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Does wealth matter? An assessment of China's rural-urban migration on the education of left-behind children

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ABSTRACT

This paper decomposes the impact of parental migration on the education of children left behind. In particular, we examine whether children are enrolled in school on a timely basis according to their age when their parents are away. We found both theoretical and empirical evidence to support that parental migration generates a strong positive impact on timely enrollment if a child is from a less wealthy background. However, the effect decreases with family wealth, and reverses after reaching a threshold; we find this point using family house size as our proxy and the turning point occurs at a moderate size of approximately 148 square meters. In addition, we find a compensating effect that migrants tend to spend more on a child's education investment to offset for the loss of parental time care. Lastly, we found the overall impact of parental migration is negative on the timely enrollment of child. Thus, with the important heterogeneities attributed to wealth, our results suggest that the left behind children of more affluent parents may be pushed into worse human capital outcomes; given the rapid development of China, it may be the case that the current cohort of left behind children is less likely to be enrolled in school than earlier cohorts.

1. Introduction

Human capital gaps originating at a young age can widen and contribute to a lifetime of income inequality (Heckman, 2008; Huggett, Ventura, & Yaron, 2011; Keane & Wolpin, 1997; Yang, 2018). Though both investments in time and funding for human capital development are crucial, recent studies have shown that active parental time inputs are of first-order importance for children at early ages, relative to resource investments (Del Boca, Flinn, & Wiswall, 2013; Guryan, Hurst, & Kearney, 2008; Ramey & Ramey, 2010). Nevertheless, studies of parental time with children often focus on the intensive margin and do not allow for differential impacts by resource endowments.

Such results are often difficult to extend to a developing economy with a large migrating population and considerable disparities in wealth. In these contexts, parents often have to migrate to gain resources, which leads to the need to study the extensive margin adjustment. Furthermore, some are migrating from dire poverty conditions while others are coming from more comfortable means.

This study estimates the impact of parental migration, an extensive margin loss of parental time, on China's rural left behind children's school enrollment. We focus on the crucial question as to how sensitive the impact is based on the family's wealth. To the best of our knowledge, this is the first paper that provides a theoretical and empirical examination of the impact of family wealth on children's human capital outcomes in a parental migration context. Our results reconcile the growing yet inconclusive arguments on the overall (net) impact of China's rural-urban migration on children in recent years by showing that sample selection with small

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differences in wealth can produce large difference in estimated outcomes.

In the theoretical section, we construct a model that identifies two channels through which parental migration affects human capital outcomes. The first is the compensating channel. Human capital production of a child requires both financial resources and time investments. A migrating parent will compensate for the inevitable lump-sum loss of parental time care by spending extra resource investments on children. Second, there is a heterogeneous wealth effect which derives from the diminishing marginal product of resource investments. The intuition is as follows: as less wealthy families are not able to spend large amounts of resources on their child's development, additional funding they can garner through migration for work can provide large marginal returns. Meanwhile, families with higher wealth status find that additional resource investment coming from migrating parents provides lower marginal returns which makes it harder to cover the impact from loss of time care. In other words, optimization and diminishing marginal products of both inputs predict that the additional funding of wealthier immigrants will not be able to offset the time lost to their children.

We find strong empirical evidence of both the compensating channel and heterogeneous wealth effect using the China Health and Nutrition Survey (CHNS) from 1997 to 2015. In terms of descriptive evidence in our sample, migrant families tend to be wealthier, measured by house size, and there is considerable heterogeneity; thus, the overall impact of migration on education is an empirical question. Using house size of 148 square meters as a cutoff, we found that migrants from below the cutoff line have children who are more likely to be enrolled in school on a timely basis than their non-migrant counterparts. However, the impact decreases as the family gets wealthier. We see this when the effect reverses for wealthier families who are above the cutoff. When we introduce a set of individual and community level observables, migration, and its interaction with house size, the impact of migration is persistently significant. In addition, we see some of the heterogeneous wealth effect operating through other variables which provide, on net, evidence of the wealth effect turning to a negative effect.

To test for the compensating effect, we use whether the child takes a bus to school as an approximation of resource investments showing that parents are sending students to schools farther away and paying for their transportation. This empirical evidence suggests that children with migrating parents from lower wealth households are 32% more likely to take bus to school, supporting the theory's prediction.

Lastly, to put our empirical work in the context of the current research on the net effects of migration, we estimate the overall impact of migration. Our results suggest that migration impact human capital of children, on net, in a negative manner. However, once controlling for other observables, the effect drops out. This shows the sensitivity of estimations of migration. It also provides robustness support that despite such sensitivity, our main heterogeneous wealth effect remains.

We are able to suggest that policymakers should support the left behind children at the lower end of the wealth distribution as they are more likely to be in school, but to remain aware that higher wealth migrants may not be helping their children. For these families, policies that allow children to move with their parents and relaxing the constraints of the *hukou* system may be a way to boost parental time inputs.

To address selection issues and inherent endogeneity problems that are common in migration studies, we use instrumental variables to account for the possibility that error terms are correlated with the decision to migrate. For example, decision to migrate may be correlated with the unmeasured ability of the child left behind or there may be non-random selection into migration along various dimensions involving family structure and push and pull factors. Secondly, parental resource investment may be correlated with family wealth through unobserved selection. We use traditional measures of past networks and interactions with province level economic conditions as instruments for migration, and parental height as an instrument for family wealth. Our tests of our instruments point toward strong statistical significance in the first stage and they pass over-identification tests for our educational attainment regressions indicating that they are valid instruments; thus, we present our IV regressions as our main output.

2. Literature review

There has been a sizable literature studying the impact of parental investment on children's outcomes. Most studies focus on the intensive margin where parents can adjust the number of hours spent with their children (Del Boca et al., 2013; Guryan et al., 2008; Ramey & Ramey, 2010). In most settings, parental investment can be split between financial investments in education and time caring for children. Estimates of these differential impacts can provide important guidance for policy makers. However, consistent results are difficult to estimate given the variations in the quality of parental care, genetic components and family backgrounds which can obscure the results (Plug & Vijverberg, 2003). Therefore, studies often find ambiguous or differing conclusions. Blau (1999) and Blau and Currie (2006) found that working parents provide higher income and can effectively substitute parental time care by investing in quality professional childcare. Others find a disadvantage of losing parental time care (Yum, 2016). While these papers give us insight into the importance of parental time and resource investment, the results reside in an intensive margin trade-off, where parents gaining labor income face trade-offs in providing a smaller, though still significant, time with children.

The time effect of migrating parents, however, is different and migration can mean that children are left behind. Many rural parents, especially in China, must face decisions at the extensive margin: they can either spend parental time at home with their children or migrate to the city without their children and accumulate financial assets. This decision is largely unique to China as migrating parents often have to leave their child at home because of the residential registration system (hukou system). This system limits access to social services and education in the destination location that is not the child's place of birth. Because of the fast urbanization of the past three decades in China and the growing employment opportunities in cities, over 150 million agrarian residents have migrated to urban industrial localities leaving over 60 million children behind (China National Bureau of Statistics, 2012).

