarchies in Development Thought*. Verso.
- Kandel W, Kao G. 2001; The impact of temporary labor migration on Mexican children's educational aspirations and performance. *International Migration Review*. 35:1205–1231.
- Kasinitz, P, Mollenkopf, JH, Waters, MC, Holdaway, J. *The children of immigrants come of age*. New York: Russell Sage Foundation; 2008. *Inheriting the city*.
- Lavelly W, Zhenyu X, Bohua L, Freedman R. 1990; The rise in female education in China: National and regional patterns. *The China Quarterly*. 121:61–93.
- Lee, L, Park, A. *Parental Migration and Child Development in China*. Gansu Survey of Children and Families; 2010. working paper
- Li H, Zhang J, Zhu Y. 2008; The Quantity-Quality Trade-Off of Children in a Developing Country: Identification Using Chinese Twins. *Demography*. 45(1):223–243. [PubMed: 18390301]
- Liang Z, Chen YP. 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.
- Liu, C, Taibin, L, Jun, L. A case study of migrant sponsored schools in Western Shanghai. In: Zhang, S, Le, W, Xu, C, Song, C, editors. *The Floating Population in Shanghai: Current Situation and Future Prospects*. East China Normal University Press; Shanghai: 1998. 162–181.
- Lloyd CB, Blanc AK. 1996; 'Children's Schooling in Sub-Saharan Africa: The Role of Fathers, Mothers and Others'. *Population and Development Review*. 22:265–298.
- Lu S, Zhang S. 2001; Education of migrant children: report from survey of migrant schools in Beijing. *Strategy and Management*. 4:95–108.
- Lu Y. 2012; Education of children left behind in rural China. *Journal of Marriage and Family*. 74(2):328–341. [PubMed: 24163479]
- 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. DOI: 10.1086/667790 [PubMed: 24078743]
- Mare RD, Palloni A. 1988; Couple models for socioeconomic effects on the mortality of older persons. *Popline*. 46:4.
- Mckenzie, DJ; Rapoport, H. Can Migration reduce education attainment? Evidence from Mexico. Working paper for Child Migration Research Network (WPS3952). 2006. http://www.childmigration.net/files/Rapoport_06.pdf

- Meyerhoefer CD, Chen CJ. 2011; The effect of parental labor migration on children's educational progress in rural China. *Review of Economics of the Household*. 9(3):379–396.
- Office of Migrant Service and Management (OMSM) in National Population and Family Planning Commission (ed.). *Zhongguo liudong renkou fazhan baogao 2010 (A Report on Migrants' Development in China, 2010)*. Beijing: China Population Press; 2010.
- Palloni A. 2006; Reproducing inequalities: luck, wallets and the enduring effects of childhood health. *Demography*. 43:587–615. [PubMed: 17236536]
- Parreñas, R. *Children of Global Migration: Transnational Families and Gendered Woes*. Stanford, CA: Stanford University Press; 2005.
- Portes, A, Rumbaut, RG. *Legacies: The Story of the Immigrant Second Generation*. Los Angeles: University of California Press; 2005.
- Qiu, JL. *Working-class Network Society: Communication Technology and the Information Have-less in Urban China*. Cambridge: MIT; 2009.
- Salah MA. 2008 The impacts of migration on children in Moldova. United Nations.
- Schiff, M, Morrison, AR, editors. *The international migration of women*. World Bank Publications; 2007.
- Song L, Lin N. 2009; Social capital and health inequality: evidence from Taiwan. *Journal of health and social behavior*. 50(2):149–163. [PubMed: 19537457]
- South SJ, Haynie DL. 2004; Friendship networks of mobile adolescents. *Social Forces*. 83(1):315–350.
- Vladicescu, N, Cantarji, V, Jigau, I. *The impact of migration and remittances on communities, families and children in Moldova*. New York, NY: United Nations Children's Fund (UNICEF); 2008.
- Wang YP, Wang Y, Wu J. 2010; Housing migrant workers in rapidly urbanizing regions: a study of the Chinese model in Shenzhen. *Housing studies*. 25(1):83–100.
- Wu X, Zhang Z. 2015; Population migration and children's school enrollments in China, 1990–2005. *Social Science Research*. 53:177–190. [PubMed: 26188446]
- Wen M, Lin D. 2012; Child development in rural China: Children left behind by their migrant parents and children of nonmigrant families. *Child development*. 83(1):120–136. [PubMed: 22181046]
- Wen M, Su S, Li X, Lin D. 2015; Positive youth development in rural China: The role of parental migration. *Social Science & Medicine*. 132:261–269. [PubMed: 25176335]
- Winship C, Morgan SL. 1999 The estimation of causal effects from observational data. *Annual review of sociology*. :659–706.
- Wu W. 2002; Migrant housing in urban China choices and constraints. *Urban Affairs Review*. 38(1):90–119.
- Xiang B. 2007; How far are the left-behind left behind? A preliminary study in rural China. *Population, Space and Place*. 13(3):179–191.
- Xinhuanet. China unveils landmark urbanization plan. 2014. Mar 16, http://news.xinhuanet.com/english/china/2014-03/16/c_133190495.htm
- Xu H, Xie Y. 2015 The Causal Effects of Rural-to-Urban Migration on Children's Well-being in China. *European Sociological Review*.
- Yang, Dongping, editor. *Annual Report of the Education of China's Migrant Children*. Beijing: Social Science Academic Press; 2017.
- Yao B, Shi Y. 2009; Analyses on the management policy of left-behind children education. *Education and Teaching Research*. 23:18–22.
- Ye, Jingzhong; Lu, P. 2011; Differentiated childhoods: impacts of rural labor migration on left-behind children in China. *The Journal of peasant studies*. 38(2):355–377. [PubMed: 21744548]
- Zeng Z, Xie Y. 2014; The effects of grandparents on children's schooling: evidence from rural China. *Demography*. 51(2):599–617. [PubMed: 24578167]
- 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.
- Zhou M. 1997 Growing up American: The challenge confronting immigrant children and children of immigrants. *Annual review of sociology*. :63–95.

