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## The children are alright: Revisiting the impact of parental migration in the Philippines

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**The children are alright: Revisiting the impact of parental migration in the Philippines**

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## **The children are all right: Revisiting the impact of parental migration in the Philippines**

### **Abstract**

The Philippine government has focused most of its migration policy initiatives to encouraging international labour migration and protecting the rights of Filipino migrant workers. However, government interventions and aids to left-behind families and children left much to be desired. This paper aims to provide a better understanding of the impact of parental migration on the welfare of left-behind children in the Philippines so that policies can be devised to support them. This study's analytical methods (instrumental variable analysis and propensity score matching) enable it to address several issues in migration research including endogeneity, migrant selectivity and community (regional) context, using previously unexamined nationally representative data from the Philippines. Our results suggest an overall positive impact on education, work, and temper of left-behind children. However, they tend to be more physically sickly. This warrants government attention to preclude any long-term negative health effects.

*Keywords: Parental Migration, Children's Welfare, Instrumental Variable, PSM*

## INTRODUCTION

For the past four decades, there has been growth in the number of Filipino migrant workers leaving the country in search of better job opportunities and higher income. In 2017, the International Organization for Migration (IOM) ranked the Philippines as ninth in total number of international migrants (about 5.7 million; IOM, 2017). Temporary migrant workers, commonly known as Overseas Filipino Workers (OFWs), constitute about half of this international migration. OFWs have families back home that depend on their income, and they have often been credited for facilitating the growth of the Philippine economy over the past years. The government plays an important role in promoting labour exports, which led to an increase in the length of overseas contract working periods, causing migrants to spend even more time abroad. The results of such heavy labour migration likely include changes in household roles and composition. The net effects of this on Filipino families, however, remain ambiguous.

Although Philippine migration policies that promote and protect Filipino migrant workers have evolved over time, policies concerning the welfare of left-behind families and children leave a lot to be desired. One of the reasons for this seemingly lack of government attention is that there are only a few empirical studies that have investigated the impact of parental migration on left-behind children. More research, particularly a comprehensive and robust research, is needed to assist policymakers in identifying and implementing policies that provide services and aid to left-behind children. Another reason is that the Philippine government has focused most of its policy efforts to promoting the welfare of Filipino migrant workers (from ensuring an efficient recruitment process to protecting their rights) and not explicitly to addressing the many needs (psychosocial, health, and nutritional needs, for example) of left-behind children.

This paper aims to help the Philippine government understand more the impact of parental migration on the welfare of left-behind children so it can devise interventions to support these young people.

Households with migrant parents may allocate remittances to benefit children's welfare. For example, children with migrant parents have been shown to stay longer and perform better in school, including in the Philippines, Mexico, China and Nepal (Arguillas & Williams, 2010; Antman, 2012; Asis & Ruiz-Marave, 2013; Hu, 2013; Acharya & Leon-Gonzales, 2014). However, other studies have found that children of migrants have higher dropout rates because of social problems and increased household responsibilities, including in Mexico and Caribbean states (Bakker et al., 2009; McKenzie & Rapoport, 2011).

In terms of health, children of migrants in the Philippines, Romania and Sri Lanka have been shown to suffer nutritional deficiencies and emotional distress (Smeekens et al., 2012; Botezat & Pfeiffer, 2014; Wickramage et al., 2015). However, other studies have reported that in Indonesia, the Philippines, Thailand and Vietnam, migration does not have significant negative effects on children's health (Battistella & Conaco, 1998; Graham & Jordan, 2011).

The contradictory results of these studies suggest two possible, opposing effects of parental migration on the welfare of left-behind children: living in a migrant household may be detrimental to a child's welfare due to the lack of parental involvement; however, the contribution of remittances might compensate for the parent's absence to some extent by increasing the household's income. The differences in results might also be attributable to several other factors: country-specific differences, identification methods and types of data.

This study examines the effects of parental migration on the welfare of the children the migrants leave behind in the Philippines. We aim to contribute to the existing literature on parental

migration and the welfare of left-behind children in the following ways. First, the analysis includes detailed measures of the welfare of left-behind children using new nationwide survey data from the Philippines (Survey on Children [SOC], 2011) that, to the best of our knowledge, has not been used for such a study before. We use eight different measures of welfare outcomes: four measures of educational outcomes (current grade level measured as a continuous variable and as a categorical variable, probability of having poor grades and probability of having good study habits), two measures of health outcomes (physical and psychological) and two measures of labour outcomes (probability of the child having worked in the past week and in the past year).

Second, this paper aims to identify the impact of parental migration on the welfare of children by properly addressing identification issues commonly faced in migration studies: endogeneity, migrant selectivity and community (regional) context. To address endogeneity, we use historical regional migration rate as the instrumental variable, following prior studies that argue that earlier migration helps develop networks that make it easier for others to migrate later (McKenzie & Rapoport, 2011; Hu, 2013; Botezat & Pfeiffer, 2014). It is imperative to properly identify the impact of migration on the welfare of children since migration itself is endogenous and is affected by other factors; otherwise, the results may lead to biased and inconsistent estimates. A few studies have used migration rates as an instrumental variable to account for networks that affect current migration (McKenzie & Rapoport, 2011; Hu, 2013; Acharya & Leon-Gonzales, 2014), but others either have focused on descriptive analysis or have not addressed endogeneity. We used an instrumental variable (IV) analysis (treatment effects and bivariate probit), propensity score matching (PSM) and combined PSM-IV, and we compare the results with those of ordinary least squares (OLS), multinomial logit and probit regressions. To address regional context, we include different regional variables; and to account for migrant selectivity,

we consider different household wealth indicators and demographic characteristics of the household to proxy for the choices of migrants.

Third, the study examines possible heterogeneity in the impact of parental migration on children's welfare conditional on the gender of the left-behind children.

The results support the existing literature that shows a positive impact of parental migration on the welfare of left-behind children, with caveats. For the period studied, children of migrant parents had higher current grade levels, lower probability of poor grades, higher probability of studying regularly, less probability of being perceived as temperamental and less likelihood of having worked in the past week and past year compared to children of non-migrant parents. The results for education (current grade and poor grades) and labour of children are robust across different econometric specifications and historical migration rates (year 1989 or 2003). We conjecture that the children of migrant parents are better off compared to the children of non-migrant parents due to the income effect brought about by parental migration. Remittances augment (and in some cases are the primary or only source of) household income and mitigate or eliminate household credit and liquidity constraints, allowing the left-behind children to enroll in school, avoid working and stay healthy.

We also find that children of migrant parents are marginally more likely to be perceived as sickly (physically) compared to their counterparts. This difference could be explained by cognitive stress theory if we consider parental migration/absence to be a source of stress for children that can lead to loneliness and adverse health outcomes (Lazarus & Folkman, 1984; Brodzinsky et al., 1992; Reyes, 2008; Folkman, 2011; Smeekens et al., 2012). According to the theory, these negative outcomes would manifest if the children react to the stress by cognitive avoidance or isolating themselves.

Heterogeneity in the impact of parental migration on children's welfare also exists: although both the daughters and sons of migrants have better study habits, left-behind boys are more likely to have good study habits compared to left-behind girls, although the difference is small (4%). While this result is consistent with some of the existing literature, it reveals only part of the story on gender's role in the differential impact of parental migration, as other studies have reported effects of the gender of the left-behind parent (or the migrant parent) in addition to the gender of the left-behind child (Battistella & Conaco, 1998; Graham & Jordan, 2011; Antman, 2012; Hu, 2013).

### LABOUR MIGRATION: THE FILIPINO CASE

According to Asis (2006), who described the Philippine diaspora extensively, labour export started when Filipinos migrated to Hawai'i in 1906 to work on sugarcane and pineapple plantations. However, significant emigration did not begin until the 1970s, and was due to the adverse economic conditions in the Philippines at the time. Both "push" factors – oil crisis, unemployment, low wages and balance of payment problems in the Philippines – and "pull" factors – the increase in demand for workers in the oil-rich Gulf region and aging countries – have since been inducing Filipinos to migrate either temporarily or permanently.

Over the years, there has been a steady increase of the temporary migrant workers known as Overseas Filipino Workers or OFWs (Figure 1), who are mostly Overseas Contract Workers (OCWs) whose contract duration can range from six months (e.g., seafarers) to two years. When contracts are renewed or OFWs move to new employers, they may stay abroad even longer. This translates to longer periods of separation, which may reach decades, from their children and families left behind in the Philippines. For example, in 2000, Filipino parents working overseas

had left behind about 5.85 million children aged 0–17, which was about 20 per cent of the 33 million Filipino children at the time (Bryant, 2005). These children were mostly left in the care of a left-behind spouse or other relatives of the migrants.

<Figure 1 here>

In 2017, the Survey on Overseas Filipinos (SOF) reported that there were about 2.3 million documented OFWs, about 98 per cent of whom were OCWs. More than half (about 54%) of these migrant workers were female who were younger on average than their male counterparts. The largest female migrant worker age group was 25 to 39 years (65%), while about 12.5% of them were aged 45 years and above. Male migrant workers were also mostly aged 25 to 39 years old (54%), with about 23% of them aged 45 years and above.

According to the 2017 SOF, Asian countries, particularly in the Middle East, were the leading destinations of both male and female OFWs: Saudi Arabia (25%), United Arab Emirates (15%), Kuwait (7%) and Qatar (5.5%). The type of work differed by sex (Figure 2). Male OFWs worked mostly as craft and trade workers, and plant and machine operators and assemblers (58%) while female workers mainly had “elementary occupations” (59%), including cleaning, household help, food preparation, and street and related sales.

<Figure 2 here>

The Philippines was ranked third in total remittances in 2015, next to India and China (Bangko Sentral ng Pilipinas, 2016; World Bank, 2016). In 2017, the World Bank reported that the inflows of remittances to the Philippines amounted to approximately 32 billion US dollars (10.5% of GDP), which made these transfers the second largest source of foreign exchange for the Philippines, next to exports of goods and services that amounted to 97 billion US dollars (31% of GDP; WB, 2017). The share of personal remittances to GDP, which is even higher than that of

foreign direct investments (3.2% of GDP in 2017), increased over time from less than 2 per cent in 1977 to about 10 per cent in 2017 (Figure 3). Data from the Family Income and Expenditure Survey (FIES) in the Philippines show that remittances constitute about 27 per cent of income of households with migrant members.

<Figure 3 here>

The Philippine government promotes and encourages labor migration and has labeled OFWs as new heroes especially since their remittances serve as the primary source of income for left-behind families and an important source of foreign reserves for the Philippines. Philippine Overseas Employment Administration (POEA), which was established by the Philippine government in 1982 through Presidential Decree 797, was initially mandated to promote the export of labor and to protect the rights of migrant workers. It is the main government agency that monitors and supervises recruitment agencies in the Philippines. Over the years, one Executive Order (247) and three Republic Acts (8042, 9422, and 10022) were passed to further protect the welfare and rights of OFWs.<sup>1</sup> The support for and protection of left-behind families are limited to family assistance loans during emergency and educational financial assistance to qualified dependents of OFWs who are active members of Overseas Workers Welfare Administration (OWWA).<sup>2</sup>

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<sup>1</sup> OFWs are only allowed to be deployed in countries where their rights are being protected.

<sup>2</sup> OWWA, which is formerly known as Welfare and Training Fund for Overseas Workers and organized in 1977, is a Philippine government agency attached to the Department of Labor and Employment (DOLE) mandated to promote the welfare of the OFWs and their families.

## CONCEPTUAL FRAMEWORK

There are two pathways by which parental migration can impact the welfare of children who are left behind in the origin country. The first is through the remittances sent, which increase the income of the household and improve the welfare outcomes of the children (Antman 2012; Hu 2013; Acharya and Leon-Gonzalez 2014; Pajaron 2016). Remittances augment the income of the receiving families (and in some cases are the only source of household income), allowing those with liquidity and credit constraints to enroll their children in school. Remittances also improve the socioeconomic status of receiving households, which can help protect children against negative health shocks.