As a result, there is a growing interest in the impact of Chinese rural-urban migration on children's human capital development in the last two decades. Studies looking at the overall effect of parental migration on left-behind children's human capital development in China often produce inconsistent results. Using community level data without differentiating family migration structure, Zhang and Matz (2017) found a positive impact of parental migration, highlighting the positive impact of remittance to children's education. Alternatively, some studies found parental migration does not matter in child's human capital development (Wang, Bai, Zhang, & Rozelle, 2017; Wang, Luo, Zhang, & Rozelle, 2017). And others find that children with both parents gone perform significantly worse in school (Zhou, Murphy, & Tao, 2014).

Such inconsistency comes from various degrees of validity in the identification methods, sample selection, and heterogeneity of sample. Due to data availability, most studies rely on self-collected survey data, multiple regressions, or propensity matching, which may entail estimation bias. Démurger and Xu (2015) and Liu and Xing (2016) found strong evidence of reverse causality where parents migrate to cities in order to raise money to support children's education. Bansak, Chezum, and Giri (2015) using data from Nepal show that omitted variables, such as crop failure, may also result in both children dropping out of school and parental migration.

Similar to our empirical exercise, Hu (2012) found that parental absenteeism has a negative impact on a child's high school attendance, although remittances partially mediate the negative impact. Mu and De Brauw (2015) found that parental migration has negative impact on left-behind children's health. Both Hu (2012) and Mu and De Brauw (2015) use migration networks and urban wage information as instrumental variables to account for inherent migration selection. While these two papers focus on the overall effect, we provide a theoretical decomposition and empirically take a deeper dive into estimating the compensating incentive of migrating parents, and examining the impact of migration through heterogeneity of family wealth.

To begin, as stated above, we are examining the extensive margin of parental time with children and separate the marginal impact of parental time from financial resources spent on a child's human capital development. This approach avoids the difficult identification problem of examining the degree of substitutability and complementarity between the two inputs that vary across families and ages of children. In addition, while some studies control for family wealth variables in the literature, we argue that the selection of observations and analysis based on family wealth are extremely important to consider both theoretically and empirically. As shown in the literature, a dramatic inconsistency is found across family demographics. Because of the potential dynamic complementarity of human capital development and borrowing constraints, estimates of the marginal impact of parental investments in children are sensitive to age and family wealth (Blau, 1999; Caucutt & Lochner, 2012; Dahl & Lochner, 2012; Powdthavee & Vernoit, 2013; Ruhm, 2008).

Of the studies that do allow for differential effects by resource endowments, few studies extend the heterogeneity of wealth to resource constrained communities. And even fewer focus on the decision between educational funding and absenteeism. Démurger and Wang (2016) found that remittances increase consumption more than investment income in rural China. De Brauw and Giles (2018) found that poor households in rural China invest in durable goods and housing, while rich households invest in non-agriculture production assets when a family member migrates. Alternatively, Dang, Huang, and Selod (2016) provide evidence that liquidity constrained rural-urban migrants increase remittances on child's education expenditure. More relevant to our study, they find that people have varying marginal propensities to consume, invest, and spend on schooling based on family wealth. To the best of our knowledge, this is the first paper that provides a tractable theoretical model and empirical evidence strengthening the heterogeneous impact of family wealth on child's development by migration pattern in a resource binding community.

3. Theoretical framework

This section develops two channels of effects that migration has on a child's human capital development: a compensating effect and a heterogeneous wealth effect. It provides theoretical guidance for finding the empirical mechanism of the impact of parental migration on the educational outcomes of children.

We model a parent of a child with a two period lifetime. We abstract away from intra-household bargaining, without distinguishing father and mother and not specifying household structure. The parent lives for two periods, a childrearing period and a period of grown-up child. The parent can choose to stay with the child or migrate for work in the first period, and enjoys the utility in return from grown-up child in the second period. We normalize the labor earnings for those who choose to stay at home to zero, as the level of w does not qualitatively affect our results.

At the start of the model ($t = 1$), the parent is endowed with an initial wealth (a). In $t = 1$, she makes an extensive margin decision (i) deciding whether to migrate for work ($i = migration$) or to stay in the village ($i = stay$) in addition to optimally choosing consumption (c_1), and child resource investment (κ) while facing the consumption price 1, and an interest rate of r.

If the parent migrates for work, she receives relative labor income (w) in comparison to non-migrant parent where we normalize the wage to 0.

The production function ($f(\cdot,\cdot)$) generates child's human capital (h), with inputs for child resource investment (κ) and parental time care (τ). Following Del Boca et al. (2013) and Cunha and Heckman (2007), we assume $f(\kappa,\tau)$ to be a continuous, increasing, and concave function in both arguments ($f_\kappa(\kappa,\tau) > 0$, $f_\tau(\kappa,\tau) > 0$, $f_{\kappa\kappa}{}^2(\kappa,\tau) < 0$, $f_{\tau\tau}{}^2(\kappa,\tau) < 0$), and both inputs have certain degrees of complimentarity ($f_{\kappa\tau}{}^2(\kappa,\tau) > 0$, $f_{\tau\kappa}{}^2(\kappa,\tau) > 0$, $f(0,\tau) = 0$, and $f(\kappa,0) = 0$).

To model the absenteeism of parental time input associated with the Chinese rural-urban migration choice, we set the migrant's time spent with child at its minimum (τ_{mig}) in comparison to non-migrant's at (τ_{stay}) which is its maximum. In the second period

($t = 2$), the parent receives savings from first period and enjoys utility value from child's development ($g(h)$), given the human capital of the child in period two (h). We assume that the higher the child's human capital, the higher the utility return ($g'(h) > 0$).[1]

Putting this all together, the parent's problem is then to maximize lifetime utility considering the increasing, concave period Bernoulli utility function $u(c)$ and discount rate β.

$$V = \max_{i, c_1, c_2, \kappa} \{u(c_1) + \beta(u(c_2) + g(h))\}$$
$$\text{s. t.}$$
$$(1 + r)(c_1 + \kappa) + c_2 \leq (1 + r)B$$
$$c_1, c_2 \geq 0$$

where

$$B = \begin{cases} a + w & \text{if i=migrate} \\ a & \text{if i=stay} \end{cases}$$

and

$$h = \begin{cases} f(\kappa, \tau_{mig}) & \text{if i=migrate} \\ f(\kappa, \tau_{stay}) & \text{if i=stay} \end{cases}$$

We assume that an agent who is indifferent will choose to stay in the village rather than migrating. Because $u(\cdot)$ is increasing, it is trivial to show that the budget constraint will hold with equality. The following lemma, Lemma 3.1 is straightforward; nonetheless, it is helpful to set the stage for the relationship between wealth, consumption and investment and is invoked in later proofs. It essentially confirms the income effect is positive for normal goods and services.

Lemma 3.1. Human capital investment in children and consumption are increasing in wealth in both periods.

