The Causal Effects of Rural-to-Urban Migration on Children's Wellbeing in China*

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Abstract

China's rural-to-urban migration has affected 12.6 million school-age rural children who have migrated with their parents and another 22 million who have been left behind by their migrant parents. While much work has been devoted to assessing the consequences of migration for the huge number of children involved in China's ongoing large-scale migration process, not enough is known, either theoretically or empirically about the causal impact of migration on children's wellbeing. We conceptualize a two-step model to understand the causal impact of migration on children. We draw upon data from the Chinese Family Panel Studies, a nationally representative, annual longitudinal survey of Chinese communities, families, and individuals launched in 2010. We pool the origin-destination child samples to form appropriate comparisons. We apply propensity score matching methods to estimate the average treatment effects for the treated. Our preliminary results highlight the mixed effects of migration on children's objective and subjective wellbeing.

Introduction

China's rural-to-urban migration, like that in many developing countries, is often temporary and circular, with children either moving along with their parents to cities or being left behind in the countryside. According to a report by the Ministry of Education of China (Ministry of Education, 2012), over 12.6 million school-age rural children had migrated with their parents in 2011, an 8% increase over the 2010 figure. At the same time, another 22 million children had been left behind by their migrant parents, a 3% decrease from a year ago. While much work has been devoted to assessing the consequences of migration for the huge number of children involved in China's ongoing large-scale migration process, not enough is known, either theoretically or empirically about the causal impact of migration on children's wellbeing (Chang, Dong, & Macphail, 2011; Nguyen, Yeoh, & Toyota, 2006).

Most of the relevant studies to date have compared migrant children to their urban native counterparts, an inappropriate reference group for fully understanding the causal impact of migration. Being socioeconomically advantaged for decades, urban Chinese children are not only better-off at birth in nearly every relevant respect, ranging from nutrition to neonatal health care and from family socioeconomic status to parenting knowledge and behavior, but also exposed to resource-rich environments (e.g. neighborhoods and schools) and more policy benefits (e.g. dependent medical insurance from their parents' work units) as they grow up. The assimilation model, largely based on the literature on immigrants to the U.S. (Alba and Nee 2003; Greenman & Xie, 2008; Zhou, 1997), may help us to predict the narrowing gap in well-being between rural-to-urban migrant children and their urban-born counterparts over the period since migration, but the assimilation model does not tell us anything, counterfactually, about the causal impact of migration on rural-to-urban migrant children.

From a causal inference perspective, it is inappropriate to use urban children as a reference group for assessing the causal effects of rural-to-urban migration. As Holland (1986, p. 946) puts it, "For causal inference, it is critical that each unit be *potentially exposable* to any one of the causes. As an example, the schooling a student receives can be a cause…of the student's performance on a test, whereas the student's race or gender cannot." Likewise, to the extent that the notion of being "potentially exposable" does not apply to urban children who are, by definition, not at risk of rural-to-urban migration, our understandings about the causal effect of this treatment would remain elusive if we continued to mistakenly treat urban children as the control group.

In studies of U.S. migration, Landale and colleagues (Landale & Hauan, 1996; Landale & Oropesa, 2001; Landale, Oropesa, & Gorman, 2000; Singley & Landale, 1998) are among the few exceptions that compare migrants to the U.S. with non-migrants living in their places of origin. Landale and colleagues' earlier work relied on pooling data from two separate samples, one for non-migrants in Puerto Rico (the origin) and one for migrants in the State of New York (the destination). Their more recent work drew upon data from an integrated survey that samples respondents from both the place of origin and that of destination. In the context of contemporary China, Liang and Chen (2007) similarly compared school enrollment rates between migrant and non-migrant children at the place of origin, in addition to local children in cities of Guangdong Province, drawing data from the 1995 China 1% Population Sample Survey.

Capitalizing on data from the 2010 wave of the *China Family Panel Studies* (CFPS), a newly launched nationally-representative longitudinal data collection project, we seek to make finer distinctions among rural children living in non-migrant families, those who are left behind, and those who migrated than have typically been made in the previous research. Through rigorously designed comparisons, we adopt a counterfactual causal inference framework to estimate the causal effects of rural-to-urban migration on rural Chinese children's well-being, achievement, and development. Our study contributes to the literature in several important ways. First, with propensity score matching (PSM) techniques, we attempt to estimate the causal effects of migration on child well-being in China, a context characterized by large-scale internal migration which is shared by many other developing countries (Toyota, Yeoh, & Nguyen, 2007). Second, the causal analysis focuses explicitly on the comparison of children of rural origin across different destinations and parental migration experiences. Third, through comparison between the left-behind children and those who migrated with their parents, we decompose the gross effects of migration into two parts, the socioeconomic resources brought by parental migration and the benefits from co-residence with parents. Fourth, we recognize the fact that migration may be beneficial for children's well-being in one domain but detrimental in another (Greenman & Xie, 2008). Thus, by examining a wide range of indicators for children's objective and subjective well-being and development, we expand upon previous studies that typically focus on one or two aspects such as education and delinquent behavior. Collectively, these extensions draw a more complete picture of migration processes and consequences for China's children.

