

UNDERSTANDING THE SITUATION OF CHINA'S LEFT-BEHIND CHILDREN: A MIXED-METHODS ANALYSIS

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This research uses a mixed-methods analysis to examine how being left behind impacts the cognition/education, nutrition, and mental health outcomes of children in rural China. We find that parental migration increases household income and decreases care, and these impacts vary according to location, socioeconomic status, and age. We also find that families generally recognize these impacts. Our findings offer a more general view of the effects of being left behind on childhood outcomes than previous research, which often used small sample sizes from limited geographic areas or age ranges. Although our research focuses on China, the findings are relevant to other developing nations where working-age individuals often migrate domestically or internationally in search of work, such as Mexico and the Philippines.

Keywords: China; Left-behind children; Labor migration; Parental absence; Remittance income

JEL classification: I20, I25, I28

I. INTRODUCTION

OVER the last three decades, China's rapid development and urbanization have induced large numbers of rural residents to migrate from the countryside to urban areas in search of better jobs and opportunities (Hu, Cook, and Salazar 2008; Wen and Lin 2011; MHRSS 2013). In the process of urbanization, many internal migrants leave their children behind in their home communities with a surrogate

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caregiver due to 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 LBC) 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 LBC in China in 2010 (NBS 2010).

Many researchers have expressed concern that when children are left behind, it has a negative effect on their education, health, and, ultimately, overall human capital accumulation (Meyerhoefer and Chen 2011; Zhao et al. 2014; Zhou, Murphy, and Tao 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, the Chinese Government has issued plans and implemented programs to address this problem (State Council of the People’s Republic of China 2016). For example, in recent years the Government has developed pilot programs to train and place mental health counselors in schools to help LBC 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 LBC (Wang 2015).

A literature has also emerged suggesting that, while vulnerable, LBC may not be the most, or only, vulnerable group of children in rural China. Researchers have found that, in certain cases, the outcomes for LBC are the same as or better than those for rural children living with their parents (henceforth CLPs). For example, research by Luo et al. (2015) has shown that there are no differences in mental or psychomotor development between infants raised by their mothers and those raised by their grandmothers. Zhou et al. (2015) find few significant differences between school-aged LBC 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), LBC 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, Singh, and Roy 2015). This research finds that positive outcomes may result from relaxing household liquidity constraints (Du and Xiang 2005) and encouraging higher investments in LBC (Edwards and Ureta 2003; Yang 2008; Lu and Treiman 2011; Antman 2012). In contrast, other researchers have reported negative effects of parental migration on LBC outcomes (Meyerhoefer and Chen

2011; Zhao et al. 2014; Zhou, Murphy, and Tao 2014; Zhang et al. 2014) due to absence of parental care (Lahaie et al. 2009; Ye and Lu 2011) or increased time spent doing on-farm or in-home work (Chang, Dong, and MacPhail 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) choices could affect the nature of the results of these studies. For example, to our knowledge, there are no papers that combine rich empirical evidence (based on large sample sizes and nuanced use of control variables) with qualitative analysis.¹ Instead, most papers on this topic only use quantitative data (Lee 2011; Wang 2014; Zhao et al. 2014; Zhou, Murphy, and Tao 2014). We believe that a mixed-methods approach may benefit our analysis of this complex issue. Indeed, LBC status has multifaceted impacts on human capital that vary based on children's ages and family resource (or wealth) levels. Many of these subtle relationships may be difficult (if not impossible) to measure precisely using quantitative data. Beyond this, 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), but their findings lack representativeness.

It is also 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 LBC 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 LBC 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., mathematics 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

¹ There is one more shortcoming to many papers in the LBC literature. Many papers only use cross-sectional data and are, therefore, unable to establish causality. Indeed, this is also a weakness of our paper (due to the absence of any easily identifiable identification strategy). However, we believe that in our case using cross-sectional data can at least establish observed facts and that this is a significant contribution, given our large sample size and diverse set of surveys that collect information on different samples (across space and across age cohorts). Hence, we leave the challenge for searching for high-quality ways to identify causal relationships between being left behind and human capital for future research.