PROOF:

See Appendix A.1 □

The second Lemma delineates our first channel by describing the compensating effect of parental migration; formally,

Lemma 3.2. Migrants compensate the loss of parental time investment by investing more resources to maintain child's human capital. Mathematically, $\kappa_{mig} > \kappa_{stay}$, if $h_{mig} = h_{stay}$.

PROOF:

See Appendix A.2 □

Our last lemma, Lemma 3.2, gives the testable implications regarding the diminishing effects of migration on human capital as wealth increases.

Proposition 3.1. Impact of migration on child's human capital decreases as family wealth increases. Mathematically, $\frac{\partial f(\kappa_m, \tau_{mig})}{\partial a} < \frac{\partial f(\kappa_s, \tau_{stay})}{\partial a}$.

PROOF:

See Appendix A.3 □

Proposition 3.1 describes the wealth effect of parental migration: the wealthier the family, the less positive impact migrating brings to child's human capital outcome.

We impose the CRRA utility function where $u(c) = \frac{c^{1-\gamma}}{1-\gamma}$, linear utility from child $g(h) = h$, and Cobb-Douglas human capital production function $f(\kappa, \tau) = A\kappa^{\omega}\tau^{1-\omega}$ in order to simulate a visual presentation of the theoretical framework. Fig. 1 describes Proposition 3.1 graphically. It shows that a child with migrating parents from less wealthy families can generate higher human capital than with staying parents, but the effect is reversed for children from wealthy families. This point of reversion occurs at the crossover point in the graph.

To investigate the heterogeneous wealth effect, Fig. 2 is generated by comparing the optimal decisions between migrants and stayers along different wealth levels. In addition to the optimal resource investment on the child that migrating parents spend, it illustrates the additional resource needed to have the child's human capital outcome be comparable to that of the staying home families. When the family is at the lower end of the wealth distribution, the optimal resource investment migrants bring in outweighs the parental absenteeism and the compensation amount is negative. As wealth grows, however, in order to compensate for missing time investment on children, migrating parents need to spend increasingly more than staying parents. The compensating effect becomes positive and continues to increase with initial endowments. Since parent's optimal decision is not to maximize a child's human capital outcome, but to maximize their utility which is partly a function of their human capital, the relative optimal human capital investment for children goes from positive (on the left end of Fig. 2) to negative for migrating parents compared to non-migrating parents (on the right side of Fig. 1.).

[1] We can interpret $g(h)$ as the parent's altruistic care about future generation's well-being. Higher human capital suggests a better well-being and returns parents a higher utility value. Alternatively, with incomplete retirement system in rural China, retired parents often depend on children to bring home retirement income. The higher human capital of the child also suggests higher returns in value to parent's retirement periods.

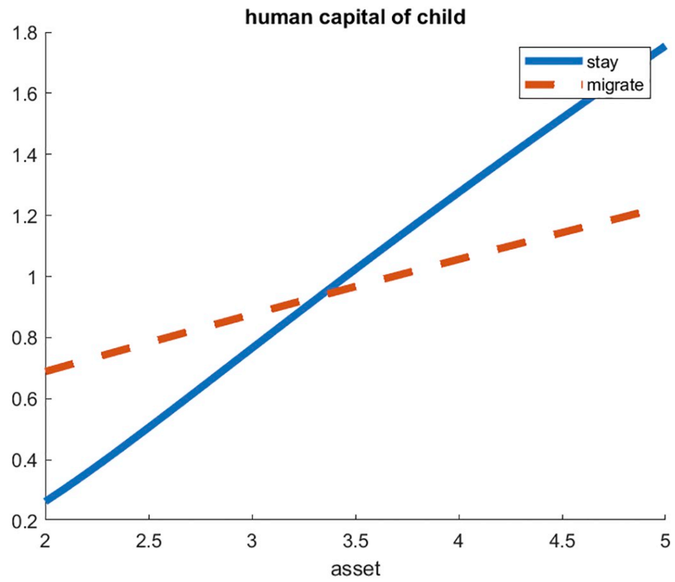

Fig. 1. Heterogeneous wealth effect.

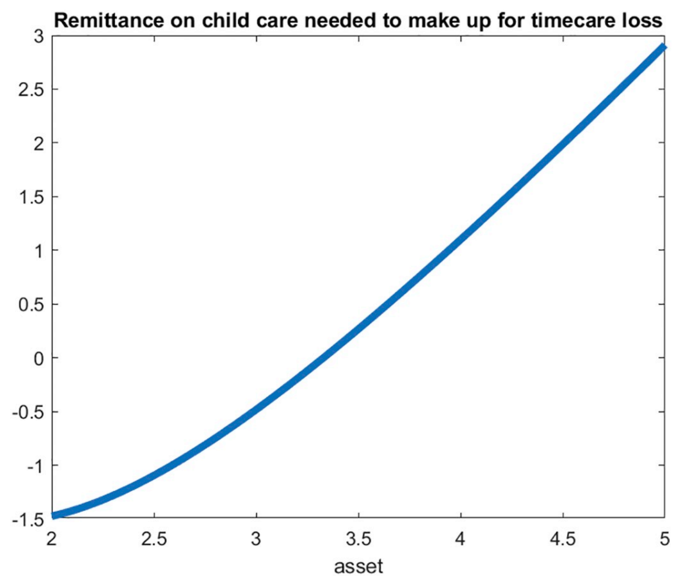

Fig. 2. Increasing κ needed for migrants to maintain same human capital outcome as staying family when wealth increases.

4. Data and descriptive statistics

The main dataset for this study comes from the longitudinal data set, the China Health and Nutrition Survey (CHNS), and uses the 1997, 2000, 2004, 2006, 2009, 2011, and 2015 waves with households from 12 provinces. We restricted the sample to be those living in rural areas with children at or younger than age 18. Our main sample contains 4502 children from 2826 households living in 175 communities with a total of 14,298 children-year observations.

Migration is becoming a more and more important phenomenon in China with the potential for serious impacts on the families left behind. We define migrant from the data as one who left the home for employment purposes. Fig. 3 displays migration trends by age and gender across sample periods. Similar to Mu and De Brauw (2015), we find that there is an increase in overall prime age migration during 2000, 2004 and 2006. This can be seen as the height of the migration rate peaks at close to 60% for those in their early 20s by 2006, up from 40% in 1997. This move toward more migration was true for both men and women between 1997 and 2006. Starting from 2009, migration appears to stabilize at a high rate. In general, more males migrate than females do; and migration has the highest rate at prime working age 20–40, during which children are undergoing fast development in various aspects between ages 0–18. This observation confirms the importance of our work and desire to answer the following: while parents

Fig. 3. Migration trends by gender and age over time.

migrate during their prime age for work, what impact does it have on their children during their key developmental age range?

