THE EFFECTS OF PARENTAL MIGRATION ON CHILD EDUCATIONAL OUTCOMES IN INDONESIA

A Thesis
submitted to the Faculty of the
Graduate School of Arts and Sciences
of Georgetown University
in partial fulfillment of the requirements for the
degree of
Master of Public Policy
in Public Policy

By

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Washington, DC
April 10, 2012

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ABSTRACT

This research evaluates the effect of belonging to a migrant household on the likelihood of attending kindergarten and senior secondary school, as well as the impact of migration on household education expenditures in Indonesia. Both linear probability models and ordinary least squares models are used to evaluate these relationships. The results indicate that belonging to a migrant household has a statistically significant impact on the probability that a four to six year-old child will attend kindergarten, and a weakly significant impact on the probability that a teenager will attend senior secondary school. In addition, migrant households were found to have lower education expenditures than non-migrant households, although the reason for this requires further research.

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As the world has become more integrated through the increased international exchange of ideas, evolving technology and low-cost transportation, more people are choosing to migrate in search of employment. Those who migrate hope to improve their quality of life through increased income; with this understanding, studies of migration typically focus on the factors that influence an individual's decision to migrate, the factors motivating migrants to remit part of their income, and the impact of remittances on various household outcomes. Although media and scholarly studies typically focus on international migration, migration within countries is also prevalent, often from rural to urban areas.

Many studies have analyzed the effect of remittances on child educational attainment. The benefits of education are universally acknowledged, and parental decisions concerning their child's education have a lasting impact on the child's employment opportunities and earning potential. Childhood educational attainment may be affected if the child has at least one migrant parent in a variety of ways. For example, higher household income resulting from migrant parent remittances may both increase a child's school attendance, and decrease the number of hours a child spends working (Yang 2008). Conversely, an older child in a migrant household may be less likely to attend school if that child is caretaker to younger siblings or must work outside the home for additional income because one or both parents have migrated, internationally or domestically, to find employment (Antman 2010). Further, upon completion of compulsory education, migrant family ties may assist older children in finding employment outside of their community, thus increasing the likelihood that they will become migrants themselves (McKenzie and Rapoport 2006). These migrant family ties may affect schooling decisions by increasing the opportunity cost of attending school when employment opportunities are more readily available.

Further, an increased outflow of adults from a community may open employment opportunities within that community for older children; this may also influence that older child's decision to continue his or her education beyond the compulsory period (De Brauw and Giles 2008).

Expanding on existing literature analyzing the effects of migration on families, the research presented here specifically explores the effects of migration on child educational attainment in Indonesia utilizing data from the Indonesian Family Life Survey (IFLS) collected by the Rand Corporation. In exploring the effects of migration on child education attainment, the study specifically accounts for the child's age and gender. These findings can assist policymakers in designing programs to complement any positive effects of migration or mitigate any negative effects; such programs may seek to increase the returns to education, or provide additional support to children in households with one or more migrant parents.

In order to document the impacts of internal, seasonal migration in Indonesia on educational attainment among children, background information on the link between migration and education is provided along with information on the Indonesian educational system. A review of relevant literature is followed by a discussion of the conceptual framework through which migration's potential effect on education is assessed and my hypothesis. Next, an overview of the data and statistical methods used in this research is presented followed by the results of the statistical analysis. A discussion of the findings and ideas for future research concludes.

BACKGROUND

Throughout history, people have chosen to migrate for various reasons, although often with the hope of finding employment that will improve their family's quality of life. Thus, it is

important to consider the effects of belonging to a migrant household on various household members, including children. Given the impact of education on future employment prospects, and education's impact on human well-being notwithstanding employment prospects, studying the effects of household characteristics on child educational attainment is increasingly important. In particular, given the difficulties of making up educational deficits as an older child or adult, policymakers should consider the circumstances affecting a child's future educational attainment.

There are multiple channels through which parental migration may affect a child's educational attainment. For example, increased household resources, as a result of remittances received from a migrant household member, are generally thought to positively impact educational attainment since parents have more income to spend on education, which may be the case for younger children in particular (McKenzie and Rapoport 2006). Also, households might have a fixed capital stock, e.g. land, and thus their total household income is somewhat fixed. In this situation, a decrease in the number of household members due to migration, for example, increases the household's income per capita and therefore, potentially increases the resources available for the remaining household members.

However, it is possible that parental migration may negatively affect educational outcomes for older children if the experience of parental migration reduces their perceived or real expected returns from education. De Brauw and Giles (2008) found that belonging to a migrant household, and/or living in an area with increasing local emigration, may provide another channel through which the opportunity cost of additional education rises. An older child

may be forced to choose between continuing his or her education, migrating in search of work, or joining the local labor market, a choice that is potentially made every year.

Other channels through which parental migration may affect a child's education are emotional stress resulting from one or both parents migrating for work, and the decreased educational attainment of an older child who left school to become primary caregiver to younger siblings (McKenzie and Rapoport 2006). These examples are not exhaustive, and the effects of migration may differ based on a child's age or gender. Essentially, policymakers must understand the driving forces behind household education decisions in order to design effective policies to mitigate the potentially negative effects of parental migration on childhood educational attainment or enhance any positive effects; these policies should also encourage parents to keep their child in school by lowering the opportunity cost of education.

