

PARENTAL LABOR MIGRATION AND CHILDREN'S EDUCATIONAL PROGRESS IN
RURAL CHINA

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Abstract

This paper explores the effect of parents' temporary labor migration on their children's educational attainment in rural northeastern China. This relationship lies at a cross-section of Chinese household registration policies and recent educational decentralization initiatives, both of which have undergone extensive debate. The effect of migration can be ambiguous because the education and development literatures suggest that higher income from remittances and increased labor-demand from adult absence can affect educational decisions in opposite ways. Using ordinary least-squares, maximum-likelihood estimation, and two-stage least-squares methods, this paper suggests that the labor-demand effect tend to dominate, delaying children's expected progress through school when parents migrate. The negative impact of parents' migration on children's education is larger for boys than girls. Relevant policy implications include the possibility of relaxing admission restrictions by household registration status and building schools for migrant children.

With warmest gratitude to

My parents and my sister, for their love,

Liz and Kaily, for their friendship,

and Chad, for his guidance and kindness

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Introduction and Motivation

Much has been said about the effect of education on both migration and social mobility, but less is known about the effects of parents' temporary labor migration on their children's schooling. In the case of China, this issue lies at the intersection of two important policies: education decentralization and the household registration system, called the *hukou*. The latter, in particular, has imposed various restrictions on residential mobility and spawned a large "floating" population of temporary migrant workers. Since school attendance is largely restricted by registered place of residence, children of rural migrants often become separated from their parents during periods of work.

Using household data from two rural Chinese provinces, this paper aims to determine whether the temporary migration of adults in the household has any significant impact on children's education outcomes. The overall effect can be ambiguous because migratory labor can have simultaneously opposite effects on education. On the positive side, migration can increase the demand for schooling through increased income and possible social capital accumulation via parental urban networks. On the negative side, adult absence from the household can increase the demand for children's labor, particularly among older children who are able to contribute substantially to household or farm production. Moreover, temporarily absentee parents are necessarily hindered from assisting and monitoring their children's educational progress. Insofar as educational outcomes generally have important implications for future employment and social mobility, results of empirical research on this topic may have policy implications for whether reform is necessary to prevent widening education disparities or improve education level in general.

Broadly speaking, the motivation for this project comes partially from the perspective that education can be considered both a means and an end to development. As a means, it facilitates accumulation of human capital and is posited to encourage economic growth; as an end, some consider education a universal right (UN, 1948: Article 26), or at least a worthy aim for all societies. The specific focus on rural Chinese communities and their migratory patterns in relation to education has to do with the country's distinctive policy environment, which combines stringent state-control over spatial mobility with an increasingly market-oriented approach to education. This constitutes an interesting and potentially instructive case in understanding household arrangements and education decisions.

More specifically, there have been concerns that education reform policies coinciding with increasing marketization in the 1980s adversely affected the disadvantaged segments of Chinese society disproportionately. One analysis of the China Health and Nutrition Survey between 1989 and 1997 (Adams and Hannum, 2005), revealed a persistent gap in enrollment rates and progress through school between children from poor and rich families, even as both outcome measures increased in absolute terms for the whole population through this period.

Temporary labor migration figures into this issue because, as will be discussed later, rural migrant families tend to be poorer than non-migrants. It would thus be useful to find out whether parental absence due to income-deriving activities mitigate or exacerbate the rich-poor achievement gap. More education increases a person's chances of successfully converting household registration status from rural to urban, which in turn increases upward social mobility (Wu and Treiman, 380). Understanding educational achievement gaps of children from migrant versus non-migrant households may shed light on ways in which the government might increase the welfare of poor households in this respect. For

example, if migration is instrumental in increasing general household welfare and raising educational outcomes through increased income, current *hukou* policies might be revised to strategically open opportunities to poorer households. Conversely, if the effect is negative, policy makers might investigate possibilities to improve urban migrant schools, for example, or focus policy on developing local enterprises to increase the returns of labor within rural villages.

The next two sections discuss some demand- and supply-side issues regarding educational enrollment and attainment in developing countries, and more specifically China. This is followed by a brief outline of the Chinese policy context, focusing on recent education reforms and the evolution of the household registration system.

Demand-Side Issues: Education and the Household

Researchers of primary and secondary schooling in developing countries all point to the household environment as a key to educational decisions. While there are sometimes disagreements on the relative importance of specific components, two factors are generally thought to be salient: household resources, broadly conceived as the sum of cash and in-kind income, assets, and landholdings; and the child's opportunity cost of schooling, usually calculated by foregone earnings in the labor market or household agricultural production. There is also significant evidence that these factors often differentially affect boys and girls and contribute to the gender gap in educational attainment.

Education and Household Income

The importance of household income and poverty status in determining children's educational outcomes has been demonstrated in a large number of studies through different

methodologies. Analysis of DHS data from 35 countries (Filmer and Pritchett, 1999) finds that in South Asia, Latin America, and Western and Southern Africa, the education attainment gap of adolescents ages 15 to 19 from poor and rich households can range from 4 to as high as 10 years. Country-specific studies in Vietnam (Glewwe and Hanan, 2004) and India (Filmer and Pritchett, 2001), for example, confirm the importance of the wealth effect on child education enrollment and attainment. Some of these studies also demonstrate that household wealth levels need not be measured using income or consumption level. Instead, household asset data are just as effective in predicting educational decisions (ibid.).

Another way to ascertain the wealth effect on educational attainment is to assess the impact of intervention programs that increase the resources of poor households. The Progresia program in Mexico (Schultz, 2001), since renamed Oportunidades by the Fox government, has been one of the most widely cited examples of how relaxing household budget constraints can have positive effects on enrollment. During its early stages, the program was implemented with a randomized design on a national scale. Careful evaluation showed that increasing household income via cash transfers conditional on children's 85 percent school attendance significantly decreased primary enrollment inequality between poor and non-poor households and increased secondary enrollment probability for both boys and girls. Studies on comparable conditional cash transfer programs in Nicaragua and Columbia (Rawlings, 2005) yield similarly positive results, as do smaller-scale projects such as a girls' scholarship program in Cambodia (Filmer and Schady, 2006). While the duplicability of such policy outcomes under different circumstances is still largely in question, the successes of these programs demonstrate how wealth constraints affect household decisions to send children to school.