Theoretical Background

We conceptualize a two-step model to understand the causal impact of migration on children: First, the parents (or other legal guardians in rare cases) decide whether or not to migrate from rural villages to cities to seek better jobs, higher income, or other goals; second, the parents who have chosen to migrate decide whether or not bring their children. Following the same logic as Xie and Wu (2005), we break down the impact of migration into two component causal questions: *(1) What are the causal effects of parental migration on child's well-being? (2) What are the causal effects of child's own migration on his/her well-being?* The first question involves the counterfactual comparison between those who are left behind by their migrant parents living in cities and those remaining in villages with their non-migrant parents, whereas the second replaces the original treatment group with those who have moved to cities with their parents.

It has been repeatedly shown, in both China and other countries, that the remittance sent back home by migrant workers increases household income, reduces poverty, and thereby contributes positively to children's education and development (Chen et al. 2009; Du, Park, & Wang, 2005; Duncan, Brooks-Gunn, & Klebanov, 1994; Edwards & Ureta, 2003). Therefore, we expect both the left-behind and the migrant children who benefit from increased economic resources contributed by adult migrant workers to be generally better-off than rural children in non-migrant households (as indicated by the plus and minus signs in Table 1). However, these benefits come with a price. Staying at home in a rural area with their migrant parents living in cities far away, left-behind children are susceptible to reduced parental care and/or supervision

and hence are more at risk for psychological and behavior problems. Studies based upon small sample data in China revealed that the left-behind children often experienced difficulty adapting to life without parents nearby, felt abandoned, and had trouble expressing feelings or obtaining help (for a brief review, see Xiang, 2007). One study that employed measurements from clinical psychology reported that compared to those urban natives who lived with their parents in cities, the left-behind children were more likely to be diagnosed with obsessive-compulsive disorder, depression, anxiety, and paranoia (Huang, 2004).

With respect to objective well-being, studies in both China and other countries have reported that compared to those in non-migrant households, the left-behind children were more likely to skip or drop out of school and to complete fewer years of schooling due to less parental supervision or increased time spent on housework and farming to substitute for the absence of adult labor (Battistella & Conaco, 1998; Chang et al., 2011; Liang & Chen, 2007; Liang, Guo, & Duan, 2008; McKenzie & Rapoport, 2011). Nonetheless, evidence in this regard remains inconclusive. For example, one study of three southern provinces found no significant difference in school attendance or academic scores in mid-term and final exams between the left-behind and those whose parents did not migrate (Zhu, Li, & Zhou, 2002). The qualitative data from the same study suggested that rural parents neither pay close attention to their children's schooling nor are they able to provide them with extra-curricular tutoring. On the contrary, migrant children may benefit from co-residing with their parents in addition to enriched family wealth. Therefore, we would expect migrant children to do better academically than their counterparts who stay in rural areas with their non-migrant parents, whereas those left-behind would tend to have non-academic problems as well due to lack of parental care and supervision.

Being a migrant, however, is itself a double-edged sword. On the one hand, migration to cities exposes children to an urban environment that is characterized by new ideas, more permissive social norms, expanded peer networks, and a wider pool of potential resources including but not limited to quality schools and teachers, nutrition-rich food environments, and high-level hospitals, all of which contribute positively to children's well-being and development. In this sense, migration can be an empowering experience for children (Dixon-Mueller, 2008; Luke et al. 2012). On the other hand, migrant children are confronted by the challenge of assimilating into a new social environment which is somewhat alien to and perhaps even discriminatory towards them. The disruption from the rural culture in which they were born can be extremely detrimental during childhood, a critical life stage for human development. Migrant children may have trouble adapting to a new urban life and thereby develop risk-taking propensities and compromise their subjective well-being. In a comprehensive study of the U.S., Greenman and Xie (2008) found that in general, Hispanic and Asian immigrant adolescents were more academically successful but also experienced more psychological disturbances (e.g. low self-esteem and depression) and engaged in more risky behaviors (e.g. delinquency, violence, substance use, and early sexual debut). Nonetheless, evidence of negative consequences for migrant children, especially in developing countries, remains inconclusive. For instance, in Sub-Saharan Africa, adolescents who experienced multiple residential changes may have become more acclimated to life disruptions over time and thus lowered the risk of initiating early sexual intercourse (Luke et al., 2012). Another study of primary school children in Shenzhen, a popular migration destination in China, found no significant difference between migrant children and

urban natives in their subjective well-being as measured by self-reported happiness, pressures from schoolwork, and self-rated health status (Lau & Li, 2011).