Determining the effect of belonging to a migrant household on education is not only important due to the non-negligible number of Indonesian migrants, both international and domestic, but also because of low secondary school enrollment in Indonesia. According to World Bank statistics, although net primary school enrollment was 95% in 2009, net secondary school enrollment was only 65%.[1]

The Indonesian educational system consists of pre-school/kindergarten, primary school, junior secondary school, senior secondary school, and university. A total of nine years of compulsory schooling, from approximately ages seven to fifteen years, is provided by the

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[1] World Bank, World Development Indicators Data. < http://data.worldbank.org/indicator/SE.PRM.NENR> Accessed 2/17/2012.

government free of charge.[2] Pre-school and kindergarten are non-compulsory, and are composed of children ages four to six. Primary school is compulsory and begins at age seven. Primary school ends at Grade 6 with students approximately twelve years-old. This is followed by junior secondary school, also compulsory, which lasts for another three years until Grade 9 with students approximately fifteen years-old. Upon completion of Grade 9, a national examination awards a Certificate of Completion for junior secondary school, and determines if the student is offered admission to senior secondary school, which students attend from ages sixteen to eighteen. It is important to note that a child's performance on the national examination for senior secondary school is likely to influence the probability that he or she will attend given that a child must pass the exam and be offered admission to a senior secondary school.

Because some educational levels are provided by the government free of charge and other levels are not, belonging to a migrant household is most likely to affect a child's education as per enrollment in pre-school/kindergarten or senior secondary school. These are the grade levels at which education will represent an additional expense to a household in excess of uniforms, supplies, and transportation costs. Thus, a child's family situation may likely impact pre-school/kindergarten or senior secondary school attendance because the decision to attend school at these levels is discretionary and potentially burdensome. Such decisions are likely to be influenced primarily by household income, which may, in turn, be related to parental migration. However, it could be that migration does not affect these educational decisions. For example, the education level of parents, and the proximity to a pre-school/kindergarten, may outweigh any possible effects of having a migrant household member. Similarly, the education level of parents,

2 UNESCO, World Data on Education. 7th Edition, 2010/201: May 2011.
<http://unesdoc.unesco.org/images/0019/001931/193181e.pdf > Accessed 12/9/2011.

and/or the career aspirations of the child, may be more likely to impact that child's decision to attend senior secondary school than any potential effects of belonging to a migrant household.

Specific information on the consumer costs associated with education in Indonesia was not found from outside sources, but the IFLS specifically surveyed household expenditures on tuition, uniforms, and transportation to school. Therefore, despite the provision of government-funded education, there may be costs for uniforms and transportation even for public school attendance; furthermore, attending private schools will incur additional tuition costs. For example, given the costs associated with education, it is possible that migrant households may be more likely to send their child to pre-school/kindergarten due to remittance income, thus reporting higher educational expenditures.

LITERATURE REVIEW

There is abundant literature on both the determinants and effects of migration decisions. One of the most researched areas of migration is the effect of remittances from a migrant on household expenditures and investment. Yang (2008) considered the effect of remittances on household investment decisions in the Philippines. Using panel data with information on various household characteristics and outcomes, he studied the differing impact of the Asian financial crisis on exchange rates, and its relationship to household decisions for those households with an international migrant. An appreciation of the Philippine currency in relation to that of the migrant's host country would be considered a positive shock, and conversely, a depreciation of the Philippine currency in relation to that of the migrant's host country would be considered a negative shock. He found that education expenditures rose, and migrant household child labor hours decreased, in those migrant households that experienced a positive currency shock.

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In addition to migration literature on the various measures of household well-being, a number of international studies have focused specifically on migration's effects on education for children in migrant households. Most literature on the effects of remittances on household well-being, such as expenditures and consumption, is generally positive; however, the impact of belonging to a migrant household on other outcomes, such as education, is mixed.

McKenzie and Rapoport (2006) used an instrumental variable censored ordered probit model and data from the National Survey of Demographic Dynamics (ENADID) to identify the impact of belonging to a migrant household on educational attainment in Mexico. The authors found that boys were less likely to complete junior secondary school if they were part of a migrant household; both boys and girls from migrant households were less likely to complete senior secondary school. Specifically, belonging to a migrant household lowered the probability of completing secondary school by 13% for boys and 14% for girls. The reasons underlying the decreased educational enrollment of teenagers ages sixteen to eighteen from migrant households are differentiable by gender; boys had an increased likelihood of migrating, whereas girls often left school to spend more time on housework. Interestingly, the authors found that migrant households experienced higher school attendance for five and six year-old children than non-migrant households.

Antman (2010) found similar results on the effect of migration on twelve to fifteen year-old males in Mexico. She utilized an individual fixed effects and instrumental variables estimation model with data collected by the National Statistical Agency of Mexico (INEGI) and the Mexican Migration Project (MMP). Focusing on paternal migration, she found that young males spent less hours on studying and school participation, and more time working outside the

home, when their father's migrated to the U.S. In a further paper, Antman (2011) used a family fixed-effects regression model to mitigate household and parental characteristics correlated with educational attainment and migration when considering the differing impact of migration by gender and age. Once again differentiating by gender, girls experienced positive effects resulting from a father's migration to the U.S., but paternal migration did not present a statistically significant effect for boys.

