

Understanding the Situation of China's Left-Behind Children: A Mixed-Methods Analysis

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Abstract

Over the last three decades, large numbers of rural residents in China have migrated from the countryside to urban areas in search of better jobs and opportunities. Many of these migrants leave their children behind in their home communities, creating a new subpopulation in China known as left-behind children (LBCs). Many researchers have expressed concern that when children are left-behind it has a negative effect on their education and health, and, ultimately, on their overall human capital accumulation. This research attempts to understand the set of factors that lead to parental migration and the impact of being left-behind on the cognition/education, nutrition, and mental health outcomes of children in rural China. To do so, we use a mixed-methods approach combining quantitative data on 195,226 rural Chinese children and qualitative interviews with 164 children, caregivers, and teachers in rural China. We find that parental migration impacts children by increasing household income and decreasing care. The effects of increased income and decreased care manifest differently for children based on location, socioeconomic status, and age. We also find that families generally do recognize the impacts that parental migration has on children. These findings are important because they offer a more comprehensive understanding of LBC outcomes than those provided in previous research, which generally use samples from a limited geographic areas or age ranges. These results can be used by policy makers to design interventions to alleviate the negative impacts that parental migration has on LBCs in China. Although our research focuses on the case of China, these findings are relevant to the situations of other developing countries where significant portions of the working-age population leave their families to migrate domestically or internationally in search of work.

Keywords: China; left-behind children; labor migration; parental absence; remittance income

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1. Introduction

Over the last three decades, China's rapid development and urbanization has induced large numbers of rural residents to migrate from the countryside to urban areas in search of better jobs and opportunities (Hu et al., 2008; Wen and Lin, 2012; MHRSS, 2013). In the process of urbanization, many internal migrants leave their children behind in their home communities with a surrogate caregiver due to circumstances, such as financial constraints, the absence of social services (due to the *hukou* household registration system), and/or the transient nature of work in urban areas (Duan and Zhou, 2005; Ye et al., 2006). Consequently, a new subpopulation has emerged in China known as left-behind children, henceforth *LBCs*, who have been left in the countryside while their parents, henceforth *migrant parents*, migrate for work (Duan and Zhou, 2005). In recent decades, the size of this population has increased dramatically. Statistics from the Sixth Population Census suggest that there were more than 60 million LBCs in China in 2010 (National Bureau of Statistics of China, 2010).

Many researchers have expressed concern that when children are left-behind it has a negative effect on their education, health, and, ultimately, on their overall human capital accumulation (Meyerhoefer and Chen, 2011; Zhao et al., 2014; Zhou et al., 2014; Zhang et al., 2014; Yue et al., 2016). If this research is correct, then increased parental out-migration could directly increase educational inequality in the short run and indirectly increase income inequality in the long run. With this understanding, China's government has issued plans and implemented programs to address this problem (State Council, 2016). For example, in recent years the government has developed pilot programs to train and place mental health counselors in schools to help LBCs cope with the absence of their parents (people.cn, 2013; Jiangxi Department of

Education, 2013). Another program was developed to train “barefoot social workers,” who work to ensure access to social services for LBCs (Wang, 2015).

A literature has also emerged suggesting that, while vulnerable, LBCs may not be the most, or only, vulnerable group of children in rural China. Researchers have found that, in certain cases, the outcomes of LBCs are the same as or better than those of rural children living with their parents (henceforth *CLPs*). For example, research by Luo et al. (2015) has shown that there are no differences in the mental or psychomotor development between infants raised by their mothers and those raised by their grandmothers. Zhou et al. (2015) found few significant differences between school-aged LBCs and CLPs in any measures of health, nutrition, or education. Additionally, in the two cases where there were significant differences between these groups (soil-transmitted helminth infection and refractive error rates), LBCs exhibited better outcomes than CLPs.

These contrasting findings may arise because there are multiple pathways (some positive and some negative) through which parental migration affects children. In some cases, researchers have found a positive relationship between parental migration and LBC outcomes (Yang, 2008; Chen et al., 2009; Roy et al., 2015). This research finds that positive outcomes may result from relaxing household liquidity constraints (Du et al., 2005) and encouraging higher investments in LBCs (Edwards and Ureta, 2003; Yang, 2008; Lu and Treiman, 2011; Antman, 2012; Ambler et al., 2015). In contrast, other researchers have reported negative effects of parental migration on LBC outcomes (Meyerhoefer and Chen, 2011; Zhao et al., 2014; Zhou et al., 2014; Zhang et al., 2014) due to reasons such as absence of parental care (Lahaie et al., 2009; Ye and Lu, 2011) or increased time spent doing on-farm or in-home work (Chang et al., 2011; McKenzie and Rapoport, 2011).

Beyond these competing mechanisms, there may be other potential reasons for the inconsistent findings on the impacts of migration on LBC outcomes. Specifically, a number of methodological (or data-related) shortcomings could affect the nature of these results. For example, many studies rely on cross-sectional data, which makes it difficult to ascertain causality (Lee, 2011; Wang, 2014; Zhao et al., 2014; Zhou et al., 2014). Other papers rely on samples that are relatively small and may not provide the statistical power necessary to identify the impact of migration on academic performance (Lu, 2012; Hu, 2012; Lee, 2011). Finally, there are also papers that use data collected from a small number of villages or a single county (e.g., Zhang et al., 2014), causing their findings to lack representativeness.

It also is possible that the results are inconsistent because of the heterogeneous nature of the LBC population. Children are left-behind at different ages and with different types of caregivers. For example, the effects of parental migration on LBCs could differ depending on whether one or both of a child's parents have migrated for work. The direction of the impact of parental migration on LBCs may also depend on the outcomes being evaluated. It is possible that leaving a child of a certain age behind may affect one outcome (e.g., math test scores) in a certain way, and another outcome (e.g., a measure of anxiety) in a different way. Finally, the surrounding environment of the households represented in a sample may differ across studies and could affect the measured human capital impacts of being left-behind. In a setting of deeper poverty, the marginal effect of higher household income due to remittance payments from migrant parents may offset the negative effect of decreased care. In contrast, in samples of households from wealthier areas, the marginal and positive effects of higher migration-generated income, due to diminishing marginal returns, may be incapable of offsetting the negative impacts of decreased care. Although the competing effects of increased income and decreased care have

been widely discussed (McKenzie, 2005; Lu, 2012; Bai et al., 2016a, 2016b), to date no systematic effort has been made to examine how each of these mechanisms impact LBCs of different ages and from different types of households.

Beyond seeking to understand the direction and magnitude of the impact of parental migration on the human capital development of LBCs, there may be other research questions worth examining. Almost nothing in the current literature addresses questions such as: Why do parents decide to migrate? On what do parents base their migration decision? Prior to (or after) leaving, do parents recognize (or consider) the effect that migration will have on their children? Of course, one reason for the absence of a rich literature that examines these types of questions may be that the types of data they require are more difficult to collect than those needed to examine whether being an LBC is correlated with or causes certain outcomes. However, if we want to fully understand the implications of migration on the human capital development of LBCs, an understanding of the answers to these questions is necessary.

The overall goal of this study is to understand the set of factors that lead to parental migration and the impact of being left-behind on the cognition/education, nutrition, and mental health outcomes of children in rural China. To meet this goal, we have four specific objectives. First, we seek to better understand the effect being “left-behind” has on children of various ages. Second, we attempt to identify the mechanisms through which children are affected by the absence of their parents. In other words, what is it about parental out-migration that hurts—or helps—their children. In the most basic sense, this is just a discussion of the tradeoff between increased income and decreased parental care. Third, we evaluate whether parents take these effects into consideration when they decide to migrate. Specifically, we seek to determine whether parents understand the potential benefits and costs of their actions. Finally, we attempt

to examine the reasons why parents leave their children at home. In other words, why is it that parents decide to migrate and, if they migrate, why do they choose to leave their children behind in the countryside?

