Social Disadvantage and Child Health among China’s Rural-Urban Migrant Households

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Abstract

This study uses migrant household survey from 2008 and 2009 to examine how social disadvantage among rural-urban migrant households affects the nutritional status of children who migrate with their parents and those who are left behind. Results indicate that China’s hukou system of household registration – designed to limit domestic migration flows by denying public services in cities to residents with rural hukou – has a negative and statistically significant effect on children’s weight-for-age Z-scores, even after controlling for a full set of socioeconomic status indicators and household characteristics. The hukou effect does not impact children’s height-for-age Z-scores (an indicator of longer-term nutritional status), suggesting that rural-urban households are resilient in the longer term. Tests for gender-based discrimination indicate that children in female-headed households do not appear to suffer from any nutritional penalty relative to children in households headed by men, while girl children do exhibit lower HAZ and WAZ scores compared to boy children.

Keywords: Rural-urban migration, China, children, health
JEL Classifications: I10, J61

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I. Introduction

Insufficient food consumption and the lack of a healthy diet for children can result in unwanted weight loss, fatigue, headaches, poor mental health, and frequent illness. Childhood health in turn serves as an important determinant of an individual’s health status in adulthood and of his or her likelihood of developing costly and debilitating health conditions. In addition, children’s nutritional status and health are associated with performance in school and years of educational attainment, both of which serve as important predictors of future labor market outcomes, especially wages and occupational attainment. The literature provides strong evidence that relates childhood health and nutritional status to cognitive development, school performance, and future success in the labor market.¹ For example, Victora et al. (2008) conducted an extensive meta-analysis as well as their own analysis of data for five developing countries and found that low height-for-age and weight-for-age at two years of age are associated with long-term impairment in educational attainment, school performance, adult height, productivity, and earnings. The authors concluded that nutritional deprivation among children is an important mechanism that can undermine the health outcomes of successive generations.

Children’s nutritional status is affected by a number of factors that include environmental exposure, food intake, illnesses, and other external determinants that are influenced by both socioeconomic status and the physical environment (Puffer and Serrano 1973). One of these determinants is parental employment, and a large body of work indicates that one of the most important channels through which parental employment affects child health and nutritional status is through the income that they earn.² Yet parents’ participation in the labor market can entail a fundamental tradeoff. The income that parents earn contributes to the household’s ability to

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¹ Victora et al. (2008).

² Puffer and Serrano (1973).
purchase goods and services that improve children’s health and nutritional status. However, parents’ market-based work could reduce the quantity or quality of time spent caring for children, with potentially adverse effects on child well-being. Just like household income, time spent with children also affects the degree to which parents, and especially mothers, can engage in care practices that influence child nutrition and health. This tradeoff can be severe for parents who have migrated to urban areas and left their children behind in rural villages in the care of others. Parental remittances may improve children’s nutritional status through greater consumption of more nutritious foods and through housing improvements that are conducive to children’s health. However, migrant parents are apart from their children and the quality of care from substitute care-providers may be inferior. Migrant households who bring their children with them also face this tradeoff given the pressure parents face to work long hours in order to stave off the risk of economic hardship that comes with rural-to-urban migration.

Our study contributes to this body of research with new evidence from China on how social disadvantage among urban migrant households affects children’s nutritional status. China constitutes an important case study not only because it is the world’s most populous country that is experiencing the biggest internal migration flow ever (estimated at 245 million people in 2016 by National Bureau of Statistics of China), but also because it has tried to manage an enormous flow of rural to urban migration with an institutionalized system of social disadvantage known as hukou that may have unintended consequences for children’s well-being. In particular, the hukou is a household registration system based on either a rural or urban classification that depends mostly on the birthplace of the household head and is very difficult to change. Moreover, many public services in urban areas are restricted to individuals with urban hukou only, thus excluding rural-to-urban migrants who still have their rural hukou and denying them access to public
healthcare, schooling, and social services. Examining the well-being of children in China’s urban migrant households can offer powerful lessons for other developing countries that are experiencing rapid rural-to-urban migration and urbanization. Other countries may not have the same formal structure of constraints imposed on rural-to-urban migrants, but if their urban infrastructures are unable to keep up with the influx of new people, then children in migrant households may face similar risks of economic hardship and poor nutritional status.

This analysis utilizes data from the Longitudinal Survey on Rural Urban Migration in China (RUMiC), a rich dataset on migrant workers and their households that has detailed information on human capital indicators, socioeconomic status, food expenditures, and health. The data are used to examine the determinants of children’s nutritional status, as measured by height-for-age Z-scores and weight-for-age Z-scores. We are particularly interested in how the nutritional status of children in migrant households differs across four important dimensions of social disadvantage associated with China’s rural to urban migration flows: (1) children in migrant households that fail to obtain an urban hukou compared to children in households that do secure an urban hukou; (2) children in female-headed households as opposed to children in male-headed households in a context where female migrant workers may have more trouble finding well-paying jobs due to gender discrimination in the labor market; (3) girl children as opposed to boy children in a context where son preference may lead parents to favor their boys over girls in allocating food and seeking healthcare; and (4) children who are left behind in rural villages in the care of others as opposed to children who migrate to urban areas with their parents.