Table 1 presents descriptive statistics by migration patterns of the parents. In our sample, 10.4% of the children have at least one parent who is currently a migrant. As our focus is migration and its impact on education we divide the summary statistics into these two groups to assess their similarities and differences. For the most part, many individual-level characteristics of the two groups are not statistically different from each other. In particular, timely enrollment, our main dependent variable of interest is constructed if a child (between age 6 and 18) is enrolled in the grade level with the corresponding age according to the mandatory education system. It shows only slightly higher enrollment rates for children of migrants in our sample and these differences are not statistically different from zero. Children of migrants are equally likely to take bus to school as those of non-migrants. For other variables, children of migrants are more likely to be minorities and their parents are less likely to be educated with the significance at the 5% level. The average house size for the whole sample is 149.64 square meters. Migrants on average own a house with 25.69 square meters larger than non-migrants. Community level indicator, urbanization index, however, do vary consistently across the groups with the migrant group coming from wealthier and more vibrant communities.[2]

Overall, however, Table 1 presents a complicated set of indicators. While some variables appear to suggest that selection into migration comes from areas where people can afford the initial journey, other indicators demonstrate that it is less educated parents who do go. Taken together, it is unclear what the impact will be on the schooling of children left behind. Furthermore, one cannot find a clear pattern and assess causality without addressing selection, wealth and migrant networks in a multivariate analysis.

Another dimension that we explore and a key contribution of this paper is the potential for migration to have differential impacts based on their assets in their rural sending community. We allow for there to be heterogeneous wealth impacts of a household on a child's education according to parental migration status. We use house size as a measurement of the wealth level. For rural families, their home is an important asset that stores wealth and provides us a relatively consistent comparison of asset accumulation across the communities in our study. Fig. 4 provides a descriptive overview of asset distribution by migration status. Overall, the house size is highly skewed with the mean concentrated at 149.36 square meters. While most households have homes that are fewer than 200 square meter, there are more right-tailed or large homes for migrants than non-migrating families.

[2] The urbanization index involves health component, housing component, transportation component, modern market component and so on measured by CHNS. For details of the variable, please refer to CHNS.

Table 1
Descriptive statistics.

	Non-migrant	Migrant	Difference
Child gender	0.5478	0.5525	−0.0047
SE	0.498	0.497	0.015
Obs	10,006	1162	
Single child	0.4348	0.4277	0.0071
SE	0.496	0.495	0.015
Obs	10,006	1162	
Minority	0.148	0.1816	−0.0336***
SE	0.355	0.386	0.011
Obs	9989	1162	
Father's education attainment	1.9223	1.9089	0.0134
SE	0.832	0.728	0.035
Obs	9011	582	
Paternal grandmother home	0.2796	0.4744	−0.1948***
SE	0.449	0.5	0.017
Obs	8874	780	
Urbanization index	54.5512	52.1234	2.4279***
SE	18.169	15.44	0.555
Obs	10,006	1162	
Enroll timely	0.579	0.5892	−0.0102
SE	0.494	0.492	0.018
Obs	7461	852	
House size	143.5073	169.2006	−25.6933***
SE	100.045	99.585	4.107
Obs	4979	673	
Bus to school	0.0491	0.0578	−0.0087***
SE	0.216	0.233	0.009
Obs	6150	606	

*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

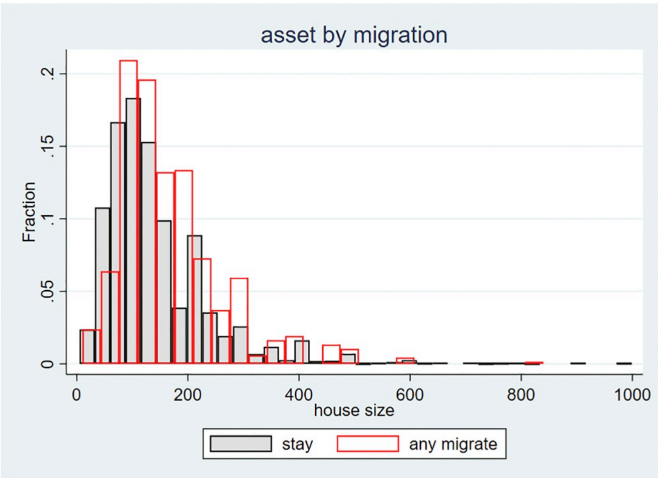

Fig. 4. Asset by migration status.

In Fig. 5, we go one step further to link house size to timely enrollment and allow for differences between migrants and non-migrants. Thus, we are looking for the pattern that we theoretically predict in Fig. 1 in our raw data in Fig. 5. The figure is strikingly similar to Fig. 4, which is the prediction of the theory. Specifically, we are comparing timely enrollment between left-behind children and children from non-migrant families by house size. In both Fig. 4, and Fig. 5, migrating parents from low wealth families provides better education outcomes for their children than staying parents. This can be see with the red line above the blue line. However, the impact of migration reverses after a certain wealth level (as house size reaches 70 square meters in the empirical work).

What is also interesting to note, in our data, the effect reverses again when house size reaches around 250 square meters; thus, in practice it appears that there is an even more complicated theoretical wealth effect and we have two cross over points. At this point, there are only a few observations for house sizes greater than 400 square meters and we do not focus our regression analysis on the tail end patterns. In addition, we recognize that this is merely an association that links between migration, home size, and educational

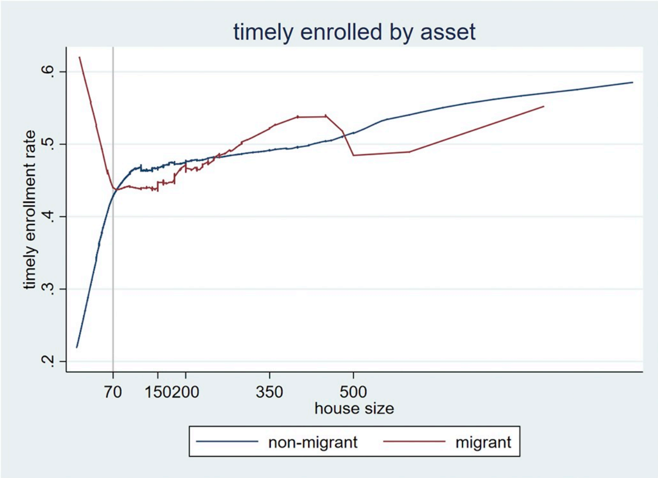

Fig. 5. Timely enrollment by family wealth level.

enrollment and not necessarily causation. As such, given the possibility of reverse causality, we find instruments for home size in our regression work. These instruments and our results are discussed in Sections 5 and 6.

5. Empirical methodology

Following the theory's predictions and the patterns observed from the descriptive statistics, we provide instrumental variable regressions results to identify the heterogeneous wealth effect and compensation channels of migration on the human capital of children.