Opportunity Costs and Expected Returns of Schooling

In addition to household income, parents' educational choices for their children also factor in the opportunity costs of sending them to school. Apart from school fees, the effect of which is more directly linked to household resources, the opportunity cost of schooling is calculated, most commonly, either in foregone wage earnings when children are old enough to enter the labor market, or in productive work within the household such as care-giving and agriculture. Research in rural China (Song et. al., 2006), for example, shows that household decision-makers sometimes consider equal education for both genders as a "luxury good" because girls tend to face higher opportunity costs to schooling than boys.

While current opportunity costs can present significant disincentives to schooling, there is evidence that parents also consider the possibility of increased future earnings as a positive incentive to send their children to school. A study in Kenya (Buchmann, 2000), for example, shows that in addition to family resource allocation constraints, parental perception of returns to schooling is a significant determinant of child enrollment. In Thailand, a country that has successfully closed its gender gap in education, anticipation of future support from children adds to this positive effect: parents commonly cite the higher reliability of girls in providing remittances as incentive to invest in daughters' education (Knodel, 1997).

Conflicting incentives to forgo formal education and engage in wage labor have spawned a debate as to which factors are more important in determining children's level of schooling. While there does not seem to be any overarching pattern by sector, a study comparing Kenya and Thailand (Buchmann and Brakewood, 2000) suggests that households tend to choose the activity that will likely yield the highest returns over time. For example, traditional ideas that labor market opportunities in the manufacturing and service sectors depress schooling need not hold if jobs either require higher levels of education or reward it

with higher wages. Similarly, agriculture does not necessarily discourage schooling but can potentially increase likelihood of higher attainment if it is profitable, as in the case of cash-cropping in Kenya (ibid.).

For migrant households, these findings indicate the presence of opposite effects of temporary adult migration on enrollment probability. While migratory labor likely subsidizes agricultural income and thus increases household resources, the absence of adults in the household possibly increases pressure for older children to stay home and substitute for the missing labor. Yet, if parental migration increases children's access to social networks in urban employment, the returns to education may increase correspondingly (Zhao, 1997). These children then have greater incentives to continue schooling in anticipation of higher future earnings. The overall effect of migration on a child's education is thus hard to predict, especially when other intermediate factors such as residing in a three-generation household or having more siblings are likely to be relevant predictors for educational attainment as well (Townsend, 2002, see below).

The Gender Gap in Attainment

Insofar as resource constraints are likely to apply to rural Chinese households, one prominent issue is the differential effect of these constraints on boys and girls. A cross-country study spanning 44 countries in South Asia and North, Western, and Central Africa (Filmer, 2005) finds that, while the wealth-driven attainment gap is wider than the gender-driven gap, many countries show exacerbating effects of wealth on girls' education. Daughters from poor households, in other words, tend to face higher income elasticities with regards to education than sons. This is often because girls usually face higher opportunity costs of education, i.e. their labor is highly valued at home, and in some cases the returns to education in the labor market can be lower for women than men (Wei, 1999).

In China, studies in urban settings document a trend towards a narrowing gender gap (Bauer, 1992), although recent research also shows persistence of gender disparities in rural areas (Song, 2006). In the case of urban areas, increases in father's education levels have shown a significant positive impact on children's educational outcomes after controlling for a variety of occupation variables, and the effect is larger for daughters than sons (Bauer, 346-7). Similar results have been found elsewhere in the world such as Côte d'Ivoire and Ghana (Tansel, 1997). While the relative importance of father's vs. mother's education levels varies between the two countries, in both cases the positive effects are highly significant. This may imply that, if migrant parents generally have more education than non-migrant parents, the gender gap within migrant households may be less pronounced.

Supply-Side Issues

As with demand-side issues, development and education scholars have conducted a great deal of research in finding out the effects of supply-side issues on school enrollment and attainment. However, different, and sometimes even contradicting, results from studies on things such as school-related characteristics suggests that it is less obvious precisely which specific components are most important in shaping enrollment decisions. This section briefly discusses two supply-side factors that have been widely studied: school-level provisions, including infrastructure, classroom resources, and teacher quality; and community-level characteristics, in particular aggregate income.

Schools and Teachers

Primary and secondary schools in developing countries often lack resources, such as textbooks, well-constructed buildings, and sufficient teachers, that might be considered

natural or even essential in richer countries. Evidence in the literature is mixed, though, on whether improving school quality is uniformly effective in increasing enrollment (Glewwe and Kremer, 2005). For example, while some studies in Ghana and Tanzania suggest that repairing leaking roofs and reducing travel time to school significantly increases enrollment and attainment, studies elsewhere, like in Kenya, show no significant results from improving school quality via providing inputs such as textbooks. Interventions can also have a differential impact on boys versus girls: in India, for example, “waterproof” schools significantly increase female but not male enrollment.

Besides infrastructure and classroom resources, scholars are also interested in the effect of teacher characteristics on education. A recent randomized trial in Kenya¹ shows that parents are willing to trade off larger class sizes for provisions of textbooks and uniforms, and some older studies have suggested that teacher characteristics are less important than household characteristics. However, a growing literature suggests that teachers are important, both in encouraging primary completion and improving performance. A study in India shows that adding a second teacher into the classroom significantly increases girls’ primary school completion and literacy rates.² In China, teacher education, experience, and quality, measured by principle-conducted evaluation scores, have all been shown to have significant effects on raising students’ math and language skills in primary school (Park and Hannum, 2001).