This study builds on work in Mu and De Brauw (2015), Chen (2013), and Meng and Yamauchi (2015), each of which examines the nutritional status of rural children in China left behind in rural hometowns after one or both parents migrated to a city. Using data from the
China Health and Nutrition Survey, Mu and De Brauw (2015) find that the income effect outweighs any detrimental effect of parental time away from children. In particular, the migration of at least one parent (where the gender of the migrating parent is not specified) is associated with an improvement in weight-for-age among children under the age of five, while there is no statistically significant effect on children’s height-for-age. In contrast, Chen (2013) uses the same data to examine the effects of fathers’ migration on children’s body mass and finds no statistically significant effects. Meng and Yamauchi (2015) use different data – the RUMiC survey – and find that as the duration of the absence of mothers increases due to migration, the height-for-age and weight-for-age of rural children ages 15 and below decreases, while the duration of the absence of migrant fathers has a negative and statistically significant effect only on rural children’s weight-for-age. Hence the evidence on whether parental migration boosts or harms the nutritional status of children left behind in China’s rural areas is inconclusive, and none of these previous studies examine migrant children in urban areas.

II. Background: Disadvantage and Inequality in China

China’s institutionalized form of migrant exclusion - the hukou system of household registration - favors households with an urban registration and discriminates against households with a rural registration in the allocation of resources and public services. In this hukou system, one’s status is assigned at birth, is based simply on a rural versus urban categorization, and it is created administratively (Afridi et al. 2015). Upward mobility from a rural hukou to an urban hukou is notoriously difficult, although not impossible for people with specialized secondary or tertiary educations and for people who are members of the Chinese Communist Party (Wu and Treiman 2004).
The hukou system evolved gradually after the Communist revolution in 1949 as the government tried to control the flow of rural to urban migrants. Despite the government’s efforts to stem this flow, the past few decades have seen an enormous surge of rural to urban migration in China, with some estimates that half of China’s population now lives in urban areas, up from just one-fifth in the early 1980s. The majority of these urban migrants do not hold urban household registrations, which means they are denied access to health care, public education, pensions, and other public services. This form of exclusion places rural-to-urban migrants without an urban hukou at a distinct disadvantage relative to people who do have urban hukou.

A growing body of research indicates that China’s urban migrants with a rural hukou are at considerable risk of being socially and economically disadvantaged in terms of access to jobs, subsidized products, education, and public services (Afridi et al. 2015; Chen and Feng 2013; Dreger et al. 2015). For example, even though schooling in China is compulsory and free for the first 9 years, public funding for schools is allocated according to the types of hukou that children hold and it is not transferable across administrative entities (Chen and Feng 2013). This feature of public school funding means that local schools in urban areas do not receive additional funds to educate migrant students who hold rural hukou. A substantial proportion of migrant children is thus forced to enroll in migrant schools, which began as informal schools to meet the needs of migrant children in urban areas and have commonly been perceived as inferior to public schools. Evidence in Chen and Feng (2013, 2017) indicate that migrant children who enroll in migrant schools have lower standardized test scores in Chinese and math relative to students enrolled in public schools. Closely related, evidence in Zhang et al. (2015) indicates that school performance among migrating children is substantially worse than that of children of urban residents, just as there is a large difference between rural and urban children.
Another outcome of the hukou system is discrimination in the labor market, where urban migrants who hold rural hukou have more difficulty being hired into high-wage formal sector jobs, especially those in state-owned enterprises (Song 2014). To the extent that urban migrants with rural hukou are less likely to find high-wage employment, there are strong implications for their ability to send remittances back home, which in turn could impact the well-being of their children left behind. In particular, Hannum et al. (2014) find that children living in poverty in China’s rural areas are more likely to experience food insecurity and be undernourished compared to children in wealthier households, and that food-insecure children in turn have lower literacy achievement in the long term. Discrimination in the labor market can also translate into declining overall economic status, a result found in Yang (2013). This study finds that rural-urban migrants in China who do not have an urban hukou have substantially lower socioeconomic status compared to their locally-born counterparts and compared to urban-urban counterparts, where socioeconomic status takes into account not only earnings and occupation but also access to social insurance and quality housing.