Holding assets constant, we hypothesize that migration can boost children's education; however, our theory also suggests that increased assets can decrease this impact. This is modeled through an interaction term between migration and assets. We also consider the selection issues and inherent endogeneity through instrumental variables that address the possible non-randomness of the decision to migrate. Specifically, we estimate Eq. (1) as an IV regression model with timely school enrollment as the dependent variable.

$$HumanCapital = \beta_0 + \beta_1 Migration + \beta_2 Migration * asset + \beta_3 Asset + \epsilon \quad (1)$$

The regression pools both left behind children and children from non-migrant families. The coefficient β_1 describes the intercept difference between left-behind children and non-migrant children. The coefficient β_2 on the interaction term between migration and assets gives the slope or marginal impact of additional assets on educational attainment of children of migrants. Lastly, the coefficient β_3, gives the marginal impact of assets on the human capital of children whose parents did not migrate.

As mentioned above, we conduct an IV analysis, and we do so using two-stage least squares methodology. In the first stage, we introduce several instrumental variables for migration status and one for house size. Following Mu and De Brauw (2015), we interact the historical migration information with provincial level wage change as pull factors. As suggested by Mu and De Brauw (2015), most of the rural-urban migration happens within the province. The province wage change is mostly driven by metro-area wage change. Rising provincial wage tend to attract rural adults for migration. Following their techniques, we have IVs for migration status that rely on past networks and current external wage options as pull factors for migration. We use the number of past migrants in a region by gender, e.g. the number of men who migrated in 1997 at the community level, the number of female migrants 1997, and interact these past networks with more recent provincial wages. The historical migration information is a commonly seen IV that often correlates to an individual's migration decision, but less likely to impact the child's school enrollment.

The IV for house size is needed as wealth can affect educational attainment but there can be other factors that determine both wealth and education, such as idiosyncratic characteristics of the individual or household. To find a valid instrument for house size we need a variable that predicts assets but not the education of children. To do so, we include father's and mother's height as it is noted in the health literature that there is a correlation between height and family wealth (Batty et al., 2009; Bozzoli, Deaton, & Quintana-Domeque, 2009). In this setting, researchers often assume that grandparents' wealth correlates to the parents' height and further correlates to the household's wealth. However, parent's height is not a direct cause for a child's school performance.

In addition to the IV regressions, we also provide similar regression specifications that control for year fixed effects and a set of individual and community level observables. The Descriptive Statistics Section shows certain dimensions of the differences between left behind children and their counterparts with non-migrant families. Taken to our multivariate regression analysis, we wanted to see if our main results that were presented visually in Fig. 5 remained robust to these additional control variables, again with our focus on the possibility of a heterogeneous wealth effect.

Table 2
Timely enrollment and migration by asset level (IV for House size and migration).

Timely enrollment	House size < 148		147 < house size < 357	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Migration	0.0241	1.0669**	−0.2653*	−1.7307
	(0.81)	(2.33)	(−1.83)	(−1.01)
Migration * house size	−0.0006	−0.0290**	0.0009	0.0071
	(−1.32)	(−2.24)	(1.44)	(0.88)
House size	0.0004***	0.0054	0.0001	−0.0056
	(3.17)	(1.37)	(0.34)	(−1.32)
Age of child	−0.0414***	−0.0431***	−0.0426***	−0.0441***
	(−23.06)	(−9.32)	(−11.10)	(−7.44)
Constant	1.0441***	0.9151***	1.1066***	2.3418***
	(45.13)	(5.47)	(14.58)	(2.75)
F test of excluded instruments				
Migration		69.28		38.69
Migration * house size		22.51		33.64
House size		27.54		2.03
Hansen J statistic		4.812 (0.09)		0.426 (0.8080)
Observations	6722	4555	1390	1110
R-squared	0.084	−0.726	0.097	−0.212

Robust t-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

In our second specification, we test for a compensation effect. This channel, as suggested by the theory, points toward higher out-of-pocket expenditures for migrants relative to non-migrants to compensate for lost time inputs of parents. In this case, the dependent variable is educational investment or spending on resources that produce increased human capital. Our reduced form IV regression is shown in Eq. (2).

$$EducationInvestment = \gamma_0 + \gamma_1 Migration + \gamma_2 X + \gamma_3 Y + \epsilon \tag{2}$$

In particular, γ_1 is our key parameter of interest which is a direct measure of how much more (or less) migrating parents spend on child's education. X describes a set of individual level variables, and Y contains community level variables. For the compensation effect to hold, γ_1 is predicted to be positive. All regressions are clustered at household level, to account for similarities of children within each household.

6. Results

6.1. Heterogeneous family wealth effect

While past empirical work has found mixed results regarding the overall impact of migration on human capital, only a few have taken a deep dive into examining the heterogeneous wealth impacts on migration. Our first set of results provides strong evidence of an important structural break in the impact of migration based on a cutoff of asset accumulation in terms of housing. This break can be seen in the decisions made to invest in the education of children.

In our regressions, migration status is a binary variable that takes the value of one if either parent is away from the household for employment purposes. The IVs for migration status, house size and the interaction includes male migrants count in the community 1997, female migrants count in the community in 1997, and the interaction of local community migrations in 1997 and the growth in the average provincial real wage, as well as father's and mother's height.

Table 2 provides the IV regression results by looking at the impact of migration status, interaction of migration and house size, and house size on child's timely enrollment. We split the sample by the wealth level (house size) with break point 148 square meters.[3] We also present the simple OLS results to indicate the possible bias resulting from endogeneity.

Following a large literature on the impact of migration on various economic outcomes, we aim to address selection issues and possible omitted variable bias when one focuses on a select group of movers (e.g. Kong, Meng, et al., 2010; Liu, Yu, & Zheng, 2018). As is typically the case in these studies, we aim to find a variable that is correlated with migration and not correlated with our key dependent variable. The direction of bias could be upward or downward based on the prevailing reason for migrating and the

[3] First stage regressions are available upon request. The diagnostics of the instruments suggest that they are valid as the pass the usual tests regarding over identification and their explanatory power for explaining current migration status.

variables potentially omitted. On the one hand, the direction of bias could be upward if we are missing a measure of ability and high ability individuals are those who migrate and would be those who make sure their children are enrolled in school. On the other hand, if economic need is the key driver and this necessity is not adequately controlled for, then the bias could be negative. In this case, needier individuals would be more likely to migrate but would be less likely to be able to put a priority on their children regularly attending school.

As mentioned above, our IVs aim to measure network effects proxied by past migration patterns, wage effects in local cities as a pull factor which is proxied by provincial wage growth, and ability to migrate as proxied by parental stature. While there is no direct test of our exclusion restriction, we feel that the assumption that these IVs are not correlated with our key dependent variables is reasonable given that they are related to historical migration patterns, wages at an aggregate level and parental characteristics and not youth schooling.

Turning to our results in Table 2 columns (2) and (4), we present our IV estimates for families with house size less than 148 square meters and those above 148; we call them lower and high wealth families, respectively. In these specifications, we can see the difference in the intercept term for migrant households. In column (2), the timely enrollment status of the child of migrant parents is higher by about one percentage point (1.07) assuming that housing assets are zero. This is equivalent to a higher intercept. Meanwhile, the intercept is negative but not significant for the high wealth group shown in specification (4). These results provide empirical estimation to the theory's prediction as the initial difference in intercept in Fig. 1.