Furthermore, the assimilation process in urban China is strongly hindered by institutional barriers such as the household registration system that substantially restricts the opportunities for migrant children to enroll in, for example, public schools of quality and the health care system (Liang et al., 2008). As a result, migrant children may not have direct access to abundant public resources, but instead have to enroll in unlicensed migrant-sponsored schools (Lu & Zhang, 2001) and face disease risks without coverage from any immunization program (Liang et al., 2008). Migrants are also at a greater risk of concentrating in deprived enclaves in cities, and the resulting declined earnings (Xie & Gough, 2011) may negatively affect their children's well-being. Nevertheless, evidence of these negative effects of migration on Chinese children remains mixed (X. Chen et al., 2009).

To summarize, we expect both the left-behind and the migrant children to benefit from the increased family economic resources contributed by adult migrant workers and thus are more advantaged in objective well-being as compared to those in non-migrant families (see the top panel in Table 1). We also expect that migrant children will benefit from a resource-rich urban environment but may also suffer from discrimination and attacks to their self-esteem during assimilation, while children remaining in rural areas, regardless of their parents' migration status, have access to poorer social and environmental resources (see the middle panel in Table 1) but will be less likely to experience problems such as discrimination. Finally, we expect, compared to those left behind, that both non-migrant and migrant children will benefit from co-residing with their parents, and the resulting improved subjective well-being.

Data

This study draws upon data from the Chinese Family Panel Studies (CFPS), a nationally representative, annual longitudinal survey of Chinese communities, families, and individuals. Designed to collect individual-, family-, and community-level longitudinal data in contemporary China, the CFPS was launched in 2010 by the Institute of Social Science Survey (ISSS) of Peking University. The studies focus on the economic, as well as the non-economic, wellbeing of the Chinese population, with a wealth of information covering such topics as economic activities, education outcomes, family dynamics and relationships, migration, and health. The CFPS respondents are tracked through annual follow-up surveys. All CFPS families are interviewed every year, along with all children and adolescents at the individual level in these families. Individual-level follow-up surveys for CFPS adults will be conducted in even-years only. The CFPS promises to provide to the academic community the most comprehensive and highest-quality survey data on contemporary China. Covering both children at rural origins (either in non-migrant families or left-behind) and those at urban destinations, the CFPS data allow us to fully capture the effects of migration across a wide range of outcomes with a battery of measures of both objective and subjective well-being,

The nation-wide CFPS baseline survey in 2010 successfully interviewed 14,798 households, along with 33,600 adults and 8,990 children within these families, in 25 designated provinces, for an approximately response rate of 79%. The stratified multi-stage sampling

strategy ensures that the CFPS sample represents 94.5% of the total population in China in 2010. In 2011, CFPS successfully followed up 13,130 of the original households, along with 7,527 children below age 16 and 1,279 adolescents between ages 16 and18. In this study, we focus on children between age 6 and 15 who were interviewed with similar survey modules

We define migration status by comparing current type of household registration ("*hukou"*) with current type of residence as well as comparing place of birth with current place of residence at county level. To simplify analysis, we combine intra- and inter-county migration and focus on rural-to-urban migration only. Thus, a rural-to-urban migrant is someone who currently lives in an urban area but maintains a rural *hukou*. Accordingly, a non-migrant (rural) child is someone who possess a rural *hukou* and lives in the same county as that at birth, and whose current place of residence is classified as rural. A left-behind child is a non-migrant living in a rural area with at least one of parent who has migrated away from home.

We examine a comprehensive list of outcomes across different child development domains, ranging from education to psychosocial to time use (see Table 2). We also plan to construct and include health outcomes in a future analysis. Informed by previous research, we will incorporate important individual and family socioeconomic and demographic characteristics as matching variables in our PSM analysis.

Preliminary Descriptive Results

Table 2 presents descriptive statistics of the dependent variables across different groups. We include urban native children in the table merely for simple comparison. There was no notable difference between non-migrant and left-behind children in terms of educational performance, except that the latter had a slightly higher chance of being a student cadre. As for educational aspiration, non-migrant children had a slightly stronger desire to attend college after growing up. The two groups also did not differ substantially from each other with respect to political knowledge, subjective well-being, or patterns of time use.

Turning to migrant children, they performed much better in both the Chinese word and the math tests specifically designed for the CFPS than non-migrant children and those left-behind. Migrant children also tended to have a stronger educational aspiration and possessed more abundant political knowledge, although they did not seem to have better psychological outcomes. Again, no remarkable difference seemed to exist in patterns of time use between migrant and non-migrant children.

Unsurprisingly, urban native children outperformed all the other groups in nearly every aspect of well-being we have measured. Even in terms of time use, where no pronounced differences existed among non-migrant, left-behind, and migrant children, the urban natives spent approximately 36 minutes less in doing household chores or farm work than the others.