The second way parental migration may affect the welfare (i.e., education and health status) of left-behind children is through parental absence acting as a stressor that has adverse effects on the children. Following Smeekens et al. (2012), we draw on cognitive stress theory to explain how a child's responses (coping mechanisms and appraisal processes) to a stressor (separation due to parental migration) can lead to negative health outcomes (in this case, physical and psychological health) (Lazarus and Folkman 1984; Folkman 2011) and poor academic performance and study habits (Brodzinsky et al. 1992). It is imperative to consider the cultural context in examining the responses of Filipino children to an absent parent. Figure 4 depicts how cultural characteristics are integrated into the appraisal process. Primary appraisal refers to the evaluation of children of an event, such as "missing the parent." Secondary appraisal pertains to coping strategies and how children address loneliness due to an absent parent.

<Insert Figure 4 here>

One coping style that has been found to have a negative impact on health is “avoidant coping” (Ruchkin, Eisenmann, and Hagglof 2000).<sup>3</sup> For left-behind children, an example of an avoidance-focused coping strategy would be attempting not to think of the migrant/absent parent. In the Philippines, with a culture oriented towards collectivism, it is not uncommon for adolescents to address stressful situations in a less direct way.<sup>4</sup> In the same vein, although social loneliness can be mitigated by a feeling of “togetherness” and the presence of other family members and friends, emotional loneliness can be harder to avoid or address, which then could lead to adverse health and behavioral outcomes, and poor academic performance (Brodzinsky et al. 1992; Reyes 2008; Smeekens et al. 2012).<sup>5</sup>

We construct a simple theoretical model to depict the impact of parental migration on the welfare of left-behind children in the Philippines. The household head is assumed to be altruistic, deriving utility from his/her own consumption and the human capital of his/her children. The household head then chooses the combination of goods, including the human capital investment options for the children, that maximizes his/her utility function. In effect, maximizing the utility function of the child increases that of the household head as well. Let  $i = 1, 2, \dots, N$  be the index of children and  $j = 1, 2$  be the welfare outcome of left-behind children (i.e., for health and education). Assuming additive and separable preferences subject to budget constraints, the household head

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<sup>3</sup> Cognitive avoidance includes any of the following: emotion management, cognitive redefinition, selective attention, and minimization of the problem. Some examples involve putting the problem out of one’s mind and pretending the problem does not exist (Brodzinsky et al. 1992).

<sup>4</sup> Chun et al. (2007, cited in Smeekens et al. 2012, 2255) differentiate individualism from collectivism: in cultures oriented towards individualism, the self is the main unit of society, while in cultures oriented towards collectivism, the ingroup is more important and is the central unit of society (i.e., the emphasis is on interdependence with other individuals within the group and fulfillment of social roles).

<sup>5</sup> Loneliness is categorized into emotional loneliness, defined as a response to the absence of a specific relationship with a specific person, and social loneliness, which is the absence of a social support network (Weiss 1973, as cited in Weiner 1975, 239).

chooses the best education and health options given the following:

$$\begin{aligned}
 \text{Max } U_i &= \sum_{j=1}^2 v_{ij}(x_{ij}) \\
 \text{s.t.} \\
 TC_i &= \sum_{j=1}^2 c_{ij} + k_i \\
 \sum_{j=1}^2 c_{ij} &\leq A_i
 \end{aligned} \tag{1}$$

where the individual subutility functions,  $v_{ij}(x_{ij})$ , are increasing and concave.  $TC_i$  is the total cost equal to the sum of financial costs ( $c_{ij}$ ) associated with schooling and good health, and non-pecuniary costs ( $k_i$ ). The total financial costs should be less than or equal to the total household wealth ( $A_i$ ).

We identify the following mechanisms by which parental migration can affect the education and health of left-behind children. The first is through remittances, which increase household income ( $A_i$ ) and improve the educational performance and health status of left-behind children, thereby increasing the utility of the household ( $U_i$ ). Following McKenzie and Rapoport (2011), remittances can relax or mitigate credit constraints experienced by households in the Philippines, thereby increasing the available resources for the improvement of the education and health of the children of international migrants.

Second, parental migration can adversely affect the education and health of children left behind in the Philippines as suggested by the cognitive stress theory, where the absence of at least one of the parents acts as a stressor: the children miss their parent and feel emotionally stressed or lonely, or avoid the problem altogether (Figure 4). When children fail to cope well with the stressful event, it can potentially lead them to perform poorly in school, behave temperamentally,

or become physically sick (Compas 1987; Brodzinsky et al. 1992; Compas et al. 2001). We consider such responses as an increase in the non-pecuniary cost of education and health of children, increasing  $k_i$ .

Third, it is possible that the positive income effect of parental migration makes it unnecessary for left-behind children to work to augment household income, allowing them to allocate their time to studying or staying healthy instead. In 2011, 12.4% (about 3.3 million) of the total population of children aged 5–17 in the Philippines were working, and about 2 million of these working children worked in hazardous environments while about 200,000 worked at night or for long hours (SOC 2011). We consider a decrease in labor of children as a decrease in the non-financial costs of the education and health of children, allowing the children to go to school, perform better academically, and be healthier, decreasing  $k_i$ .

## EMPRICIAL MODELS

Given the above conceptual framework, we estimate the following model to examine the impact of parental migration on children’s welfare:

$$Y_{ni} = \beta_0 + \beta_1 \text{childofmigrant}_i + \beta_2 X_i + \beta_3 R_{j, 2011} + u_i \quad (2)$$

where  $Y_{ni}$  is the  $n$ th child welfare outcome of parental migration on  $i$ th child and *childofmigrant* pertains to child of migrant (1 if the child has at least one migrant parent).

Child welfare outcomes ( $Y_{ni}$ ) are measured in eight different ways: (a) four educational outcomes, as a continuous variable (current grade level), as binary variables (indicator for poor grades and indicator for studying regularly) and as a categorical variable with four categories (no

grade completed, primary, secondary and tertiary); (b) two health outcomes – physical and psychological – as binary variables (indicators for whether the child is perceived to have poor health, and to have anger issues or to be temperamental); and (c) two labour outcomes as binary variables (indicators for whether the child had worked in the past week and in the past year).

We also identify other factors that could potentially impact the welfare of the children based on the literature surveyed and conditional on data availability. The impact of parental migration may depend on characteristics of the children such as sex, rank among his/her siblings and age. For example, in Mexico, left-behind boys had higher chances of migrating and dropping out in junior high school while girls had higher chances of dropping out in high school (McKenzie & Rapoport, 2011). In the Caribbean, younger siblings were more likely to drop out due to coping difficulties and increased fighting incidences in school, while older siblings were more likely to drop out due to the new household responsibilities they had to assume in the absence of their migrant parent (Bakker et al., 2009).

The characteristics of the household head also affect the welfare of children. For example, the positive impact of parental migration on the education of children in the Philippines is more pronounced in households where the father migrates while the mother stays at home (Battistella & Conaco, 1998; Asis & Ruiz-Marave, 2013). Socioeconomic characteristics of the household are also relevant. In Nepal, the migration of uneducated mothers and those from poor households actually resulted in higher child enrollment rates and educational investment (Acharya & Leon-Gonzales, 2014).

In equation (2) above, the characteristics of the children, households and household head are represented by  $X_i$ , which is a vector of control variables that affect child welfare outcomes including child's characteristics (sex, child's rank among his/her siblings and age), household's

characteristics (household head's sex, age, spouse's age and household size, location such as regions and urbanity, water and light sources, ownership of agricultural land, and average monthly gross income bracket).  $R_{j, 2011}$  pertains to a vector of 2011 regional infrastructure and income level (average annual household income, percentage of households that experienced hunger, number of schools and school attendance); and  $u$  is the error term.

Equation (2) is estimated using ordinary least squares or OLS for current grade level as a continuous variable, multinomial logit for current grade level as a categorical variable, and probit for the rest of the welfare outcomes measured as binary variables.<sup>6</sup>

### *Heterogeneity in the Impact of Parental Migration across Gender of Child*

To test whether there exists a differential impact of parental migration conditional on the gender of the child, an interaction of indicator for child of a migrant parent and indicator for gender of the child ( $childofmigrant_i * child'ssex_i$ ) is added to Equation (2); the other variables are similar to those in Equation (2):

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<sup>6</sup> For estimating the effect on current grade as a categorical variable, we use the following multinomial logistic regression model:

$$Logit(y=m) = \log\left(\frac{p(y=m)}{1-p=m}\right) = \delta_0 + \delta_1 childofmigrant + \delta_2 X_i + e_i, \quad m=1, 2, 3, 4$$

where  $y$  equals the four categories for the child's current grade level variable, and the category being tested is indicated by  $m$ . The base category used here is primary school, because the majority of our sample is in this group. In addition,  $childofmigrant$  is a dummy variable indicating whether or not a child has a migrant parent and  $X$  is the vector of controls.

For our binary outcomes, a simple linear probability model (LPM) would violate the assumptions of OLS, namely that error terms have equal variances for all  $X$ s and that error terms are normally distributed. Thus, in order to address this issue, a probit regression is included and is modeled as follows:

$$Pr(Y_{ni} = 1 | X) = G(y_0 + y_1 childofmigrant_i + y_n X_i)$$

$$s.t. G(z) = \Phi(z) = \int_{-\infty}^z \varphi(v) dv$$

where  $Y_{ni}$  represents child welfare outcome  $n$  of individual  $i$ ; and  $childofmigrant$  and  $X$  pertain to the variables described for Equation (2).  $G(z)$  is the standard normal cumulative distribution function.

$$Y_{ni} = \alpha_0 + \pi_1 \text{childofmigrant}_i + \pi_2 \text{child'ssex}_i + \pi_3 \text{childofmigrant}_i * \text{child'ssex}_i + \pi_4 X_i + \pi_5 R_{j,2011} + e_i \quad (3)$$

Equations (4–5) below depict the impact of parental migration on girls and on boys, respectively, while Equation (6) describes the heterogeneity in the impact of parental migration between these two groups:

$$\left. \frac{\partial Y_{ni}}{\partial \text{child\_Mig}} \right|_{\text{child'ssex}=0} = \pi_1 \quad (4)$$

$$\left. \frac{\partial Y_{ni}}{\partial \text{child\_Mig}} \right|_{\text{child'ssex}=1} = \pi_1 + \pi_3 \quad (5)$$

$$\left. \frac{\partial Y_{in}}{\partial \text{child\_Mig}} \right|_{\text{child'ssex}=1} - \left. \frac{\partial Y_{in}}{\partial \text{child\_Mig}} \right|_{\text{child'ssex}=0} = \pi_3 \quad (6)$$

#### IDENTIFICATION ISSUES: ENDOGENEITY OF PARENTAL MIGRATION

In the base model above (Equation 2), the assumption is that migrant and non-migrant households are similar in all observable and unobservable characteristics. However, it is likely that the decision to migrate is correlated with unobserved characteristics that affect the household's decision to invest in child welfare. For example, it is possible that parents migrate in order to be able to invest more in their children's education or health.

To avoid bias and overestimation of the effects of migration, we instrument for parental migration using historical regional migration rate (in 2003) because this variable reflects regional migration networks, which facilitate current parental migration by making it more convenient and

less costly (McKenzie & Rapoport, 2011; Hu, 2013; Botezat & Pfeiffer, 2014). We chose the year 2003 for two reasons: first, the supply of migrants from the Philippines started to dramatically increase from this year, making it a turning point in outmigration (Figure 1 above). Second, the value of the Philippine peso against the US dollar was at its lowest around this period (Figure 5), thereby increasing the amount of remittances received by households and pulling Filipinos either to work or stay abroad.

< Figure 5 here >

Two conditions must be satisfied to ensure the validity of this instrumental variable (IV): it should be partially correlated to parental migration; and it should be uncorrelated to the error term in Equation (2). Otherwise, we will have weak instruments, which could lead to substantial bias in the IV estimators and hypothesis tests with large size distortions (Stock & Yogo, 2002).

To test the first requirement, parental migration in 2011 is regressed on regional migration rate in 2003 while controlling for all other variables described in Equation (2). The results section below will detail the outcome of this regression.

Even if the historical migration rate is correlated with parental migration, there may be cases in which the 2003 migration rate directly affects the welfare of children in 2011, which would violate the second requirement for a valid IV. For example, it is possible that remittances sent by migrants in 2003 improved the infrastructure in a given region, affecting the health and education outcomes of children in 2011 through better health and public school systems. To account for this, we control for historical variables in 2003 that measure regional infrastructure and income level, discussed below.