China is also known for its strong cultural preferences for sons, which is reflected in discrimination against girls in decisions about health care, schooling, and feeding. Sen (1989) drew attention to this “missing women” problem with evidence of unusually high male to female population ratios in Asia and North Africa. The preference for sons and this shortfall of women relative to men in the population can arise from a number of cultural, economic, and institutional factors that cause parents to treat boys in ways that favor their growth and development over girls. Parental behavior such as withholding healthcare when a girl is sick contributes to the selective neglect of “unwanted” girls and to their higher chances of nutritional deprivation and even mortality. The absence of social protection institutions for old age, relatively fewer
employment opportunities for women, and strict family planning policies can reinforce the lower social value of women and the cultural preference for having sons (Das Gupta et al. 2003). Hence, young girls in China’s migrant households may be more at risk for poor nutritional status than boys. The lower value of women, in turn, may contribute to relatively greater economic hardship for female-headed households compared to male-headed households that have migrated to China’s urban areas if women face discrimination in the labor market and have more trouble finding a well-paying job than their male counterparts. A number of studies have documented persistent gender gaps in pay and employment in China’s urban labor markets.³

III. Methodology and Data

The effects of parental characteristics such as employment and education on children’s health outcomes and nutritional status commonly accrue through higher socioeconomic status, which in turn operates through a set of “proximate determinants” of health that directly influence child health outcomes and nutritional status (Mosley and Chen 1984). The proximate determinants include fertility factors, environmental hazards, feeding practices, injury, and utilization of health services. At the household level, income and wealth are linked to child well-being through the effects that purchased goods and services have on the proximate determinants of child health. Employed parents bring income into the household, which allows for greater household expenditures. Greater income and assets directly increase the ability of households to purchase or access clean water, clothing, adequately-ventilated housing, fuel for proper cooking, safe storage of food, personal hygiene items, health services, and sufficient quantities of nutritious foods. These items all serve as direct input into children’s health and nutritional status. In other words, these proximate determinants are the mechanisms by which socioeconomic status affects child health. This framework’s emphasis on socioeconomic status in influencing
children’s nutritional status is consistent with findings in Yip et al. (1992) that poor growth status among Asian children—as measured by low birth weight, stunting (low height-for-age), and wasting (low weight-for-height)—is mostly associated with nutritional and health determinants rather than genetic factors.

To estimate the determinants of nutritional status among children in China’s migrant households, we use data from the Rural-to-Urban Migrants Surveys for 2008 and 2009 from the Longitudinal Survey on Rural Urban Migration in China (RUMiC). The RUMiC was set up to investigate the patterns and effects of migration in China. The survey involves individual microdata jointly collected by researchers at the Australian National University, the University of Queensland, and the Beijing Normal University. Figure 1 shows the three regions of the survey covering 15 cities that are either provincial capitals or other major migrant-receiving cities across nine provinces and metropolitan areas. The Eastern region contains Guangzhou, Dongguan, Shenzhen, Shanghai, Nanjing, Wuxi, Hangzhou, and Ningbo; the Central region includes Zhengzhou, Hefei, Luoyang, Bengbu, and Wuhan; and the Western region contains the two highly populated cities of Chengdu and Chongqing. Whereas the eight cities in the Eastern region are the largest migration destinations, the remaining seven in the Central and West are among the largest migration sending areas. The survey contains comprehensive information on a wide array of control variables that can affect measures of children’s food consumption and nutritional status. The sample of children is restricted to individuals who are ages 15 and below and live in households that report household expenditures. After deleting observations with missing values for any of the key variables in the analysis, our pooled dataset contains a total of 3,286 children, of whom 1,457 live with their parents in urban areas and 1,829 are left behind in the rural hometowns. This imbalance between children who migrate with their parents versus
those who stay behind is consistent with evidence in Mu and De Brauw (2015) that among Chinese households with urban migrants, migration of entire families is less common so many children stay behind.

The estimation equation is specified as follows:

\[ Y_{ijt} = b_1 D_{ijt} + b_2 X_{ijt} + b_3 J_j + b_4 T_t + e_{ijt}. \]

The notation \( Y_{ijt} \) denotes the nutritional status of child \( i \) in region \( j \) in year \( t \); the variable \( D \) is an indicator of disadvantage, alternatively measured by whether or not the household has a rural hukou, whether or not the household has a female household head, whether or not the child is a girl, and whether or not the child lives with their parents. The matrix \( X \) contains a number of individual and household-level control variables, \( J \) represents region-level fixed effects, and \( T \) denotes year fixed effects. The equation is estimated for all children in migrant families as well as separately for children living with their parents and children left behind as a point of comparison. In order to test the various hypothesized mechanisms that could link measures of social disadvantage to children’s nutritional status, we estimate a series of nested models starting with a baseline model of child outcomes regressed on the urban hukou indicator and the sex of the child. We then estimate a similar baseline model of child outcomes regressed on the indicator for female-headed household and the sex of the child, and we then estimate a third baseline model of child outcomes regressed on the indicator for child lives with the parents and the sex of the child. Each of these baseline models includes region and year fixed effects. We then introduce socioeconomic factors and various household composition variables. This approach allows us to test alternative mechanisms for how measures of disadvantage relate to nutritional status, in isolation and in a full model that includes all of the explanatory variables. We estimate this series of models for two different dependent variables: stunted and wasted. Because the
survey records multiple children per household as separate observations, we correct the standard errors for clustering at the level of the household.