To meet these specific objectives, we use a mixed-methods research approach that includes a meta-analysis of seven quantitative studies and responses from 164 qualitative interviews. This research approach allows us to overcome two of the most prominent issues that arise when studying LBCs. First, because of the heterogeneous nature of the LBC population, studies that focus on a single sample, a single age-group, or a single outcome measure cannot provide us with general findings. To attempt to reach more general findings on LBCs, our quantitative-based (empirical-based) meta-analysis includes studies using sample of children of various ages that evaluate the effect of migration on several different outcome measures. Second, despite the richness and wide coverage of the empirical work that is included in the meta-analysis, quantitative data are not always able to study some important, but, more qualitative-oriented research questions. To better understand these questions, we use responses from a relatively extensive set of qualitative interviews with children, parents, caregivers, and teachers from China. Although this research approach—using a mixed methods methodology that includes both quantitative and qualitative information—is ambitious, we believe it is the only way we can determine general conclusions about this important topic.

The rest of this paper is structured as follows. The next section introduces our quantitative research approach. Specifically, we will introduce the studies included in our meta-analysis as well as describe the samples and the outcome measures evaluated. In the third section, we present our quantitative findings, which draw on the meta-dataset to address our first and second objectives. The fourth section discusses our qualitative methods, including details on

how we selected our sample of students, teachers, and caregiver respondents, and provides details on our interview protocol. Our qualitative findings are presented in section five and seek mainly to address our third and fourth objectives. The sixth section of the paper attempts to summarize the overall findings and draw conclusions.

2. Quantitative Approach

2.1 Data

In total, our sample consists of 195,226 children from ten provinces across China (Gansu, Qinghai, Shaanxi, Ningxia, Guizhou, Sichuan, Hebei, Zhejiang, Anhui, and Henan provinces). All data were collected between 2009 and 2015 and comprised at least two rounds of investigation/data collection. The papers published using the sub-datasets that comprise our metadata are presented in Table 1, and the exact locations and sample sizes of each study are presented in Table 2.

While there were slight differences across the studies in terms of the exact nature of sampling and data collection, there were many similarities. All surveys are broadly representative of rural areas in the sample provinces. All surveys followed uniform data collection protocols and employed experienced enumeration team leaders and supervisors. The enumerators were undergraduate and graduate students from local universities who were recruited from academic departments relevant to the focus of the survey in question. All enumerators underwent comprehensive training that lasted from two to seven days, depending on the complexity of the survey and testing instruments, and training was overseen by at least one of the study's principal investigators. Each of the surveys was designed by the principal investigator teams and was intended to collect data on a variety of health and education issues affecting rural

children. All survey enumerators were blind to children's parental migration status when outcomes were measured.

2.2 Data Collection and Outcome Measures

Using our metadata, we can examine the effect of parental out-migration on the cognition/education, mental health, and physical health of children in three different age groups: infants and toddlers (age 0-3), primary school students (grades 1-6), and secondary school students (grades 7-12). The age ranges of each sample are presented in Table 2.

The cognitive development outcomes of infants and toddlers in our sample were assessed using the Mental Development Index (MDI) generated from the Bayley Scales of Infant Development (BSID) test instrument. The BSID is an internationally validated test of infant cognitive and motor development that contains two components: the Mental Development Index (MDI) and the Psychomotor Development Index (PDI). The tests are given one-on-one with the caregiver present (and assisting when necessary). For the purposes of this study, we only use MDI scores. Lower MDI scores indicate lower levels of cognitive development and offer a way to identify developmental delays (or poorer levels of cognitive development).

Mental health development outcomes (or non-cognitive skills) of infants and toddlers were evaluated using the Ages and Stages Questionnaire: Social Emotion (ASQ:SE). The ASQ:SE is an internationally recognized, scaled test of infant and toddler social-emotional development. Specifically, the instrument measures and evaluates the self-regulation, compliance, communication, adaptive functioning, autonomy, affect, and interactions with other people of sample infants and toddlers. The ASQ:SE relies on the responses of mothers to questions asked by enumerators during face-to-face interviews. When interpreting the results, a higher ASQ:SE score is indicative of lower levels of social-emotional development issues.

The main education outcomes of primary school students were produced from math, Chinese, and English scales created by the authors with input from local education bureaus. Specifically, the outcomes were measured using standardized Mathematics, Chinese, and English test instruments. The Mathematics test instrument was designed based on the Trends in Mathematics and Science Survey (TIMSS), but we also ensured that test questions were consistent with the math curriculum taught in rural schools. The Chinese and English exams were developed based on national education curricula. All the questions in the endline tests were different from those in the baseline tests. Enumerators from the research teams were trained in strictly-timed examination protocols and administered/proctored all tests in person to minimize cheating and ensure that time limits were strictly enforced.

The mental health outcomes of primary school students were evaluated using three internationally recognized psychological scales: a Mental Health Test (MHT), a social anxiety scale for children (SASC), and a self-esteem scale (SES). The MHT scale measures general anxiety and has been used extensively across China (Deng et al., 2002). The test includes 100 yes/no questions, 10 of which are validity checks. If the student answered yes to more than 7 of the validity check questions, the test is considered invalid. The remaining 90 points make up a student's MHT score, where a lower score corresponds to lower risk for mental health problems and a score of 65 or higher indicates high risk for mental health problems.

The SASC can assess a child's emotional, cognitive, and behavior problems associated with the social anxiety and has also previously been used in studies in China (Zhou and Fan, 2001; Yuan et al., 2012). The scale is made up of 10 items, each requiring students to self-rate themselves on a three-point Likert scale. A higher score is indicative of a higher level of social anxiety.

The Rosenberg SES is a measure of self-esteem, which has been translated and previously used in China (Song et al., 2011; Wang et al., 2013). The scale is made up of 10 items and requires the students to self-rate themselves on a four-point Likert scale. For the SES test instrument, a higher score indicates higher levels of self-esteem.

Secondary school students in our sample were evaluated in a similar manner to primary school students. Specifically, educational outcomes were also measured using scores from standardized Mathematics, Chinese, and English test instruments. All instruments were developed in the same manner as for primary school students. In addition to the standardized test scores, we also use dropout rates to evaluate the effect of parental migration on the educational outcomes of secondary school students.

The mental health outcomes of secondary school students were assessed using the same MHT scale used with primary school students. Using the MHT scale allows us to evaluate the general anxiety levels of secondary school students. Because of time restrictions during the survey periods, we were unable generate measures of social anxiety and self-esteem for students of this age group.

3. Quantitative Results

3.1 LBC Prevalence

All seven datasets included in our sample found high rates of parental migration (Table 3). For any type of parental migration, these rates ranged from 14.4% of secondary school sample in Dataset 7 to 56.7% of primary school students in Dataset 3. Across our entire metadata, the cumulative rate of parental migration was 43.6%, both parents migrated in 28.7% of sample households in our metadata, and only one parent migrated in 15.0% of sample households (excluding Dataset 1 where this information was not available). However, in each of

individual sub-datasets where necessary information was provided, we found that migrant households were more likely to have one parent migrate (ranging between 25.6% and 37.5% of sample households, depending on the dataset) than have both parents migrate (ranging between 7.8% and 19.6% of sample households, depending on the dataset). The only exception was Dataset 7, where more households had both parents migrate (10.5% of the sample) than one parent migrate (3.8% of the sample).

3.2 Cognitive/Academic Outcomes

Table 4 presents a summary of how being left-behind is associated with the cognitive development and educational outcomes of sample children. In general, we find mixed impacts of being left behind on the cognitive/educational outcomes of sample children.

Findings from our sample of infants and toddlers (Dataset 1) suggest that being left-behind has a large, significant, and negative effect on the cognitive development of young children. We find that when mothers migrate for work and leave 6 to 24-month-old infants with their grandparents, the MDI scores of the infants decrease by about 2.57 points, on average. This effect constitutes a decrease of 0.15 standard deviations (significant at the 1% level). This finding signifies that maternal migration substantially harms the cognitive development of infants. Given that the literature base generally finds that investments in early childhood have massive implications for lifelong educational outcomes (Heckman, 2006), this suggests that young children in rural China that are left behind may be placed at a disadvantage that cannot be made up for later in life.