De Brauw and Giles (2008) considered the opportunity cost versus the actual cost of high school enrollment in China; this discussion also examined the relationship between opportunities for domestic migration, and the opportunity cost of continued schooling. Utilizing an instrumental variables approach, the authors found that decreases in the cost of migration to seek employment resulted in subsequent decreases in the probability that a rural child will attend high school. The possible channels for this negative effect were hypothesized to be: (1) increased knowledge of employment opportunities in other areas as the size of the migrant population from a community increases; and/or (2) the possibility that employment prospects increase within a community as more of the working-age population migrates.

Nguyen and Purnamasari (2011) evaluated the effect of male and female international migration on education in Indonesia. They utilized an instrumental variable technique in which migration and remittances were instrumented for using historical migration networks. The authors used the IFLS from 2000 and 2007; they found that child labor outside the home was reduced as a result of female migration, but that school enrollment was not affected. Similarly, Deb and Seck (2006) applied data from the Mexican Family Life Survey and IFLS to evaluate the effect of domestic migration on various household outcomes in Mexico and Indonesia. The

authors were able to use a linear probability model to determine if a Mexican child was in the proper grade for his or her age, and found that children from migrant households were more likely to be in the proper grade based on their age than were children from non-migrant households. Unfortunately, equivalent data on Indonesia was not available. Therefore, they did not evaluate the impact of migration on education in Indonesia.

The research presented here will expand the literature on migration and education by measuring the relationship between domestic migration and educational attainment in Indonesia. It will utilize different measures of migration and educational attainment than have been used in previous studies. Ordinary least squares will be utilized to evaluate the possible effects of migration on household education expenditures, while a linear probability model will assess the possible effects of migration on the likelihood of an Indonesian child attending kindergarten and an Indonesian teenager attending senior secondary school.

CONCEPTUAL FRAMEWORK AND HYPOTHESIS

This research focuses on the impacts of internal, seasonal migration in Indonesia on household educational expenditures, the likelihood that a four to six year-old child attended in kindergarten, and the likelihood that a fifteen to twenty-two year-old attended senior secondary school. In doing so, I control for the educational attainment of parents, household education expenditures, household size, gender, and the location of the household. Other factors that could affect educational outcomes considered in this research that are unobserved include household income, socio-economic status, educational attainment of older siblings, parent and child educational aspirations, real or perceived benefits of education, quality of the nearest school, distance to the nearest school, whether the child is required to work, or any fees or costs for

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school attendance. These additional variables were not analyzed due to either limitations on available data, or the inherent difficulty in quantifying qualitative variables such as "aspirations" or "perceptions." Moreover, data on household income is often unreliable due to inaccurate reporting, usually underreporting (Ferguson et al. 2003).

It is likely that parental education is one of the most important determinants of a child's education level; generally, higher parental educational attainment is often associated with higher household incomes as compared to those households with less parental educational attainment. Household educational expenditures are likely to be affected by the number of household members and household income. In addition, the gender of a child could influence their employment prospects as well as that child's or family's belief that continued education is worthwhile based on those employment prospects. The location of a household, whether it is urban or rural, and perhaps even the specific village or province, could affect educational opportunities. For example, children living in urban areas may be more likely to live closer to their school and/or have more choices of schools to attend, which translates into more senior secondary school seats available, thus making is easier to matriculate. This could be particularly important for teenagers who must decide whether to attend senior secondary school. It is possible that more rural areas may lack a selection of senior secondary schools, and the travel distance may be greater for rural teenagers to attend those schools as compared to teenagers in more urban areas. These are important factors that are likely to affect educational decisions.

There are several channels through which migration may affect the educational attainment of children from migrant households, which include the "income" effect or "substitution" effect of belonging to a migrant household. The "income" effect could be seen if

higher incomes affect education decisions. For example, the "income" effect could be present if increased educational expenditure on children results from remittances from one or more migrant parents. If education is a normal good, then consumption of education should rise.

Alternatively, the "substitution" effect changes the relationship between the costs associated with education and the benefits of continuing childhood education in migrant households. Educational attainment among children may decrease as a result of belonging to a migrant household for several reasons. These reasons may include the stress of having a migrant parent, the household's reliance on the child's wage labor or household labor, and the child forgoing further education to contribute to a family business or care for younger siblings. As a result of a parent's migration, a child may be required to perform tasks previously performed by that parent. In addition, older children in migrant households may experience a higher opportunity cost for remaining in school due to the competing opportunity of migration employment, thus these children's educational attainment may be lower than children in comparable non-migrant households. For example, if a parent migrates to a large city for employment, his or her older child may be more likely to migrate than a child with no migrant parents. This could partially result from that migrant parent being able to assist in their child's search for employment effectively lowering the "cost" of migration.