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 2006; Lu 2012; Bai et al. 2016; Bai et al. 2018), to date no systematic effort has been made to examine how each of these mechanisms impact LBC of different ages and from different types of households.

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 trade-off 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 153 qualitative interviews. This research approach allows us to overcome two issues that arise when studying LBC. First, because of the heterogeneous nature of the LBC population, studies that focus on a single sample, age group, or outcome measure cannot provide us with general findings. To attempt to reach more comprehensive conclusions, our quantitative-based (empirical-based) meta-analysis includes studies using samples 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, and surrogate caregivers 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 introduce the studies included in our meta-analysis and describe the samples and the outcome measures evaluated. In

Section III, we present our quantitative findings, which draw on the meta-dataset to address our first and second objectives. Section IV discusses our qualitative methods, including details on how we selected our samples of students and caregivers, and provides details on our interview protocol. Our qualitative findings are presented in Section V and we mainly seek to address our third and fourth objectives. Section VI attempts to summarize the overall findings and draw conclusions.

II. QUANTITATIVE APPROACH

A. Data

In total, our sample consists of 195,226 children from 10 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, followed uniform data collection protocols, and employed experienced enumeration team leaders and supervisors. All enumerators underwent comprehensive training that lasted from two to seven days 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.

B. 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 (ages 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.² The BSID is an internationally validated test of infant cognitive and motor development that contains two

² BSID is an internationally validated test of infant cognitive and motor development. This test has been extensively used in the psychological literature and is listed by the American Psychiatric Association as a standard way to diagnose certain developmental disorders (American Psychiatric Association 2000).

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, and Scott Rozelle	2016
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, and 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, and Scott Rozelle	2016
Dataset 4	Effects of Parental Migration on Mental Health of Left-Behind Children: Evidence from Northwestern China	Yaojiang Shi, Yu Bai, Yanni Shen, Kaleigh Kenny, and Scott Rozelle	2016
Dataset 5	Effect of Parental Migration on the Academic Performance of Left Behind Children in North Western China	Yu Bai, Linxiu Zhang, Chengfang Liu, Yaojiang Shi, Di Mo, and Scott Rozelle	2017
Dataset 6	Effect of Parental Migration on the Academic Performance of Left-Behind Middle School Students in Rural China	Lili Li, Lei Wang, and 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, and Scott Rozelle	2016

components: the Mental Development Index (MDI) and the Psychomotor Development Index. The tests are given one-on-one with the caregiver present. 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.

The mental health development outcomes (or non-cognitive skills) of infants and toddlers were evaluated using the Ages and Stages Questionnaire: Social Emotion (ASQ:SE).³ The ASQ:SE is an internationally recognized, scaled test

³ ASQ:SE is an instrument developed for measuring social-emotional development in children aged six to 60 months and is frequently used in childcare centers. Although this instrument is relatively short (with only 19–33 items), the ASQ:SE is popular because it is capable of broadly evaluating this particular element of child development among infants and young children. This measurement has been used in countries such as the United States, the Netherlands, Sweden, and Korea (Squires, Bricker, and Twombly 2002).

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	Ages 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 students	17,635
Dataset 5	Haidong prefecture, Qinghai province	4th and 5th grade students	12,207
Dataset 6	Yulin prefecture, Shaanxi province	Junior high school students	7,148
Dataset 7	Yulin prefecture, Shaanxi province	Junior high school students	10,391

of social–emotional development for infants and toddlers. Specifically, the instrument measures and evaluates infants and toddlers on their self-regulation, compliance, communication, adaptive functioning, autonomy, affect, and interactions with other people. The ASQ:SE relies on the responses of caregivers to questions asked by enumerators during face-to-face interviews. When interpreting the results, a higher ASQ:SE score is indicative of higher levels of social–emotional development issues.