Although being left-behind has obvious negative impacts on the cognition of infants, its effects on the educational outcomes of primary school students are not as clear. For example, using Dataset 2, we found no significant differences in educational outcomes between LBCs and

CLPs in terms of standardized Mathematics, Chinese, or English test scores. In contrast, using one sample of primary school students from the relatively well-off Shaanxi province (Dataset 3), we found that the migration of the second parent in households where one parent had already migrated had a significant negative impact of 0.08 SD on the standardized Mathematics test scores of students (significant at the 10% level). However, conducting the same analyses using a sample of students from a comparatively poor area of Qinghai province (Dataset 5) found that when any parent in a household out-migrated between the time of the baseline and endline surveys, their child's standardized English test score rose relative to those of the children whose parents never migrated, all else held constant. Additionally, it was found that second parent migration had a significantly positive effect on the educational outcomes of sample students. Although we cannot say for sure, it is possible that the marginal effect of increased household income is higher in poorer areas of China (Qinghai compared to Shaanxi), and, therefore, may be perceptible in poorer areas but not in more prosperous ones.

Similar to the results found using our samples of primary school students, the results from our secondary school samples also present mixed results on educational outcomes. Findings from Dataset 6 suggest that parental migration has a small, but negative impact on the academic performance of LBCs at the secondary school level. Specifically, we find that when any parent migrates, it reduces a child's standardized math score by 0.07 standard deviations, on average (significant at the 10% level). However, analysis using Dataset 2 did not find significant differences between LBCs and CLPs in either standardized test scores or dropout rates. The differences in these outcomes may be explained by the fact that Dataset 6 sampled in areas of nine provinces with various levels of household income, but Dataset 2 only sampled in a

relatively rich area of Shaanxi province. Again, these results suggest that the environment in which children live is associated with how being left behind affects educational outcomes.

3.3 Mental Health Outcomes

Unlike the generally mixed results found on cognition/educational outcomes, parental out-migration is found to have no positive impacts on the mental health condition of children. Poor mental health outcomes are related to a higher incidence of self-esteem issues, depression, anxiety, and anti-social behavior in affected individuals. Beyond individual effects, poor mental health status in a population can also have detrimental economic and social effects. For example, these conditions have been found to be related to decreased work productivity (Simon et al., 2001; Stewart et al., 2003) and antisocial behavior that can lead to increased crime rates (Loeber, 1982; Huesmann, Dubow, & Boxer, 2009; Moffit, 1993). For this reason, mental health issues have negative implications for not just individuals, but also for Chinese society at large. A summary of the findings on mental health is presented in Table 5.

Among infants and toddlers in our sample (Dataset 1), the ASQ:SE scores of children whose grandmother was their primary caregiver did not differ significantly from those children whose mother was their primary caregiver. However, this does not mean that the mental health situation of either LBCs or CLPs is good. It was also found from this research that about 40% of infants in this sample scored low enough on the ASQ:SE questionnaire to indicate high risk for social-emotional development issues. Although maternal migration does not appear to be related to the social-emotional development of infants, these results suggest that all rural Chinese infants are placed at a greater risk for developmental issues compared to the general population. For this reason, it is important that resources be focused on improving the social-emotional development and mental health condition of all rural infants.

In terms of our primary school samples, we find that parental migration is negatively associated with the mental health status of students. According to our findings using the primary school sample in Dataset 4, parental migration increases measures of anxiety and decreases measures of self-esteem among children in this age group. Specifically, the MHT and SASC scores of primary school LBCs increased by 1.43 and 0.32 points, respectively (both significant at the 1% level), indicating increases in general anxiety and social anxiety. In addition, the average SES score of students decreased by 0.17 points (significant at the 10% level), signifying a decrease in the self-esteem of students. This study also found that parental return-migration does not appear to (at least immediately) undo the harmful impact of out-migration on their child's mental health, as return-migration had no significant effects on the MHT, SASC, or SES scores of sample children. Clearly, parental migration has negative impacts on the mental health of primary school students that cannot be corrected even if parents return home.

We also find that the negative effects of parental migration on the mental health of children continue as they enter secondary school. Specifically, among a sample of junior high school students in Dataset 7, we find that the standardized MHT scores of LBCs are 0.17 standard deviations higher than their CLP peers (significant at the 1% level), indicating higher levels of general anxiety among LBC students. This finding indicates that even as children continue in their schooling, left-behind children appear to perform worse than their peers in terms of mental health.

These findings that parental migration negatively affect the mental health condition of primary and secondary school students (and offers no benefits to younger children and infants) are concerning given that research has shown that mental health issues that emerge in childhood often continue into adulthood (Rao, Hammen, & Daley, 1999; Harrington et al., 1990). Because

parental migration appears to have irreversible negative impacts on the mental health situation of children, it may be the case that labor migration in rural China will deteriorate the mental health of rural residents over the long-term. Because mental health issues, such as depression and anxiety, have been shown to decrease productivity and human capital development (Ding et al., 2006), this situation could have serious consequences for China's future economic development.

3.4 Quantitative Results Summary

Our quantitative analysis reveals three main conclusions. First, we find that parental migration generally does not benefit the cognitive and non-cognitive development of infants and toddlers. Specifically, we find that measures of cognitive and social-emotional development are low among our sample of infants, and maternal migration appears to decrease measures of infant cognitive development. These findings for children of this age group are concerning, as cognitive and social-emotional development during infancy have been shown to affect an individual's lifelong outcomes (Heckman, 2006; Doyle et al., 2009). These results may be due, in part, to differential parenting styles between mothers and grandmothers. Research has found that infants that suffer from emotional neglect are more likely to have worse cognitive and social-emotional development outcomes than their peers (Hildyard and Wolfe, 2002). Using Dataset 1, we found that mothers are far more likely than grandmothers to engage and interact with their child by singing to, reading to, and playing with them. It may be that this lack of engaged parenting harms their cognitive and social-emotional development of LBC infants.

Second, our results suggest that being left-behind in rural areas has no positive impacts on the mental health of children of any age. Specifically, we find that being left behind has significant, negative impacts on the mental health status of primary and secondary school students and no significant impacts on the social-emotional development of infants. Although we

find that the mental health condition of LBCs is the same if not worse than that of their CLP peers, there is also evidence that all children in rural areas may need additional mental health support. For example, using Dataset 1, we found that 40% of sample infants were at risk for social-emotional development issues. In addition, if we were to compare rural students with their urban counterparts, it is likely that all children in rural China would be found to be vulnerable and require extra resources. For this reason, broadly-targeted interventions aimed at improving the mental health conditions of rural children may be the most effective at improving such issues in rural China.

Finally, our findings may suggest that the impacts of parental migration are contingent on the nature of the sample of children. Our findings on the academic outcomes of LBC and CLP students appear to suggest that household income plays a role in determining how being left behind impacts children. Using Dataset 5 from Qinghai province, we find more positive results than those results found using other samples from more prosperous areas, such as the sample areas in Datasets 2 and 3. In the case of Qinghai, it appears that the marginal effect of increased household income provided by parental migration is enough to offset the effect of decreased care, leading to more positive outcomes for LBCs.

4. Qualitative Approach

While the quantitative section showed that in many cases the outmigration of parents had a negative effect on their children, in this section we want to examine whether parents understand the implications of their actions. To supplement the findings of our quantitative research, we conducted a series of interviews in rural and urban areas of Shaanxi province. Three primary goals drove this qualitative research: a.) to understand why parents choose to migrate; b.) to identify the mechanisms through which parental migration may be impacting LBCs at

different ages; and c.) to determine whether parents are aware of these effects and take them into consideration when they decide to migrate. To gain a full understanding of these three topics, our qualitative interviews included three types of respondents: students (LBCs and CLPs), caregivers (of LBCs and CLPs, as well as migrant parents in cities), and teachers.