It is also possible for the effects of migration on educational attainment to be positive for younger children but negative for older children. Specifically, a younger child may benefit from the "income" effect, and be more likely to attend pre-school/kindergarten. By contrast, an older child may be affected by the "substitution" effect, and may not attend senior secondary school in order to care for younger siblings at home.

Similarly, the effects may differ or vary in magnitude depending on the gender of the child. As discussed previously, McKenzie and Rapoport (2006) found Mexican migrant households had higher school enrollment rates than non-migrant households for elementary school aged children; however, belonging to a migrant household was associated with lower junior high school completion rates for boys, but not for girls.

The research presented here focuses on the effects of Indonesian domestic parental migration on household expenditures for education, the likelihood that a child aged four to six years attends kindergarten, and the likelihood that an older child aged fifteen to twenty-two years attends senior secondary school. Due to the non-compulsory nature of kindergarten and senior secondary school, belonging to a migrant household is most likely to affect childhood educational attainment for these age groups.

This research operates under the hypothesis that migrant households will spend more on education than non-migrant households as a result of increased income from a migrant household member. If a household member chooses to migrate, it is most likely due to a lack of employment opportunities in their home village or city. Therefore, a migrant household is likely to realize increased household income if one or more household members' migration for work results in higher income. This increased household income may allow for increased expenditures for education, such as the expense of kindergarten for a younger child, the expense of senior secondary school for an older child, or other private educational pursuits (e.g. tutoring, language training, etc.).

This research also hypothesizes that the effects of parental migration on education will be positive for younger children, but negative for older children. Younger children may likely

benefit from the "income" effect of remittances on a household resulting in more time devoted to schoolwork and school attendance than children from non-migrant households. However, given the high compulsory primary school enrollment rate, the effect of belonging to a migrant household may only significantly affect non-compulsory kindergarten enrollment. Under these conditions, a child in a migrant household may be more likely to attend kindergarten than a child in a non-migrant household.

Conversely, it is possible that belonging to a migrant household will decrease the likelihood that an older child will continue his or her education past the age of fifteen, or junior secondary school, after which education is no longer compulsory. For example, since education is compulsory until age fifteen, school enrollment may decline after age fifteen as the opportunity cost of education becomes greater than the immediate benefits of employment.

DATA AND METHODS

Data[3]

This research is based on data from the IFLS available from the Rand Corporation. Begun in 1993, the IFLS is a longitudinal survey project that collects socioeconomic and health data on the Indonesian population and survey communities. The first survey round (IFLS1) was administered to 7,224 households in thirteen provinces of Indonesia, and represented approximately 83% of Indonesia's total population. In 1997, IFLS2 sought to re-interview the households from IFLS1. In 1998, IFLS2+ re-interviewed 25% of the original sample following the economic and political crisis. In 2000, IFLS3 focused on the original sample. The most

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3The source of the information for this section is: Strauss, John, Firman Witoelar, Bondan Sikoki and Anna Marie Wattie. *The Fourth Wave of the Indonesia Family Life Survey: Overview and Field Report*. RAND Labor and Population Working Paper draft, Volume 1: April 2009.

recent round, IFLS4, was carried out on in 2007 and 2008 on the sample from 2000 with 13,535

households interviewed. IFLS4 sought to interview the original 1993 households as well as

households created by splitting off from households in the original sample. The re-contact rate

for the IFLS is fairly high, particularly for a developing country survey. In the IFLS4, used as the

primary data source for the research presented here, 93.6% of the original households or split-off

households from IFLS1 were re-surveyed.

For the original survey, IFLS1, the sample was stratified on provinces and rural and

urban locations. The thirteen provinces[4] represented contain 83% of the total population, and

were chosen in order to maximize the representativeness of the survey. In addition, these

provinces were chosen based on the cost-effectiveness of survey administration in these

locations. Within the provinces, enumeration areas with nationally representative samples were

randomly chosen with households randomly selected from within those enumeration areas.

Households were defined as "a group of people whose members reside in the same dwelling and

share food from the same cooking pot,"[5] the same definition used by the Indonesian Central

Bureau of Statistics (BPS) (Strauss et al. 2009).

The IFLS is a long and complicated survey, and there are several ways that one could

define the concept of migration using the IFLS. For this research, a migrant was defined as a

household member who had spent more than six months outside of the Desa or Kelurahan (town

or village) of their household from 2000 to 2008. Therefore, a migrant in 2008 spent more than

4 Sumatra (North Sumatra, West Sumatra, South Sumatra and Lampung), Java (DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java), from the remaining major island groups (Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi)

5 Strauss, John, Firman Witoelar, Bondan Sikoki and Anna Marie Wattie. *The Fourth Wave of the Indonesia Family Life Survey: Overview and Field Report*. RAND Labor and Population Working Paper draft, Volume 1: April 2009, page 4.

six months outside of his or her Desa or Kelurahan on at least one occasion between 2000 and 2008. A migrant household was defined as a household in which one or more members had spent more than six months outside of his or her Desa or Kelurahan between 2000 and 2008. In this regard, this definition of migration refers to seasonal migration as opposed to permanent migration.