Given the above requirements for valid IV, we estimate the following two-stage models using treatment effects for the continuous current grade level and bivariate probit for the rest of the binary outcome variables (poor grades, good study habits, being sickly and being temperamental, and indicators for whether the child had worked in the past week and in the past year):

$$childofmigrant_i = \theta_0 + \theta_1 M_{j,2003} + \theta_2 X_{i,2011} + \theta_3 R_{j,2011} + \theta_4 R_{j,2003} + \vartheta_i \quad (7)$$

$$Y_{ni} = \beta_0 + \beta_1 childofmigrant_i + \beta_0 X_i + \theta_3 R_{j,2011} + \theta_4 R_{j,2003} + \varepsilon_i \quad (8)$$

where  $childofmigrant_i$  is a discrete variable for whether the  $i$ th child has migrant parents,  $M_{j,2003}$  is the historical regional migration rate in 2003 computed as the ratio of the total regional number of migrants relative to the total population per region  $j$  and  $R_{j,2003}$  pertains to historic regional variables in 2003, which include the following: (a) for education, we use total number of schools per 1,000 population, elementary school participation rate and secondary school participation rate; (b) for health, we use total number of hospitals per 1,000 population; and (c) for regional income level, we use average annual household income, Gini concentration ratios, poverty incidence among families, labour force participation rate and telephone and road density. The rest of the variables are similar to those described in Equation (2) above.

#### Propensity score matching (PSM)

As mentioned above, it is possible that those who migrate are those who value their children's welfare more, resulting in a self-selection bias. Another potential solution is the use of propensity score matching (PSM), which compares two groups, the treatment group (children of

migrant parents) and the control group (children of non-migrant parents). PSM has been used to estimate causal treatment effects under certain assumptions. The first assumption is unconfoundedness, which implies that any systematic differences in outcomes between these two groups can only be attributed to parental migration, which we consider as the treatment, given the same values for the observable covariates (Imbens, 2004; Caliendo & Kopeinig, 2008; Stuart, 2010; Bloom et al., 2012). Another is that assignment to the group is random. Ideally, in a randomized controlled experiment, the treatment (parental migration) is random and the selection for treatment is uncorrelated to the potential outcomes with and without treatment. But even in the case of a non-randomized study, if it is controlled for properly, then causal effect can be estimated as in a randomized controlled experiment (Rubin, 1974; Rosenbaum & Rubin, 1983). In summary, regardless of whether it is done in a randomized experiment or a non-experimental study, the estimation of causal effects essentially relies on the comparison of potential outcomes assuming that the only difference between the treated and controlled groups is the treatment.

More technically, PSM is a matching method that uses propensity scores to match migrant households with non-migrant households using observed characteristics (Bloom et al. 2012; Imai and Azam 2012). As suggested by Rosenbaum and Rubin (1983), instead of matching each child of a migrant with a control child, which could be difficult given the sample size and the need for simultaneous matching on every dimension, matching based on “propensity score” or the probability that a child has migrant parents, given observable characteristics, will suffice. The propensity score is derived from probit analysis to determine the factors that impact the probability of parental migration and hence, of being a child of a migrant (Equation 9 below).<sup>7</sup>

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<sup>7</sup> Any discrete choice model can be used to estimate propensity scores, with a preference for logit or probit models, which usually provide similar results (Caliendo and Kopeinig 2008).

$$Pr(\text{childofmigrant}=1 | X) = G(\omega_0 + \omega_n X) \quad (9)$$

$$s.t. G(z) = \Phi(z) = \int_{-\infty}^z \varphi(v) dv$$

In equation (9), PSM requires that covariates  $X$ , which encompass all the independent variables described in Equation (7), be not affected by the probability that a child is a left-behind child.

In effect, PSM constructs a counterfactual by matching observations based on their propensity scores (derived in Equation 9) or the probability that a child would have been a child of a migrant based on a given a set of characteristics. Children are then paired based on their propensity scores, and average treatment effects are calculated from the average of the differences between the outcomes of matched children. The PSM approach assumes that after matching on all observable household, child, and regional characteristics, assignment to the treatment (children of migrant parents) or control group (children of non-migrant parents) is random. The average outcomes for children in the treatment group are compared with those for the matched controls.

#### *PSM-IV*

The estimation of treatment effects using PSM, assuming unconfoundedness, can obtain consistent and sometimes efficient estimates; however, combining estimation methods can mitigate or eliminate remaining bias (Abadie 2003; Imbens 2004; Caliendo and Kopeinig 2008; Imai and Azam 2012). In this regard, we also perform an instrumental variable (IV) combined with PSM (Abadie 2003; Caliendo and Kopeinig 2008; Dey and Imai 2015).

In addition to the unconfoundedness assumption, in non-experimental studies, the overlap (common support) assumption is also invoked to address selection problems.<sup>8</sup> The overlap assumption ensures that children with the same covariates have a positive probability of being in both treated and controlled groups or alternatively, that the control group is comparable with the treatment group (Caliendo and Kopeinig 2008). Using PSM (nearest neighbor matching method), we identified the common support and those observations whose propensity scores lie outside the common support region are excluded from the dataset then we ran an instrumental variable (IV) regression.

## DATA DESCRIPTION

We primarily use the 2011 Survey on Children (SOC), which is a nationwide survey that gathers information about children (5–17 years old) to better understand their activities, labour force participation and working conditions in the Philippines. The 2011 SOC, as a rider to the October 2011 Labour Force Survey (LFS), is the third survey conducted since 1995 and is a joint project of the International Labour Organization (ILO) and the Philippine National Statistics Office (NSO). It is composed of two main questionnaires: SOC Form 1, which is the Household Questionnaire, and SOC Form 2, the Child Questionnaire, which focuses on child labour. This article uses the first questionnaire, which collected information on household characteristics (income level, migration status, resources and location) and child characteristics (educational characteristics, health and labour force participation). We derive the child of migrant indicator,

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<sup>8</sup> These two assumptions are also referred to as “strong ignorability” (Rosenbaum and Rubin 1983).

child welfare outcomes and socioeconomic characteristics of children and households from the 2011 SOC.

A total of 70,707 children were included in the analysis; about 3,234 of these children (4.6%) have migrant parents (Table 1).

<Table 1 here>

Table 1 depicts the different child welfare outcomes used in this paper. On average, migrants' children had a higher current grade level (by about one level) and more of them were in high school and college compared to children of non-migrants. Left-behind children were also less likely (by about 1%) to have poor grades and more likely (by about 9%) to have good study habits.

For the two health outcomes, out of the 70,707 children, only about 354 (0.5%) were perceived by the survey respondent to be sickly or temperamental, with the rates slightly higher on average for children of non-migrant parents than for children of migrant parents.

For labour outcomes, around 6,080 had worked in the past week while around 9,263 had worked in the past year. In addition, on average, children of non-migrant parents were more likely to have worked in the past week (5.6% more) and in the past year (8.1% more) than children of migrant parents.

Table 2.1 shows the definition and descriptive statistics of the demographic and socioeconomic characteristics of the children and households in the dataset that are predicted to impact children's welfare outcomes. In terms of child characteristics, there is not much difference between children of migrants and non-migrants. On average, about half of the children in the dataset are male, the second to youngest sibling and about 11 years of age.

<Table 2.1 here>

Differences between the two types of households can be seen in the household characteristics. Households of left-behind children have younger household heads (about two years younger), are mostly in urban areas (about 51%), have slightly smaller household sizes, usually have access to water and light sources, and, although they own less agricultural land, more of them belong to higher income brackets compared to the households of children of non-migrant parents.

Regional data are taken from three sources, which are merged with the SOC dataset: (a) the 2004 Survey on Overseas Filipinos (SOF), which contains data on the amount of remittances and on the socioeconomic characteristics of workers who were working or had worked abroad; (b) the 2011 and 2014 Philippine Statistical Yearbooks (PSY), which compile major economic and social information about the Philippines; and (c) the 2011 Annual Poverty Indicator Survey (APIS).

Regional characteristics in 2011, depicted in Table 2.2a, reveal regional differences. First, children of both migrants and non-migrants lived mostly in the National Capital Region (NCR) and CALABARZON, which is the region next to it (Columns 2 and 3). Second, households living in NCR had the highest average income while those living in the Autonomous Region of Muslim Mindanao (ARMM) had the lowest (Column 4).

<Table 2.2a here>

Third, the highest percentages of families who experienced hunger in 2011 were in the Eastern Visayas (Column 5), consisting of the three main islands of Samar, Leyte and Biliran (16.2%), which is not surprising given that this region frequently experiences natural disasters, such as the extremely destructive super typhoon Yolanda that made landfall there in 2013.

Fourth, in Column 7 the Cordillera Administrative Region (CAR) had the highest school attendance (71%), defined as the regional percentage of those aged 3 to 24 who attended either public or private schools in 2011–2012, while ARMM had the lowest (63%). Fifth, the

northernmost part of the Philippines (Ilocos and Cagayan regions) had the highest historical migration rates in 2003, followed by NCR and CALABARZON (Column 8).

Table 2.2b shows the regional variables that measure the regional infrastructure and income level in 2003 to address endogeneity of parental migration as shown in Equations (7) and (8) above. Historically, we can see that the average annual household income is highest in NCR and lowest in ARMM (Column 1) consistent with the data in 2011 discussed above. The highest poverty incidence is also recorded in another Mindanao region, Caraga (Column 3). Phone and road density are largest in NCR, as expected (Columns 8 and 9).

< Table 2.2b here >

## RESULTS

### Impacts of parental migration on children's outcomes

The results of estimating Equation 2 can be gleaned from Table 3. OLS estimates (Column 1) show that children of migrants studied half a year more than children of non-migrants, keeping other factors constant. Multinomial logit estimates (Columns 2 to 4) suggest that parental migration is associated with a 0.06-decrease in the relative log odds of a child having no grade completed and a 0.02-increase in the relative log odds of a child having secondary education compared to the child being enrolled in primary school (i.e., the base category).

<Table 3 here >

Probit estimates suggest that left-behind children are less likely (by about 1%) to have poor grades and more likely (by about 6%) to study regularly than children of non-migrant parents (Columns 5 and 6). In addition, girls, regardless of the type of household, are 1 per cent less likely

to have poor grades and 5 per cent more likely to study than boys. This last result will be further explored below (in “Heterogeneity in the impact of parental migration”).

The probit regression results involving the two measures of health outcomes (sickly and temperamental) show no statistical difference between children of migrant parents and children of non-migrant parents (Table 3, Columns 7 and 8). Girls have marginally better health outcomes than boys.

The results, thus far, show that across different econometric specifications, children of migrant parents have better educational and health outcomes, keeping everything else constant. These findings support the first mechanism discussed in the theoretical framework – a positive impact of parental migration on children’s welfare through the income effect (increased remittances), and reduced credit and liquidity constraints.

We also want to confirm whether the children of migrants have better educational outcomes because they participate less (or not at all) in the labour market, or, conversely, whether children of non-migrants need to work to augment the income of the family. Probit regressions reveal that children of migrant parents were 5 per cent less likely to have worked in the past week and 6 per cent less likely to have worked in the past year compared to children of non-migrant parents (Table 3, Columns 9 and 10, respectively). The marginal effects for the other control variables suggest that boys were more likely (4%) to participate in the labour market than girls. Meanwhile, rank among siblings and age of children are positively correlated with the probability of working in both time periods. This means that older and earlier in rank are more likely to work. In addition, for both labour outcome variables, children in urban areas, from larger families, with access to water and light sources, without agricultural land and whose household’s average gross income was higher were less likely to participate in the labour market.

## Heterogeneity in the impact of parental migration

As mentioned above, the results presented in Table 3 indicate that girls, regardless of parental migration, have better educational, health and labour outcomes than boys. To formally test whether the impact of parental migration on welfare outcomes varies across the gender of the child, we include an interaction of child of a migrant and gender of the child of a migrant in the regression analyses (from Equation 3 above).

The coefficients of child of a migrant from Table 4 show that, following Equation (4), parental migration has a positive effect on the welfare of left-behind daughters in terms of their education and labour (Columns 1, 2, 3, 6 and 7). Post-estimation Wald tests reveal similar results for sons of migrant parents (after testing Equation 5 above). Heterogeneity between the two groups can only be observed for the study habits regression through the interaction term coefficient (from Equation 6). In particular, the impact of parental migration is 4 per cent higher for boys than girls in terms of good study habits.