The interaction term of migration status and house size returns is not significant in the OLS results but is −0.029 in the IV results shown in column 2. In this model, we find a statistically significant difference for lower wealth families. Such results provide evidence showing that the slope is smaller and differs from the impact of housing on enrollment rates for children of parents who do not migrate. In other words, the impact of migration on a child's timely school enrollment decreases as family wealth increase and confirms the theoretical prediction plotted in Fig. 1. For non-migrants in our IV results, house size does not have a statistically significant impact at traditional levels on timely enrollment of children in low-wealth households. However, the coefficient is positive and significant at the 15% level and is positive and significant for the OLS results. Taken together, these results suggest there may be a slight upward slope or relationship between assets and schooling for children of migrants which is also predicted in Fig. 1.

The IV results presented in column 2 are our preferred specification and provide mixed evidence regarding the sign of the bias. On the one hand, the bias appears negative for the migration indicator which goes from essentially zero to positive and significant. On the other hand, the interaction term which is our key parameter of interest is estimated as zero in the OLS results and negative and significant in the IV model. This indicates upward bias in the OLS results for the interaction term. Thus, there could be a combination of ability and need that is driving parents to move to the city for work and to leave their children behind. In terms of validity of the instruments, the F-tests for the first stage are all higher than ten and the overidentifying test that is captured by the Hansen's J is only significant at the 10% level in the low wealth household and shows no endogeneity for high wealth regressions. We therefore conclude that our instruments are valid and give more weight to the IV results over the OLS results.

In columns (3) and (4), we present our OLS and IV results for higher wealth families. In these regressions, house size does not provide a statistically significant impact for non-migrant households in both regressions.

However, migration does have an impact in the OLS regression which is reversed from our findings in column (2) and matches the descriptive in Fig. 5. To begin, the initial impact of migration decreased to −0.27 at 147. The interaction term is positive but not significant at standard levels. Regardless of whether one gives any weight to the coefficient on the interaction term, our results reinforces the importance of heterogeneities of the interaction of wealth and migration on schooling.[4] The instruments in high wealth regression also appear valid as most of the F-tests in the first stage are over 10 and the Hansen's J shows no evidence of endogeneity in the overidentification tests. In the IV regression, both migration and the interaction term do not enter the regression significantly.

To examine other dimensions of heterogeneity, we include more observables in our regressions and present them in Table 3. In particular, we control for a variety of individual and household characteristics: age, gender and minority status of child, education level of father, number of siblings in the family, and whether the paternal grandmother is living in the household. We also control for community level characteristics through a level of urbanization index, which includes a host of information such as the level of community health, housing, transportation, modern markets and so on. Lastly, we add year fixed effects.

In these regressions, the impact of migration on the timely enrollment of children is persistent. For less wealthy households, migrant families are 32.93 percentage points more likely to have child enrolled in school on a timely basis. The scale is lower than IV regression in Table 2. As house size increases, the impact of migration is reduced by 1.22 percentage point for each square meter which is also less in scale compared to the IV results in Table 2. Meanwhile, a host of covariates are significant and vary across regressions and these relationships provide some insight into the mechanisms at work when making the complicated decision to send a child to school, especially for those in extremely resource constrained families. While the fully specified models shown in Table 3 show weaker relationships between migration and education, we still find considerable evidence of a heterogeneous wealth effect.

This is seen overall in the comparisons between Column (1) and (2) where there are a number of statistical differences across variables. In particular, it seems that the education of the father has a positive impact on children's education while age has a negative effect; these impacts appear similar across household wealth levels. There is a negative sibling effect that comes through stronger for high wealth families. This may be due to the fact that they cannot afford to have more children in school. The minority status is negatively associated with timely enrollment for low wealth households which could represent cultural or resource differences by ethnic origin. The presence of a paternal grandmother appears to detract from educational opportunities of children in low wealth

[4] Special thanks to Barbara Fraumeni for pointing out the multiple cross points as house size increases.

Table 3
Timely enrollment by migration and asset with control variables (IV for migration and asset).

Timely enrollment	(1)	(2)
	House size < 148	147 < house size < 357
Migration	0.3293*	−2.9261
	(1.96)	(−0.98)
Migration * house size	−0.0122*	0.0122
	(−1.90)	(0.99)
House size	0.0020	−0.0000
	(0.30)	(−0.00)
Age of child	−0.0456***	−0.0492***
	(−12.78)	(−7.57)
Child gender (male = 1)	−0.0143	−0.0169
	(−0.85)	(−0.48)
Father's education	0.0432***	0.0487*
	(3.43)	(1.88)
Number of siblings	−0.0211*	−0.0627***
	(−1.71)	(−2.60)
Minority	−0.0786**	−0.0297
	(−2.18)	(−0.58)
Paternal grandmother home	−0.0682**	−0.0690
	(−2.53)	(−1.13)
Urbanization index	0.0031***	0.0026*
	(5.04)	(1.65)
Year dummy		
Constant	0.8002	1.0197
	(1.30)	(1.52)
F test of excluded instruments		
Migration	21.44	1.51
Migration * house size	4.2	1.98
House size	0.87	1.27
Hansen J statistic	5.012 (0.0816)	0.179 (0.9145)
Observations	3824	845
R-squared	0.086	0.048

Robust t-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

households. It is possible that children are given part of the eldercare responsibilities. Lastly, the community characteristics captured by the level of urbanization have a positive association with timely school enrollment across the two wealth levels and is likely picking up better infrastructure and overall resources available at the community level.

Taken together, to the extent that these control variables absorb the impact of migration on timely enrollment, the difference between lower wealth and higher wealth individuals for these variables still highlights the importance of wealth heterogeneity. Others have found that the impact of parental migration decision may be coming from a variety of differences in other dimensions, similar to Wang, Luo, et al. (2017) and Wang, Bai, et al. (2017). The exact linkage and channels at work are a fertile area for future research.

Along these lines, we also conducted further exploration to determine if there is an increase in food related consumption for children left behind. As Lemma 3.1 indicates, as wealth increases, investment both in children and in household consumption increases. Therefore, one could expect to see increases in other normal goods such as food. In additional regressions (shown in Table A.2), we use child weight as an indicator of food consumption. Rather than food expenditures, we feel that weight is a direct and better measurement of nutrition intake than food quantity. The results of the child weight regressions are consistent with the main results of timely enrollment presented in Tables 2 and 3. We find a positive but declining impact of migration on child weight as household assets rise.[5] Specifically, migration increases a child's weight, but the slope is smaller when family wealth (measured by house size) increases.[6] Similarly, our results are primarily driven by lower wealth households.

[5] We thank an anonymous referee for the suggestion to examine food consumption as an alternative impact of migration and assets on household spending and investment.

[6] We also conducted auxiliary tests to see if there is evidence of reverse causality and found no impact of child weight on timely enrollment. Hence, we cannot provide evidence of how nutrition related health status transmit to education enrollment.