In short, there seems to be no coherent theory on what the most important links are between school quality and improving educational attainment. Retrospective research in this area is particularly riddled with problems such as errors in measurement and the limited ability to control for important unobservable characteristics. In addition, it can be difficult to

¹ Results are from mimeo by Kremer, Michael, Sylvie Moulin, and Robert Namunyu, “Unbalanced Decentralization.” Cited in Glewwe and Kremer, 2005.

² Results are from mimeo by Aimee Chin, “The Returns to School Quality When School Quality is Very Low: Evidence from Operation Blackboard in India.” Cited in Glewwe and Kremer, 2005.

conduct cross-country comparisons due to idiosyncratic education policies and general cultural environment. This thesis will attempt to address these issues, although data limitations are a reality for the present as well as previous research.

Role of Communities

Besides schools, the community can also be an important influence in household educational decisions. In India, for example, aggregate deprivation and village caste relations remain important factors in predicting enrollment after controlling for both household and school characteristics (Dostie and Jayaraman, 2006). A cross-country study also demonstrated that community participation and oversight in the form of Parent-Teacher Associations have shown success in improving education by decreasing teacher absenteeism rates and raising test scores, with EDUCO in El Salvador being the most celebrated example (Lewis, 2006).

In China, decentralization of the educational system has intensified the connection between local resources and education in general, providing a natural environment to study the role of communities in educational provision and attainment. For example, one study on 1992 data of rural households in 29 provinces found that, after controlling for household characteristics, the number of local schools and logged village income both have significant effects on probability of enrollment (Hannum, 2003). Furthermore, the impact of community attributes on enrollment did not vary across household income levels (158). A more qualitative study comparing the trajectory of education development in China to India (Rao et. al., 2003) suggests that cultural belief systems, in particular the universal attitude of valuing education on the part of Chinese parents (165-6), have been pivotal to the success of achieving near universal primary enrollment (157).

The significance of community factors in promoting educational attainment can affect children of migrant households in several ways. It is possible, for example, that aggregate poverty may affect the extent to which households value education if parental perception of the returns to schooling are generally low. The case of Thailand cited before shows that perceived returns to education constitute strong incentives to invest in children's schooling. It is reasonable to posit then, that perception of low future returns would have the reversed effect.

From the children's perspective, having migrant parents in a highly mobile vis-à-vis a less mobile village may also result in differential effects of their own parents' migratory activities on educational attainment. For example, village norms of allocating children's time spent in education and labor may vary depending on the proportion of children that encounter the same situation. It would be reasonable to expect that it is both more common and more acceptable for children to spend more days working in agriculture or in the home if the village has a large proportion of migratory adults. This, in turn, can influence how migrant household choose the optimal bundle of labor and schooling depending on their villages' migrant-population composition. In addition, adult absent spells necessarily imply a decrease in parental involvement in school activities. If parental involvement in the home and in schools is positively correlated with school quality, adult migration might be expected to exert a negative effect on children's schooling through this pathway.

Past Research on Migration and Education

As mentioned above, the education and migration literatures include few inquiries into the effects of temporary parental migratory labor on household education decision for the children. One study looks at the impact of residential patterns in South Africa on

educational attainment (Townsend et al. 2002) and finds that, while an increase in the number of migrants within the household has significantly negative effects on the attainment of most children, father's migration has significantly positive impact on older children of both genders. In contrast, mother's migration tends to discourage enrollment of adolescent girls, and three-generational households have a positive effect on the same group.

One possible explanation for the observed patterns may be that with the increase in migrants in the household, the demand for child labor also increases. For girls, especially, the absence of mothers creates pressure to stay home and substitute for the missing labor, while the presence of older women in three-generational households has the opposite effect. Fathers' migration may be associated with expansion of their social network and better financial resources that encourage more schooling.

In this example, the pathways through which migration affect schooling choices generally seem to follow the principles outlined above, although the specific constellation of factors within each household may create its own idiosyncratic patterns. The initial motivation to migrate may add to the complexity of decision-making. In the Chinese context, for example, women's decision to migrate can itself be linked back to household factors that include the presence of children (Yang, 1999). Estimation of parental temporary labor migration's effects on children's educational attainment is thus not likely to be a straightforward exercise.

The Chinese Context

This project focuses on the intersection of two Chinese policies: education, and more specifically the reforms in the 1980s and early 90s, which had a profound impact on parents' decision-making in their children's education particularly in rural areas; and the household

registration system, which is largely responsible for the prevalence of temporary rural-urban migration. Each of these is discussed below.

Education Policies

The governing ideology behind Chinese education policies since 1949 has fluctuated between an egalitarian approach that seeks to close urban-rural gaps and a liberal competitive approach that aims to improve quality. However, the latter is inherently biased towards urban children due to the higher concentration of wealth in urban areas (Hannum, 2002). The wave of reform in the 1980s was largely a response to the perception of declining quality following the rapid expansion of basic education provisions in the 1970s (Tsui, 1997). Local schools and teachers considered to be sub-standard were closed down and dismissed, while the new wave of expansion starting in the early 1980s aimed to achieve universal primary education within the decade. In 1986, the government instituted free nine-year education.

However, coinciding with the gradual transition to a market economy and government fiscal decline, implementation of these policies eventually slowed down. The administration adopted a local responsibility and decentralized management principle, which effectively decentralized certain public goods provision, including education. In order to fund schools, local authorities began to levy higher school fees (Tsang, 1996), which put poorer communities at a disadvantage in school finances. Although China achieved virtually universal primary enrollment by 1990³, the proportion of children continuing to lower and upper secondary school may have been adversely affected by this policy, particularly because the educational reforms coincided with large-scale adoption of the household

³ World Bank data records a 97 percent total net primary enrollment rate in 1990, and subsequently fluctuates from 95 percent to 100 percent for the following decade. For more detailed data please see <http://devdata.worldbank.org/edstats/query/default.htm>.

responsibility system. Under this arrangement, village authorities retain the right to land and to contract it out to peasants, which means that farmers eventually only have cultivation rights but not ownership rights to their land. The inability of households to alter the amount of land they claim combined with land tax obligations increases the demand for adolescent labor, especially if there are adult migrants in the household (Zhao, 1999). This reinforces the posited negative effect of parental migration on children's educational attainment.