<Table 4 here>

## Addressing endogeneity of parental migration

### Two-step treatment-effects model and bivariate probit results

Tables 5 shows the two-step regression results after estimating Equations 7 and 8 using historical regional migration rate (in 2003) as the instrumental variable for parental migration in 2011. In the first stage regression, which test for the relationship between historical migration and

current migration, our results support the findings in the literature that historical migration tends to create a regional migration network, which facilitate current migration (Table 5, Column 1).<sup>9</sup>

<Table 5 here>

It can be gleaned from Table 5, Column 2 that a child of a migrant studied about 1 year more (about 10 months more) than a child of a non-migrant parent. Bivariate probit regression results suggest that, in terms of study habits (Column 4), a child of a migrant is more likely to have good study habits than a child of a non-migrant, although the difference is small (1%). Regarding the health outcomes, a child of a migrant is about 3 per cent less likely to be perceived as temperamental but marginally more likely to be sickly compared to a child of a non-migrant (Columns 5 and 6). As to labor outcomes, children of migrants were still less likely, albeit only slightly, to have worked in the past week or past year (Columns 7 and 8).

We also use the earliest regional migration rate available from 1989 to check the findings' robustness.<sup>10</sup> After controlling for the other historical regional variables, for which data are only available for 2003, we found a strong correlation between the 1989 historical migration rate and 2011 parental migration (Table 6, Column 1).<sup>11</sup> It is likely that political instability in the Philippines in 1989 acted as a push factor for the international migration of Filipino workers.<sup>12</sup> The results, displayed in Table 6, suggest that regardless of the year used for historical migration rate (1989 or 2003) the children of migrant parents are better off in terms of educational and labor outcomes. However, although children of migrant parents are also found to be less temperamental,

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<sup>9</sup> The *F*-statistic is about 139, satisfying the 10 per cent maximal IV size of 16.38 and the first requirement for a valid IV (Staiger & Stock, 1997; Stock & Yogo, 2002).

<sup>10</sup> Regional migration data for 1989 were the earliest available.

<sup>11</sup> The *F*-statistic is about 33, which satisfies the first requirement for a valid IV.

<sup>12</sup> After the "People Power" revolution in 1986 ended two decades of authoritarian rule by Marcos, the country suffered from political instability due to a series of coup attempts against the new government.

they are more likely to be perceived as physically sickly than children of non-migrant parents (Table 6, Column 5).

<Table 6 here>

#### PSM and PSM-IV results

Table 7 displays the results of estimating Equation (9) using PSM and comparing the welfare outcomes of children of migrant parents against the outcomes of a matched control group (children of non-migrant parents) that have similar observable characteristics using the propensity scores derived. The average treatment effect (ATE) from PSM supports the results of the IV regressions in Table 5 above that a child of a migrant is in a higher grade level, less likely to have poor grades, more likely to have good study habits, less likely to be temperamental and less likely to work.

< Table 7 here>

Table 8 shows the results of PSM-IV after limiting the dataset to observations that are within the common support region and using the 2003 regional migration rate as the instrumental variable.<sup>13</sup> The results suggest that a child of a migrant is about half a year higher in current grade than the child of a non-migrant (Column 2) and is less likely to work in the past week or the past year (Columns 7 and 8).

< Table 8 here>

Using the 1989 migration rate as instrumental variable for robustness yields consistent findings – a child of a migrant has better educational outcome (less likely to have poor grades) and less likely to work (Appendix 6, Columns 3, 7, and 8, respectively).

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<sup>13</sup> The 2003 migration rate as IV passed the the 10 per cent maximal IV size of 16.38 and the first requirement for a valid IV as seen in Table 8, Column 1 (Staiger & Stock, 1997; Stock & Yogo, 2002). The 1989 migration rate for PSM-IV likewise passed the IV requirement.

The results, after addressing identification issues using instrumental variable and PSM, indicate that although children of migrant parents are better off in terms of education and labor outcomes and being perceived as less temperamental compared to their counterparts, they are more likely to be perceived as physically sickly.

## CONCLUSION

The goal of this paper is to examine the effects of parental migration on the welfare of the children left behind in the Philippines. This topic is relevant because the Philippines is a leading exporter of labour, with millions of migrant workers living in other countries, many of whom have families at home in the Philippines. The impact of parental migration is interesting to analyze because it has been shown to have both positive effects (through increased income to the household) and negative effects (due to parental absence) on child welfare.

Our findings support the literature that claims migration improves children's welfare – or at the very least, does not diminish it. The clearest positive effects we observe are in education and labour, as children of migrants are more likely to reach a higher level of educational attainment, less likely to have poor grades and less likely to have worked in the past week and in the past year. The results are robust across the different econometric models used, even after addressing biases attributed to endogeneity of parental migration using treatment effects, biprobit, PSM and PSM-IV models. The positive impact of parental migration can be attributed to an income effect; that is, the migrant parents send remittances, which augment household income, helping households cope with credit and liquidity constraints. This income effect then allows households to enroll and keep their children in school and provide sufficient and healthy food. It keeps the children from working

as well, which may be especially important given the number of children working in hazardous environments.

The positive impact of parental migration on the welfare of left-behind children is unsurprising given the role of remittances in the Philippine economy and in household welfare (Yang & Choi, 2007; Yang, 2008).

Parental migration also improves the health of the left-behind children, albeit only marginally. Children of migrant parents are less likely to be perceived as temperamental compared to the children of non-migrant parents. However, our results also show that children of migrant parents are more likely to be perceived as physically sickly compared to the children of non-migrants. This could be explained by the cognitive stress theory (Smeekens et al., 2012), with parental migration considered a source of stress to left-behind children. Left-behind children can feel emotionally stressed and lonely; even in the Philippines' collectivist culture, the presence of friends and relatives can be insufficient to address emotional loneliness. The coping strategies of left-behind children can affect their health; for example, they can avoid the problem altogether and not think of the absent parent (avoidant coping), which then can lead to poor health (Lazarus and Folkman 1984; Ruchkin et al. 2000; Folkman 2011; Smeekens et al. 2012).

Our findings also suggest that the impacts of parental migration on the welfare of left-behind children can vary by the gender of the child. For example, although parental migration results in good study habits for both daughters and sons, the positive effect is more pronounced for sons. This result only partially explains the gender differential in the impact of parental migration, as the gender of the migrant parent (and left-behind parent) is unaccounted for due to data limitations. When the data become available, analyzing gender bias in migrants' households would be a worthwhile endeavor, especially because of the growing trend of the feminization of

migration and the relative adverse impact of maternal migration on left-behind children (Battistella & Conaco, 1998; Asis & Ruiz-Marave, 2013; Survey on Overseas Filipinos, 2013; Donato & Gabaccia, 2015; Le Goff, 2016).

Although most of the results of this paper show that parental migration has a positive impact on the welfare of the left-behind children, we cannot ignore its negative impact on health. Left-behind children are found to be more likely to be sickly than children who live with their parents. This result suggests that government efforts are needed to consider and address the health needs of children left behind in the Philippines. Some of the strategies that the government could adopt include expanding its existing conditional cash transfer schemes to include left-behind families and encourage caregivers to attend to the health of left-behind children.

Another consideration is the training of health workers, teachers, and individuals working with left-behind children so they can better assist them. Other global health initiatives (including those pertaining to mental health) could be incorporated into the national policy to help these left-behind children. It is pertinent to address the needs of these children to prevent any long-term negative health effects (Fellmeth, et al., 2018).

Our research could be improved, conditional on data availability, by incorporating the actual amount of remittances and the length of parental absence, which could provide a deeper and broader analysis of the impact of parental migration. It is also important to measure perception variables in actual terms when data becomes available. Another consideration is whether the development of long-distance communication technology has helped mitigate the adverse effects of parental absence from children's lives.

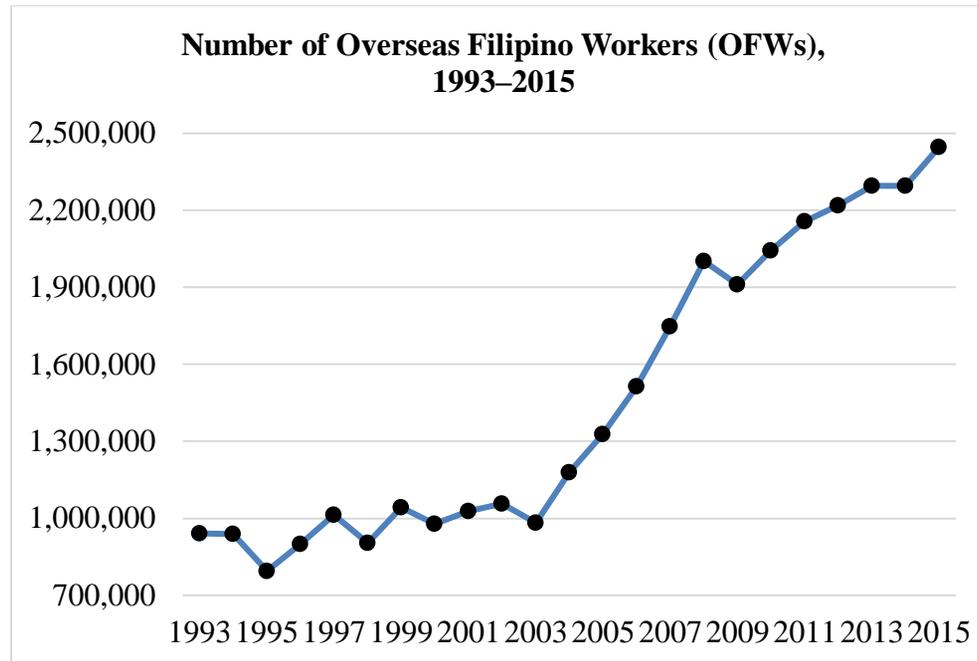
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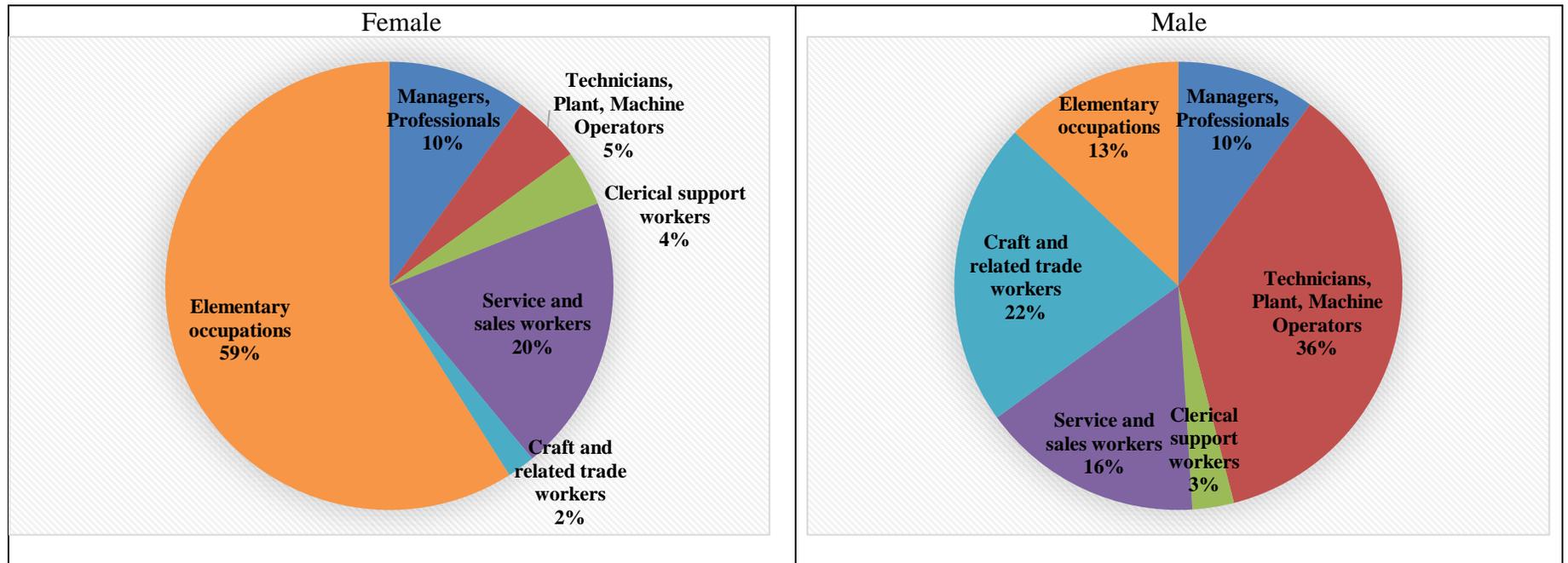
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Figure 1. Number of Overseas Filipino Workers (OFWs), 1993–2015