For our student interviews, our sample selection was conducted as follows. First, we chose our two sample counties in Shaanxi province, taking into consideration the migration patterns and socioeconomic situations of the selected locations. Then, within our two sample counties, we selected nine primary and secondary schools to include in our sample (four primary schools and five secondary schools). After choosing the schools, we purposively selected students to have a sample of respondents with diverse parental migration statuses. Specifically, within each school we primarily chose LBC students to include in our sample, although we also conducted interviews with CLPs to better understand the differences that exist between LBCs and their peers. We attempted to interview 10 students in each school (7 LBCs and 3 CLPs), although the exact breakdown deviated slightly in each school. As can be seen in Table 6, we interviewed a total of 90 students: 38 primary school students and 52 secondary school students. In terms of the parental migration statuses, 63 students were any type of LBC (father, mother, or both parents migrated) and 25 students were CLPs (Table 6).

The caregiver sample was also purposively selected to reflect a variety of household migration statuses. Specifically, we selected caregiver respondents in several ways: for caregivers of primary and secondary school students, we consulted with school principals at our sample schools to identify respondents; for caregivers of infants and toddlers, we worked with local officials to identify households in sample communities; and for migrant parents we interviewed parents who had migrated to Xi'an and left young children at home. In all, we

interviewed 68 caregivers, 24 of whom were caregivers of infants or toddlers and 44 of whom were caregivers of school-age children. Initially, we had only anticipated to interview LBC and CLP caregivers, however during our interviews we noticed the complexity and diversity of household migration patterns, and for this reason also chose to add interviews with migrant parents. In total, we interviewed 34 LBC caregivers, 28 CLP caregivers, and 6 migrant parents.

In addition to adding interviews with two types of caregivers noted above, during the interview process we also realized that responses from teachers would provide additional insight into the situation of LBC students. Although students and caregivers can speak to their own experience, teachers are able to observe the differences between students from households with different migration statuses with a certain amount of objectivity.

All 164 respondents gave informed consent for the interviews. We developed an interview protocol for each type of respondent (that is, students, caregivers, and teachers) that were flexible to the different household migration statuses. Each interview lasted from 20 to 40 minutes and was semi-structured: interviewers referenced a scripted interview protocol, but also had the freedom to diverge from this protocol to investigate specific stories that emerged.

5. Qualitative Results

5.1 Parent Migration Decisions

When we asked parents and other caregivers about the motivations for migration, respondents indicated that parents are motivated to migrate by the financial opportunities in cities. Typically, the employment prospects available in cities are considerably more lucrative than those in rural areas. Our interview respondents estimated that when a household member migrates for work, it can increase household income from anywhere between 10,000 and

120,000 RMB per year. Given that the national average household income in rural areas in 2015 was only 11,421.70 RMB (NBS, 2016), labor migration offers rural households the ability to substantially increase their income.

I can earn more here, and there is no work to do at home. In one month, my net income is about 1800-2000 RMB and I'll send 20-30 RMB back home as an allowance for my son [Migrant Parent 2.8.4.14.2.1]

There aren't any jobs in this county, so you need to leave. At this point, it is very difficult for the parents to find jobs because they haven't graduated from elementary school. [Grandparent 3.2.3.5.0.4]

At home, there are no jobs to work, there is a lot of room to develop when you migrate for work, so it wasn't hard for the parents to decide to migrate. [Grandparent 3.4.1.8.0.3]

The most common reason that parents and other household members migrated to cities for work was because they felt that there was no other option. Following decades of economic development and the rise of consumerism in China, the self-sustainable, agrarian lifestyle that was once the norm in rural areas can no longer adequately provide for the needs of these households. Although about 44% of China's population, and most the country's children (57.4% according to the 2010 census), still reside in the countryside (NBS, 2010; 2016), relatively few off-farm employment opportunities exist in these areas. This situation was apparent as we conducted our interviews. At our interview sites, there were often only a handful of storefronts and restaurants in operation in the villages, if there was a commercial area at all.

Migrating isn't a choice, it's a necessity. [Parent 2.1.3.2.0.2]

Migrating for work isn't a choice, if you don't migrate for work, then there is no guarantee that you'll be able to survive. [Grandparent 3.1.3.2.0.1]

They will continue to migrate because this is the only way that to support the child's education. [Grandparent 3.4.1.8.0.2]

5.2. How parental migration affects children

It is our belief that there are two main mechanisms through which parental absence will affect the cognitive and mental health outcomes of LBCs: an income effect and a care effect. Although rural labor migration provides numerous benefits for rural residents and helps maintain their livelihoods in communities that are devoid of many forms of off-farm employment, it cannot be ignored that parental absence will acutely affect the children that they leave behind in the countryside. In this subsection, we seek to unpack how increased household income and decreased parental care lead to different outcomes for LBCs in relation to those of other children.

5.2.1. Income Effect

We found that the increased household income provided by labor migration did not have any perceivable effects on the standard of living in migrant households or the resources provided to LBCs. It is likely that this situation arises because our survey respondents do not have much (or any) basis for comparison. This is because labor migration is the norm for most households in our sample. Interview respondents indicated that members of their families had always migrated, so it cannot be expected that they would know what their economic circumstances would be without remittance income.

The child's father has been working since he was in his teens. He came back when the child was born and then left again. [Parent 2.3.1.7.0.2]

I have been migrating for work for about 16 years... I am not currently planning on returning home because I still need to make money. [Migrant Parent 2.8.3.14.2.1]

I don't think I'll return home because then there'd be no spending money or income. [Migrant Parent 2.8.3.14.2.2]

Both student and caregiver respondents indicated that they do not believe household expenditure changed significantly after one or both parents migrated for work. This again may be because labor migration is a regular occurrence in most households. However, it is also possible that this situation arises due to the fact that increased income is often used to save for future

expenditure or pay off debts. If expenditure is spread in this manner, then it is likely that the impacts of increased remittance income are not visible over the short-term.

There have been no financial changes because all the money is saved for the child's future. [Parent 2.4.1.7.0.8]

The parents migrated to provide for the child's education, to buy necessities for the household, and to pay off some debts that we still have from buying our house. [Grandparent 3.3.2.8.0.1]

Although responses from our qualitative interviews appear to suggest that increased income is imperceptible and unlikely to affect the livelihoods of LBCs, this may be because we conducted our interviews in relatively well-off rural areas. It may be that the average household income in our sample areas are already sufficient to provide for everyday expenses. It is possible that if we conducted our interviews in more impoverished rural areas (such as the in the area of Qinghai province represented in our quantitative data) we would find impacts on education, food, and health expenditures in rural households after one or both parents migrate.

The change hasn't been large, but it's definitely better than before. The most important thing is that we can provide more for our child. [Parent 2.3.4.7.0.4]

There hasn't been any change for his grandfather or me, the most important thing is being able to provide for the child. The interest on a year's savings is not sufficient. So, there has not been a change. [Grandparent 3.4.1.9.0.1]

5.3.1. Care Effect

To best account for the heterogeneity among LBCs in our qualitative sample, we examine how decreased or absent parental care impacts the outcomes of LBCs in three different age groups: infants and young children, primary school students, and secondary school students.

5.3.1.1. Infants and young children

Our infants and young children sample ranged from six months to three years of age. In the case of single-parent migration, all primary caregivers interviewed were mothers, and all primary caregivers interviewed were grandparents in households where both parents migrated.

Interviews with our sampled caregivers revealed that many parents believed it was reasonable to migrate when their children were young because infants and toddlers would not remember or be affected by the absence of their parents.

There are some negative impacts, but the child is too young right now to remember anything, so there will not be too big of an impact. There might be impacts after the child starts going to school. [Grandparent 3.4.1.9.0.1]

The child does not understand anything, even if their parents are by their side or there is a special circumstance, the child is too young and will not remember anything. [Grandparent 3.4.1.9.0.1]

From our interviews, we discovered that there are noticeable differences in care between parents and grandparents that serve as primary caregivers. For example, while all parents in our qualitative sample speak Mandarin, many grandparents speak only dialect. Growing up in a household where only dialect is spoken may mean that children's Mandarin skills will be underdeveloped by the time they enter school. Although there have been some exceptions in recent years, most schools in China still teach exclusively in Mandarin Chinese (Lai et al., 2016). If a child does not enter school with sufficient Mandarin skills, their ability to learn will be negatively impacted.