The educational outcomes of primary school students were evaluated using mathematics, Chinese, and English scales created by the authors with input from local education bureaus. Specifically, the outcomes were measured using standardized test instruments for mathematics, Chinese, and English. The mathematics test instrument was designed based on the Trends in Mathematics and Science Survey, but we also ensured that test questions were consistent with the mathematics 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),⁴ a social anxiety scale for children (SASC),⁵ and a self-esteem scale (SES).⁶ The MHT scale measures general anxiety and has been used extensively across China (Deng, Lei, and Cao 2002). The test is scored on a 90-point scale, 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 assesses emotional, cognitive, and behavior problems associated with 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. Furthermore, 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. Because of time restrictions during the survey periods, we were unable to generate measures of social anxiety and self-esteem for students of this age group.

⁴ The MHT was developed by Professor Zhou Bucheng together with his colleagues from the School of Psychology and Cognitive Science at East China Normal University. The test is a variation of the children's Manifest Anxiety Scale, a scale that has been widely used in the United States and other developed countries for more than a decade as a screening and clinical tool. Researchers have used this test extensively across China to measure the mental health of grade school students in urban contexts (Zhou 1991; Deng, Lei, and Cao 2002; Ge, Se, and Zhang 2014).

⁵ The SASC was created by Annette La Greca and has been used to measure social anxiety among children from several different countries, such as the United States and Norway (La Greca et al. 1988; Kristensen and Torgersen 2006; Meyer et al. 2006). The SASC has also been proven over time to have good psychometric properties, reliability, and validity among samples of Chinese children (Li, Su, and Jin 2006).

⁶ The SES was created by Morris Rosenberg in 1965. The SES is a unidimensional measure of self-esteem, or confidence in one's abilities, and self-worth (Rosenberg 1965). The scale was initially developed using a sample of over 5,000 high school students randomly selected across New York State. The scale has been translated into multiple languages, including Chinese, and has been used for cross-country comparisons of self-esteem (Cheng and Hamid 1995; Schmidt and Allik 2005).

TABLE 3
Prevalence of LBC in Sample Studies during Baseline Survey

Study	Number of Children Surveyed	Prevalence of LBC (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%) [†]	29,221 (15.0%) [†]

Source: Authors' own data.

Note: LBC = left-behind children.

[†]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 in total.

III. QUANTITATIVE RESULTS

A. LBC Prevalence

We find high rates of parental migration across all sample datasets (Table 3). Across our entire metadata, the cumulative rate of parental migration was 43.6%, both parents migrated in 15.0% of sample households in our metadata, and only one parent migrated in 28.7% of sample households (excluding Dataset 1 where this information was not available). Additionally, in each sub-dataset where necessary information was provided, we find 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).

B. 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

TABLE 4
Cognitive/Educational Outcomes by Age Group

Age Group	Measure	Outcome
Infant/toddler		
Dataset 1	Mental development index (MDI) from the Bayley Scales of Infant Development	Negative: -2.57 points on MDI scale
Primary school		
Dataset 2	Mathematics, Chinese, and English standardized tests	Neutral: No significant differences
Dataset 3	Mathematics standardized test	Negative: -0.08 standard deviations
Dataset 5	English standardized test	Positive: 0.04 standard deviations [†]
Secondary school		
Dataset 6	Mathematics standardized test scores	Negative: -0.07 standard deviations
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.

[†]Both "any parent migration" and "second parent migration" have an impact of 0.04 standard deviations using this sample of children.

and leave their child with their grandparents, the MDI scores of the infants decrease by an average of 2.57 points, or 0.15 standard deviations (significant at the 1% level). Given that the literature base generally finds that investments in early childhood have massive implications for lifelong educational outcomes (Heckman 2006), this may mean that these cognitive delays 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 find no significant differences in standardized test scores for mathematics, Chinese, or English between LBC and CLPs. In contrast, using a sample of primary school students from the relatively well-off Shaanxi province (Dataset 3), we find that the migration of the second parent in households where one parent had already migrated had a significant negative impact of 0.08 standard deviations on students' standardized test scores for mathematics (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), we find that when any parent in a household out-migrated between the time of the baseline and endline surveys, their child's standardized test score for English rose relative to those of the children whose parents never migrated, all else held constant. Additionally, we find that second parent migration had a significantly positive effect on the educational outcomes of sample

TABLE 5
Mental Health Outcomes by Age Group

Age Group	Test Used	Outcome
Infant/toddler Dataset 1	Ages and Stages Questionnaire: Social–Emotion	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 [†]
Secondary school Dataset 7	Standardized score on MHT	Negative: 0.17 standard deviations

Source: Authors' own data.