Method of Analysis

Ordinary least squares (OLS) regression is used to determine the effects of migrant household status on household education expenditures. To determine whether belonging to a migrant household affects educational attainment, a linear probability model is used because educational attainment is considered to be a binary variable (i.e. did the student attend senior secondary school or not). Logit or probit models are not as useful in this scenario since they require one to assume that the standard errors are distributed by the normal or extreme value distributions, respectively, which is highly unlikely to be the case.

Using an OLS model ignores the likely endogeneity bias that results from the positive selection of migrants. Migrants observably tend to be better educated, and are less likely to come from poor households. Due to the endogeneity issues surrounding the inherent and unobservable differences between migrants and non-migrants, a method developed by Altonji, Elder and Taber (2005) was used to account for the endogeneity of migration. This method effectively measures how strong the relationship between unobservables and outcomes of interest would need to be to explain the coefficient that was estimated.

Descriptive Statistics

Individual level data was used to analyze education decisions and household level data

was used to analyze household education expenditures. Further, education among children and

adults is measured as the highest level of education completed by the individual on a scale of 0-5

as follows: 0-no schooling, 1-kindergarten, 2-elementary school, 3-junior secondary school,

4-senior secondary school, and 5-college/university.

The sample was restricted to households with children under the age of twenty-three, but

older than age three. Restricting the data to only households with children between ages of four

to twenty-two ensures that households with no children, or children too young or too old to

attend school, are not included in the analysis of household education expenditures. The analysis

of kindergarten attendance was restricted to children ages four to six because those are the ages

at which a child is eligible to attend kindergarten.

For the analysis of the senior secondary school attendance, the sample was restricted to

children ages fifteen to twenty-two because individuals in that age range are either attending

senior secondary school or had the possibility to attend; the decision to attend senior secondary

school is made around age fifteen. Older individuals up to age twenty-two are included because a

twenty-two year-old in 2008 would have been fourteen years-old in the 2000, the starting year of

the IFLS4. Thus, if a member of their household was a migrant between 2000 and 2008, a

teenager's decision to attend senior secondary school could have been affected by one or more of

their household members migrating for work.

Table 1 shows the number of migrant and non-migrant households in 2008. For this sample, 20% of households are migrant households and 19% of individuals live in migrant households.

Table 1: Household Observations for Migrant and Non-Migrant Households

	Migrant	Non-Migrant	Total
Households 2008	1,757	6,948	8,705

As shown in Table 2, migrants tend to be younger than the average adult population, and have slightly more education. Male migrants are somewhat older, on average, than female migrants. However, educational attainment is the same for both genders with migrants being relatively more educated than non-migrants.

Table 2: Characteristics of Migrants from 2000-2008

	Total Adult Sample	All Migrants	Male Migrant	Female Migrant
Mean Age	35.8	31.5	33.1	29.7
	(11.9)	(10.5)	(10.8)	(9.87)
No Education	4.4%	2.2%	2.0%	2.3%
Elementary Education	36.2%	28.7%	28.6%	28.9%
Junior Secondary School	18.3%	20.0%	19.8%	20.2%
Senior Secondary School	28.6%	35.9%	36.0%	35.7%
College/University	12.6%	13.2%	13.5%	12.9%
Observations	29,819	2,213	1,174	1,039

Note: All Adults includes all individuals age eighteen or older. Standard deviations are in parentheses. Migrants are defined as individuals who spent more than 6 months outside of their Desa or Kelurahan (town or village) on at least one occasions prior to the survey.

As shown in Tables 3 and 4, migrant and non-migrant households in 2008 were quite similar, although the mean age of a migrant household was slightly lower than the mean age of a

non-migrant household. Migrant households seem to have parents with slightly higher educational attainment than non-migrant households, and have slightly larger households than non-migrant households. Finally, household education expenditures are slightly lower in migrant households than non-migrant households.

Table 3: Characteristics of Migrant and Non-Migrant Households in 2008

Individual-Level	Migrant Household	Non-Migrant Household
Mean Age	27.6	29.3
	(15.0)	(15.4)
Observations	7,870	33,282

Household-Level	Migrant Household	Non-Migrant Household
Mean HH Size	4.62	4.47
	(1.71)	(1.61)
Mean Total Education Expenditures (in rupiah)	134,329	151,096
	(248,683)	(249,911)
Proportion Urban	0.51	0.52
	(0.50)	(0.50)
Observations	1,757	6,948

Note: Standard deviations are in parentheses. Migrant households are defined as households where one or more individuals spent more than six months outside of their Desa or Kelurahan (town or village) on at least on occasion prior to the survey.