- Zhou C, Sylvia S, Zhang L, Luo R, Yi H, Liu C, Shi Y, Loyalka P, Chu J, Medina A, Rozelle S. 2015; China's Left-Behind Children: Impact of Parental Migration On Health, Nutrition, And Educational Outcomes. *Health Affairs*. 34(11):1964–1971. [PubMed: 26526256]
- Ziol-Guest KM, McKenna C. 2009Early childhood residential instability and school readiness: Evidence from the Fragile Families and Child Wellbeing Study. Center for Research on Child Wellbeing Working Paper 2009-21-FF.
- Zou H, Qu Z, Zhang Q. 2005; The Development and Needs of Migrant Children in Nine Chinese Cities. *Youth Studies*. 2:1–7.

Table 1

Summary Statistics for Independent Variables (all children)

	Mean	St. Dev	Median	%
Key Independent Variables				
Family Arrangement				
Migrant children				45.70
Migrant children living with both parents				43.35
Migrant children living with one parent only*				2.35
Left behind children				54.30
Left behind children living with mother only				8.76
Left behind children living with father only				2.82
Left behind children with no parents present, living with grandparents				29.42
Left behind children with no parents present, living with others				13.30
Total				100
Gender of child: Boy				58.85
Migrants' number of moves in cities	2.20	3.36	2.00	
Child's live space (m2 per capita)	56.05	94.6	29.33	
Control Variables				
Age of child	10.47	2.87	10	
Mother's education	6.36	3.14	6	
Father's education	7.57	2.89	8	
Number of siblings	0.50	0.56	0	
Nonagricultural wage income in 2008	39,761	40,747	33,180	
Migrants' duration of stay in cities	7.77	5.25	6.00	
School Type				
Urban public Schools				31.85
Migrants schools/others				13.69
Rural public Schools				54.46
Urban schools require fees for migrant children (yes=1)				89.08

Table 2

Academic Performance by Family Arrangement

Chinese (%)	Family Arrangement						
	All migrant children	Migrant children with both parents	Migrant children with one parent	All left behind children (LBC)	LBC with mother only	LBC with father only	LBC with grand-parents
Poor	1.53	1.61	0	4.04 ⁺	2.08	5.56	4.26
Lower medium	9.54	9.64	7.69	10.56	12.5	5.56	7.98
Medium	45.80	46.18	38.46	38.20 ⁺	37.5	44.44	38.3
Upper medium	28.63	28.11	38.46	28.57	29.17	27.78	30.85
Very good	14.50	14.46	15.38	18.63	18.75	16.67	18.62
Total %	100	100	100	100	100	100	100
Total N	262	249	13	322	48	18	188
Math (%)							
Poor	1.53	1.61	0	4.04 ⁺	4.17	5.56	3.19
Lower medium	12.60	12.85	7.69	10.56	12.5	5.56	7.45
Medium	41.22	41.37	38.46	32.30 [*]	27.08	33.33	35.11
Upper medium	29.01	28.51	38.46	30.43	29.17	27.78	31.91
Very good	15.65	15.66	15.38	22.67 [*]	27.08	27.78	22.34
Total %	100	100	100	100	100	100	100
Total N	262	249	13	322	48	18	188
Award (%)							
Yes	52.29	52.21	53.85	52.17	66.67	38.89	49.47
No	47.71	47.79	46.15	47.83	33.33	61.11	50.53
Total %	100	100	100	100	48	18	188
Total N	262	249	13	322	48	18	188