I'll tell my child stories in Mandarin but her grandmother only knows how to speak in dialect. [Migrant Parent 2.6.0.13.1.2]

I was thinking about migrating as well, but his grandmother is uneducated, so I decided to stay at home. [Parent 2.3.2.6.0.1]

In addition to differences in language, grandparents also appeared to be less receptive to new parenting information and less capable of physically caring for children than their mothers. Grandparents reported raising their grandchildren the same way they raised their own children and did not look to outside sources for new parenting information. However, there have been major developments in our understanding of childhood development in the last several decades, and the way grandparents describe raising their children is often out of line with these

developments. Parents, on the other hand, appear to be more likely to look to outside sources of information on parenting and adopt more positive parenting practices than those used by grandparents.

There is a generational gap, his grandfather and I need to do farm work, we won't focus all of our energy on taking care of him. [Grandparent 3.4.1.8.0.3]

His mother and father do not approve of how we take care of the child, there is a generational gap in our understandings of how a child should be raised. [Grandparent 3.3.2.7.0.6]

There is a generational gap in how we care for the child...The child's grandmother doesn't listen and just hits the child, and she doesn't approve of how the parents take care of the child [Grandparent 3.1.3.2.0.1]

Responses to our interview questions also indicated that grandparents may not be as physically capable to care for children. Several grandparents reported that they had difficulty keeping up with and caring for a child due to a lack of energy that they attributed to old age. As a result, grandparents were often reluctant to play with their grandchildren and preferred to leave children to play by themselves or watch television. Unfortunately, this situation seriously limits the amount of interaction the child receives. Without cognitive and social stimulation, children could potentially suffer from cognitive and social-emotional delays (Walker et al., 2007).

"We watch cartoons with our kids, we walk around with them, and the child plays with toys by himself." [Grandparent 3.4.1.8.0.3]

Our family has a small child and it isn't good to have only the grandmother and grandfather take care of him. I'm afraid that they not capable of taking care of the child. [Parent 2.3.1.7.0.1]

Proper nutrition is also crucial during the earliest stages of life. However, just as grandparents were ill-informed about proper parenting practices, they also were not well-acquainted with current knowledge on child nutrition, and this was often mentioned as a detriment by parents. We found that grandparents in our sample were likely to feed their children staple foods and formula, but the World Health Organization (WHO) recommends that children

be introduced to complementary foods starting at six months of age, and that children eat some form of meat, poultry, fish, or eggs, as well as some form of fruit or vegetable daily (Dewey, 2003). From responses to our interviews, it appears that these feeding practices are not followed by the caregivers of infants and toddlers.

The grandparents only pay attention to whether the child eats, they do not pay attention to anything else. [Parent 2.7.3.13.1.2]

In terms of eating, the child eats a lot of snacks, and this isn't good. But this child does not like to eat vegetables, and his grandparents don't force him to eat them. [Parent 2.7.4.12.2.3]

5.3.1.2. Primary School

Interview respondents in primary school were between the ages of 9 and 13 years old and the majority (12/15) had one or both parents migrate by the time they were 5 years old. Although many caregivers indicated that they believe it is best for parents to be home when children are in school, others believed that grandparents are still capable of helping with schoolwork at this educational stage. Additionally, several parents cited that once children could take care of themselves at a basic level, they felt more comfortable migrating for work.

It is most important for a child to have their parents' care when they are attending primary school. [Grandparent 3.1.3.2.0.1]

The most important period [for parents to be at home] is when the child is in kindergarten and primary school, because you want to establish a good educational foundation. [Parent 2.3.1.7.0.2]

Once the child is 10 years old, I also plan to migrate for work [Parent 2.4.2.6.0.5]

To not influence the child's schooling, two years after the child attends first grade his mother will take care of him herself, she'll return and look for a job in this county. [Grandparent 3.4.1.8.0.3]

Their mother will return next year because the oldest child will start primary school and needs instruction from his mother. [Grandparent 3.3.2.6.0.3]

I'll migrate for work when the child is able to attend school on her own. [Parent 2.4.2.9.0.4]

From our qualitative interviews, it appears that there are two main mechanisms through which decreased care affects primary school children: decreased educational support and increased loneliness/stress. When parents migrate, many children are left behind with their grandparents, who often have received little (if any) education. This was apparent from our interviews. We found that, while other students have someone at home who can help them with school work, 10 out of 15 LBC in our primary school sample reported that their caregivers are not capable of helping them with their schoolwork. This is of concern for the educational outcomes of LBCs over the long-term, as it has been shown from previous research that adequate academic support is a key input to the educational achievement and educational gains of students (Jeynes, 2005; Sheldon and Epstein, 2005).

My grandmother can't help me with my homework because she had never attended school, but she will remind me to do my homework. My grandmother tells me that I first need to do my homework, then I can play. [Primary School LBC 1.2.3.5.1.3]

I don't live at school, so I help my mother with chores when I return home. I watch after my younger brother and sister. In the evening, I do my homework and go to sleep around 9:30 pm. My mother and father will check my homework. [Primary School CLP 1.2.3.5.1.5].

"No, [my grandparents] don't help me with my homework because they received very little education." [Primary School LBC 1.1.4.4.1.5].

Parental migration can also increase feelings of sadness and loneliness among LBCs. All primary school LBCs interviewed reported missing their parents, and 10 of the 15 LBC respondents said they would prefer that their parents return home than continue to work and live in a different location. Four LBC respondents even indicated that they have been negatively affected emotionally from the absence of their parents. Additionally, 13 of the 15 LBC students reported that they spoke with their parents once a week at most, and several spoke with their parents even less frequently.

I want to make them return and live here, I think that it isn't good that they migrate for

work because they are not able to be with me. [Primary School LBC 1.1.3.2.2.3]

I'm really hurt, I hope my mother and father would return home soon. [Primary School LBC 1.1.3.1.2.3]

I'm very sad, I wish they could return, if doesn't matter if they bring gifts or not. [Primary School LBC 1.1.3.2.2.1]

I was really happy when I was in Zhejiang with my parents. I'm not happy here because my father is gone. [Primary School LBC 1.1.3.2.1.4]

My biggest wish is for my dad to not be a migrant worker anymore [Primary School LBC 1.7.3.11.1.1]

During our interviews, we gained the impression that the caregivers of LBCs cannot make up for this care deficit. Most LBC respondents (9 out of 15) reported that their caregiver does not interact with them in an engaging manner, as they will often only do chores or watch television together. Among the LBCs that live their grandparents, 10 of the 13 reported that there were noticeable differences between the care they received from their grandparents and that they had received from their parents. These differences often emerged in terms of help with schoolwork and interest in the child's life.

There is a little bit of a difference [between myself and CLPs], they're able to receive more care. [Primary School LBC 1.2.3.4.1.5]

[When I return home from school] I will eat dinner and watch TV with my parents, do my homework, and find classmates to play with [Primary School CLP 1.2.3.4.2.2]

These findings are concerning because research has shown that parental outmigration can lead to long-term, negative cognitive and physical outcomes for LBCs. Research has found that children's development relies on supportive relationships with adult caregivers, particularly their parents (National Scientific Council on the Developing Child, 2004). In the absence of such relationships, children may face unnecessary stress that can become toxic. Toxic stress occurs when an individual's stress response is activated for a prolonged period and the stress is not mitigated by supportive relationships. When children suffer from toxic stress, it can disrupt brain

development, increase the risk of stress-related diseases, and lead to life-long cognitive impairments (Center on the Developing Child, 2017).

There is also reason to believe that prolonged separation from a primary caregiver can be emotionally distressing and have a negative effect on the mental health of the child, and this is the case even if there are periods when the child and the caregiver are together (National Scientific Council on the Developing Child, 2004). Given these findings, it is likely that the negative care effect experienced by primary school LBCs negatively impacts them over the long-term in ways that may not be immediately perceptible to parents and caregivers.