Analytic Plan

We will apply PSM methods to estimate the average treatment effects for the treated (ATT). Borrowing the notation from causal inference, let Y_i^T be the outcome for child *i* if he/she is

treated (i.e. left-behind with migrant parents in the first causal question and being a migrant child in the second question), and Y_i^C be the outcome for the same child if he/she is untreated (i.e. living in a non-migrant family). The ATT can be computed as:

$$ATT = E\left(Y_i^T - Y_i^C \middle| D_i = 1\right) = E(Y_i^T \middle| D_i = 1) - E\left(Y_i^C \middle| D_i = 1\right)$$

where D =1 if being treated and 0 otherwise. However, it is impossible to observe Y_i^C for the same child who is treated. To infer causality, we have to make an assumption that does not necessarily hold in reality; that is, the treated and untreated children are similar in unobserved characteristics if they are matched on observable characteristics that affect treatment (Rosenbaum & Rubin, 1983). In other words, if we assume that conditional on a set of observed characteristics, X, there exists a matched analogue in the control group for each treated child, then the following conditional independence is satisfied:

$$E\left(Y_i^C \middle| X, D_i = 1\right) = E\left(Y_i^C \middle| X, D_i = 0\right) = E\left(Y_i^C \middle| X\right)$$

We can then estimate ATT as:

$$ATT = E[Y^T | D = 1, \Pr(D = 1|X)] - E[Y^C | D = 0, \Pr(D = 1|X)]$$

where $Pr(D=1|X)$ is the probability of being treated conditional on X. To estimate the effects of parental migration on child's well-being (i.e. the first causal question), we will match the left-behind children with non-migrant children on a number of individual and family socioeconomic and demographic variables. To answer the second causal question, we will match the migrant children with non-migrant ones by their propensity score of migration.

Furthermore, we will perform multiple imputations to handle missing data provided that no strong evidence of non-ignorable missing mechanism is discovered in exploratory analyses (Schafer, 1999). We will also apply sampling weights and adjust for the complex survey design of the CFPS in our final analyses to obtain generalizable results. Finally, as the 2011 CFPS data becomes available in the near future, we can capitalize on its panel feature to further remove any time-invariant unobservables that may correlate with migration decisions and hence bias the estimates. Specifically, we will adopt a difference-in-difference (DID) PSM strategy to purge out the time-invariant factors before and after migration as well as control for individual-level heterogeneity (Y. Chen & Jin, 2012; Heckman, Ichimura, & Todd, 1997; Wagstaff et al. 2009).

Table 1. Conceptual comparisons among three types of children: rural non-migrant (stayer), left-behind, and rural-to-urban migrant

	Stayer	Left-Behind	Mover
Parental migration	No	Yes	Yes
Economic resource	-	+	+
Self-migration	No	No	Yes
Exposure to urban environment	-/+	-/+	+/-
Co-residence with parent(s)	Yes	No (or partial)	Yes
Parenting	+	-	+

Table 2. Descriptive statistics of dependent variables

	Non-Migrant	Left-Behind	Migrant	Urban Native
Educational Performance				
Word test score (mean)[a]	20.9	20.5	22.1	24.2
Math test score (mean)[a]	10.8	10.4	11.4	12.4
Chinese grade reported by parents (mean)[b]	2.6	2.5	2.8	3.1
Math grade reported by parents (mean)[b]	2.6	2.5	2.8	3.1
Percentile rank in the last Chinese exam (mean)[a]	66.9	68.3	65.0	73.2
Percentile rank in the last Math exam (mean)[a]	66.1	67.6	64.8	72.0
Being a student cadre last year (%)[a]	29.7	33.2	35.9	45.4
Educational Aspiration				
Self-expectation to attend college in future (%)[a]	57.4	54.6	61.6	85.1
Political Knowledge				
Know the general secretary of CPC (%)[a]	48.7	45.0	50.5	62.3
Know the prime minister of China (%)[a]	40.1	41.6	48.5	58.4
Know the president of the US (%)[a]	24.2	24.6	42.2	60.8
Subjective Well-Being				
Very popular among friends (%)[a]	25.8	28.8	26.8	33.5
Very happy (%)[a]	39.3	41.1	42.4	50.4
Very confident about future (%)[a]	36.5	39.4	39.9	43.3
Very easygoing (%)[a]	27.1	28.5	33.0	40.4
Time Use				
Hours per workday surfing Internet for entertainment (mean)[a]	0.1	0.0	0.2	0.2
Hours per workday watching TV/video, or listening to radio/music (mean)[a]	0.9	1.0	1.1	0.9
Days per week doing housework/farming (mean)[a]	2.7	2.7	2.8	2.1
N (age of 10-15)	1,466	389	666	517

[a] Age range is 10-15

[b] Age range is 6-15

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