Migration and the Household Registration System

As seen in this last example, the increased demand for adolescent labor is one example of a more generalized rule where rural agricultural households allocate labor largely based on the marginal productivity of each available work opportunity. The choice to migrate thus indicates a higher marginal returns of off-farm versus farm activities. In China, one study using data from eight provinces found the marginal return of non-farm production in yuan per day to be as much as ten times higher than farm production (Knight and Song, 2003). Such high returns combined with nearly zero opportunity cost of land (Zhao, 1999) would normally constitute large incentives to migrate, yet urbanization has not taken place at blistering speed in China as expected (data see UN, 2005).

This phenomenon is the intended consequence of China's household registration system, or *hukou*, designed specifically to prevent mass urbanization after the first wave of migration between 1951 and 1960 (Liang, 2001). As soon as leaders realized that the observed urbanization rate could not be sustained because, among other things, current agricultural outputs could not support the urban population, the government began to pursue various urban retrenchment and rustication policies to reach a stable 17 percent rate of urbanization by 1977.

The *hukou* was a key instrument in this process. Beginning in 1958 (Chan and Zhang, 1999), rural residents intending to migrate to an urban area had to obtain authorization from both the place of origin and destination, satisfying various requirements including government-mandated quotas. Without proper urban household registration status, migrants were neither authorized to buy food nor find employment in the city. One feature that is still somewhat in effect and particularly relevant to this paper is the limitation on school admission based on the *hukou*. The registration status defines both the place, either urban or rural, and type, either agricultural or non-agricultural, of residency. Students can only attend schools within their registered district, which means that migrant parents who choose to travel with their children cannot enroll them in the local public schools. As a result, parents often leave their children at home during the months they work elsewhere.

Beginning in the early 1980s, reform in the *hukou* system has eased constraints on migration both via an increase in employment opportunities and new residential arrangements. Non-state-owned enterprises are allowed by the government to provide workers with temporary urban resident cards (Liang, 2001), and those without such permits can still live in the city so long as they have the financial means to do so. Even with continuous reform, the household registration system still retained its general form and function in regulating population movement within the country.

Chinese rural households' migration decisions are thus not only responsive to agricultural productivity, but also to government policy constraints. The resulting sizable "floating" population engaged in temporary non-farm labor brings the discussion back to changes in household conditions that may have important effects on children's schooling. In light of the literature, the following section explains a conceptual model for examining the relationship between children's education and parental migration.

Conceptual and Empirical Model

In general terms, this study's conceptual model is:

Education Outcome = f (child, parent, household and village characteristics), the variable of interest being parental migration activities, where:

Parental Migration = g (parental education, household and village characteristics).

In order to estimate the specific effect of parental migratory labor activities on children's educational attainment, the model controls for their age, gender, parental education, household composition, and per capita total household consumption expenditure, as well as their respective villages' number of preschool classrooms, operating busses, and proportion of subsidized nitrogen fertilizer. Parental migration decisions, aside from being influenced by many of these common factors such as their own educational attainment and the age and number of children they would leave at home, may also be tied to network effects within their village. The following sections explain these pathways and describe the empirical model used to test their actual effects.

Determinants of Education

Educational outcomes are generally measured in three ways: enrollment, attainment, and test scores. This project will focus on lagged education attainment, as measured by the difference between expected and actual years of education, since test scores are not available in this data and recent studies have suggested primary enrollment is high. As children are expected to begin primary schooling by age 6, the dependent variable is calculated as the difference between years of schooling actually obtained and a child's age less six. The interpretation of educational lag may be different for children of different ages: for younger children, lagged attainment is most likely result of either delayed enrollment or retainment,

while lags in older children and adolescents are more likely to reflect dropping out of school completely.

At the individual level, the model controls for the child's age and gender. Gender equality in education has been a general challenge in developing countries, and there has been much discussion on the effects of the one-child policy on gender preferences in China. As discussed earlier, income effects, for example, are often said to be more severe for girls than boys (Song et. al., 2006). After controlling for potential gender effects, household wealth, composition, and parental education are all important drivers of educational decisions at the household level. The various pathways have already been outlined above: greater household resources are associated with higher demand for education; increases in the number of school-age children may increase financial strain on family resources and thus depress the demand for education. The presence of very young siblings may increase the demand for older children's substitutive labor in daycare when adults migrate and thus depress demand for education. In general, higher parental education levels are associated with greater demand for children's education.

Finally, some village-level controls may also have important effects on the schooling decision. Provision of kindergartens or preschools, for example, can be indicative of both greater village resources as well as collective preference for education, both of which may increase enrollment (Hannum, 2003). The number of busses running through the village is used as a proxy for distances and thus expected to have a negative effect, although, as discussed earlier, some scholars find that distance to school is not an important predictor after accounting for household wealth effects and schooling's opportunity costs (Clemens, 2004). The proportion of subsidized nitrogen fertilizer used is indicative of aggregate poverty, since richer villages are ineligible to be subsidized.

Determinants of Migration

Following an example in the literature (Knight and Song, 2003), this paper categorizes workers who had worked outside of their townships for 60 days or more during the past year as migrants. The migration literature suggests that there are many determinants of migration decision, including parents' own educational level and the presence of younger children at home, both of which are also important factors in education decisions. Household wealth is important particularly if migration is chosen as a means to diversify risk, in which case decreases in financial constraints will lower incentives to migrate (Rozelle et al., 1999). In this way, although difficult to estimate, migration can also be responsive to the relative marginal productivity of labor on and off the farm. At the community level, past or current migrant labor population within the village can also have some predictive power on individual decisions to migrate due to the positive effect migrant networks can have on future migration choices (ibid.).