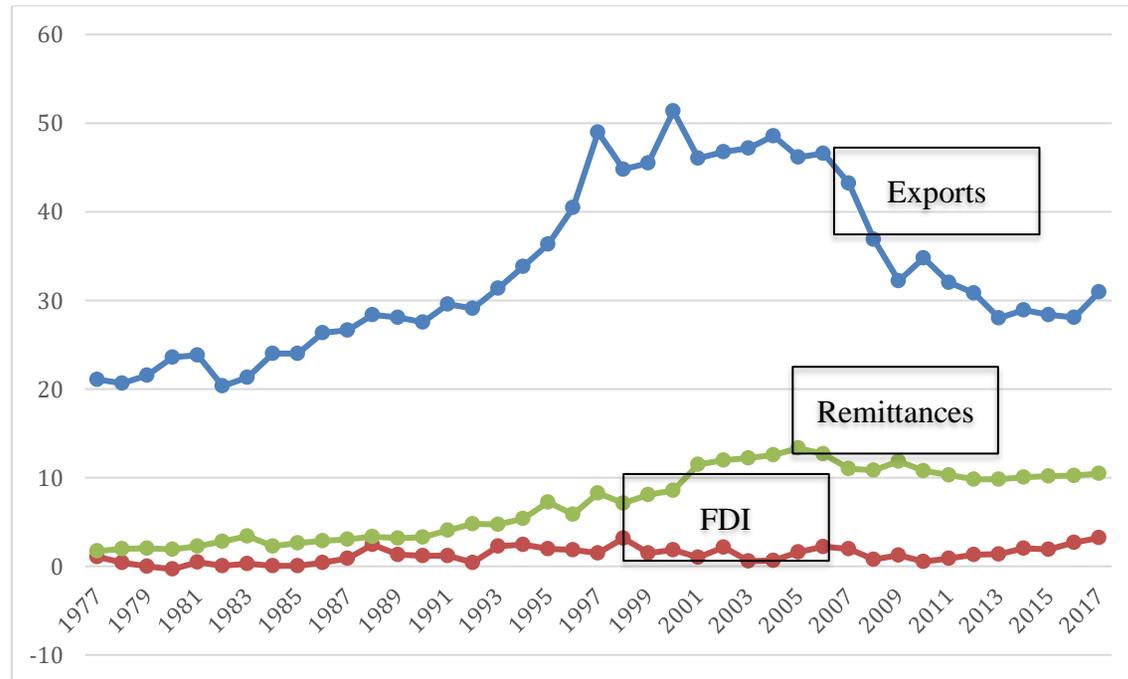
*Source: Survey on Overseas Filipinos, 1993–2015*

Figure 2. Type of work of Overseas Filipino Workers (male and female), 2017



Source: Survey on Overseas Filipinos, 2017

Figure 3. Exports, remittances and foreign direct investment (FDI) as % of GDP (1977–2017)



Source: World Bank Development Indicators, 2017

Figure 4. Parental migration, remittances, coping mechanisms and welfare outcomes

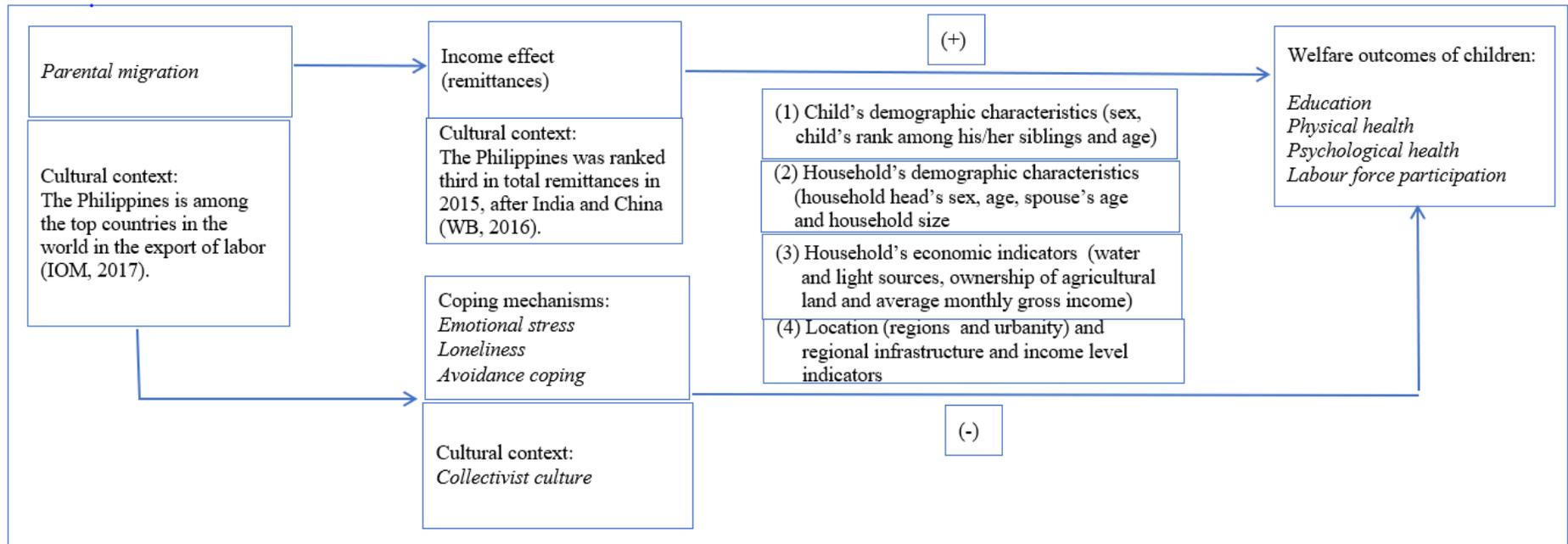


Figure 5. Philippine peso rate (against US \$), 1970–2016



Source: Reference Exchange Rate Bulletin, Treasury Department, Bangko Sentral ng Pilipinas, 2016

Table 1. Means (standard deviations) of the children's outcome variables

<b>Variable</b>	<b>Description</b>	<b>All Children</b>	<b>Children of Migrants</b>	<b>Children of Non-Migrants</b>
<i>Education Outcomes</i>				
Grade level	Current grade level of the child	4.867 (4.825)	6.086 (5.220)	4.808 (4.798)
Grade level	0 if child has never been enrolled	0.390	0.308	0.394
	1 if child's current grade is below grade 7	0.406	0.403	0.406
	2 if child is enrolled in high school	0.177	0.234	0.174
	3 if child is enrolled in college	0.027	0.054	0.026
Poor grades	=1 if the respondent perceives that the child has poor grades in school	0.011 (0.104)	0.003 (0.053)	0.011 (0.106)
Regular study	=1 if the child studied regularly in the last 12 months	0.612 (0.487)	0.693 (0.461)	0.608 (0.488)
<i>Health Outcomes</i>				
Sickly	=1 if the respondent perceives the child to have poor health	0.005 (0.069)	0.002 (0.050)	0.005 (0.069)
Temperamental	=1 if the respondent perceives the child to be angry or emotional	0.005 (0.073)	0.002 (0.046)	0.006 (0.074)
<i>Labor Outcomes</i>				
Work in past week	=1 if the child has worked in the past week	0.086 (0.280)	0.032 (0.177)	0.088 (0.284)
Work in past year	=1 if the child has worked in the past year	0.131 (0.337)	0.054 (0.227)	0.135 (0.341)
<i>Number of Observations</i>		70,707	3,234	67,473

Table 2.1. Means (standard deviations) of the independent variables

<b>Variable</b>	<b>Description</b>	<b>All Children</b>	<b>Children of Migrants</b>	<b>Children of Non-Migrants</b>
<i>Child Characteristics</i>				
Child of migrant	= 1 if the child is the son, daughter, or grandchild of a labor migrant	0.046 (0.209)		
Child's sex	=1 if the child is male	0.528 (0.499)	0.530 (0.499)	0.528 (0.499)
Child's rank	Child's rank amongst his/her siblings, 1 being the youngest	2.561 (1.584)	2.203 (1.298)	2.578 (1.594)
Child's age	Age of the child	11.124 (6.010)	11.805 (5.716)	11.091 (6.022)
<i>Household Characteristics</i>				
Household head's sex	=1 if the household head is male	0.978 (0.147)	0.871 (0.335)	0.983 (0.129)
Household head's age	Age of the Household Head	45.429 (9.962)	43.145 (7.667)	45.538 (10.045)
Partner's age	Age of the Spouse of the Household Head	42.321 (9.607)	41.115 (7.420)	42.378 (9.696)
Urban	=1 if the household is from an urban area	0.354 (0.478)	0.515 (0.500)	0.347 (0.476)
Household size	Number of members in the household	6.587 (2.140)	5.962 (1.934)	6.617 (2.144)
Water source	=1 if water source is from a community system or a tubed/piped well. =0 if from dug well, rain, or river.	0.794 (0.405)	0.937 (0.243)	0.787 (0.410)
Light source	=1 if lighting is powered by electricity. =0 if lighting is powered by gas or oil.	0.821 (0.384)	0.967 (0.180)	0.814 (0.389)
Agricultural land	=1 if the household owns a property primarily used for agriculture	0.265 (0.441)	0.182 (0.386)	0.269 (0.444)
Average monthly gross income	Household Income Bracket			
	Less than Php 5,000	0.252	0.040	0.263
	Php 5,000 – Php 7,999	0.273	0.110	0.281
	Php 8,000 – Php 14,999	0.238	0.250	0.238
	Php 15,000 – Php 19,999	0.093	0.164	0.090
	Php 20,000 – Php 29,999	0.071	0.173	0.066
	Php 30,000 – Php 49,999	0.044	0.145	0.040
	Php 50,000 and over	0.028	0.122	0.023
<i>Number of observations</i>		70,707	3,234	67,473

Table 2.2a. Averages of regional variables (arranged from north to south)

	Household Distribution (2011)			Average Annual HH Income 2011	Hunger Percentage 2011	Schools 2011	School Attendance 2011	Migration Rate 2003	Migration Rate 1989
	All Children	Children of Migrants	Children of Non-Migrants						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ilocos	0.049	0.090	0.047	92,362	0.028	6,348	0.671	0.018	0.016
Cagayan	0.044	0.073	0.043	90,486	0.035	5,424	0.661	0.021	0.006
CAR	0.041	0.050	0.040	102,170	0.003	3,754	0.711	0.014	0.014
Central Luzon	0.075	0.142	0.072	110,162	0.042	9,609	0.651	0.013	0.012
NCR	0.094	0.154	0.091	168,215	0.027	4,673	0.671	0.017	0.019
CALABARZON	0.091	0.161	0.087	120,472	0.038	11,386	0.664	0.017	0.014
MIMAROPA	0.045	0.013	0.046	74,190	0.058	4,427	0.703	0.006	0.003
Bicol	0.067	0.039	0.068	76,617	0.095	7,693	0.691	0.006	0.001
Western Visayas	0.063	0.051	0.063	88,908	0.066	8,661	0.702	0.015	0.007
Central Visayas	0.062	0.061	0.062	91,291	0.081	7,917	0.665	0.009	0.003
Eastern Visayas	0.059	0.012	0.061	77,520	0.162	8,136	0.689	0.005	0.002
Zamboanga Peninsula	0.042	0.012	0.043	70,946	0.093	4,870	0.685	0.006	0.002
Northern Mindanao	0.046	0.033	0.046	88,939	0.101	5,310	0.662	0.007	0.002
Davao	0.054	0.024	0.056	83,694	0.064	4,420	0.639	0.008	0.001
SOCCSKSARGEN	0.052	0.036	0.053	73,855	0.130	4,511	0.663	0.009	0.003
ARMM	0.073	0.029	0.075	58,256	0.049	4,841	0.630	0.004	0.004
Caraga	0.045	0.020	0.046	80,192	0.117	3,965	0.674	0.004	0.003
<i>Number of observations</i>	<i>70,707</i>	<i>3,234</i>	<i>67,473</i>						