Table 4
Correlation between bus to school and education spending and timely enrollment.

	(1)	(2)
	Education spending 2006	Timely enrollment
Bus to school	2366.7867***	0.0644***
	(2.68)	(2.65)
Constant	2238.0781***	0.6891***
	(11.00)	(92.42)
Observations	728	6958***
R-squared	0.012	0.001

Robust t-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

6.2. Impact of resource investment

Theory also predicts that migrants will compensate for the parental time lost with children by increasing education investment. In other words, we would expect to see higher educational investment (as an input in the educational process) for migrants. In CHNS, only the 2006 wave has data on education expenditures and we cannot do a formal test of the level of funding. Instead, we use whether the child takes buses to school as the main proxy for a resource investment in child's education. We use this variable to differentiate an increased educational investment proxy as most children walk or bike to school and taking a bus is an indication of traveling to a farther and better school that will eventually improve educational outcomes. As evidence that this is a good proxy, we look for a correlation between taking a bus and educational funding on a limited sample in 2016.

We construct simple OLS results between education spending and whether the child takes bus to school. As seen in Table 4 Column (1), taking a bus to school is strongly positively correlated with the education expenditure. Basically, a household spends more than 2000 additional yuan on schooling if their child takes a bus to school. As mentioned earlier, schools available by bus are likely to be those outside of the home district and are also more likely to be more expensive investments in overall schooling.

Table 5
Bus to school (IV regression).

Bus to school	(1)	(2)	(3)
	Full sample	House size < 148	147 < house size < 357
Migration	0.1843	0.3184*	−0.9437
	(0.94)	(1.67)	(−1.37)
Age of child	0.0109***	0.0101***	0.0087
	(6.51)	(5.61)	(1.61)
Gender of child (male = 1)	0.0012	0.0062	0.0018
	(0.16)	(0.76)	(0.08)
Father's education	0.0052	0.0049	0.0155
	(0.93)	(0.74)	(0.93)
Number of siblings	−0.0069*	−0.0091**	−0.0036
	(−1.77)	(−2.07)	(−0.24)
Minority	−0.0027	0.0124	−0.0216
	(−0.17)	(0.72)	(−0.38)
Paternal grandmother home	−0.0113	−0.0117	0.0086
	(−1.18)	(−1.02)	(0.27)
Urbanization index	0.0002	0.0004	−0.0010
	(0.53)	(0.95)	(−0.81)
Year dummy	✓	✓	✓
Province dummy	✓	✓	✓
Year * province dummy	✓	✓	✓
Constant	0.0267	−0.0102	0.2007
	(0.40)	(−0.09)	(1.35)
F test of excluded instruments migration	3.98	4.75	0.71
Hansen J statistic	5.953 (0.0510)	5.992 (0.0500)	
Observations	3619	2896	632
R-squared	0.032	−0.024	−0.577

Robust t-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

In addition, a simple OLS results in Column (2) of Table 4 also suggests the positive correlation of taking a bus to school and the timely enrollment status of child. One may infer the transmission mechanism in which education resource investment represented by taking a bus to school also increases the educational outcome, as timely enrollment in school. Given the scope of this study, we defer the causal inference of this channel to future work.

Table 5 provides an IV estimation of parental migration on a child's chance of taking bus to school, while controlling for the observables as described above and province and year dummies. Migration does not play a statistically significant role for children going to school by bus on average from the full sample, as in Column (1). However, if we split the sample by house size, migration leads to an 18.43 percentage point higher chance for the relatively poor households to send their child to school by bus than parents at home of similar wealth (Column (2)). This suggests that poor migrants tend to compensate by investing more resources in children and we confirm the existence of a compensation effect in our sample. The effect drops out by looking at wealthier households. Other covariates also determine the likelihood of taking a bus. We find that older children are more likely to take a bus. Child with siblings tend to be less likely to take bus to school. All of these relationships are essentially as we would expect and provide further credence for our results.

6.3. Overall impact

After decomposing the impact of migration on child's timely enrollment by allowing for a *wealth* effect and separately examining for a *compensating* effect of spending on human capital investments, we provide IV regression results of the *overall* effect of parental migration on children's timely enrollment. We do this third empirical exercise to put our work in the context of the current research and to give a suggested road-map for future empirical and theoretical work.

Table 6 provides results that overall, not controlling for anything else, parental migration reduces child's timely enrollment by 42.92 percentage points. However, once we control for the standard demographic variables of the child, household characters, community characters and time and province fixed effects, the impact of migration on timely enrollment drops out. This provides evidence of the heterogeneities existing in this strand of studies. Various demographic, family, and locality factors contributes to migration and child's education outcomes. The total impact of migration can be largely described by the control variables. This also provides evidence showing the robustness of our main results in Tables 2 and 3, where the heterogeneous wealth and migration channel persist even with the same control variables.

Table 6
Overall effect: Enroll Timely and migration (IV regressions).

Timely enrollment	(1)	(2)
	Without controls	With controls
Migration	−0.4292*	0.4836**
	(−1.88)	(1.25)
Age of child	−0.0465***	−0.0467***
	(−21.63)	(−22.66)
Gender of child (male = 1)		−0.0083
		(−0.59)
Father's education		0.0312***
		(3.16)
Number of siblings		−0.0174*
		(−1.92)
Minority		−0.0095
		(−0.33)
Paternal grandmother home		−0.0746***
		(−3.64)
Urbanization index		0.0044***
		(6.41)
Year	✓	✓
Province	✓	✓
Year * province	✓	✓
Constant	1.1428***	0.6751***
	(13.28)	(6.89)
F test of excluded instruments migration	10.57	3.95
Hansen J statistic	2.023 (0.3637)	2.473 (0.2904)
Observations	5830	4794
R-squared	0.110	0.168

Robust t-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

7. Conclusion

Overall, our results add both empirical and theoretical evidence regarding the importance of parental time and resource investment on the human capital development for children. We also contribute to a growing literature on the impact of China's vast internal migration and the impact on Left Behind Children by providing additional identification strategies. Finally, our results shed light on the policy implications of migration restrictions for urban-rural migration for children and demonstrate the costs of absenteeism in terms of the potential for lost human capital. Given that rural children are already behind in schooling from their urban counterparts, having parents migrate may only increase the inequalities felt by millions of children left behind, especially as they gain resources and face difficult trade-offs regarding where to utilize these additional funds.

Our results suggest that low-wealth migrants will boost the educational outcomes of their children up to a point. However, heterogeneous wealth effects will ultimately put downward pressure on educational attainment differentials as migrants become more affluent and additional funds do not produce significant marginal returns. While this time has not come in our sample, it is likely to come soon given the rapid development of China.