Estimation Strategy

This paper uses ordinary least-squares (OLS), maximum-likelihood estimation (MLE) specified in a treatment-effects model, and two-stage least-squares (2SLS) to estimate whether parental migration significantly affects children's progress through primary and junior secondary schools. While OLS yields the most efficient and unbiased estimates in linear models with fully exogenous regressors, parental migration may be endogenous to educational decisions due to simultaneity issues and common linkages to household factors. For example, it is plausible that migration choices take into account their children's current progress through school, such that parents whose children are having difficulty in school are less likely to migrate.

To correct for these problems, the OLS results are compared to both MLE and 2SLS estimates. Both of these models use an exogenous instrumental variable to identify the effect of parental migration on children's educational progress and as such correct for the endogeneity. Consistency between these estimates would indicate correct specification. The instrument used for both models is the proportion of village labor force that migrated in 1988, representative of historically-cultivated migrant networks that become available to future potential migrants. This particular choice follows an example in the literature that studied the relationship between migration and agricultural productivity using the same dataset (Rozelle et al., 1999; see below for data description). Other studies have also identified migrant networks as a positive influence on migration decisions, where experienced migrants can often assist with establishing contacts and securing jobs (Zhao, 2003). The variable does not have any significant direct effect on children's lag in education, and a test for the instrument's power produces an F-statistic of 19.24.

Data and Descriptive Statistics

The data used in this project is the World Bank's 1995-1997 China Living Standards Survey (CLSS), which includes 787 households from the northern province of Hebei and northeastern province of Liaoning, with a sample of approximately 3000 individuals. The CLSS is not a rigorous random sample because the original motivation of the survey was to compare current living standards with conditions under Japanese occupation. Instead, three counties from each province were selected as primary sampling units, from each of which five villages were selected to represent the variation within the counties, including one that had been surveyed previously. All estimations are clustered at the county level to be consistent with this sampling method.

Table 1: Descriptive Statistics

| Variable | N | Mean | Std Dev | Minimum | Maximum |
|--|-----|----------|----------|---------|----------|
| Years of lagged education | 532 | 1.088 | 1.129 | 0 | 9 |
| Enrollment | 529 | 0.853 | 0.355 | 0 | 1 |
| Migrant household status ¹ | 532 | 0.141 | 0.348 | 0 | 1 |
| Missing father's migration status | 532 | 0.615 | 0.487 | 0 | 1 |
| Missing mother's migration status | 532 | 0.891 | 0.312 | 0 | 1 |
| Age of child | 532 | 10.414 | 2.967 | 6 | 15 |
| 12 years old or over | 532 | 0.395 | 0.489 | 0 | 1 |
| Female | 532 | 0.477 | 0.500 | 0 | 1 |
| Father completed primary school | 532 | 0.758 | 0.429 | 0 | 1 |
| Father completed junior secondary school | 532 | 0.286 | 0.452 | 0 | 1 |
| Father completed senior secondary school | 532 | 0.028 | 0.166 | 0 | 1 |
| Mother completed primary school | 532 | 0.558 | 0.497 | 0 | 1 |
| Mother completed junior secondary school | 532 | 0.194 | 0.395 | 0 | 1 |
| Mother completed senior secondary school | 532 | 0.024 | 0.155 | 0 | 1 |
| Household members, ages 5 and younger | 532 | 0.126 | 0.343 | 0 | 2 |
| Number of household members ages 6-15 | 532 | 1.656 | 0.635 | 1 | 3 |
| Number of household members ages 16-65 | 532 | 2.338 | 0.674 | 2 | 7 |
| Household members ages 66 and over | 532 | 0.184 | 0.475 | 0 | 2 |
| Household consumption ² | 532 | 4553.660 | 2773.300 | 1015.10 | 42685.90 |
| Number of preschool classrooms in village | 532 | 1.133 | 0.437 | 0 | 2 |
| Number of busses running through village | 532 | 16.440 | 30.387 | 0 | 144 |
| Proportion of nitrogen fertilizer subsidized | 532 | 0.068 | 0.138 | 0 | 0.5 |
| Total village population | 532 | 1312.020 | 525.201 | 455 | 4008 |
| Size of village workforce | 532 | 616.532 | 262.658 | 201 | 1920 |
| Total migrant population | 532 | 29.632 | 64.685 | 0 | 360 |

¹This collapses non-migrants with parents who did not report migration status. If these are excluded, 33.6% of children (75 out of 223) have migrant parents.

²Household wealth is measured by dividing household consumption, calculated by World Bank personnel using the total use value of the house and durable goods plus total household education and consumption expenditure, by the square root of household size. A detailed discussion of the method is found in the survey documentation.

Table 1 and Table 2 show the summary statistics of variables used in this paper. After excluding 21 children who could not be matched to their parents, the sample consists of 532 children between the ages of 6 and 15 inclusive, with an average age of 10.4. The sample is restricted to this range because China's official policy mandates nine years of

universal education up to junior secondary school, where the completion age is 15 given normal progress.