Note that the RUMiC migrant survey contains no sample weights. Due to the largely incomplete official residential registration of migrants in cities, the most fundamental challenge of designing an unbiased sampling frame involves how to randomly sample the migrant population when lacking reliable information on the migrants’ backgrounds and their distribution (Gong et al. 2008). Existing migrant surveys (for example, the China Urban Labour Survey conducted by China Academy of Social Sciences) nevertheless use administrative records of residential addresses as the basis for sampling. However, a large proportion of migrant workers in China live in their workplaces such as factory dormitories and construction sites, so the residential sampling framework is inevitably biased. The RUMiC survey addresses this issue by using a unique sampling frame based on information collected in a census of migrant workers at their workplaces, whereas the census is conducted in a number of randomly selected city grids within the defined city’s boundary (IZA et al. 2014).6

The control variables in X include a dummy variable for child is a boy, the prestige ranking of the household head’s primary occupation, a set of dummy variables for consumption expenditure quartiles, the share of food expenditures in total consumption expenditures, the usual weekly hours worked by the household head, mother’s years of schooling, father’s years of schooling, age of the household head, a dummy variable for household head is of the Han ethnic group (the dominant ethnic group in China), and weight and height of the household head. Note that the occupational prestige variable is a ranking from 0 to 25 (from lowest to highest prestige) for the 25 occupation categories in the RUMiC data based on the occupational prestige scores in Li (2005).
We use data in the RUMiC on children’s height and weight to specify children’s nutritional status as height-for-age and weight-for-age Z-scores (standard deviation scores). These measures both compare a child to a reference population. For population-based assessment, the Z-score is routinely considered to be the best system for analysis of anthropometric data and the best indicator of malnutrition because of its advantages compared to the other methods. The Z-score specifies the relevant anthropometric value as a number of standard deviations (or Z-scores) above or below the reference median of the U.S. Centers for Disease Control Reference Population for children of the same gender (CDC 2000). The formula for calculating the Z-score is: \[ Z\text{-score} = \frac{\text{observed value} - \text{median value of the reference population}}{\text{standard deviation value of the reference population by gender}}. \] We used the CDC growth charts as a standard rather than the World Health Organization (WHO) growth charts – another common reference population – because the CDC comparison group is more suitable reference group as argued in Meng and Yamauchi’s (2015) analysis of child health outcomes in China. That said, our regression results do not change substantively when the WHO standards are used.

Sample means, presented in Table 1, indicate that on average, children from migrant families who live with their parents have higher WAZ and HAZ scores than their counterparts who are left behind. Among the control variables, the sample means indicate that a very high percent of children in migrant households have a rural hukou (97 percent), and this figure is even higher for children who are left behind in rural villages. More than a quarter of migrant children are in female-headed households, and this proportion is even higher for children living with their parents. Fewer than half of the children are girls, and for the final key indicator of disadvantage, about 56 percent of children in migrant households are left behind in rural villages. Of particular
interest among the other control variables is the food share in total consumption spending: on average, migrant children live in households that spend between 3 and 4 percent of their total consumption budgets on food. Also of note is the average weekly hours of work by the household head, which is considerably higher for the parents of children left behind (35) compared to the parents who still live with their children (30). Consistent with published statistics on gender gaps in schooling, on average mothers have about two years less schooling than fathers, a gap that is slightly larger for the parents of left-behind children and smaller for parents who live with their children. Also consistent with published statistics, virtually all household heads identify their ethnicity as Han, the dominant ethnic group in China.

Looking closer at the differences in anthropometric measures between children of migrant families who live with their parents and those who are left behind, Figure 2 depicts kernel density estimates for the weight-for-age and height-for-age Z-scores. Each curve shows the distribution of Z-scores around zero (where the observed value for a particular child equals the median value for the reference group). Figures show weighted kernel densities using standard bandwidths that are selected non-parametrically. Panel A shows that the WAZ distribution for children left behind is generally to the left of the distribution for children living with their parents, indicating that left-behind children are at greater risk of nutritional deprivation as measured by their weight-for-age. The difference in the two distributions is even larger for the HAZ distributions. Since height-for-age is considered a longer-term measure of nutritional deprivation, the figure suggests that migration decisions that entail leaving children behind can have long-lasting negative repercussions for the children’s nutritional status.

IV. Results
We present baseline model estimates from the bivariate regressions in Table 2. Note that each estimate is taken from a separate estimation that includes year and region fixed effects. The top of the table shows that children from migrant households that have a rural hukou have a weight-for-age Z-score that is 0.47 points lower than children from migrant households that have secured an urban hukou. Most of this penalty from holding a rural hukou for weight-for-age occurs for children who live with their parents, while the negative coefficient on the rural hukou variable loses its statistical significance for children who are left behind. The final three columns indicate a similar conclusion for height-for-age. In particular, children from migrant households that have a rural hukou have a height-for-age Z-score that is 0.58 points lower than children from migrant households that have managed to obtain an urban hukou. This nutritional cost from holding a rural hukou is substantial and is statistically significant.