Table 2.2b. Averages of regional variables in 2003 (arranged from north to south)

Region	Average Annual HH Income	GINI Concentration Ratio	Poverty Incidence	Schools per 1000	Net Participation Rate (Primary) <sup>1/</sup>	Net Participation Rate (Secondary) <sup>1/</sup>	Hospitals per 1000	Phone Density <sup>2/</sup>	Road Density <sup>3/</sup>	Labor Participation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ilocos	124,000	0.39	24.4	0.63	89.44	68.12	0.03	4.49	13.20	65.10
Cagayan	126,000	0.44	19.3	0.84	85.67	55.30	0.03	1.02	6.80	69.90
CAR	152,000	0.43	25.8	1.15	90.29	55.33	0.03	6.27	9.66	68.00
Central Luzon	160,000	0.35	13.4	0.39	92.53	65.29	0.02	5.31	9.35	64.00
NCR	266,000	0.40	4.8	0.09	97.43	74.29	0.02	25.77	146.10	65.50
CALABARZON	184,000	0.40	14.5	0.33	98.22	72.17	0.03	2.50	14.13	66.80
MIMAROPA	103,000	0.44	39.9	0.83	91.38	57.17		2.50	7.48	69.80
Bicol	109,000	0.47	40.6	0.74	90.87	54.45	0.02	8.72	12.38	68.20
Western Visayas	111,000	0.44	31.4	0.61	85.78	56.56	0.01	6.20	14.31	68.70
Central Visayas	121,000	0.47	23.6	0.57	88.07	57.05	0.02	7.83	11.93	65.40
Eastern Visayas	103,000	0.46	35.3	1.04	85.81	48.29	0.02	3.20	10.14	73.20
Zamboanga Penen	93,000	0.52	44.0	0.78	89.40	47.68	0.02	1.00	6.23	65.70
Northern Mindanao	109,000	0.48	37.7	0.61	88.51	52.11	0.03	4.83	8.00	74.50
Davao	117,000	0.46	28.5	0.48	84.77	50.50	0.03	6.75	7.24	68.70
SOCCSKSARGEN	113,000	0.48	32.1	0.54	81.95	50.81	0.03	2.89	6.21	69.10
ARMM	83,000	0.36	45.4	0.72	80.71	23.55	0.01	1.29		57.00
Caraga	90,000	0.43	47.1	0.84	92.72	49.36	0.03	5.63	6.41	70.10

Notes:

<sup>1/</sup> For public school only.<sup>2/</sup> Ratio of total number of telephone lines installed or equipped and total population.<sup>3/</sup> Ratio of the length of the region's total road network to its land area.

Table 3. Marginal effects of parental migration on children's outcomes (OLS, multinomial logit, probit)

	OLS	Multinomial Logit			Probit					
	Current Grade	Categorical Current Grade			Poor Grades	Regular study	Sickly	Temperamental	Work in past week	Work in past year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Child of migrant	0.57*** (0.09)	-0.06*** (0.01)	0.02*** (0.01)	0 (0)	-0.01*** (0)	0.06*** (0.01)	0 (0)	0 (0)	-0.05*** (0.01)	-0.06*** (0.01)
Child's sex	-0.66*** (0.04)	0.05*** (0)	-0.04*** (0)	-0.01*** (0)	0.01*** (0)	-0.05*** (0)	0.001** (0)	0.002*** (0)	0.04*** (0)	0.04*** (0)
Child's rank	-0.15*** (0.02)	-0.02*** (0)	-0.01*** (0)	-0.01*** (0)	0.00*** (0)	0.01*** (0)	0 (0)	0.00*** (0)	0.01*** (0)	0.01*** (0)
Child's age	0.18*** (0)	0.01*** (0)	0.02*** (0)	0.01*** (0)	0.00*** (0)	-0.01*** (0)	0.00*** (0)	0.00*** (0)	0.01*** (0)	0.01*** (0)
Urban	-0.08* (0.05)	0.02*** (0)	0 (0)	0 (0)	-0.00*** (0)	-0.02*** (0)	0 (0)	0 (0)	-0.02*** (0)	-0.02*** (0)
Household size	-0.28*** (0.01)	0.04*** (0)	-0.01*** (0)	-0.00*** (0)	-0.00*** (0)	-0.04*** (0)	0 (0)	-0.00** (0)	-0.01*** (0)	-0.01*** (0)
Water source	0.18*** (0.01)	-0.02*** (0)	0.01 (0)	0.01*** (0)	-0.00* (0)	0.01*** (0)	-0.00*** (0)	0 (0)	-0.01*** (0)	-0.02*** (0)
Light source	0.44*** (0.01)	-0.03*** (0)	0.04*** (0)	0.01*** (0)	-0.01*** (0)	0.02*** (0.01)	-0.00*** (0)	-0.00* (0)	-0.03*** (0)	-0.04*** (0)
Agricultural land	0.14*** (0.01)	-0.01*** (0)	0.01* (0)	0 (0)	0.00*** (0)	0.01*** (0)	0.00*** (0)	0.00*** (0)	0.03*** (0)	0.04*** (0)
Ave. gross income	0.15*** (0.01)	-0.01*** (0)	0.00*** (0)	0.01*** (0)	-0.00*** (0)	0.01*** (0)	-0.00*** (0)	-0.00*** (0)	-0.01*** (0)	-0.01*** (0)
<i>Head's characteristics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Regional variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>No. of obs.</i>	70,707	70,707	70,707	70,707	70,707	70,707	65,541	70,707	70,707	70,707

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance respectively. Robust standard errors (in parentheses). Appendix 1 presents the complete regression results.

Table 4. Marginal effects of parental migration on welfare outcomes by gender of the child (OLS for current grade, probit for the rest)

	Current Grade (1)	Poor Grades (2)	Regular Study (3)	Sickly (4)	Temperamental (5)	Work in Past Week (6)	Work in Past Year (7)
Child of migrant	0.44*** (0.14)	-0.02** (0.01)	0.04*** (0.01)	-0.00 (0.00)	-0.00 (0.00)	-0.04*** (0.01)	-0.05*** (0.01)
Child's sex	-0.67*** (0.04)	0.01*** (0.00)	-0.05*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.04*** (0.00)	0.04*** (0.00)
Child of migrant x Child's sex	0.25 (0.18)	0.01 (0.01)	0.04** (0.02)	0.00 (0.00)	0.00 (0.00)	-0.01 (0.01)	-0.02 (0.01)
Child's rank	-0.15*** (0.02)	0.00*** (0.00)	0.01*** (0.00)	-0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Child's age	0.18*** (0.00)	0.00*** (0.00)	-0.01*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
<i>Head's chars.</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Household's chars</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Location variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald tests of the joint significance of coefficients for child of migrant and child of migrant x child's sex							
Chi-square	19.75	8.76	42.03	0.62	1.66	52.39	63.39
<i>p</i> -value	0.00	0.01	0.00	0.73	0.44	0.00	0.00
Marginal effects	0.69***	-0.01**	0.08***	0.00	-0.002	-0.06***	-0.07***

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance, respectively. Robust standard errors in parentheses.  $N = 70,707$  for all regressions except sickly ( $N = 65,541$ ). Appendix 2 presents the complete regression results.

Table 5. Coefficients and marginal effects of parental migration on children's welfare outcomes using 2003 migration rate (two-step treatment effects, bivariate probit)

	First stage	Second stage						
	Child of migrant (1)	Current Grades (2)	Poor Grades (3)	Regular Study (4)	Sickly (5)	Temperamental (6)	Work in past week (7)	Work in past year (8)
Child of migrant		0.78*** (0.16)	-0.01 (0.01)	0.01*** (0)	0.00** (0)	-0.03*** (0.01)	-0.002* (0)	-0.002* (0)
Migration rate 2003	0.88*** (0.08)							
Child's sex	0.02 (0.02)	-0.68*** (0.04)	0 (0)	0 (0)	0 (0)	0.00*** (0)	0.00*** (0)	0.00*** (0)
Child's rank	-0.11*** (0.01)	-0.13*** (0.02)	0 (0)	-0.00*** (0)	0 (0)	0 (0)	-0.00** (0)	-0.00*** (0)
Child's age	0.03*** (0)	0.18*** (0.01)	0 (0)	0.00*** (0)	0.00* (0)	0.00*** (0)	0.00*** (0)	0.00*** (0)
<i>Head's chars.</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Household's chars</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Location variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>2003 regional variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>2011 regional variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance respectively. Robust standard errors (in parentheses). Appendix 3 presents the complete regression results.

Table 6. Coefficients and marginal effects of parental migration on children's welfare outcomes using 1989 migration rate (two-step treatment effects, bivariate probit)

	First stage	Second stage						
	<i>Child of migrant</i>	Current Grades	Poor Grades	Regular Study	Sickly	Temper	Work in Past Week	Work in Past Year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child of migrant		0.78*** (0.16)	-0.01 (0.01)	0.01*** (0.00)	0.001* (0.00)	-0.03** (0.01)	-0.003* (0.00)	-0.003* (0.00)
Migration rate 1989	15.25*** (2.21)							
Child's sex	0.02 (0.02)	-0.68*** (0.04)	0.00 (0.00)	-0.00* (0.00)	0.00** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Child's rank	-0.11*** (0.01)	-0.13*** (0.02)	-0.00 (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00 (0.00)	-0.00** (0.00)	-0.00*** (0.00)
Child's age	0.03*** (0.00)	0.18*** (0.01)	0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
<i>Head's chars.</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Household's chars</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Location variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>2003 regional variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>2011 regional variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance respectively. Robust standard errors (in parentheses). Appendix 4 presents the complete regression results including the control variables (household head's characteristics, household's characteristics, location and regional variables).

Table 7. Effect of parental migration on children's welfare outcomes (propensity score matching) using 2003 migration rate

	Average Treatment Effect
Current grade	1.29*** (0.13)
Poor grades	-0.01*** (0.00)
Regular study	0.09*** (0.01)
Sickly	0.00 (0.00)
Temperamental	-0.003** (0.001)
Work in past week	-0.06*** (0.01)
Work in past year	-0.09*** (0.01)

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance respectively. Bootstrapped standard errors in parentheses.

Table 8. Marginal effects of parental migration on children's welfare outcomes using 2003 migration rate, PSM-IV

	First stage	Second stage						
	<i>Child of migrant</i>	Current Grade	Poor Grades	Regular Study	Sickly	Temperamental	Work in the past week	Work in the past year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child of migrant		0.50+ (0.32)	0.00 (0.00)	0.02 -0.02	0.00 (0.00)	0.00 (0.00)	-0.01* (-0.01)	-0.02** (-0.01)
Migration rate 2003	12.10*** (1.62)							
Child's sex	0.31 (0.28)	-0.92*** (0.12)	0.00* (0.00)	-0.03*** (0.01)	0.00 (0.00)	0.00 (0.00)	0.01*** (0.00)	0.01*** (0.00)
Child's rank	-2.37*** (0.35)	-0.11* (0.07)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00** (0.00)	0.00** (0.00)	0.00* (0.00)
Child's age	0.62*** (0.09)	0.19*** (0.02)	0.00 (0.00)	-0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)
<i>Head's chars.</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Household's chars</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Location variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>2003 regional variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>2011 regional variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,258	6,258	6,258	6,258	6,174	6,174	6,258	6,258

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance respectively. Robust standard errors (in parentheses). Appendix 5 presents the complete regression results including the control variables (household head's characteristics, household's characteristics, location and regional variables).