Table 2: Control Variable Difference of Means, by Migrant Household Status

| Variable | Migrant | | Non-Migrant | | Difference | t-Stat. | p-Value |
|--------------------------------|---------|---------|-------------|---------|------------|---------|---------|
| | N | Mean | N | Mean | | | |
| <i>Child Characteristics</i> | | | | | | | |
| Age of child | 75 | 9.63 | 148 | 10.51 | - 0.88 ** | -2.12 | 0.035 |
| 12 years old or over | 75 | 0.38 | 148 | 0.50 | - 0.13 ** | -2.04 | 0.043 |
| Female | 75 | 0.43 | 148 | 0.48 | - 0.0531 | -0.75 | 0.455 |
| <i>Parental Education</i> | | | | | | | |
| Father: primary | 75 | 0.73 | 148 | 0.78 | - 0.0505 | -0.84 | 0.402 |
| Father: junior secondary | 75 | 0.31 | 148 | 0.30 | 0.01 | 0.14 | 0.886 |
| Father: senior secondary | 75 | 0.03 | 148 | 0.07 | - 0.0477 | 1.67 | 0.097 |
| Mother: primary | 75 | 0.53 | 148 | 0.51 | 0.02 | -0.28 | 0.781 |
| Mother: junior secondary | 75 | 0.27 | 148 | 0.22 | 0.04 | -0.72 | 0.471 |
| Mother: senior secondary | 75 | 0.05 | 148 | 0.05 | 0.01 | 0.20 | 0.845 |
| <i>Household Composition</i> | | | | | | | |
| Ages 5 and younger | 75 | 0.19 | 148 | 0.11 | 0.08 | 1.51 | 0.134 |
| Ages 6 through 15 | 75 | 1.61 | 148 | 1.74 | - 0.1232 | -1.34 | 0.181 |
| Ages 16 through 65 | 75 | 2.32 | 148 | 2.30 | 0.02 | 0.27 | 0.784 |
| Ages 66 and above | 75 | 0.17 | 148 | 0.15 | 0.03 | 0.37 | 0.713 |
| Household consumption | 75 | 4166.80 | 148 | 4265.80 | - 98.969 | -0.48 | 0.634 |
| <i>Village Characteristics</i> | | | | | | | |
| Preschool classrooms | 75 | 1.12 | 148 | 1.17 | - 0.0489 | -0.69 | 0.489 |
| Busses through village | 75 | 17.44 | 148 | 16.10 | 1.34 | 0.29 | 0.774 |
| % subsidized N fertilizer | 75 | 0.04 | 148 | 0.06 | - 0.0134 | -0.90 | 0.370 |

47.7 percent of the sample are female, 85.3 percent enrolled in school in 1994, with an average lag in expected years of education of 1.09 years. 75.8 percent of fathers and 55.8 percent of mothers have completed primary education, 28.6 percent of fathers and 19.4 percent of mothers junior secondary, and less than 3 percent of fathers and mothers senior secondary. None of the control variable have statistically different means at the 5% level

between children from migrant and non-migrant households, with the exception of age variables. It is somewhat contrary to expectation that children with migrant parents tend to be younger on average compared to their peers with non-migrant parents. This may be an artifact of the large number of observations missing parental migration information (see below).

Table 3: Enrollment and Lagged Progress, by Gender and Migrant Household Status

| | N | Enrollment Rate (%) | N | % with lagged progress ¹ | N | Mean of lagged years ¹ |
|-------------------------------------|-----|---------------------|-----|-------------------------------------|-----|-----------------------------------|
| Non-migrant household | | | | | | |
| boys | 76 | 85.53 | 77 | 62.34 | 77 | 1 |
| girls | 71 | 85.92 | 71 | 67.61 | 71 | 0.972 |
| <i>total</i> | 147 | 85.71 | 148 | 64.86 | 148 | 0.986 |
| Migrant household: | | | | | | |
| boys | 43 | 76.74 | 43 | 60.47 | 43 | 1.21 |
| girls | 32 | 78.13 | 32 | 59.38 | 32 | 0.906 |
| <i>total</i> | 75 | 77.33 | 75 | 60 | 75 | 1.08 |
| Missing migrant info ² : | | | | | | |
| boys | 157 | 87.26 | 158 | 63.29 | 158 | 1.15 |
| girls | 150 | 86.67 | 151 | 68.21 | 151 | 1.13 |
| <i>total</i> | 307 | 86.97 | 309 | 65.7 | 309 | 1.14 |
| Overall: | | | | | | |
| boys | 276 | 85.14 | 278 | 62.59 | 278 | 1.12 |
| girls | 253 | 85.38 | 254 | 66.93 | 254 | 1.06 |
| <i>total</i> | 529 | 85.26 | 532 | 64.66 | 532 | 1.09 |

¹This category does not account for children with “negative” lag years, i.e. those who enrolled in school before they were six years old.

²Children whose parents did not report work location are placed in a separate category to avoid confounding the results, since it cannot be verified whether their parents were migrants or not.

Table 3 reports enrollment and educational progress statistics by children's parental migration status and gender. Only 223 out of the 532 children had fathers or mothers who reported the location of their non-farm labor activity, and of these 33.6 percent migrated outside of the township. Overall, girls have similar enrollment rates as boys, and while a larger proportion of girls are behind in school than boys, the average education lag is larger for boys than girls. Children from migrant households have lower enrollment rates, by 7 to 8 percentage points, compared with the overall sample as well as their peers in non-migrant households. However, a smaller percentage of migrant-household children are behind in school than their peers with non-migrant parents, and this difference is particularly significant for girls at 8 percentage points.

This, together with lower averaged years of delayed progress, may reflect smaller negative effects of parental absence on girls than boys. That is, while girls in migrant households have lower enrollment rates, once enrolled they are also on average less likely to fall behind in school compared to boys in migrant households and girls in non-migrant households. Boys, on the other hand, tend to fall behind in school more when their parents migrate. One caveat, however: It is still unclear at this point whether these figures represent systematic differences between children living in the two types of households, because none of these differences are statistically significant.

Results

Table 4 shows regression results using OLS, MLE, and 2SLS to estimate the effect of parental temporary labor migration on children's educational progress. Robust standard errors are reported in brackets. In order to include in the sample the large number of children whose parents did not report their location of work, missing household migration

values are replaced with zero and flagged with an indicator; the significance of these indicators across OLS and MLE treatment-effects models suggest that there may be some systematic differences between those who reported no migration and those who did not report migration status at all.