Note:

⁺ significant at 0.1 level^{*} 0.05 level^{**} 0.01 level

level 1000

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Table 3

Coefficients for Logistic Regressions on Chinese, Math, and Awards for All Children

Key Independent Variables	Chinese		Math		Awards	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Family arrangement (Ref.= LBC)						
Migrant children	11.240 ***	0.083	5.160	0.011	1.139	0.273
Gender of child (Ref.=Girls)	-0.982 ***	-4.942 +	-0.371 +	-2.173	-0.403 +	-2.521
Number of moves in the city	0.044	0.104 *	-0.007	0.055	0.041	0.232 **
Child's living space	-3.1E-04	-3.6E-04	3.2E-04	8.0E-05	0.002	0.003
Control Variables						
Age of child	0.006	0.015	-0.005	0.000	0.069 *	0.077 *
Mother's education	0.061 *	0.054 +	0.031	0.029	0.089 *	0.086 *
Father's education	0.036	0.040	0.041	0.041	0.034	0.030
Number of siblings	0.141	0.165	-0.076	-0.067	0.040	0.023
Wage income in 2008 (in log form)	0.679 **	-0.127	0.422 +	0.063	0.262	0.113
Duration of stay in the cities	0.022	0.009	0.025	0.007	0.038 +	-0.019
School Type (Ref.=Other Schools)						
Public schools	0.600 *	0.556 +	0.955 **	0.924 **	0.787 +	0.809 +
Urban migrant schools	-0.057	-0.070	0.323	0.295	0.504	0.531
Urban schools require fees for MC	-0.205	-0.138	0.232	0.265	-0.179	-0.185
Interactions:						
MC × Boys	0.448		0.391		0.670 +	
MC× Wage income in 2008	-1.110 ***		-0.527 +		-0.135	
MC× Child's living space	0.015		0.010		0.015	0.229
Boys × Wage income in 2008		0.409		0.188		-0.261 **
Boys × Number of moves in cities		-0.089		-0.099		0.090 *
Boys × Duration of stay in the city		0.023		0.029		-0.003
Boys × Child's living space		-0.001		4.7E-04		-3.814 +
Intercept 1	4.204 +	4.204 +	2.246	-1.345	-5.139 *	

Key Independent Variables	Chinese		Math		Awards	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept 2	5.862 **	5.862 **	3.977 +	0.389		
Intercept 3	8.106 ***	8.106 ***	5.846 *	2.256		
Intercept 4	9.655 ***	9.655 ***	7.309 **	3.708 +		
Number of Cases	579	579	579	579	579	579
Prob > F	0.000	0.000	0.01	0.02	0.001	0.000

Note:

+ significant at 0.1 level

* 0.05 level

** 0.01 level

*** 0.001

Table 4
Coefficients of Logistic Regressions on Chinese, Math and Awards for Migrant Children (MC)