5.3.1.3. Secondary School

Secondary school children in our sample were between the ages of 13 and 18 and over half of these students were LBCs (37/53). Among the LBCs in our secondary school sample, 20 students were from households where both parents had migrated, and 17 lived in households where only one parent had migrated. Most sample students in this age group reported that they did not believe that the migration of their parents had any noticeable effect on them. However, we believe this is likely arises for two reasons. First, because the parents of all but one sample LBC student began migrating for work before the child entered junior high school, meaning that they had little basis for comparison. Second, a large proportion of students in our secondary school sample boarded at school. It is possible that these students would experience less of a care deficit following the migration of their parents, as they substitute this care, to a degree, with that of their teachers and classmates.

It is most important [for parents to be at home when] the child is in kindergarten and primary school, afterward they can take care of themselves. [Parent 2.4.1.7.0.8]

Although students generally communicated that parental migration didn't substantially

impact them, they still noted differences between their current situation and one where their parents were at home. For example, many students indicated that their household responsibilities, such as chores or caring for younger siblings, are greater than would be the case if their parents at home.

[I think there is a difference between myself and CLPs] because they have their parents by their side if they ever run into any issues, and their parents can take care of them when they are sick. [Secondary School LBC 1.1.4.3.1.1]

When [CLPs] are playing, I need to do chores like doing laundry [Secondary School LBC 1.1.4.4.1.2]

In addition, it also appears that LBCs noticed slight differences in their ability to communicate with different caregivers. Several students noted that they could talk with their parents more easily than with their surrogate caregiver, particularly if their caregiver is their grandparent. This may be because grandparents usually have lower educational attainment than parents, and because many grandparents only speak dialect, while students have learned to speak in standard Mandarin at school. Due to these deficiencies, it is likely a knowledge or language impediment that keeps students from engaging in any sort of meaningful or substantial conversation with their grandparents.

“I feel very empty and bored when I am at home. When my parents are at home, my home feels very warm and loving.” [Secondary School LBC 1.5.5.10.2.2]

“I help [my grandparents] cook and we watch TV together but we don’t really talk.” [Secondary School LBC 1.1.4.4.1.5]

Although these care deficits appear to be minor compared to those of younger LBCs, the increased stress and isolation experienced by adolescent LBCs can lead to certain negative outcomes that are specific to this age group. Certain periods of brain development, such as during adolescence, have been found to leave an individual particularly vulnerable to developing depression due to stress exposure (Andersen and Teicher, 2008). Depression has been found to

lead to numerous negative outcomes, such as diminished energy and functioning, negative educational and labor market outcomes, interpersonal problems, and substance abuse (Lewinsohn et al., 1993).

We have reason to believe that LBCs are particularly vulnerable to developing depression and other psychological issues due to stress for two reasons. First, social isolation can diminish the ability of LBCs to cope with stress (Cacioppo and Hawkley, 2003, House, 2001) and permanently alter brain structure (Lewis et al., 1990). Second, there is evidence lack of parental support also reduces the ability of adolescents to cope with stress. The effects of lack of parental support may be particularly acute for LBCs, as research has found that the loss of a parent before the age of 17 has a significant impact on the development of mood disorders, and the effect from long-term parental separation is larger than that from parental death (Agid et al., 1999). These outcomes are especially apparent when there are discontinuities in social support (Kaltiala-Heino et al., 2001). In addition, research suggests that social support from other individuals, such as peers, cannot completely substitute for parental care (Stice, Ragam, and Randall, 2004).

Although we did not screen for depression symptoms among LBCs in our sample, it may be the case that a disproportionate number of LBCs in junior high and high school do exhibit symptoms of depression. Several LBCs spoke of the stress they experience due to schoolwork, sleep disturbances, as well as the feelings of loss they experience due to the migration of one or both parents. Considering the research on stress and depression in adolescents, the situation of our sample LBCs does not appear to be supportive enough to allow students to regulate stress, which can have implications for their mental/physical health and educational/labor outcomes over the long term.

I'll occasionally sleep for 8 or 9 hours, but it is usually only 3 or 4. I'll be thinking about things, or about my relationships with my classmates and parents. For example, If I fight

with one of my classmates I'll think about whether I had done something wrong or not, or I'll just miss my parents. [Secondary School LBC 1.1.4.3.1.3]

At one point I had the opportunity to live together with my parents, but I didn't want to go because I felt that my parents didn't have enough experience taking care of me. [Secondary School LBC 1.1.4.5.1.4]

During final examination period or when I don't manage my relationships with classmates well, I'll become emotionally exhausted. [Secondary School LBC 1.1.4.5.1.4]

I'll often feel tired because of the Gaokao (college entrance exam), there is a lot of pressure to study, I get really agitated when completing questions. [Secondary School LBC 1.5.5.10.2.2]

I'm doing okay emotionally, but it's right before the Gaokao and I have absolutely no self-confidence. [Secondary School LBC 1.5.5.3.2.2]

[LBCs and CLPs] are not the same emotionally. As they get older it gets worse, because they begin to become more aware of their "LBC" status. [Teacher 4.6.4.13.1.1]

5.4.1. Parental Recognition and Consideration

Given the responses to our interviews that elucidated how migration affects LBCs, we then sought to determine whether parents were aware of these effects, and, if they were, how these effects influence their migration decisions. Many caregivers in our sample realized that their absence would have a negative impact on their child and on intra-family relationships. Many caregivers noted that parent-child relationships were strained after parents migrated. This could be because many children were emotionally distressed when their parents left, or because they had not become sufficiently attached to their parents in their absence. In addition, several caregivers noticed changes in their child's personality following parental migration. Children were often described as more introverted and withdrawn than they had been before the departure of their parents. Many caregivers also noted that there seemed to be a change in children's grades after parental migration, and that they did not think this situation could be remedied if parents returned.

I feel that the child used to be happy, but now she is very timid. [Parent 2.4.1.8.0.6]

Before we left, the child was lively and happy, but after afterward the child became very shy and introverted, and her grades also got worse. [Parent 2.1.3.1.0.3]

I think parental migration has a negative effect on children. When parents migrate for work it will influence their relationship with the child, it's not possible for them to be close, and the parents are also not able help with schoolwork. [Grandparent 3.4.1.8.0.2]

His personality has changed since I left, he has become quiet and doesn't like to talk or interact with the people around him. He will rarely listen to me because I don't usually communicate with him when I'm out working. [Migrant Parent 2.8.4.14.2.1]

When the child was one-year-old I migrated for work for a year, and once I returned I saw that he had a bad temper and personality. I realized that I still need to take care of the child myself. [Parent 2.3.1.7.0.1]

However, there were also caregivers who believed that there are no negative care effects caused by parental out-migration. Many caregivers believed this because there is still someone looking after the child and that there is no difference in quality between the care provided by parents and grandparents. Others believed that a care deficiency only influences older children who are in school. Many caregivers expressed that infants and young children are too young to remember anything, and therefore it is preferable for parents to out-migrate when children are young.

"I don't think there are any negative side effects to migrating for work." [Parent 2.2.3.4.0.1]

We are very satisfied with how the grandmother takes care of the child, there is no generational gap in our parenting methods. [Parent 2.3.1.7.0.3]

She's too small right now, it'll have no effect on her if she can't remember anything. After she starts to attend school, then the absence of her parents will have an effect. [Grandparent 3.4.1.9.0.1]

Her mother said that she is not worried about grandma taking care of the child, she does not know how to take care of a child, so the decision to migrate was not hard. [Grandparent 3.3.2.6.0.2]

Although it is obvious why parents would be willing to migrate for work if they believe that it would have no negative impacts on their children, what is less clear are the motivations for parents to migrate when they recognize these impacts. In general, we found that parents who migrated did so because of the increased income that migration can provide. In addition, it was common for caregivers to believe that there are certain periods of child development when it is

more important for parents to be home than others. For example, many parents felt that they should be at home when their child begins school, or when surrogate caregivers are no longer able to help with schoolwork. Due to these considerations, it seemed that the income benefits outweighed the negative care effects, at least during certain points in the child's development.