Overall, migration is associated with larger delays in children's educational progress. The OLS model suggests that holding the child's age and gender, parental education, household composition and consumption, and some village characteristics constant, having at least one migrating parent is likely to increase the lag in schooling by 0.26 years. The MLE treatment-effects model, which uses the size of the village labor force to instrument migration decision, estimates a smaller effect of 0.08 years. Given that OLS tends to be the more efficient estimator while MLE corrects for endogeneity and is therefore more unbiased, the true averaged effect of migration on schooling delay is likely somewhere between 0.08 and 0.26 years, where the OLS estimate is upwardly biased.

To identify the gender-specific effects, two separate model includes an interaction variable that multiplies a child's gender by parental migration status; since gender in this case is indicated by whether a child is female, the coefficient on the interaction variable thus measures the marginal effect of migration on girls versus boys. Neither migration coefficient is individually significant in the OLS model, but tested jointly they produce an F-statistic of 4.19 and p-value of 0.0854. This suggests a marginal effect of 0.354 years lagged in boys' education if they reside in migrant households, versus 0.131 years lagged for girls. A 2SLS instrumented model, using the same instrument, produces much larger coefficients and also larger standard errors, such that the marginal effect of migration for girls is actually negative although insignificant. Table 5 summarizes these results.

Table 4: Estimation Results

| Variables | No Gender Interaction | | Gender Interaction | |
|----------------------------------|---------------------------|----------------------------|---------------------------|-------------------------|
| | OLS | MLE | OLS | 2SLS |
| Constant | -1.527 *** (.234) | -1.503 *** (0.236) | -1.524 *** (0.232) | -1.450 (1.773) |
| <i>Migration</i> | | | | |
| Household | 0.262 * (.115) | 0.077 (0.222) | 0.354 (0.243) | 0.680 (1.837) |
| Female interaction | | | -0.223 (.344) | -1.228 (1.591) |
| Missing: father | 0.238** (.079) | 0.238 *** (0.078) | 0.239 ** (0.077) | 0.214 (0.712) |
| Missing: mother | -0.120 * (.052) | -0.122 ** (0.052) | -0.137 ** (0.050) | -0.239 (0.669) |
| <i>Child Characteristics</i> | | | | |
| Age | 0.256 *** (0.029) | 0.256 *** (0.028) | 0.258 *** (0.030) | 0.265 *** (0.033) |
| Age 12 and over | -0.379 ** (0.117) | -0.378 *** (0.114) | -0.394 ** (0.112) | -0.463 ** (0.176) |
| Female | -0.139 * (0.056) | -0.140 ** (0.055) | -0.109 (0.056) | -0.027 (0.166) |
| <i>Parental education</i> | | | | |
| Primary: father | .190 (.126) | 0.190 (0.123) | 0.194 (0.131) | 0.210 (0.207) |
| Junior secondary: father | -0.347 ** (0.098) | -0.347 *** (0.096) | -0.355 *** (0.098) | -0.390 *** (0.097) |
| Senior secondary: father | -0.132 (0.189) | -0.132 (0.185) | -0.141 (0.197) | -0.205 (0.816) |
| Primary: mother | -0.206 * (0.088) | -0.203 ** (0.086) | -0.207 * (0.087) | -0.214 ** (0.077) |
| Junior secondary: mother | -0.256 * (0.102) | -0.256 ** (0.100) | -0.246 * (0.113) | -0.200 (0.134) |
| Senior secondary: mother | 0.857 *** (0.184) | 0.854 *** (0.181) | 0.874 *** (0.214) | 0.960 ** (0.270) |
| <i>Household Characteristics</i> | | | | |
| # Age 5 and under | 0.116 (0.092) | 0.119 (0.090) | 0.113 (0.085) | 0.101 (0.129) |
| # Age 6 through 15 | 0.195 *** (0.036) | 0.197 *** (0.034) | 0.196 *** (0.036) | 0.196 ** (0.052) |
| # Age 16 through 65 | -0.003 (0.026) | -0.002 (0.026) | -0.006 (0.030) | -0.022 (0.040) |
| # Age 66 and over | 0.097 (0.075) | 0.098 (0.073) | 0.097 (0.072) | 0.097 (0.071) |
| Consumption ³ | -0.000018 * (0.000009) | -0.000018 ** (0.000009) | -0.000018 * (0.000008) | -0.000016 (0.000008) |
| <i>Village Characteristics</i> | | | | |
| # Kindergarten classes | -0.071 (0.153) | -0.073 (0.150) | -0.078 (0.152) | -0.109 (0.220) |
| # Buses in village | 0.003 *** (0.0005) | 0.003 *** (0.0005) | 0.003 *** (0.0005) | 0.002 (0.001) |
| % N fertilizer subsidized | -0.647 (0.715) | -0.643 (0.699) | -0.634 (0.705) | -0.576 (0.721) |
| F-test: instruments | | F = 19.24 (p = 0.007) | | See MLE model |
| * p = 0.1 | | | | |
| ** p = 0.5 | | | | |
| *** p = 0.01 | | | | |

Table 5: Summary of Migration Effects

| | No Gender Interaction | | With Gender Interaction | |
|-------------------------------|-----------------------|---------|--------------------------|-------------------------|
| | OLS | MLE | OLS | 2SLS |
| Boys | 0.262 * | 0.077 | 0.354 (0.243) | 0.680 (1.837) |
| Girls | (0.115) | (0.222) | 0.131 (0.133) | -0.548 (3.087) |
| Joint F-test: migration terms | | | F = 4.19* (p = 0.085) | F = 0.88 (p = 0.469) |

In general, the small positive coefficients on the parental temporary migration variable suggests that the demand for children’s labor has a slightly stronger, and negative, effect on their timely progress in school than the positive effects from having the additional income. There are several plausible explanations for why this adverse effect seems to be smaller for girls than boys. One may be that, since the household’s demand for girls’ education is usually more income elastic than for boys’ education, the positive effect of migration remittances may partially offset the negative effect of labor demand. Another explanation may be that, since the majority of migrants are fathers, boys may substitute for fathers’ labor activities more than girls. This is consistent with an earlier study on the same sample of households, which found that migratory labor activities, at least in the short-run, significantly depresses agricultural production (Rozelle et al., 1999). Unfortunately, due to poor-reporting of child labour participation in the survey, it is difficult to further pursue this hypothesis.