Key Independent Variables	Chinese		Math		Awards	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
MC Family arrangement (Ref.=MC with two parents)						
MC with one parent only	9.881 *	1.867 ***	15.504 ***	2.156 ***	6.855	1.775 +
Gender of child (Ref.=Girls)	-0.454 +	-4.925	0.158	-4.887	0.302	-0.830
Number of moves in cities	0.069	0.138	0.026	0.086	0.132	0.187
Child's living space	0.018	0.031 *	0.011	0.019 +	0.019	0.034
Control Variables						
Age of child	-0.027	-0.041	-0.007	-0.021	0.109 *	0.113 *
Mother's education	0.041	0.017	0.049	0.019	0.149 **	0.140 *
Father's education	0.087 +	0.097 *	0.036	0.054	0.016	0.022
Number of siblings	0.675 **	0.714 **	0.177	0.238	0.080	0.072
Wage income in 2008 (in log form)	-0.328	-0.555 +	0.097	-0.197	0.128	0.068
Duration of stay in the city	-0.014	-0.002	-0.037	-0.017	0.004	-0.009
School type (Ref=Other schools)						
Urban public schools	0.820 **	0.903 **	1.252 **	1.313 **	0.777 +	0.913 +
Migrant schools	0.090	0.106	0.487	0.485	0.508	0.590
Urban schools require fees for MC	-0.480	-0.515	0.183	0.158	-0.421	-0.451
Interactions:						
MC with one parent only $\times$ Wage in 2008	-1.010 *		-1.569 ***		-0.590	
MC with one parent only $\times$ Living space	0.035		0.044 +		-0.016	
Boys $\times$ Number of moves in cities		-0.101		-0.084		-0.067
Boys $\times$ Duration of stay in the cities		-0.018		-0.030		0.026
Boys $\times$ Wage income in 2008		0.501		0.555		0.143
Boys $\times$ MC with one parent only		-3.009 ***		-3.447 ***		-2.329 +
Boys $\times$ Child's living space		-0.024		-0.015		-0.031
Intercept 1	-6.731 **	-8.817 **	-1.701	-4.459	-4.436	-4.164

Key Independent Variables	Chinese		Math		Awards	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept 2	-4.607 *	-6.709 *	0.704	-2.086		
Intercept 3	-2.040	-4.104	2.876	0.112		
Intercept 4	-0.327	-2.323	4.470	1.761		
Number of cases	259	259	259	259	259	259
Prob > F	0.000	0.000	0.002	0.000	0.041	0.038

Note:

⁺ significant at 0.1 level

* 0.05 level

** 0.01 level

*** 0.001 level

Table 5
Coefficients of Logistic Regressions on Chinese, Math and Awards for Left-Behind Children (LBC)

Key Independent Variables	Chinese		Math		Awards	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Family arrangement (Ref.=LBC with others)						
LBC with mother	7.895	0.318	6.408	0.260	12.070 ⁺	0.916 ⁺
LBC with grandparents	14.024 ^{**}	0.092	9.424 ⁺	0.195	7.361	-0.001
Gender of child (Ref.=Girls)	-1.197 ^{**}	-3.266	-0.441	2.279	-0.320	-5.255
Number of moves in cities	na	na	na	na	na	na
Child's living space	1.8E-04	-2.4E-04	0.001	1.2E-04	0.004	0.002
Control Variables						
Age of child	0.036	0.040	0.014	0.004	0.060	0.051
Mother's education	0.096 [*]	0.091 [*]	0.036	0.035	0.068	0.046
Father's education	-0.015	-0.021	0.041	0.031	0.040	0.046
Number of siblings	-0.280	-0.179	-0.249	-0.173	0.076	0.127
Wage income in 2008 (in log form)	1.341 ^{***}	0.541 ⁺	0.832 [*]	0.555 [*]	0.872 [*]	0.153
Duration of stay in the cities	0.059 [*]	0.044	0.072 ^{**}	0.042	0.058 [*]	0.026
Interactions:						
LBC with mother × Boys	-0.435		-0.126		-0.255	
LBC with grandparents × Boys	0.506		0.178		-0.108	
LBC with mother × Wage in 2008	-0.715		-0.560		-0.975	
LBC with grandparents × Wage in 2008	-1.359 ^{**}		-0.908 ⁺		-0.678	
LBC with mother × Child's living space	0.001		-0.003		-0.010 ⁺	
LBC with grandparents × Child's living space	-0.001		0.001		-0.003	
Boys × Wage income in 2008		0.208		-0.294		0.443
Boys × Duration of stay in the city		0.018		0.043		0.052
Boys × Child's living space		0.000		0.001		-0.002
Intercept 1	10.970 ^{**}	2.798	6.327	3.154	-11.077 [*]	-3.036
Intercept 2	12.506 ^{***}	4.287	7.786 [*]	4.591 ⁺		

Key Independent Variables	Chinese		Math		Awards	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept 3	14.643 ***	6.370 *	9.511 **	6.308 *		
Intercept 4	16.176 ***	7.873 *	10.966 **	7.752 **		
Number of Cases	320	320	320	320	320	320
Prob > F	0.000	0.000	0.072	0.033	0.187	0.113

Note:

⁺ significant at 0.1 level

* 0.05 level

** 0.01 level

*** 0.001 level