The next set of results indicates that female headship does not appear to be a disadvantage for children in migrant households, as originally hypothesized. The first three columns show that female headship has a very small and statistically insignificant association with children’s weight-for-age Z-scores. In contrast, female headship actually has a positive and highly significant effect on height-for-age scores of children in migrant families. On average, children in migrant families headed by a woman have a HAZ score that is 0.36 points higher than children in migrant households headed by a man. This effect also holds for the sub-samples of children living with their parents and children left behind. These results most likely reflect a fairly robust finding in the literature that additional income concentrated in the hands of women result in positive benefits to children (Quisumbing and Maluccio 2003, Doss 2006). Although improvements in household income may benefit all members, resources concentrated in the hands of women may do more for children than those concentrated in the hands of men (Thomas
Women’s control over financial resources has well-documented effects on human capital outcomes for themselves and their children through cooperatively-bargained processes. These previous findings would explain why children in our Chinese sample have higher height-for-age Z-scores if they are members of female-headed households as compared to male-headed households.

Results from the third bivariate model show quite clearly that girls have lower weight-for-age scores than boys, a result that is statistically significant across both sub-samples. Because these Z-scores are constructed from reference population averages that are gender-specific, the lower WAZ scores do not reflect physiological norms in which boys weigh more than girls. Rather, girls are exhibiting lower WAZ scores for some other reason that could be related to China’s traditional practices and views around son preference. The penalty for being a girl is not as large for HAZ scores in the overall sample, but it is slightly larger for the HAZ scores of children who migrate to the city and live with their parents.

Our fourth indicator of social disadvantage is whether or not children from migrant families are left behind in their rural villages or live with their parents in urban areas. Not surprisingly, results from the fourth bivariate model indicate a substantial health penalty for being left behind as opposed to living with one’s parents. Children from migrant families who are left behind in the care of other family members or friends in their rural villages have WAZ scores that are 0.21 points lower and HAZ scores that are 0.52 points lower as compared to children from migrant families who migrate with their parents to urban areas.

The full model estimations, in which all four indicators of disadvantage are included in the same regression as well as a full set of socioeconomic status variables and household characteristics, are found in Table 3. One of the most striking results is that even after
controlling for the full set of SES variables and household characteristics, the rural hukou variable still has a negative and statistically significant effect on migrant children’s weight-for-age Z-scores. In particular, children in migrant families who are unfortunate enough to still have a rural hukou have a WAZ score that is, on average, 0.35 points lower than children in migrant families who have an urban hukou. This effect is not only statistically significant, but it is also relatively large in magnitude. Interestingly, the second column of results shows that most of this effect is coming from children who continue to live with their parents, while the rural hukou does not appear to matter as much for children who are left behind. The only coefficient estimate that is larger in magnitude is for Han ethnicity. The estimates show that children from families where household heads are members of the majority Han ethnicity have a WAZ score that is, on average, 0.46 point lower than their ethnic minority counterparts. The effect is statistically significant for both children who are left behind and children who live with their parents. The reason could be due to China’s strict affirmative action policies that protect minority workers more than Han workers in the urban labor market, especially in public-sector jobs. For example, Howell (2017) uses the China Household Ethnic Survey in 2012 to show that minority respondents are more likely to have a formal labor contract and less likely to be engaged in unpaid work compared to the Han respondents.8

As with the bivariate results, children from female-headed households do not appear to experience any drawback as hypothesized, most likely due to the counteracting effect of mothers tending to spend higher proportions of additional resources on investments in children’s human capital compared to fathers, as discussed above. Although we don’t see an effect when it comes to the sex of the household head, we do see a penalty for girl children: on average, a girl has a WAZ score that is 0.20 points lower compared to a boy – a penalty that is about the same for
children living with their parents and children who are left behind. Also of note from the WAZ full model estimation is that our fourth indicator of disadvantage for migrants (whether or not the child continues to live with his/her parents) also retains its statistical significance. In particular, after controlling for the full set of socioeconomic status indicators and household characteristics, children in migrant families who are left behind in the care of others have WAZ scores that are 0.17 points lower than children who live with their parents.

Several of the control variables have a negative and statistically significant effect on children’s WAZ scores. In particular, children whose parents work longer hours tend to have lower WAZ scores. This result reflects the tradeoff associated with market-based work: time spent by parents working in the labor market contributes to household income but takes away time spent caring for children, which could have a deleterious effect on their health. Age of the household head also has a negative and statistically significant effect on children’s WAZ scores. Counteracting these detrimental effects are positive effects from the occupational prestige ranking of the household head, mother’s schooling, and the weight of the household head. The positive and statistically significant effect of mother’s schooling on children’s weight-for-age scores is consistent with findings in numerous studies for other countries that maternal education is an important positive determinant of child health (Boyle et al. 2006).