Other control variables are mostly consistent with theories in the literature previously discussed. Parental education tends to be negatively correlated with children’s lag in education across all specifications, particularly if mothers have completed primary or junior secondary school or if fathers have completed junior secondary school. One curious result is that mother’s completion of senior secondary school (i.e. twelve years) is positively

and highly significantly correlated with children's educational lag in all four models. While potential explanations such as the option of home-schooling may be plausible, interpretation of this result may not be appropriate because of the very small proportion, i.e. less than three percent, of children who have mothers who have completed senior secondary school.

Household wealth, measured as use value of total consumption divided by the square root of the household size, is significantly and negatively correlated with delayed progress. The positive coefficient on the number of busses running through the village, an approximate measure for distance, supports this result. While the busses themselves may provide the means of transport, transportation cost may still add to the household's financial burden and decrease schooling incentives.

In terms of household composition, the coefficient on the number of school-aged children in the household is highly significant and consistent in magnitude across all four models. Each additional member in this age group is associated with approximately 0.196-year increase in lag. This is consistent with earlier discussions on education decentralization policies in the recent decades and their effect of increasing the burden of school fees on families. Since the model already controls for household wealth, this result may reflect a general level of deprivation where rural households on average cannot afford to send numerous children to school at once. The lack of household resources, in this case, translates into delayed progress through school.

Finally, consistently significant estimates on the age variables may reflect a pattern in educational progress. The positive coefficient on age and negative coefficient on whether a child has reached 12 years old seem to suggest the following: children tend to fall behind in school as they get older, probably because the demand for their labor also rises as their capacity for work increases. Once they reach the age they were supposed to have finished primary school, however, they tend to fall behind less. Together, there seems to be a pattern

where parents are more likely to hold children back in school during primary-school years. Once children are older and already enrolled in school, parents may be more motivated to keep them in school.

In short, controlling for individual and household characteristics, parental migration still seems to have a negative effect on children's timely progress through school, with smaller marginal effects on girls versus boys. This is likely reflective of a scenario where the positive effect from additional labor income into the household mitigates the negative effect of higher labor demand effect for girls. Consistent with the theories that girls tend to be affected more by household income fluctuations and that girls' education can sometimes be seen as a "luxury" good in poorer households, the negative impact of migration on girls may be mitigated by the positive income effect relative to boys.

Policy Implications

If parental temporary labor migration indeed has negative effects on children's educational attainment, then effective policy changes must be targeted either at decreasing the incentive for migration or providing a solution to side effects of mobile labor. In this case, educational decisions and the migratory phenomenon are largely tied to government policies such as education decentralization, in the former case, and the household registration system, in the latter. Education policies may be the less complicated area for change, and several possible measures come to mind.

One option would be for the government to change school admission policies via reducing restrictions by household registration. Given the current volume of migrants, however, immediate complete relaxation of admission controls will likely result in chaos and over-crowding of urban schools. A new law passed by China's State Council in 2003, for example, charged local governments with the responsibility to provide schooling for all

children within their jurisdiction without allocating the necessary funds (*New York Times*, 2007). In some instances, children were deprived of education altogether because public schools lacked the capacity to admit more students and private schools were closed by government orders. To avoid this in the future, the central government would need to fund, at least partially, expansion of public schools to accommodate more children. Alternatively, a more incremental approach that, for example, limits admission by proximity of residence may also ease some of the separation constraints, particularly for adults that migrate to nearby townships.

Similarly, the government may opt to establish and financially support special schools for migrant children. Private migrant schools have been burgeoning in urban centers over the recent years and may be one of the cheapest ways to allow parents to travel with their children while working away from home, yet their somewhat ambiguous legal status poses a constant threat to their attendees (*ibid.*). While there may be other issues associated with this type of special-provision schools, such as high levels of poverty concentration and lower educational quality, legalizing their existence may be the first step towards providing equitable education for urban and migrant children alike.

Caveats and Limitations

One of the major limitations of this study is its data source. As this survey focused primarily on household agricultural activities, it did not include data on supply-side issues that affect education such as primary and secondary school provision and quality. Missing migration data and the small sample size pose difficulty in comparing different definitions of migration to gain a better understanding of its relationship to household child education decisions. For example, other measurements may define the migration time-period differently (Rozelle et al., 1999), or perhaps use the actual amount of time away rather than

using a dichotomous definition. If migration influences educational decisions via the demand for adolescent labor on the farm while adults work off the farm, then the season and duration of migration would hypothetically have differential results on attainment and enrollment for older children.

Also, although internal temporary labor migration is a wide-spread phenomenon in China, the geographic limitation of this dataset restricts the ability to make inferences about such a phenomenon at a larger scale. Inasmuch as some of the pathways described in this paper are most likely present in most parts of rural China, it would still be difficult to postulate that the relationship between parental migration and education in other parts country is the same as the one described here from this restricted and non-representative sample.

Conclusion

This paper is a study on the relationship between parental temporary migratory labor and their children's educational attainment in rural China. Following examples in the education and development literature, regression analysis results that control for important individual, parental, and community characteristics suggest that living in households with migrant parents is associated with delayed progress through school, and this effect is smaller for girls relative to boys. Insofar as the internal migratory phenomenon is closely tied to Chinese government's household registration policy, several policy options such as relaxing school-admission restraints and building new migrant schools may begin to address the problem. Since this conclusion has been derived from a small and geographically limited survey sample, more research on the issue with larger and ideally panel datasets are necessary to ascertain more generally the nature of this relationship between parental migration and children's education.

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