[†]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.

students. Although we cannot say for sure, it is possible that the marginal effect of increased household income is higher in poorer areas (Qinghai compared to Shaanxi), and, therefore, may be perceptible in these areas but not in more prosperous ones.

The results from our secondary school samples also present mixed results on educational outcomes. From Dataset 6, we find that when any parent migrates, it reduces a child's standardized mathematics score by 0.07 standard deviations on average (significant at the 10% level). However, analysis using Dataset 2 did not find significant differences between LBC and CLPs in terms of either standardized test scores or dropout rates. We may find differences in these outcomes because Dataset 2 sampled in areas of nine provinces with various levels of household income, but Dataset 6 only sampled in a relatively rich area of Shaanxi province.

C. 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. 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, it is also found 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 of developmental issues compared with the general population.

We also find that parental migration is negatively associated with the mental health status of primary school students. According to our findings using Dataset 4, parental migration increases children's anxiety and decreases their self-esteem. The average MHT and SASC scores of primary school LBC 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 self-esteem. This study also finds that parental 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 are not reversed when parents return home.

The negative impacts that parental migration has on children's mental health appear to continue as students enter secondary school. Among a sample of junior high school students in Dataset 7, we find that the standardized MHT scores of LBC are 0.17 standard deviations higher than those of CLPs (significant at the 1% level), indicating higher levels of general anxiety. This finding indicates that the mental health condition of LBC is worse than that of their peers across multiple age groups.

D. 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. These findings 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 our finding from Dataset 1 that mothers are far more likely than grandmothers to engage and interact with their child. It may be that a lack of engaged parenting harms LBC infant development, as research has also found that emotional neglect leads children to have worse cognitive and social-emotional development outcomes (Hildyard and Wolfe 2002).

Second, we find that being left behind has no positive impacts on the mental health of children of any age. 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. In addition, evidence from our data suggests that these negative impacts cannot be remediated when parents return home. These findings could have serious consequences for China's future economic development as research has shown that childhood mental health issues often continue into adulthood (Rao, Hammen, and Daley 1999; Harrington et al. 1990) and ultimately decrease productivity and human capital development (Ding et al. 2006).

Finally, our findings may 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 found using samples from more prosperous areas (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 LBC.

IV. QUALITATIVE APPROACH

To better understand why parents migrate and whether they recognize how migration impacts their children, we conducted a series of interviews in rural and urban areas of Shaanxi province. Three primary goals drove this qualitative research: (1) to understand why parents choose to migrate, (2) to identify the mechanisms through which parental migration may impact LBC at different ages, and (3) 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 two types of respondents: students (LBC and CLPs) and parents/caregivers (of LBC and CLPs, as well as migrant parents).

For our student interviews, our sample selection was conducted as follows. First, we chose two sample counties in Shaanxi province. Then, within our two sample counties, we selected four primary schools and five secondary schools to include in our sample. After choosing the schools, we purposively selected students to construct a sample with diverse parental migration statuses. We attempted to interview 10 students in each school (seven LBC and three CLPs), although the exact breakdown deviated slightly from school to school. We interviewed a total of 85 students: 32 primary school students and 53 secondary school students (Table 6). In terms of parental migration status, 59 students were LBC (father, mother, or both parents migrated) and 26 students were CLPs (Table 6).

The caregiver sample was also purposively selected to reflect a variety of household migration statuses. We selected caregiver respondents in several ways: we consulted with school principals to identify caregivers of primary and secondary school students; we worked with local officials to identify caregivers of infants and toddlers; and we interviewed parents who had migrated to Xi'an and left young children at home. In total, we interviewed 34 LBC caregivers, 28 CLP caregivers, and six migrant parents.