Not all of these conclusions hold for height-for-age scores, the longer-term indicator of children’s nutritional status. One of the main differences is that holding a rural hukou no longer matters for the children’s HAZ scores. Thus we conclude that children pay a cost in terms of nutritional status in the shorter term if their parents fail to obtain an urban hukou, but in the longer term the households are resilient and children do not suffer a penalty as measured by lower HAZ scores. In contrast, what does matter for children’s HAZ scores is household
headship. Children from migrant families with female heads have, on average, a height-for-age Z-score that is 0.62 points higher than children from migrant families with male household heads. This effect is large and statistically significant at the 1% level. As noted above, most likely this result reflects the finding in the literature that on the margin, financial resources in the hands of women have a large impact on children’s health and household budget allocations toward child investments as compared to financial resources in the hands of men.

Some of the conclusions made for WAZ scores also hold for HAZ scores. In particular, girl children still experience a penalty in their HAZ scores relative to boys, although the result is only statistically significant for the sample of children who live with their parents. Another similar conclusion is that children who are left behind experience a substantial health penalty as compared to children who live with their parents, with a HAZ score differential of 0.34 points. The positive effect of maternal education on child health also holds for HAZ scores, and this effect holds for both children who live with their parents as well as children who are left behind.

V. Policy Lessons

This study, the first to examine China’s rural-urban migrant households and the nutritional status of both children left behind as well as children who migrate with their parents, has found that China’s institutionalized form of trying to limit migrant flows has a detrimental impact on the health of children. In particular, the hukou system of household registration – in which many public social services in China’s cities are accessible only to residents with an urban household registration – has a negative and statistically significant effect on children’s weight-for-age Z-scores, even after controlling for a full set of socioeconomic status indicators and household characteristics. This indicator is a measure of short-term nutritional deprivation in which children are deprived of sufficient calories to exhibit substantial weight loss relative to the
benchmark reference group. This relative deprivation for children whose parents do not hold an urban hukou is exhibited mostly for children who migrate with their parents; the effect is not precisely estimated for children who are left behind. The urban hukou effect does not impact height-for-age Z-scores – an indicator of longer-term nutritional status – after controlling for household socioeconomic status and composition, suggesting that rural-urban households are resilient in the longer term and are able to adjust to their new urban lives without their children exhibiting more permanent effects of reduced height due to insufficient caloric intake. We also found substantial health penalties for WAZ scores and for HAZ scores among children who are left behind in rural villages in the care of others, relative to children who migrate with their parents. Finally, in our tests for penalties arising from gender, we found that children in female-headed households do not appear to suffer from any nutritional deprivation relative to children in households headed by men as originally hypothesized. However, girl children do exhibit lower HAZ and WAZ scores compared to boy children, a finding that is consistent with previous findings of son preference in China.

Overall these results point to the importance of revising the hukou system so that children who migrate to urban centers with their parents are not suffering from denial of public services and economic hardship that arise from their rural hukou status. Improving the accessibility of public services in urban areas for rural-urban migrants will also make it more likely that parents bring their children with them rather than leave them behind, thus mitigating another disadvantage for child health caused by China’s inequitable system of household registration. Results from this study also support the implementation and enforcement of a number of other policy interventions, particularly those that support migrant parents’ roles as caregivers of young children at the same time that they are employed in productive market-based activities in urban
areas. Of particular importance is a transformative approach that boosts the remunerative value and security of migrants’ jobs, improves the compatibility of market work with child care, and promotes skills development.

Improving the pecuniary returns that rural-urban migrants receive for their jobs in the form of wages at par with or exceeding the minimum wage, greater job security, and improved terms of employment will have a direct bearing on their employment decisions. Policy measures to achieve these goals are already embedded in China’s national labor standards that cover formal sector workers, but the policies are enforced consistently across establishments. Measures such as safe workplace conditions, overtime pay, and paid benefits, although potentially costly to implement, promote lower turnover rates, improve well-being for workers, and contribute to extended firm-specific tenure. These measures need to be provided to a broader range of migrant workers by removing exemptions, promoting awareness of benefit availability, and strengthening enforcement efforts. That said, a substantial number of rural-urban migrants work in low-pay or unpaid jobs that are not covered by national labor standards or escape enforcement. In addition to enforcing labor standards in paid jobs that are supposedly covered by national labor laws, a related policy goal is to create more wage-employment and productive self-employment opportunities for migrant workers through policy reforms that incentivize opportunities to switch from low-paid work in marginally productive activities to more remunerative work in productive activities.

In addition, public support for out-of-home child care services helps to relieve the time and budgetary constraints that migrant workers experience. Public support for early education programs also directly benefits those children who otherwise could be receiving inferior-quality care from alternative providers, and it could substantially reduce the number of children who are
left behind in rural villages when their parents migrate to urban centers. Public support of child
care services also promotes higher levels of educational attainment among older children,
especially girls, who otherwise might be withdrawn from school to care for younger siblings.