I don't think parental migration is good... but they will continue to migrate, otherwise we will have no income. It is only through migrating for work that we will be able to provide for the child's education and livelihood. [3.4.1.8.0.2]

I think it is most important for parents to be home starting when the child is in junior high school, because their parents can tutor them, which grandparents are unable to do. [Grandparent 3.4.1.8.0.2]

I think it is most important for parents to be home when the child is in fifth or sixth grade. At that point, I can't keep up with their school work and it is necessary for their mother and father to help. [Grandparent 3.2.3.5.0.4]

I returned home from migrating when my daughter was testing for high school so that I could help take care of her and support her education. [Parent 2.7.5.11.2.1]

From our interviews, we also hoped to understand why parents decided to bring their children with them to the cities or not. From our interviews, we learned that parents who brought their children typically did so to avoid the negative care effects associated with leaving children in the countryside. However, we also found that bringing children to cities is prohibitively expensive for most families. The cost of living in cities is much higher than in rural areas due to high commodity prices. In addition to higher prices, parents also face an opportunity cost, as one parent would need to take care of the children instead of working. Another consideration is access to public services, such as education. In China, access to public services is tied to hukou, so it is only possible to receive public services in the area in which you are registered. Because migrant children cannot usually be enrolled in urban public schools, and private migrant schools are expensive and generally provide low-quality education, this option is not attractive to many families. Also, many families simply believe that a city environment is not the proper place to

raise a child, due to constrained living spaces and long working hours for parents.

I strongly disagreed with leaving my child behind. But to open a shop, you get up early and get off late with no time to rest during the day. The rhythm of life is not suitable for children. [Migrant Parent 2.8.4.13.1.1]

We need money to pay for food for the kids, if we brought the kids to the city we would have to take care of them all day and would be unable to work. [Migrant Parent 2.4.1.7.0.8]

Guangzhou's weather is just too uncomfortable. The child can't bear the heat. The cost of living is also too high. After much consideration, we decided to keep the child at home. [Grandparent 3.4.1.9.0.1]

I cannot afford to bring my child to live with me. The cost of attending school here is 5000-6000 RMB per semester. [Migrant Parent 2.8.4.14.2.1]

The only way I can see this situation being resolved is by earning more money and changing our hukou status. [Migrant Parent 2.8.4.14.2.1]

5.4 Qualitative Results Conclusion

From the information gathered from our qualitative interviews, we find that income and care effects are both present in LBC households. Although only the negative care effects were perceived by children, it appears that this is the case because parental migration is a constant in their lives. Because working age individuals in rural China typically provide for both children and elderly relatives, the economic burden placed on them is heavy. Due to the lack of off-farm employment opportunities in rural areas, many of these individuals have no choice but to migrate to cities in search of employment and higher wages to support their families. This was noted in almost all interviews with parents and caregivers in households where at least one individual had migrated.

In addition to the positive income effect, we also found that the negative care effect is indeed present among children in our sample, and the way this effect manifests varies based on the age of children. Among caregivers of infants and young children in our sample, there was an overarching belief that these children are too young to remember anything, and therefore it makes little difference whether a parent migrates or not when they are at this age. However, we

also discovered that there were differences in the care provided by parents and surrogate caregivers (all of whom were grandparents) in terms of their language skills, receptiveness and knowledge of new parenting information, physical capabilities, and feeding practices.

Interviews with primary school students and their caregivers indicated that children of this age were most likely to experience care deficiencies in terms of academic support and increased feelings of sadness/loneliness, both of which could lead to long-term negative outcomes. Specifically, if students do not establish a solid educational foundation early on in their schooling, it is likely that it cannot be made up for later. Additionally, the mental health of primary school students could deteriorate if the absence of their parents causes them considerable stress that is not mediated by a trusted caregiver. If this stress become “toxic,” it could have long term negative psychological and physiological impacts on the child.

From our interviews with secondary school students, we believe that the most detrimental care effects occur through increased stress and social isolation. Regardless of parental migration status, most children of this age experienced increased stress due to the academic pressure placed on them to prepare for entrance exams for high school and college. But, we found that LBC students often needed to take on additional household responsibilities and faced increasing social isolation as they found less common ground (linguistically and intellectually) with grandparents that cared for them. This situation is concerning because it has been found that there is a causal relationship between substantial stress and developing depression during adolescence. Even among students that board at school, the risk of developing depression is likely higher because peer support is not as effective at mediating stress as support from parents.

Although we found that caregivers in our qualitative sample generally do recognize these impacts, the benefits provided from increased income appeared to outweigh the negative impacts

of decreased care, leading parents to migrate. Parents also feel that they cannot bring their children with them to cities due to the cost and their inability to access public services, such as schools. For these reasons, we find that many families decide that leaving children behind in rural areas is the best option for their household.

VI. Conclusion

In this paper, we have employed a mixed methods approach to examine the current state of left-behind children in China. Specifically, we analyzed a pooled meta-dataset with a sample of 195,226 rural Chinese children and responses to interviews with 164 rural children, caregivers, teachers, and migrant parents. From this two-pronged approach, we sought to understand whether parental migration has any beneficial or harmful impacts on left-behind children, and, if it does, how these impacts arise. In addition, we hoped to determine whether parents and caregivers recognize these impacts and consider them when making decisions on whether to migrate for work or not. From this analysis, we found that parental migration impacts children primarily through increased household income and decreased care. Additionally, the tradeoff between these income and care effects manifests differently for children based on their area of residence, household socioeconomic status, and age. We also find that families generally do recognize the impacts that increased income and decreased care have on their children, and will take these factors into consideration when making their migration decision.

Results from both our quantitative and qualitative analyses suggest that the increased income drives rural labor migration and allows for a higher standard of living in rural areas due to remittance income. Respondents to our qualitative interviews consistently implied that many households have no other opportunities to earn income because there are so few off-farm jobs

available in their villages and counties. Also, because migration can substantially increase household income, it allows for households to save for future expenditures, such as medical costs and school fees.

Although rural labor migration provides necessary resources for households, it is less clear if this increased income can bring about positive impacts for left-behind children. Our results show parental migration has mixed impacts on cognitive/academic outcomes and negative impacts on mental health outcomes. The mixed results on cognitive/academic outcomes may be due to the heterogeneity of our quantitative sample. For example, we find that parental migration has mixed impacts on the academic outcomes of primary and secondary school students, but unequivocally negative results on the cognitive development of infants and young children. The impact may also depend on the socioeconomic conditions of our sample children. We found that for the subset of our quantitative meta-data that was collected in a relatively impoverished area of Qinghai province generally experienced positive educational impacts following parental migration, but results using samples from richer areas of Shaanxi province found no impact or a negative impact on the educational outcomes of LBCs.

In addition to the impacts of increased income, we also examined how parental absence affects the mental health outcomes of LBCs. The results of both our quantitative and qualitative analyses on this topic show that parental absence offers no benefits, and typically harms, the mental health of LBCs. Parental separation can be a catastrophic and stressful experience for children, and the effects of this stress likely cannot be remediated if/when parents return home. This is concerning, as it has been shown that when children's stress response systems are activated for a prolonged period without mediation from a supportive adult, it can their permanently alter brain architecture and increase their risk for developing stress-related disorders

and depression. These harmful impacts can, in turn, have negative effects on the human capital development and labor market outcomes of these children later in life. Clearly, the decreased care received by LBCs in China today is denying over 60 million children the opportunity to reach their full potential. For this reason, we believe that the government of China should take steps to improve the current situation of left-behind children.