Appendix 1. Complete regression results - marginal effects of parental migration on children's outcomes (OLS, multinomial logit, probit)

	Current Grade	Categorical Current Grade			Poor Grades	Regular study	Sickly	Temper	Work in past week	Work in past year
		No Grade Completed	Secondary	Tertiary						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Child of migrant	0.57*** (0.09)	-0.06*** (0.01)	0.02*** (0.01)	0.00 (0.00)	-0.01*** (0.00)	0.06*** (0.01)	-0.00 (0.00)	-0.00 (0.00)	-0.05*** (0.01)	-0.06*** (0.01)
Child's sex	-0.66*** (0.04)	0.05*** (0.00)	-0.04*** (0.00)	-0.01*** (0.00)	0.01*** (0.00)	-0.05*** (0.00)	0.001** (0.00)	0.002*** (0.00)	0.04*** (0.00)	0.04*** (0.00)
Child's rank	-0.15*** (0.02)	-0.02*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	0.00*** (0.00)	0.01*** (0.00)	-0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Child's age	0.18*** (0.00)	0.01*** (0.00)	0.02*** (0.00)	0.01*** (0.00)	0.00*** (0.00)	-0.01*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Household head's sex	-0.01 (0.13)	0.00 (0.01)	0.01 (0.01)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.01)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.01)	0.01 (0.01)
Household head's age	-0.02*** (0.00)	0.00*** (0.00)	-0.00*** (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Partner's age	0.00 (0.00)	-0.00 (0.00)	0.00*** (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Urban	-0.08* (0.05)	0.02*** (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00*** (0.00)	-0.02*** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.02*** (0.00)	-0.02*** (0.00)
Household size	-0.28*** (0.01)	0.04*** (0.00)	-0.01*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.04*** (0.00)	0.00 (0.00)	-0.00** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Water source	0.18*** (0.05)	-0.02*** (0.01)	0.01 (0.00)	0.01*** (0.00)	-0.00* (0.00)	0.01*** (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.01*** (0.00)	-0.02*** (0.00)
Light source	0.44*** (0.05)	-0.03*** (0.01)	0.04*** (0.00)	0.01*** (0.00)	-0.01*** (0.00)	0.02*** (0.01)	-0.00*** (0.00)	-0.00* (0.00)	-0.03*** (0.00)	-0.04*** (0.00)
Agricultural land	0.14*** (0.04)	-0.01*** (0.00)	0.01* (0.00)	0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.03*** (0.00)	0.04*** (0.00)
Ave. gross income	0.15*** (0.01)	-0.01*** (0.00)	0.00*** (0.00)	0.01*** (0.00)	-0.00*** (0.00)	0.01*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Constant	5.22*** (0.18)									

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance respectively. Robust standard errors (in parentheses). N=70,707 except for Sickly N = 65,541. Dummy variables for the 17 regions in the Philippines are also included but are not shown.

Appendix 2. Complete regression results - Marginal effects of parental migration on welfare outcomes by gender of the child (OLS for current grade, probit for the rest)

	Current Grade (1)	Poor Grades (2)	Regular Study (3)	Sickly (4)	Temper- amental (5)	Work in Past Week (6)	Work in Past Year (7)
Child of migrant	0.44*** (0.14)	-0.02** (0.01)	0.04*** (0.01)	-0.00 (0.00)	-0.00 (0.00)	-0.04*** (0.01)	-0.05*** (0.01)
Child's sex	-0.67*** (0.04)	0.01*** (0.00)	-0.05*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.04*** (0.00)	0.04*** (0.00)
Child of migrant x Child's sex	0.25 (0.18)	0.01 (0.01)	0.04** (0.02)	0.00 (0.00)	0.00 (0.00)	-0.01 (0.01)	-0.02 (0.01)
Child's rank	-0.15*** (0.02)	0.00*** (0.00)	0.01*** (0.00)	-0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Child's age	0.18*** (0.00)	0.00*** (0.00)	-0.01*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Household head's sex	-0.01 (0.13)	-0.00 (0.00)	-0.00 (0.01)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.01)	0.01 (0.01)
Household head's age	-0.02*** (0.00)	0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Partner's age	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Urban	-0.08* (0.05)	-0.00*** (0.00)	-0.02*** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.02*** (0.00)	-0.02*** (0.00)
Household size	-0.28*** (0.01)	-0.00*** (0.00)	-0.04*** (0.00)	0.00 (0.00)	-0.00** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Water source	0.18*** (0.05)	-0.00* (0.00)	0.01*** (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.01*** (0.00)	-0.02*** (0.00)
Light source	0.44*** (0.05)	-0.01*** (0.00)	0.02*** (0.01)	-0.00*** (0.00)	-0.00* (0.00)	-0.03*** (0.00)	-0.04*** (0.00)
Agricultural land	0.14*** (0.04)	0.00*** (0.00)	0.01*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.03*** (0.00)	0.04*** (0.00)
Ave. gross income	0.15*** (0.01)	-0.00*** (0.00)	0.01*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Constant	5.23*** (0.18)						
Wald tests of the joint significance of coefficients for child of migrant and child of migrant x child's sex							
Chi-square	19.75	8.76	42.03	0.62	1.66	52.39	63.39
p-value	0.00	0.01	0.00	0.73	0.44	0.00	0.00
Marginal effects	0.69***	-0.01**	0.08***	0.00	-0.002	-0.06***	-0.07***

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance, respectively. Robust standard errors in parentheses.  $N = 70,707$  for all regressions except sickly ( $N = 65,541$ ). Dummy variables for the 17 regions in the Philippines are included.

Appendix 3. Complete regression results - coefficients and marginal effects of parental migration on children's welfare outcomes using 2003 migration rate (two-step treatment effects, bivariate probit)

	<i>Child of migrant</i>	Current Grades	Poor Grades	Regular Study	Sickly	Temper	Work in past week	Work in past year
Child of migrant		0.78*** (0.16)	-0.01 (0.01)	0.01*** (0.00)	0.00** (0.00)	-0.03*** (0.01)	-0.002* (0.00)	-0.01* (0.01)
Migration rate 2003	0.88*** (0.08)							
Child's sex	0.02 (0.02)	-0.68*** (0.04)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)
Child's rank	-0.11*** (0.01)	-0.13*** (0.02)	0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00*** (0.00)	0.00** (0.00)
Child's age	0.03*** (0.00)	0.18*** (0.01)	0.00 (0.00)	0.00*** (0.00)	0.00* (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Household head's sex	-0.98*** (0.04)	0.04 (0.13)	-0.00 (0.00)	-0.04*** (0.00)	-0.00 (0.00)	-0.02*** (0.01)	-0.01*** (0.00)	-0.01 (0.00)
Household head's age	-0.02*** (0.00)	-0.02*** (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.00** (0.00)	-0.00*** (0.00)	-0.00 (0.00)
Partner's age	-0.01*** (0.00)	0.01 (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.00** (0.00)	-0.00*** (0.00)	0.00 (0.00)
Urban	0.03 (0.02)	-0.10** (0.05)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00** (0.00)	-0.01*** (0.00)
Household size	-0.02*** (0.01)	-0.29*** (0.01)	-0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Water source	0.33*** (0.04)	0.27*** (0.05)	0.00 (0.00)	0.02*** (0.00)	0.00 (0.00)	0.00** (0.00)	0.00*** (0.00)	-0.01** (0.00)
Light source	0.52*** (0.05)	0.43*** (0.05)	0.00 (0.00)	0.02*** (0.00)	0.00* (0.00)	0.00** (0.00)	0.00*** (0.00)	-0.01** (0.00)
Agricultural land	-0.12*** (0.03)	0.14*** (0.05)	0.00 (0.00)	-0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)
Ave. gross income	0.26*** (0.01)	0.14*** (0.01)	0.00 (0.00)	0.01*** (0.00)	0.00* (0.00)	0.00*** (0.00)	0.00*** (0.00)	-0.00 (0.00)
<b>2011 Regional Variables</b>								
Ave. family income	-0.00** (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00** (0.00)	0.00 (0.00)	0.00** (0.00)	-0.00* (0.00)	-0.00 (0.00)
Hunger percentage	0.08***	-0.01	0.00	0.00***	0.00	0.00	0.00***	-0.00

Appendix 3. Complete regression results - coefficients and marginal effects of parental migration on children's welfare outcomes using 2003 migration rate (two-step treatment effects, bivariate probit)

	<i>Child of migrant</i>	Current Grades	Poor Grades	Regular Study	Sickly	Temper	Work in past week	Work in past year
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
No. of schools	-0.00***	0.00	-0.00	-0.00***			-0.00***	0.00
	(0.00)	(0.00)	(0.00)	(0.00)			(0.00)	(0.00)
School attendance ratio	0.08***	-0.02	-0.00	0.00***			0.00***	-0.00
	(0.02)	(0.03)	(0.00)	(0.00)			(0.00)	(0.00)
<b>2003 Regional Variables</b>								
Ave. family income	-0.00	0.00	-0.00	-0.00	-0.00	0.00	-0.00**	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Gini concentration ratio	0.15	0.19	0.00	0.01	-0.00	-0.01	0.01	-0.02
	(0.46)	(0.86)	(0.01)	(0.02)	(0.00)	(0.01)	(0.00)	(0.04)
Poverty incidence	-0.04***	0.01	0.00	-0.00***	-0.00	-0.00	-0.00***	-0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Schools per 1000	-0.67***	0.62**	-0.00	-0.03***			-0.01***	0.00
	(0.19)	(0.27)	(0.00)	(0.01)			(0.00)	(0.01)
Elementary net participation rate	0.08***	0.01	0.00	0.00***			0.00***	0.00
	(0.02)	(0.02)	(0.00)	(0.00)			(0.00)	(0.00)
Secondary net participation rate	-0.01*	0.02*	-0.00	-0.00			-0.00**	-0.00
	(0.01)	(0.01)	(0.00)	(0.00)			(0.00)	(0.00)
Hospitals per 1000					0.00	0.02		
					(0.00)	(0.09)		
Telephone density	0.08***	0.01	0.00	0.00***	0.00	0.00***	0.00***	0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Road density	-0.02***	0.01*	-0.00	-0.00***	-0.00	-0.00***	-0.00***	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Labor force Participation rate	-0.00	0.01	0.00	-0.00	-0.00	0.00**	0.00	0.00**
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-10.66***	3.7						
	(2.25)	-2.75						

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance respectively. Robust standard errors in parentheses. Dummy variables for the 17 regions in the Philippines are also included.

Appendix 4. Coefficients and marginal effects of parental migration on children's welfare outcomes using 1989 migration rate (two-step treatment effects, bivariate probit)

	<i>Child of migrant</i>	Current Grades	Poor Grades	Regular Study	Sickly	Temper	Work in Past Week	Work in Past Year
Child of migrant		0.78*** (0.16)	-0.01 (0.01)	0.01*** (0.00)	0.001* (0.00)	-0.03** (0.01)	-0.003* (0.00)	-0.003* (0.00)
Migration rate 1989	15.25*** (2.21)							
Child's sex	0.02 (0.02)	-0.68*** (0.04)	0.00 (0.00)	-0.00* (0.00)	0.00** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Child's rank	-0.11*** (0.01)	-0.13*** (0.02)	-0.00 (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00 (0.00)	-0.00** (0.00)	-0.00*** (0.00)
Child's age	0.03*** (0.00)	0.18*** (0.01)	0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Household head's sex	-0.98*** (0.04)	0.04 (0.13)	-0.01 (0.01)	-0.04*** (0.00)	-0.00 (0.00)	-0.02** (0.01)	-0.01*** (0.00)	-0.01*** (0.00)
Household head's age	-0.02*** (0.00)	-0.02*** (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00* (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Partner's age	-0.01*** (0.00)	0.01 (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00* (0.00)	-0.00** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Urban	0.02 (0.02)	-0.10** (0.05)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Household size	-0.02*** (0.01)	-0.29*** (0.01)	-0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.00** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Water source	0.33*** (0.04)	0.27*** (0.05)	0.00 (0.00)	0.02*** (0.00)	0.00 (0.00)	0.00* (0.00)	0.00*** (0.00)	0.00*** (0.00)
Light source	0.52*** (0.05)	0.43*** (0.05)	0.00 (0.00)	0.02*** (0.00)	0.00** (0.00)	0.00* (0.00)	0.00*** (0.00)	0.00*** (0.00)
Agricultural land	-0.11*** (0.03)	0.14*** (0.05)	0.00 (0.00)	-0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)
Ave. gross income	0.26*** (0.01)	0.14*** (0.01)	0.00 (0.00)	0.01*** (0.00)	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)
<b>2011 Regional Variables</b>								
Ave. family income	-0.00*** (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Hunger percentage	0.14*** (0.02)	-0.01 (0.01)	0.00 (0.00)	0.01*** (0.00)	-0.00 (0.00)	-0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)
No. of schools	-0.00*** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00*** (0.00)			-0.00*** (0.00)	-0.00*** (0.00)
School attendance ratio	1.07*** (0.16)	-0.02 (0.03)	0.00 (0.00)	0.05*** (0.01)			0.01*** (0.00)	0.01*** (0.00)
<b>2003 Regional Variables</b>								
Ave. family income	-0.00*** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Gini concentration ratio	46.65*** (6.67)	0.19 (0.86)	0.20 (0.16)	2.14*** (0.35)	-0.00 (0.00)	-0.02 (0.02)	0.29*** (0.08)	0.39*** (0.09)
Poverty incidence	-1.32*** (0.19)	0.01 (0.01)	-0.01 (0.00)	-0.06*** (0.01)	-0.00** (0.00)	-0.00* (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
Schools per 1000 population	-21.57*** (3.17)	0.62** (0.27)	-0.09 (0.07)	-0.99*** (0.16)			-0.13*** (0.04)	-0.18*** (0.04)
Elementary net participation rate	2.04*** (0.30)	0.01 (0.02)	0.01 (0.01)	0.09*** (0.02)			0.01*** (0.00)	0.02*** (0.00)