Table 4: Parental Education Levels of Migrant and Non-Migrant Households in 2008

Father Education Level	Migrant Household	Non-Migrant Household
No Education	3.9%	5.6%
Elementary Education	38.4%	44.9%
Junior Secondary School	17.0%	15.5%
Senior Secondary School	29.6%	23.2%
College/University	11.2%	10.8%
Observations	6,000	1,613

Mother Education Level	Migrant Household	Non-Migrant Household
No Education	7.0%	10.6%
Elementary Education	41.3%	49.0%
Junior Secondary School	21.1%	16.0%
Senior Secondary School	22.4%	17.8%
College/University	8.2%	6.6%
Observations	7,162	1,785

Since kindergarten, like senior secondary school, is non-compulsory, migrant households with remittance income may be more likely to send their children to kindergarten than non-migrant households, which may have fewer resources. This is essentially the "income" effect of belonging to a migrant household, as discussed previously. Table 5 shows the percentage of children ages four to six in kindergarten. The percentages are very similar for migrant and non-migrant households with the exception of six year-olds. The percentage of six year-olds from migrant households in kindergarten is 73.5%, whereas the percentage of six year-olds from non-migrant households in kindergarten is 67.1%. The t-statistic associated with the hypothesis test that the percent of children in kindergarten was the same across the two groups[6] revealed the

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[6] The p-value for the t-test of proportion was 0.2334.

difference in the percentage of six year-olds from migrant households in kindergarten, as compared to those from non-migrant households, is not statistically significantly different.

Table 5: Children Ages 4-6 in Kindergarten in Migrant and Non-Migrant Households

	Migrant Household	Non-Migrant Household
Age 4		
Kindergarten	23	42
No Kindergarten	237	558
Percent in Kindergarten	8.8%	7.0%
Observations	260	600
Age 5		
Kindergarten	67	143
No Kindergarten	183	393
Percent in Kindergarten	26.8%	26.7%
Observations	250	536
Age 6		
Kindergarten	133	427
No Kindergarten	48	209
Percent in Kindergarten	73.5%	67.1%
Observations	181	636

As shown in Table 6, the percentage of children in migrant households with a senior secondary school education is slightly higher than for non-migrant households.

Table 6: Percentage of Children 15-22 by Education Level in Migrant and Non-Migrant Households in 2008

	Migrant Household	Non-Migrant Household
No Education	0.5%	0.8%
Elementary Education	17.3%	17.9%
Junior Secondary School	25.2%	26.2%
Senior Secondary School	47.0%	44.4%
College/University	10.2%	10.8%
Observations	1,251	4,709

<u>Regression Results</u>

       The results from an OLS regression model on the effect of migrant household status on the log of household educational expenditures are presented in Table 7. (The results of regressions on actual household educational expenditures and the percentage of total household expenditures spent on education can be found in the Appendix, Table 1 and Table 2.) Simply regressing the migrant household dummy variable on the log of household education expenditures yielded a statistically significant effect, with migrant household status decreasing household education expenditures by 7.3%. As more explanatory variables were controlled for, the effect of migrant household status increased, with migrant household status decreasing household expenditures on education by 11.4%.

Table 7: The Effect of Residing in a Migrant Household on the Log of Household Educational Expenditures

Variable	(1)	(2)	(3)	(4)	(5)	(6)
R-squared	0.0007	0.0610	0.0858	0.1401	0.1665	0.2697
Sample Size	6,033	6,033	6,033	6,033	6,033	6,033
Migrant Household	-0.073	-0.116	-0.125	-0.113	-0.135	-0.114
	[0.035]**	[0.001]***	[0.000]***	[0.001]***	[0.000]***	[0.000]***
Father Education		0.180	0.107	0.072	0.078	0.059
		[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Mother Education			0.157	0.112	0.127	0.095
			[0.000]***	[0.000]***	[0.000]***	[0.000]***
Urban Dummy				0.522	0.503	0.267
				[0.000]***	[0.000]***	[0.000]***
Household Size					0.108	0.105
					[0.000]***	[0.000]***
Kabupaten Dummy Variables [1]						Yes

Note: P-values are in parentheses.

A single asterisk denotes significance at the 10% level. A double asterisk denotes significance at the 5% level. A triple asterisk denotes significance at the 1% level.

[1] A Kabupaten is a level of government administration similar to a regency or city. A Kabutpaten is further divided into Kecamatans, which are sub-districts within a regency or city.

The primary dependent variable of interest in the linear probability model results presented in Table 8 was the probability that a child between ages four and six attended kindergarten. As stated previously, it is important to distinguish any possible effect of belonging to a migrant household on kindergarten attendance since kindergarten is non-compulsory in Indonesia. The effect of belonging to a migrant household was only significant on the probability of attending kindergarten when Kabupaten[7] dummies were included. Specifically, belonging to a migrant household increased the likelihood that a child attended kindergarten by 3% at the 10%

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[7] A Kabupaten is a level of government administration similar to a regency or city. A Kabupaten is further divided into Kecamatans, which are sub-districts within a regency or city.

significance level. Also, when the Kabupaten dummies were included, the education of the father became significant.

When only six year-olds were considered, belonging to a migrant household increased the likelihood that a child attended kindergarten by 7.8% and was significant at the 5% level. There were no gender differences between the effects.