All 153 respondents gave informed consent for the interviews. We developed separate interview scripts for children, caregivers, and migrant parents 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 investigate specific stories that emerged.

TABLE 6
Interview Respondent Characteristics

Students Characteristics ($N = 85$)	Number of Students
School level:	
Primary school	32
Secondary school	53
Migration status:	
Left-behind children (one or both parents migrated)	59
Children living with their parents (no parents migrated)	26
Caregiver Characteristics ($N = 68$)	Number of Caregivers
Type of caregiver:	
Parent	42
Grandparent	26
Migration status:	
Left-behind children caregiver	34
Children living with their parents caregiver	28
Migrant parents	6

V. QUALITATIVE RESULTS

A. Parent Migration Decisions

Responses to our interviews indicated that parents are motivated to migrate by employment opportunities in cities that are considerably more lucrative than rural areas. Respondents estimated that when an individual migrates for work, he or she can increase household income from RMB 10,000 to RMB 120,000 per year. Given that the average household income in rural areas was only RMB 11,421.70 in 2015 (NBS 2016), labor migration can substantially increase household income.

I can earn more here, and there is no work to do at home. In one month, my net income is about RMB 1,800–2,000. (Migrant Parent 2.8.4.14.2.1)⁷

⁷ Following our interviews, we anonymized all interview transcripts and assigned an identification number to each transcript to maintain confidentiality. The number contains the following information: the first numeral refers to the type of interview respondent (i.e., children, parents, grandparents, and teachers); the second refers to the data on which the individual were interviewed; the third refers to the age cohort of the child in question (i.e., infant/toddler, kindergarten age, elementary school age, and middle school age); the fourth numeral identifies the group of researchers who conducted the interview; the fifth refers to the location of the interview (a particular village or school); and the sixth and last numeral refers to the order in which individuals were interviewed in a given village/school.

There aren't any jobs in this county, so you need to leave. (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 why parents and other household members migrated to cities for work was because they felt that there was no other option. Although about 44% of China's population, and most of the country's children (57.4% in 2010), still reside in the countryside (NBS 2010, 2016), relatively few off-farm employment opportunities exist in these areas. This situation was apparent in our sample villages where there were often only a handful of storefronts and restaurants in operation, 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 to support the child's education. (Grandparent 3.4.1.8.0.2)

B. *How Parental Migration Affects Children*

Although labor migration provides numerous benefits to rural residents, it cannot be ignored that parental absence will acutely affect children. It is our belief that parental absence affects the cognitive and mental health outcomes of LBC through two main mechanisms: an income effect and a care effect. In this subsection, we seek to unpack how increased household income and decreased parental care lead to different outcomes for LBC in relation to those of other children.

1. *Income effect*

We find that increased household income does not have any perceivable effects on the household's standard of living or the amount of resources provided to LBC. This is likely because our survey respondents do not have much (or any) basis for comparison. Interview respondents indicated that members of their families had always migrated, so they do not 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 increased income is used to save for future expenditure or to 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)

We may find that increased income does not appear to affect the livelihoods of LBC because we conducted our interviews in relatively well-off areas. It may be that the average household income in our sample areas are already sufficient to provide for everyday expenses.

2. *Care effect*

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

(1) Infants and toddlers

Interviews with our sampled caregivers reveal that many parents believe it is reasonable to migrate when their children are young because infants and toddlers

(who ranged in age from 6 months to 3 years) will 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 the care children receive from their parents and grandparents. For example, while all parents in our qualitative sample speak Mandarin, many grandparents only speak regional dialects. 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 may 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 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 has been significant progress in our understanding of childhood development over 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 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 understanding 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. She also 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 of caring for children as parents. Several grandparents reported that they had difficulty keeping up with and caring for a child due to a lack of energy. 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 are 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 were also not well-acquainted with current knowledge on child nutrition. We found that grandparents in our sample were likely to feed their children staple foods and formula, but the World Health Organization recommends that children be introduced to complementary foods starting at 6 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 (PAHO 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)

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)

(2) Primary school

Interview respondents in primary school were between the ages of 9 and 13 years old and the majority (22 out of 32) had one or both parents migrate. 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)