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Appendix

A.1. Proof of Lemma 3.1

Proof:

Given the agent's problem, the first order conditions with respect to c_1, c_2, κ, h has (λ‘s are the Lagrangian's for the associated budget constraints):

$$u'(c_1) = (1 + r)\lambda_c \tag{A1}$$

$$\beta u'(c_2) = \lambda_c \tag{A2}$$

$$(1 + r)\lambda_c = \lambda_h f_k(\kappa, \tau) \tag{A3}$$

$$\beta g'(h) = \lambda_h \tag{A4}$$

Therefore, we have Euler equation for consumption as:

$$u'(c_1) = (1 + r)\beta u'(c_2) \tag{A5}$$

And for resource investment:

$$(1 + r)u'(c_2) = g'(h) f_k(\kappa, \tau) \tag{A6}$$

As $u(\cdot)$ is increasing in c_1 and increasing in c_2, Eq. (A5) requires a positive relationship between c_1 and c_2. Similarly, since $f_k(\cdot, \tau)$ is decreasing in κ*, and u'(·)*, is decreasing in c2, Eq. (A6) requires a positive relationship between c_2 and κ. According to the budget constraint, therefore, a higher wealth B leads to higher c_1, c_2, κ.

□

A.2. Proof of Lemma 3.2

Proof:

Since $f_\kappa(\kappa, \tau) > 0$, $f_\tau(\kappa, \tau) > 0$, the marginal rate of technical substitution (MRTS) between κ and τ for the production of human capital is positive:

$$MRTS_{\kappa,\tau} = \frac{f_\tau(\kappa, \tau)}{f_\kappa(\kappa, \tau)} > 0$$

Since migrants lose the parental time input on the extensive margin, $\tau_{mig} < \tau_{stay}$, migrants have to compensate the loss of time by investing in more κ in order to maintain the same level of human capital (same isoquant, $h_{mig} = h_{stay}$).

□

A.3. Proof of Proposition 3.1

Proof:

Following from Lemma 3.1, the higher the wealth, the more resource investment κ, or $\frac{\partial \kappa}{\partial a} > 0$. Since $f_k(\kappa, \tau) > 0$, we have $\frac{\partial f(\kappa, \tau)}{\partial a} > 0$. This result establishes the monotonicity of human capital in wealth.

If $a = 0$, non-migrants cannot afford κ due to corner solution, $\kappa_s = 0$. But migrants have income $w > 0$, hence have $\kappa_m > 0$.

We have human capital outcome $f(0, \tau_{stay}) < f(\kappa_m, \tau_{mig})$.

As $a \to \infty$, $\kappa_m \to \kappa_s$. From Lemma 3.2, $f'(\kappa, \tau_{mig}) < f'(\kappa, \tau_{stay})$. We have $f(\kappa, \tau_{mig}) < f(\kappa, \tau_{stay})$.

This concludes that when a resource is binding, the migrant's child has higher human capital; and as resources increases, the stayer's child has higher human capital.

□

A.4. Impact of migration and family wealth on child's timely enrollment

Due to missing observations, Table 3 results rely on a smaller sample than in Table 2. As a robustness check, we conduct the same regressions using the restricted sample from Table 3 regressions. All results remain robust and are provided in Table A.1.

Table A.1
Timely enrollment and migration by asset level – restrict to Table 3 sample (IV for house size and migration).

Timely enrollment	House size < 148		147 < house size < 357	
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
Migration	0.0411	0.3766*	0.0286	−5.6320
	(1.00)	(1.65)	(0.12)	(−1.45)
Migration * house size	−0.0010	−0.0182*	0.0003	0.0240
	(−1.51)	(−1.90)	(0.32)	(1.41)
House size	0.0004**	0.0020	−0.0000	−0.0052
	(2.25)	(0.79)	(−0.14)	(−0.85)
Age of child	−0.0469***	−0.0445***	−0.0488***	−0.0443***
	(−20.65)	(−10.74)	(−10.41)	(−5.85)
Constant	1.1156***	1.0409***	1.1980***	2.2368*
	(36.56)	(8.68)	(12.90)	(1.85)
F test of excluded instruments				
Migration		29.78		8.63
Migration * house size		7.38		8.03
House size		16.7		2.04
Hansen J statistic		10.973 (0.0041)		0.233 (0.8898)
Observations	3824	3824	845	845
R-squared	0.113	−0.060	0.127	−0.484

Robust t-statistics in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$

A.5. Impact of migration on health status of child – an alternative measure

As Lemma 3.1 indicates, as wealth increases, investment both in children and in household consumption increases. We conduct robustness checks to show if there is an increase in food related consumption. In addition, we avoid using direct food consumption, but use weight of a child as an indicator of it. This is because of its better measurement of nutrition intake than food quantity. Results in Table A.2 remain consistent with the main results in Tables 2 and 3. It is primarily driven by lower wealth household, where migration increases child's weight, with a smaller slope when family wealth (measured by house size) increases. The larger the house size (higher family wealth), the heavier weight the child is.[7]

[7] We also conducted auxiliary test and found no correlation between child weight and timely enrollment. Hence, we cannot provide evidence of how nutrition related health status transmit to education enrollment.

Table A.2
Child weight – asset regression (IV for house size and migration).

Weight of child	House size < 148			147 < house size < 357		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	IV control	OLS	IV	IV control
Migration	−0.1626	24.3877***	3.5221	4.0238	−170.6503	−116.3943
	(−0.32)	(2.84)	(0.49)	(0.82)	(−1.49)	(−1.38)
Migration * house size	−0.0124	−0.9263***	−0.5135*	−0.0166	0.8164	0.4747
	(−1.52)	(−3.32)	(−1.72)	(−0.82)	(1.47)	(1.24)
House size	0.0142***	0.2935**	0.4229*	0.0058	−0.1332	−0.0515
	(5.23)	(2.08)	(1.85)	(0.81)	(−0.97)	(−0.89)
Age of child	3.3034***	3.5722***	3.4197***	3.2651***	3.4947***	3.3244***
	(103.70)	(21.50)	(23.10)	(36.24)	(16.60)	(28.20)
Gender of child (male = 1)			2.3281***			1.6607**
			(3.81)			(2.05)
Father's education			0.0635			1.3451**
			(0.10)			(2.35)
Number of siblings			−1.6534***			−1.2626***
			(−4.60)			(−2.93)
Minority			−1.7142			−3.3151***
			(−1.24)			(−3.53)
Paternal grandmother home			−1.5085			1.6290
			(−1.49)			(1.37)
Urbanization index			0.0252			0.0095
			(1.05)			(0.32)
Year			✓			✓
Constant	−2.3303***	−14.0242**	−39.8593*	−1.8723	23.8582	6.0544
	(−6.92)	(−2.27)	(−1.76)	(−1.05)	(0.87)	(0.50)
F test of excluded instruments						
Migration		48.56	22.74		13.02	1.64
Interaction		10.15	4.47		13.01	1.73
House size		2.05	0.88		1.88	1.03
Hansen J statistic		3.698 (0.1514)	3.694 (0.2965)		0.178 (0.9150)	4.466 (0.1072)
Observations	5549	3614	3058	849	655	511
R-squared	0.683	−0.590	−0.454	0.634	−0.223	0.620

Robust t-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

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