Table 8: Effect of Residing in a Migrant Household on the Probability of Attending Kindergarten (Ages 4-6)

									Only Age 6
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
R-squared	0.0003	0.0041	0.0041	0.0066	0.0082	0.0111	0.2046	0.3358	0.3941
Sample Size	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,427	804
Migrant Household	0.013	0.013	0.007	0.005	0.005	0.000	0.006	0.031	0.078
	[0.435]	[0.434]	[0.687]	[0.761]	[0.766]	[0.984]	[0.713]	[0.069]*	[0.028]**
Male Dummy		-0.002	-0.002	-0.002	-0.002	-0.004	-0.007	-0.016	0.042
		[0.891]	[0.884]	[0.869]	[0.886]	[0.806]	[0.638]	[0.252]	[0.131]
Father Education			0.017	0.008	0.006	0.008	0.008	0.014	0.026
			[0.003]***	[0.219]	[0.346]	[0.198]	[0.218]	[0.030]**	[0.047]**
Mother Education				0.018	0.015	0.013	0.009	0.006	-0.014
				[0.008]***	[0.032]**	[0.069]	[0.219]	[0.404]	[0.371]
Urban Dummy					0.031	0.033	0.025	0.006	0.072
					[0.043]**	[0.031]**	[0.106]	[0.793]	[0.118]
Household Size						-0.013	-0.018	-0.005	0.002
						[0.000]***	[0.000]***	[0.256]	[0.812]
Household Education Expenditures							8.78E-08	8.57E-08	5.38E-08
							[0.030]**	[0.026]**	[0.378]
Kabupaten Dummy Variables [1]								Yes	Yes

Note: P-values are in parantheses.

A single asterisk denotes significance at the 10% level. A double asterisk denotes significance at the 5% level. A triple asterisk denotes significance at the 1% level.

[1] A Kabupaten is a level of government administration similar to a regency or city. A Kabutpaten is further divided into Kecama tans, which are sub-districts within a regency or city.

The primary dependent variable of interest in the linear probability model results presented in Table 9 was senior secondary school attendance since senior secondary school is non-compulsory in Indonesia; students begin senior secondary school at approximately age fifteen. Several control variables were used, including parental education levels and household educational expenditures. Whether a child belonged to a migrant household did not affect the

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probability that he or she attended senior secondary school except when household location dummy variables for the Kabupaten were included. When location dummies were added, belonging to a migrant household increased that probability that a child would attend senior secondary school by 2.5% at the 10% significance level. The male dummy also became significant at the 10% level when location dummies were added. With location dummies included, boys were 1.9% less likely to attend senior secondary school.

As expected, parental education, in particular the mother's education, had the largest influence on whether a child attended senior secondary school. The more education a child's mother achieved increased the probability of that child attending senior secondary school by approximately 7-10%; the father's education only increased the probability by approximately 4-5% when mother's education was included.

Table 9: Effect of Residing in a Migrant Household on the Probability of Attending Senior Secondary School (Ages 15-22)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R-squared	0.0002	0.0003	0.1009	0.1587	0.1808	0.1828	0.2046	0.2990
Sample Size	5,960	5,960	5,960	5,960	5,960	5,957	5,664	5,664
Migrant Household	0.019	0.019	0.003	0.001	0.011	0.016	0.023	0.025
	[0.232]	[0.234]	[0.848]	[0.940]	[0.456]	[0.266]	[0.115]	[0.089]*
Male Dummy		-0.009	-0.009	-0.011	-0.016	-0.015	-0.013	-0.019
		[0.482]	[0.437]	[0.350]	[0.177]	[0.197]	[0.282]	[0.092]*
Father Education			0.107	0.058	0.051	0.053	0.042	0.038
			[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Mother Education				0.109	0.096	0.095	0.081	0.065
				[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Urban Dummy					0.156	0.158	0.123	0.109
					[0.000]***	[0.000]***	[0.000]***	[0.000]***
Household Size						-0.011	-0.017	-0.018
						[0.000]***	[0.000]***	[0.000]***
Household Education Expenditures							0.00000029	0.000000268
							[0.000]***	[0.000]***
Kabupaten Dummy Variables [1]								Yes

Note: P-values are in parantheses.

A single asterisk denotes significance at the 10% level. A double asterisk denotes significance at the 5% level. A triple asterisk denotes significance at the 1% level.

[1] A Kabupaten is a level of government administration similar to a regency or city. A Kabutpaten is further divided into Kecama tans, which are sub-districts within a regency or city.

Since migration is an endogenous process, the Altonji-Elder-Taber strategy was used to explore how the endogeneity of migration might affect the results above. This method was developed with the assumption that selection based on observed explanatory variables provides some information on the selection based on unobservable characteristics in a particular model. Essentially, the Altonji-Elder-Taber method measures how much the omitted variable bias would need to be to explain away a statistically significant coefficient, relative to the variation explained by variables included in the model. For example, if the Altonji-Elder-Taber statistic was 3, the amount of variation remaining in the unobservables would have to be three times the

variation explained by the observable variables in a regression to explain away the entire coefficient.

The Altonji-Elder-Taber statistic for the regression of the log of household educational expenditures on migrant household status was 13.94; this suggests that the amount of variation remaining in the unobservables would have to be almost 14 times that explained by the observable variables in the regression to explain away the statistically significant result. Although Altonji et al. suggest that a statistic above 1 would be hard to explain because it is unlikely that so many explanatory variables of interest would be left out of a regression by a researcher, the fact that there are likely to be so many variables, at both the household and individual levels, that impact educational expenditures, the high Altonji-Elder-Taber statistic is not necessarily surprising.