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)

Once the child is 10 years old, I also plan to migrate for work. (Parent 2.4.2.6.0.5)

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

One way that the care effect manifests for LBC is that they receive decreased educational support. When parents migrate, many children are left behind with their grandparents, who often have received little (if any) education. While other students have someone at home who can help them with school work, 12 out of 22 LBC in our primary school sample reported that their caregivers aren't capable of doing so. This may constrain the educational outcomes of LBC over the long term, as adequate academic support is a key input to educational achievement (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. (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 LBC. All primary school LBC missed their parents, and 12 of the 22 LBC said they want their parents to return home. Four LBC even indicated that the absence of their parents has negatively affected them emotionally. Eighteen of the 22 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, it 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 that my dad will not be a migrant worker anymore. (Primary School LBC 1.7.3.11.1.1)

During our interviews, we gained the impression that the surrogate caregivers of LBC cannot make up for this care deficit. Nine LBC respondents reported that they have little interaction with their caregiver, as they will often only do chores or watch television together. Among the LBC that live their grandparents, 10 of the 16 reported that there were noticeable differences between the care they received from their grandparents and from their parents.

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 found that children's development relies on supportive relationships with adult caregivers (National Scientific Council on the Developing Child 2004). In the absence of such relationships, children could suffer from toxic stress, which occurs when a person is under stress that is not mitigated by supportive relationships for a prolonged period. 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). Given these findings, it is likely that the negative care effect experienced by primary school LBC negatively impacts them over the long term in ways that may not be immediately perceptible to parents and caregivers.

(3) Secondary school

Secondary school children in our sample were between the ages of 13 and 18 and over half of these students (37 out of 53) were LBC. Among the LBC 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 parental migration had any effect on them. We believe this likely arises for two reasons. First, parents of all but one LBC student began migrating before the child entered junior high school, so they have 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.

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)

Still, LBC students 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 when their parents were 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 LBC noticed differences in their ability to communicate with caregivers. Several students noted that they could talk with their parents more easily than with their surrogate caregiver, particularly grandparents. 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.

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)

The increased stress and isolation experienced by adolescent LBC could lead to negative outcomes that are specific to this age group. Certain periods of time when children's brains are still developing, such as during adolescence, have been found to leave an individual particularly vulnerable to developing depression due to stress exposure (Andersen and Teicher 2008). There is also evidence that lack of parental support reduces the ability of adolescents to cope with stress, especially 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, Ragan, and Randall 2004). Although we did not screen for depression symptoms among LBC in our sample, several LBC spoke of the stress they experience due to schoolwork, sleep disturbances, and feelings of loss.

I'll occasionally sleep for eight or nine hours, but it is usually only three or four. 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 *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 [now] it's right before *gaokao* and I have absolutely no self-confidence. (Secondary School LBC 1.5.5.3.2.2)

3. *Parental recognition and consideration*

Given our findings on how parental migration may affect LBC, we now seek to determine whether parents are aware of these potential impacts and, if they are, how their migration decisions are influenced by these factors. Many caregivers noted that parent-child relationships became strained after parents migrated. In addition, several caregivers noticed their children became more introverted and withdrawn. In some instances, caregivers also noted that children's grades worsened.

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

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 to help with school work. (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 years 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 needed 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 because they saw 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 toddlers are too young to remember anything, and therefore will not be affected by parental absence.

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 [my daughter-in-law] said that she is not worried about grandma [me] taking care of her 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 migrate if they believe that it will not negatively impact their child, what is less clear is why parents 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, caregivers commonly believed that there are certain periods of child development when it is less necessary for parents to be at home.

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. (Grandparent 3.4.1.8.0.2)

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 learned that parents who brought their children with them to cities typically did so to avoid the negative care effects associated with leaving children behind. However, bringing children to cities is prohibitively expensive for most families. The cost of living in cities is much higher than in rural areas and parents would 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, that can only be received in the area where a household is registered. Additionally, because migrant children cannot be enrolled in urban public schools, they must attend expensive and low-quality private migrant schools that are not an attractive option to many families. Many families also believe that constrained living spaces and long working hours make city life unsuitable for children.