Given our findings on the impacts of parental migration, we believe two routes can be taken to improve the educational and mental health outcomes of LBCs. First, we believe programs can be implemented to alleviate the negative effects of parental migration. For example, early childhood education centers could be established in rural areas of China. Early childhood education programming has been shown to have long-term cognitive, academic, and social developmental benefits for children (Barnett, 1998; Coolahan et al., 2000). These centers could be particularly beneficial for left-behind infants and young children, as they would not only provide a means for these children to receive more stimulation, but could also teach surrogate caregivers about the importance of interacting with these children in an effective manner. Additionally, social/emotional learning (SEL) curriculums could also be implemented to benefit the mental health of primary and secondary school students. The goal of SEL programs is to equip students with skills to manage their emotions, seek help, and reduce the negative impacts of common stressors (Greenberg et al., 2003). Curriculums of this sort have been shown to be effective in rural China, as Wang et al. (2016) found that an SEL program reduced learning anxiety by 2.3 percentage points in the first semester of program implementation.

Another potential route that could serve to improve the situation of LBCs is encouraging families to stay together or removing the barriers that keep families apart. One potential policy that could help reduce the need for rural labor migration is a conditional cash transfer (CCT)

program that provides a monetary incentive for at least one parent to remain at home with their children. The CCT could also be accompanied by an informational campaign on the effects that rural labor migration has on LBCs. However, it must be acknowledged that such a program would be expensive to implement, difficult to monitor, and would not be able to totally eradicate the practice of leaving children behind in the countryside.

Although many steps could be taken to reduce parental migration or alleviate its negative effects, ultimately the only way that the negative impacts parental migration places on LBCs could be eliminated is through hukou reform. If it were possible for rural migrants to settle permanently in cities and receive public health and social services in those locations, it is likely that more families would migrate together. The most tangible impact that hukou reform could have for left-behind children is that it would allow them to enroll in urban public schools, removing one of the most significant barriers that keeps children from migrating with their parents. Although doing so would require substantial time and resources from the Chinese government, we believe that such an effort would be worthwhile if it is able to provide more equal opportunities for all children in China and could help develop China's human capital stock for decades to come.

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Table 1. Summary of Previous Studies

Sample Number	Title	Authors	Year Published
Dataset 1	The Effect of Maternal Migration on Early Childhood Development in Rural China	Ai Yue, Sean Sylvia, Yu Bai, Yaojiang Shi, Renfu Luo, & Scott Rozelle	Working Paper
Dataset 2	China's Left-Behind Children: Impact of Parental Migration on Health, Nutrition, and Educational Outcomes	Chengchao Zhou, Sean Sylvia, Linxiu Zhang, Renfu Luo, Hongmei Yi, Chengfang Liu, Yaojiang Shi, Prashant Loyalka, James Chu, Alexis Medina, & Scott Rozelle	2015
Dataset 3	Order Matters: The Effect of Second-Wave Migration on Student Academic Performance in Northwest China	Yu Bai, Michael Neubauer, Tong Ru, Yaojiang Shi, Kaleigh Kenny, & Scott Rozelle	Working Paper
Dataset 4	Effects of Parental Migration on Mental Health of Left-Behind Children: Evidence from Northwestern China	Yaojiang Shi, Yu Bai, Yanni Shen, Linxiu Zhang, Kaleigh Kenny, & Scott Rozelle	2016
Dataset 5	Effect of Parental Migration on the Academic Performance of Left-behind Children in Northwestern China	Yu Bai, Linxiu Zhang, Chengfang Liu, Yaojiang Shi, Di Mo, & Scott Rozelle	Working Paper
Dataset 6	The Effect of Parental Migration on the Academic Performance of Left-Behind Middle School Students in Rural China	Lili Li, Lei Wang, & Jingchun Nie	2017
Dataset 7	Mental health in rural China: Comparisons across provinces and among subgroups of children and adolescents	Hongyan Liu, Yaojiang Shi, Kaleigh Kenny, & Scott Rozelle	Working Paper

Table 2. Description of Previous Samples

Sample number	Sample area	Age group	Sample size
Dataset 1	Shangluo prefecture, Shaanxi province	6-30 months old	1,412
Dataset 2	Shaanxi, Ningxia, Qinghai, Guizhou, Sichuan, Gansu, Hebei, Zhejiang, and Anhui provinces	Age 3-17	236,092
Dataset 3	Ankang prefecture, Shaanxi province	3rd and 5th grade students	5,104
Dataset 4	Tianshui prefecture, Gansu province and Yulin prefecture, Shaanxi province	4th and 5th grade	17,635
Dataset 5	Haidong prefecture, Qinghai province	4th and 5th grade	12,207
Dataset 6	Yulin prefecture, Shaanxi province	Junior High School	7,148
Dataset 7	Yulin prefecture, Shaanxi province	Junior High School	10,391

Table 3. Prevalence of LBCs in Sample Studies During Baseline Survey

Study	Number of Children Surveyed	Prevalence of LBCs (at least one migrant parent)	One Parent Migrates	Both Parents Migrate
Dataset 1	1,412	244 (17.3%)	N/A	N/A
Dataset 2	141,329	64,023 (45.3%)	41,834 (29.6%)	22,189 (15.7%)
Dataset 3	5,104	2,895 (56.7%)	1,878 (37.5%)	982 (19.6%)
Dataset 4	17,635	8,677 (49.2%)	6,476 (36.7%)	2,201 (12.5%)
Dataset 5	12,207	5,483 (44.9%)	3,290 (30.0%)	2,193 (18.0%)
Dataset 6	7,148	2,387 (33.4%)	1,827 (25.6%)	560 (7.8%)
Dataset 7	10,391	1,493 (14.4%)	397 (3.8%)	1,096 (10.5%)
All Metadata	195,226	85,202 (43.6%)	55,702 (28.7%) ^a	29,221 (15.0%) ^a

Source: Authors' own data.

Notes: ^a Percentages were calculated using the portion of the sample that included information on the nature of household migration patterns – this sample includes 193,814 children total.

Table 4. Cognitive/Educational Outcomes by Age Group

Age Group	Dataset	Measure	Outcome
Infant/Toddler	Dataset 1	Mental Development Index (MDI) from the Bayley Scales of Infant Development (BSID)	Negative; -2.57 points on MDI scale
	Dataset 2	Mathematics, Chinese, and English Standardized Tests	Neutral; no significant differences
Primary School	Dataset 3	Mathematics Standardized Test	Negative; -0.08 SD
	Dataset 5	English Standardized Test	Positive; 0.04 SD ^a
Secondary School	Dataset 6	Mathematics Standardized Test Scores	Negative; -0.07 SD
	Dataset 6	School Dropout Rate	Neutral; no significant differences
	Dataset 2	Mathematics, Chinese, and English Standardized Tests	Neutral; no significant differences

Source: Authors' own data.

Notes: ^a Both “any parent migration” and “second parent migration” have an impact of 0.04 SD using this sample of children

Table 5. Mental Health Outcomes by Age Group

Age Group	Dataset	Test Used	Outcome
Infant/Toddler	Dataset 1	Ages and Stages Questionnaire: Social-Emotion (ASQ-SE)	Neutral; no significant impacts
Primary School	Dataset 4	Mental Health Test (MHT), Social Anxiety Scale for Children (SASC), Self-esteem Scale (SES)	Negative; 1.43 points on MHT scale, 0.32 points on SASC scale, and -0.17 points on SES scale ^a
Secondary School	Dataset 7	Standardized score on Mental Health Test (MHT)	Negative; 0.17 SD

Source: Authors' own data.

Notes: ^a Higher scores on the MHT and SASC scales indicate higher risk for general mental health and social anxiety issues, respectively. A higher score on the SES scale indicates higher levels of self-esteem.

Table 6. Interview Respondent Characteristics

Students Characteristics (n=90)	Number of Students
<i>School Level</i>	
Primary School	38
Secondary School	52
<i>Gender</i>	
Male	40
Female	50
<i>Migration Status</i>	
LBC (One or both parents migrate)	63
CLP (No parents migrate)	25
Caregiver Characteristics (n=68)	Number of Caregivers
<i>Type of Caregiver</i>	
Parent	42
Grandparent	26
<i>Migration Status</i>	
LBC Caregiver	34
CLP Caregiver	28
Migrant Parents	6
Teacher Characteristics (n=6)	Number of Teachers
Number of Teachers	6