Finally, policies to promote skill development focus on both meeting current economic
needs and building the capacity for meeting future development needs. Promoting skills
development includes improving the quality of education for both boys and girls. Although
China has worked to close its overall gender gap in educational attainment, there are still
imbalances in the quality of the educations that young people are getting, and these imbalances
are particularly severe between urban-born children and rural-born children. Moreover,
depending on the types of activities in which migrant workers choose to engage, public support
of vocational training can also be useful in preparing migrants for better-paying jobs. Finally, to
better reach workers in the informal sector and in the outer reaches of urban areas, specially-
designed training programs, such as those that are community-based or geographically mobile,
can provide training opportunities to migrants who otherwise remain unreached by standard
education and training initiatives.
Bibliography


Table 1. Sample Statistics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>All Children (Mean, S.D.)</th>
<th>Children with Parents (Mean, S.D.)</th>
<th>Left Behind Children (Mean, S.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight-for-Age Z-score</td>
<td>0.249 (1.523)</td>
<td>0.370 (1.455)</td>
<td>0.153 (1.569)</td>
</tr>
<tr>
<td>Height-for-Age Z-score</td>
<td>-0.536 (1.884)</td>
<td>-0.200 (1.830)</td>
<td>-0.804 (1.883)</td>
</tr>
<tr>
<td><strong>Key Indicators of Disadvantage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household has rural hukou</td>
<td>0.972 (0.165)</td>
<td>0.941 (0.236)</td>
<td>0.997 (0.057)</td>
</tr>
<tr>
<td>Female-headed household</td>
<td>0.288 (0.453)</td>
<td>0.310 (0.462)</td>
<td>0.270 (0.444)</td>
</tr>
<tr>
<td>Child is a girl</td>
<td>0.434 (0.496)</td>
<td>0.436 (0.496)</td>
<td>0.432 (0.496)</td>
</tr>
<tr>
<td>Child left behind</td>
<td>0.557 (0.497)</td>
<td>0.000 (0.000)</td>
<td>1.000 (0.000)</td>
</tr>
<tr>
<td><strong>Other Control Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom consump quartile</td>
<td>0.214 (0.410)</td>
<td>0.047 (0.212)</td>
<td>0.347 (0.476)</td>
</tr>
<tr>
<td>2nd consump quartile</td>
<td>0.239 (0.426)</td>
<td>0.199 (0.399)</td>
<td>0.271 (0.444)</td>
</tr>
<tr>
<td>3rd consump quartile</td>
<td>0.271 (0.445)</td>
<td>0.315 (0.465)</td>
<td>0.236 (0.425)</td>
</tr>
<tr>
<td>Top consump quartile</td>
<td>0.276 (0.447)</td>
<td>0.439 (0.496)</td>
<td>0.146 (0.353)</td>
</tr>
<tr>
<td>Food share in total consumption</td>
<td>3.443 (1.430)</td>
<td>3.175 (1.241)</td>
<td>3.656 (1.532)</td>
</tr>
<tr>
<td>Usual weekly hours worked by HH head</td>
<td>32.764 (36.067)</td>
<td>29.804 (37.095)</td>
<td>35.121 (35.059)</td>
</tr>
<tr>
<td>Mother’s years of education</td>
<td>6.154 (4.057)</td>
<td>7.414 (3.197)</td>
<td>5.150 (4.377)</td>
</tr>
<tr>
<td>Father’s years of education</td>
<td>7.996 (3.374)</td>
<td>8.505 (2.856)</td>
<td>7.590 (3.685)</td>
</tr>
<tr>
<td>Age of HH head</td>
<td>35.011 (5.216)</td>
<td>35.158 (5.281)</td>
<td>34.894 (5.162)</td>
</tr>
<tr>
<td>HH head has Han ethnicity</td>
<td>0.981 (0.135)</td>
<td>0.976 (0.153)</td>
<td>0.986 (0.118)</td>
</tr>
<tr>
<td>Weight of HH head (kg)</td>
<td>63.374 (9.595)</td>
<td>64.000 (9.809)</td>
<td>62.876 (9.394)</td>
</tr>
<tr>
<td>Height of HH head (cm)</td>
<td>166.710 (6.872)</td>
<td>166.625 (6.925)</td>
<td>166.778 (6.831)</td>
</tr>
<tr>
<td>No. observations</td>
<td>3,286</td>
<td>1,457</td>
<td>1,829</td>
</tr>
</tbody>
</table>

Note: Sample includes children under the age of 16 years.
Table 2. Baseline Model Bivariate Estimations for Effects of Disadvantage Indicators on Child Anthropometric Measures