For the regression of kindergarten attendance on migrant household status for six year-olds, the Altonji-Elder-Taber statistic was 0.89; thus, the amount of variation remaining in the unobservables would have to be about the same as that explained by the observable variables in the regression to explain away the statistically significant result. For the probit model on only six year-olds, the Altonji-Elder-Taber statistic was 7.50. Although this statistic is very high, it does seem possible that the unobservables not included in the regression such as individual level characteristics of parents and access to kindergarten, for example, could contain 7 times the variation of the observables which would explain away the statistically significant result. For the regression of senior secondary school attendance on migrant household status for fifteen to twenty-two year-olds, the Altonji-Elder-Taber statistic was 0.56; thus, the amount of variation

remaining in the unobservables would have to be about half as much as that explained by the observable variables in the regression to explain away the statistically significant result.

Overall, the Altonji-Elder-Taber statistics provide some evidence that the statistically significant results of this analysis are robust, yet may still suffer from a certain degree of omitted variable bias that would be extremely difficult to mitigate and is likely to be present in similar analyses due to the nature of the unobservables.

DISCUSSION

Contrary to findings of related migration research, Indonesian migrant households reported spending less on education than non-migrant households. Regarding the affect of belonging to a migrant household on the probability of attending kindergarten, six year-old children in migrant households were nearly 8% more likely to attend kindergarten than six year-old children in non-migrant households. Similarly, it was hypothesized that senior secondary school aged children of migrants may be less likely to attend senior secondary school than children from non-migrant households. A small positive relationship was found whereby belonging to a migrant household increased the probability that a child would attend senior secondary school by 2.5%; however, there was a negative effect for boys. Still, factors such as parental education levels have a greater effect on the probability that a child attends senior secondary school than whether a household contains a migrant.

There are some significant limitations regarding these findings. The foremost limitation is the difficulty in controlling for the inherent endogeneity of migrant status; an individual's decision to migrate points to a clear, yet unknown, difference between that individual and a non-migrant individual. This research does not address these unobservable differences between

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migrant and non-migrant households. Some literature has sought to control for this endogeneity through the use of fixed effect models or instrumental variables, but results have been mixed. It is extremely difficult to find credible instrumental variables to mitigate the effects of unobservables.

Future research should attempt to determine why migrant households appear to spend less on education than non-migrant households. Additional research should examine the possible effects of belonging to a migrant household on a child's academic performance in school, and whether children of migrant households are more likely to work while in school. Policymakers could utilize these findings to promote more desirable spending habits, particularly if migrant households are found to spend a larger portion of their disposable income on consumption, rather than education or increased savings. Future policy research could also focus on encouraging teenage boys, who are less likely to attend senior secondary school, to continue their education. There are still many unanswered questions related to migration decisions and educational attainment in Indonesia, but continued research and data collection will broaden the understanding of these complex issues.

Appendix Table 1: Effect of Residing in a Migrant Household on Household Educational Expenditures

Variable	(1)	(2)	(3)	(4)	(5)	(6)
R-squared	0.0006	0.0609	0.0807	0.0988	0.1320	0.1809
Sample Size	8,349	8,349	8,349	8,349	8,349	8,349
Migrant Household	-14,095	-27,686	-31,598	-29,641	-34,926	-30,881
	[0.030]**	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Father Education		39,966	25,879	23,226	18,341	16,878
		[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Mother Education			30,892	25,136	27,309	23,754
			[0.000]***	[0.000]***	[0.000]***	[0.000]***
Urban Dummy				68,203	65,564	27,925
				[0.000]***	[0.000]***	[0.000]***
Household Size					26,394	27,145
					[0.000]***	[0.000]***
Kabupaten Dummy Variables [1]						Yes

Note: P-values are in parantheses.

A single asterisk denotes significance at the 10% level. A double asterisk denotes significance at the 5% level. A triple asterisk denotes significance at the 1% level.

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Appendix Table 2: Effect of Residing in a Migrant Household on the Percentage of Household Expenditures on Education

Variable	(1)	(2)	(3)	(4)	(5)	(7)
R-squared	0.0033	0.0166	0.0203	0.0269	0.0566	0.1094
Sample Size	8,154	8,154	8,154	8,154	8,154	8,154
Migrant Household	-0.010	-0.012	-0.012	-0.012	-0.014	-0.011
	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Father Education		0.005	0.004	0.003	0.002	0.002
		[0.000]***	[0.000]***	[0.000]***	[0.003]***	[0.009]***
Mother Education			0.004	0.003	0.004	0.003
			[0.000]***	[0.000]***	[0.000]***	[0.000]***
Urban Dummy				0.012	0.011	0.006
				[0.000]***	[0.000]***	[0.005]***
Household Size					0.007	0.008
					[0.000]***	[0.000]***
Kabupaten Dummy Variables [1]						Yes

Note: P-values are in parantheses.

A single asterisk denotes significance at the 10% level. A double asterisk denotes significance at the 5% level. A triple asterisk denotes significance at the 1% level.

[1] A Kabupaten is a level of government administration similar to a regency or city. A Kabutpaten is further divided into Kecama tans, which are sub-districts within a regency or city.

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