Appendix 4. Coefficients and marginal effects of parental migration on children's welfare outcomes using 1989 migration rate (two-step treatment effects, bivariate probit)

	<i>Child of migrant</i>	Current Grades	Poor Grades	Regular Study	Sickly	Temper	Work in Past Week	Work in Past Year
Secondary net participation rate	-1.06*** (0.16)	0.02* (0.01)	-0.00 (0.00)	-0.05*** (0.01)			-0.01*** (0.00)	-0.01*** (0.00)
Hospitals per 1000 population					-0.00 (0.00)	-0.07 (0.08)		
Telephone density	0.84*** (0.12)	0.01 (0.01)	0.00 (0.00)	0.04*** (0.01)	-0.00 (0.00)	0.00** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Road density	0.03*** (0.01)	0.01* (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00 (0.00)	-0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Labour force part. rate	1.39*** (0.20)	0.01 (0.01)	0.01 (0.00)	0.06*** (0.01)	-0.00 (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Constant	-187.02*** (27.41)	3.70 (2.75)						
N	65,541	65,541	65,541	65,541	62,388	62,388	65,541	65,541

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance, respectively. Robust standard errors in parentheses. Dummy variables for the 17 regions in the Philippines are included.

Appendix 5. Marginal effects of parental migration on children's welfare outcomes using 2003 migration rate, PSM-IV

	First stage	Second stage						
	<i>Child of migrant</i>	Current Grade	Poor Grades	Regular Study	Sickly	Temper	Work in the past week	Work in the past year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child of migrant		0.50+	0.00	0.02	0.00	0.00	-0.01*	-0.02**
		(0.32)	(0.00)	-0.02	(0.00)	(0.00)	-(0.01)	-(0.01)
Migration rate 2003	12.10***							
	(1.62)							
Child's sex	0.31	-0.92***	0.00*	-0.03***	0.00	0.00	0.01***	0.01***
	(0.28)	(0.12)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Child's rank	-2.37***	-0.11*	0.00	0.00	0.00	0.00**	0.00**	0.00*
	(0.35)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Child's age	0.62***	0.19***	0.00	-0.00***	0.00	0.00	0.00***	0.00***
	(0.09)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
<b><i>Household chars.</i></b>								
Household head's sex	-11.41***	-0.09	0.01**	-0.01	0.00	0.00	-0.01	-0.01
	(0.78)	(0.28)	(0.01)	(0.01)	(0.01)	0.00	0.00	(0.01)
Household head's age	-0.30***	-0.03**	0.00	-0.00***	0.00	0.00	0.00	0.00
	(0.05)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Partner's age	-0.33***	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	(0.05)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Urban	0.08	-0.07	0.00	0.00	0.00	0.00	-0.01***	-0.01**
	(0.28)	(0.15)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Household size	-0.08	-0.30***	0.00	-0.02***	0.00	-0.00*	-0.00***	-0.00***
	(0.07)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Water source	5.14***	0.45***	0.00	0.03***	0.00	0.00	-0.01**	-0.01*
	(0.83)	(0.15)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)

Appendix 5. Marginal effects of parental migration on children's welfare outcomes using 2003 migration rate, PSM-IV

	First stage	Second stage						
	<i>Child of migrant</i>	Current Grade	Poor Grades	Regular Study	Sickly	Temper	Work in the past week	Work in the past year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Light source	11.14*** (1.51)	0.45** (0.20)	0.00 (0.00)	0.04*** (0.01)	0.00 (0.00)	0.00 (0.00)	-0.01** (0.00)	-0.01** (0.00)
Agricultural land	-0.71 (0.44)	-0.01 (0.14)	0.00 (0.00)	0.00 (-0.01)	0.00 (0.00)	0.00 (0.00)	0.01*** (0.00)	0.01*** (0.00)
Ave. gross income	5.16*** (0.75)	0.04 (0.05)	0.00 (0.00)	0.01*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00* (0.00)
<b>2011 Regional Vars.</b>								
Ave. family Income	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Hunger percentage	1.16*** (0.18)	-0.03 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
No. of schools	-0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)			0.00 (0.00)	0.00 (0.00)
School attendance ratio	0.02 (0.11)	-0.03 (0.10)	-0.00** (0.00)	0.00 (0.00)			0.00 (0.00)	-0.00* (0.00)
<b>2003 Regional Vars.</b>								
Ave. family income	0.00*** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Gini concentration ratio	-8.09* (4.78)	-1.89 (2.88)	-0.01 (0.01)	0.04 (0.13)	0.00 (0.01)	-0.02 (0.01)	-0.02 (0.04)	0.01 (0.05)
Poverty incidence	0.41*** (0.09)	0.02 (0.05)	0.00** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)

Appendix 5. Marginal effects of parental migration on children's welfare outcomes using 2003 migration rate, PSM-IV

	First stage	Second stage						
	<i>Child of migrant</i>	Current Grade	Poor Grades	Regular Study	Sickly	Temper	Work in the past week	Work in the past year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No. of schools per 1000 Population	-2.24** (1.04)	0.8 (0.87)	0.01* (0.00)	0.00 (0.04)			0.00 (0.01)	0.02 (0.02)
Elementary net participation rate	-0.08 (0.10)	0.03 (0.06)	-0.00** (0.00)	0.00 (0.00)			0.00 (0.00)	0.00 (0.00)
Secondary net participation rate	0.23*** (0.07)	-0.02 (0.04)	0.00 (0.00)	0.00 (0.00)			0.00 (0.00)	0.00 (0.00)
Telephone density	1.19*** (0.19)	0.01 (0.04)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Road density	-0.42*** (0.06)	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Labor force participation rate	-0.78*** (0.13)	-0.03 (0.04)	-0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00** (0.00)	0.00 (0.00)
No. of hospitals per 1000 population					-0.07 (0.11)	-0.08 (0.06)		
Constant	24.94* (13.11)							
Observations	6,258	6,258	6,258	6,258	6,174	6,174	6,258	6,258

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance, respectively. Robust standard errors in parentheses.

Dummy variables for the 17 regions in the Philippines are included.

Appendix 6. Marginal effects of parental migration on education and health of children using 1989 migration rate, PSM-IV

	First stage	Second stage						
	<i>Child of migrant</i>	Current Grade	Poor Grades	Regular Study	Sickly	Temper	Work in the past week	Work in the past year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child of migrant		0.41 (0.34)	-0.004* (0.00)	0.01 (0.02)	-0.00 (0.00)	0.00 (0.00)	-0.01* (0.00)	-0.02*** (0.00)
Migration rate 1989	177.60*** (21.09)							
Child's sex	0.21 (0.24)	-0.87*** (0.12)	0.00** (0.00)	-0.03*** (0.01)	0.00 (0.00)	0.00 (0.00)	0.01 (0.00)	0.01 (0.00)
Child's rank	-1.85*** (0.24)	-0.15** (0.07)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00** (0.00)	0.00 (0.00)	0.00 (0.00)
Child's age	0.47*** (0.06)	0.20*** (0.02)	0.00 (0.00)	-0.00** (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Household head's sex	-11.57 (247.92)	-0.09 (0.28)	0.01 (0.14)	-0.02 (0.63)	-0.00 (0.01)	0.00 (0.00)	-0.01 (0.00)	-0.01 (0.00)
Household head's age	-0.24*** (0.04)	-0.03*** (0.01)	-0.00 (0.00)	-0.00*** (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Partner's age	-0.25*** (0.03)	0.00 (0.01)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Urban	0.08 (0.24)	-0.11 (0.15)	0.00 (0.00)	-0.01 (0.01)	-0.00 (0.00)	-0.00 (0.00)	-0.01 (0.00)	-0.00 (0.00)
Household size	-0.11* (0.06)	-0.29*** (0.03)	-0.00*** (0.00)	-0.02*** (0.00)	0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00 (0.00)
Water source	4.33*** (0.62)	0.49*** (0.16)	0.00 (0.00)	0.04*** (0.01)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Light source	9.01*** (0.96)	0.56*** (0.21)	0.00 (0.00)	0.05*** (0.01)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Agricultural land	-0.86*** (0.33)	0.02 (0.14)	-0.00 (0.00)	-0.00 (0.01)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.01 (0.00)
Ave. gross income	4.33*** (0.53)	0.00 (0.05)	0.00 (0.00)	0.01** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)

Appendix 6. Marginal effects of parental migration on education and health of children using 1989 migration rate, PSM-IV

	First stage	Second stage						
	<i>Child of migrant</i>	Current Grade	Poor Grades	Regular Study	Sickly	Temper	Work in the past week	Work in the past year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>2011 Regional Vars.</b>								
Ave. family income	-0.01*** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00*** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Hunger percentage	1.69*** (0.21)	-0.03 (0.04)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
No. of schools	-0.00*** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)			-0.00 (0.00)	-0.00 (0.00)
Attendance ratio	11.66*** (1.42)	0.00 (0.10)	0.00 (0.00)	0.03*** (0.01)			0.00 (0.00)	0.01 (0.00)
<b>2003 Regional Vars.</b>								
Ave. family income	-0.00*** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00** (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Gini concentration ratio	535.65*** (63.84)	-1.17 (2.88)	0.25 (0.20)	1.41*** (0.52)	0.00 (0.01)	-0.02 (0.01)	0.26 (0.00)	0.41 (0.00)
Poverty incidence	-14.73*** (1.77)	0.02 (0.05)	-0.01 (0.01)	-0.04*** (0.01)	0.00 (0.00)	0.00 (0.00)	-0.01 (0.00)	-0.01 (0.00)
No. of schools per 1000 population	-245.72*** (29.51)	0.65 (0.88)	-0.10 (0.09)	-0.61*** (0.23)			-0.12 (0.00)	-0.17 (0.00)
Elementary net participation rate	23.09*** (2.78)	0.00 (0.06)	0.01 (0.01)	0.06*** (0.02)				
Secondary net participation rate	-12.08*** (1.45)	-0.01 (0.04)	-0.01 (0.00)	-0.03*** (0.01)			-0.01 (0.00)	-0.01 (0.00)
Telephone density	9.93*** (1.18)	0.03 (0.03)	0.00 (0.00)	0.03*** (0.01)	0.00 (0.00)	0.00 (0.00)	0.01 (0.00)	0.01 (0.00)
Road density	0.29*** (0.05)	0.00 (0.01)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Labor force participation rate	15.59*** (1.87)	-0.04 (0.04)	0.01 (0.01)	0.04*** (0.01)	-0.00 (0.00)	0.00* (0.00)	0.01 (0.00)	0.01 (0.00)

Appendix 6. Marginal effects of parental migration on education and health of children using 1989 migration rate, PSM-IV

	First stage	Second stage						
	<i>Child of migrant</i>	Current Grade	Poor Grades	Regular Study	Sickly	Temper	Work in the past week	Work in the past year
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No. of hospitals per 1000 population					-0.07 (0.12)	-0.08 (0.06)		
Constant	-2,045.06 (0.00)							
Observations	6,258	6,258	6,258	6,258	6,174	6,174	6,258	6,258

Notes: \*\*\*, \*\*, \* indicate 1%, 5%, and 10% statistical significance, respectively. Robust standard errors in parentheses.

Dummy variables for the 17 regions in the Philippines are included.