<table>
<thead>
<tr>
<th>Bivariate Model</th>
<th>Weight-for-Age Z-scores</th>
<th>Height-for-Age Z-scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Children</td>
<td>Children with Parents</td>
</tr>
<tr>
<td>Household has rural hukou</td>
<td>-0.468*** (0.152)</td>
<td>-0.383** (0.164)</td>
</tr>
<tr>
<td>Female-headed household</td>
<td>0.017 (0.067)</td>
<td>-0.008 (0.094)</td>
</tr>
<tr>
<td>Child is a girl</td>
<td>-0.179*** (0.056)</td>
<td>-0.176** (0.080)</td>
</tr>
<tr>
<td>Child left behind</td>
<td>-0.210*** (0.060)</td>
<td>.. (..)</td>
</tr>
</tbody>
</table>

Note: Each estimate is from a separate bivariate regression. Standard errors, in parentheses, are clustered at the household level. The notation *** is p <0.01, ** is p <0.05, * is p <0.10. All regressions include regional and year fixed effects. Children are under the age of 16.
Table 3. Full Model Estimations for Effects of Disadvantage Indicators on Child Anthropometric Measures

<table>
<thead>
<tr>
<th>Weight-for-Age Z-scores</th>
<th>Height-for-Age Z-scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Children</td>
</tr>
<tr>
<td>Household has rural Hukou</td>
<td>-0.351**</td>
</tr>
<tr>
<td>Female-headed Household</td>
<td>0.006</td>
</tr>
<tr>
<td>Child is a girl</td>
<td>-0.204***</td>
</tr>
<tr>
<td>Child left behind</td>
<td>-0.173***</td>
</tr>
<tr>
<td>Occupational rank HH head</td>
<td>0.009**</td>
</tr>
<tr>
<td>2nd consump. quartile</td>
<td>0.059</td>
</tr>
<tr>
<td>3rd consump. quartile</td>
<td>0.014</td>
</tr>
<tr>
<td>Quartile Top consump. quartile</td>
<td>0.019</td>
</tr>
<tr>
<td>Food share in total consump.</td>
<td>0.020</td>
</tr>
<tr>
<td>Usual weekly hours worked</td>
<td>-0.006***</td>
</tr>
<tr>
<td>Mother’s years of education</td>
<td>0.019**</td>
</tr>
<tr>
<td>Father’s years of education</td>
<td>0.007</td>
</tr>
<tr>
<td>Age of HH head</td>
<td>-0.071***</td>
</tr>
<tr>
<td>HH head has Han ethnicity</td>
<td>-0.456***</td>
</tr>
<tr>
<td>Weight (height) of HH head</td>
<td>0.017***</td>
</tr>
<tr>
<td>No. observations</td>
<td>3,286</td>
</tr>
</tbody>
</table>

Note: Standard errors, in parentheses, are clustered at the household level. The notation *** is p <0.01, ** is p <0.05, * is p <0.10. All regressions include regional and year fixed effects. Children are under the age of 16.
Figure 1. Spatial Coverage of the Urban Migrant Survey in RUMiC data

Note: The survey locations are primarily based on whether a province is one of the major sending or receiving regions (lighter areas) and was conducted in the 15 cities (darker areas) which are provincial capital cities or other major migrant-receiving cities.
Figure 2. Kernel Density Estimates of Child Anthropometric Measures

Panel A: Weight-for-Age Z-Scores

Panel B: Height for Age Z-Scores
ENDNOTES

1 See Alderman et al. (2006) and Currie (2009) for reviews of the literature on the long-term effects of children’s health.

2 For evidence on the relationship between household socioeconomic status and child health, see, for example, Bhattacharya et al. (2004), Chowa et al. (2010), Currie and Lin (2007), and Rodgers (2011).

3 These studies include Gustafsson and Li (2000), Dong and Bowles (2002), Chi and Li (2014), and Xiu and Gunderson (2015).

4 Data collection was supported by the Institute for the Study of Labor, which provides the Scientific Use Files through its data center. More information about the data can be found in Akgüç et al. (2014) and Fang et al. (2016).

5 In the RUMiC surveys, we are able to distinguish between migrant children who live with parents in the household and those who are left behind from the location answered in the questions “Where is the current primary residential place of the child located?” and “Where did the child reside in 2007 (or 2008)?”.

6 Further details regarding the listing scheme and random sampling procedures of the survey can be found in Gong et al. (2008) and Kong (2010).

7 A very small proportion of left-behind children in rural hometowns have an urban hukou, which is possible if their parents had been able to successfully acquire an urban hukou and if some unforeseen event (such as a family emergency or sickness) caused the parents to send their child back to the rural hometown.

8 The few empirical studies that have examined China’s ethnic minorities have mostly focused on rural areas because that is where most ethnic minority groups live (Gustafsson and Li 2003; Zhang 2008; Gustafsson and Ding 2009a and 2009b; and Wu and Song 2014). Hence very little is known regarding how China’s ethnic minorities have fared in urban areas. Regarding health inequities by ethnicity, Ouyang and Pinstrup-Andersen (2012) used seven waves of the China Health and Nutrition Survey collected in nine provinces from 1989 to 2006 and found negative and statistically significant effects for being ethnic minority compared to Han Chinese in a set of anthropometric measures for people of all age groups. These results are based on non-migrant households.