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 unsuitable for children. (Migrant Parent 2.8.4.13.1.1)

We need money to pay for the children's food, if we brought the kids to the city, we would have to take care of them all day and wouldn't be able 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. (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 RMB 5,000–6,000 per semester. (Migrant Parent 2.8.4.14.2.1)

C. *Qualitative Results Conclusion*

From our interviews, we found that parents would typically migrate to provide for their families. 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. This was noted in almost all interviews with parents and caregivers in households where at least one individual had migrated.

Our interviews also suggested that LBC were primarily impacted by care deficits that manifest differently based on the ages of children. Generally, the care provided to infants and toddlers by parents and surrogate caregivers differs in terms of their language skills, receptiveness to new parenting information, physical capabilities, and feeding practices. Interviews with primary school students and their caregivers indicated that children of this age were likely to receive

decreased academic support and experience increased feelings of sadness/loneliness. Among secondary school LBC students, we believe that negative care effects occur through increased household responsibilities, stress, and social isolation.

Although we found that caregivers in our qualitative sample generally did recognize these impacts, the benefits provided from increased income appeared to outweigh the negative impacts of decreased care. 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 LBC in China. Specifically, we analyzed a pooled meta-dataset with a sample of 195,226 rural Chinese children and responses to interviews with 153 rural children, caregivers, and migrant parents. From this analysis, we found that parental migration impacted LBC 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 had no other opportunities to earn income because there were 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.

It is less clear, however, if increased income benefits LBC. Our results suggest that parental migration has mixed impacts on cognitive/academic outcomes of LBC. These 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 toddlers. The impact may also depend on socioeconomic status. Although we found that LBC from the subsample collected in a relatively impoverished area of Qinghai province appeared to experience positive educational impacts following parental

migration, LBC in samples from richer areas of Shaanxi province experienced no or negative changes in their academic performance following parental migration.

We may find inconsistent relationships between parental migration and academic/cognitive outcomes because LBC suffer from worse mental health outcomes than their peers. The results of both our quantitative and qualitative analyses suggest that parental absence offers no benefits and likely harms the mental health of LBC. 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 prolonged periods of time without mediation from a supportive adult, it can increase the risk that a child will develop stress-related disorders and depression. These harmful impacts may, in turn, have negative effects on the human capital development and labor market outcomes of children later in life. The decreased care received by LBC in China today could deny over 60 million children the opportunity to reach their full potential. For this reason, we believe that the Chinese Government should take steps to improve the current situation of LBC.

We believe two policy options could potentially improve the educational and mental health outcomes of LBC. First, programs could 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 toddlers, as they could teach surrogate caregivers about new parenting information and practices. Additionally, social-emotional learning curricula could also be implemented in primary and secondary schools to improve the mental health condition of LBC students. Social-emotional learning programs can equip students with skills to manage their emotions and reduce the negative impacts of common stressors (Greenberg et al. 2003). Curricula of this sort have been shown to be effective in rural China, as Wang et al. (2016) found that a social-emotional learning program reduced learning anxiety by 2.3 percentage points in the first semester of program implementation.

The situation of LBC could also be improved by encouraging families to stay together or removing barriers that keep families apart. One potential policy that could help reduce the need for rural labor migration is a conditional cash transfer program that provides a monetary incentive for at least one parent to remain at home with their children. The conditional cash transfer could also be accompanied by an informational campaign on the effects that rural labor migration has on LBC. However, it must be acknowledged that such a program would be

expensive to implement, difficult to monitor, and would not totally eradicate the practice of leaving children behind in the countryside.

Although many policy options could potentially reduce the need for parental migration or alleviate its negative effects, ultimately the only way to eliminate the negative impacts associated with parental migration is to reform *hukou* laws. If rural migrants could settle permanently in cities and receive public and social services, it is likely that more parents would bring their children with them to cities. Although doing so would require substantial time and resources from the Chinese Government, reforming these laws could help level the playing field for all children in China and develop the country's human capital stock for decades to come.

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