Remittances and the Educational Attainment of Children in the Philippines

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Acknowledgements

Abstract

This paper examines the determinants, primarily the receipt of remittances, of educational attainment of Filipino children using merged datasets from the 2003 Labor Force and Family Income and Expenditures Surveys. The determinants of the highest grade completed of children aged 13 to 22, 17 to 22, and 21 to 22 years are studied using IV-ordered probit models. Estimation results show that the receipt of remittances has positively affect the probability of finishing high school for Filipino males aged 17 to 22 years. However, the receipt of remittances negatively affects the probabilities of graduating from elementary school and college for females aged 13 to 22 and 21 to 22 years, respectively. Parental education has the largest contributions to changes in the probabilities of graduation and the effects of having a highly educated mother are greater than that of having a highly educated father. Limited household resources adversely affect the education of children.

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Chapter 1 - Introduction

For close to the past three decades, international migration has grown to become an increasingly conspicuous part of the economic life of the Philippines. Between 1975 and 2007, the total deployment of migrants grew annually by an average of 9.8 percent (Orbeta & Abrigo, 2009) with 1,470,826 workers leaving in 2010 (Philippine Overseas Employment Agency, 2011). It is estimated that as of 2010, the stock of overseas Filipinos stood at 9,452,984 (Commission on Filipinos Overseas, 2010) or around 10 percent of the population. (Figure 1.1 shows the evolution of the stock and deployment of migrants between 2005 and 2010.) Accompanying the rise of labor exports from the Philippines is the fact that over the past two decades, annual remittance inflows to the Philippines grew at an average annual rate of 14 percent. From receiving a little over US$1.2 billion in remittances in 1990, remittances have grown to reach US$20 billion in 2011 or equivalent to ten percent of gross national income (Bangko Sentral ng Pilipinas, 2012b). In contrast, the average annual inflow of net foreign direct investment and official development assistance between 2005 and 2010 stood at just US$2.66 billion (The World Bank, 2012). The growth in gross international reserves (GIR) has also generally followed that of remittances' and has grown at an average annual rate of 18 percent to reach US$62 billion in 2010 from US$2 billion in 1990 (see Figure 1.2). According to the Bangko Sentral ng Pilipinas (BSP) (2012b), the GIR is expected to have grown by 20 percent over 2010 to reach US$75 billion by 2011.

The Philippine government's labor export policy has become a cornerstone of Philippine development policy (Solomon, 2009) and future migration flows from the Philippines are expected to continue into the long-term due to a number of push factors (Ducanes & Abella, 2009). Notwithstanding these developments, the effects of international migration and remitting behavior on the household remain largely unknown. On the one hand, migration imposes costs on the sending household, in terms of what Pernia (2009) calls "psychosocial costs" (p. 4) when family members are separated from each other. On the other hand, households may also receive remittances from abroad, which may then act to augment its income and therefore

change the behavior of its members. In view of these, the net effect of the household's migration behavior is largely uncertain. Thus, the evaluation of the effects of migration on the household is becoming increasingly important.

Figure 1.1 Stock and Deployment of Overseas Migrants, 2005-2010
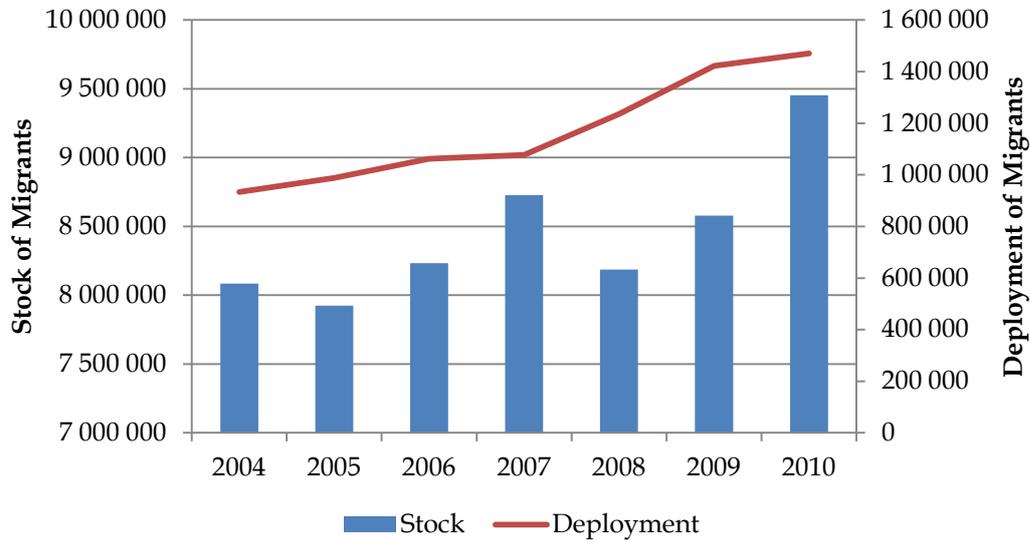
Source: Data on the stock of migrants is taken from the Commission on Filipinos Overseas (2010) while data on the deployment of migrants is taken from the Philippine Overseas Employment Agency (POEA) (2011).

Figure 1.2 Gross International Reserves and Remittances (in US$ million), 1990-2010
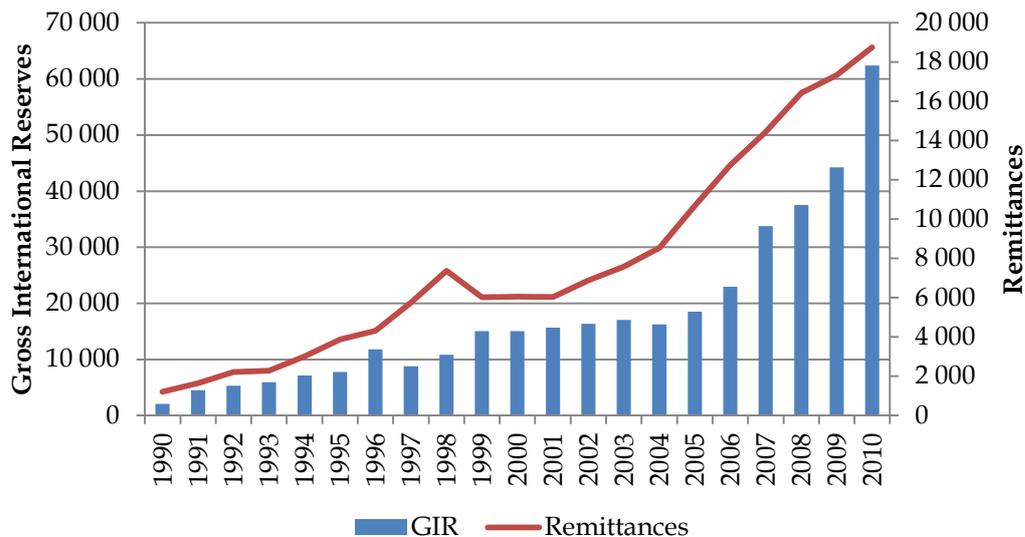
Source: BSP (2012a)

This study aims to determine the effect of the receipt of remittances on the educational attainment of children in a household. In order to address this, cross-sectional data from the 2003 Family Income and Expenditure Survey and the 2003 Labor Force Survey were used. These surveys contain information on the educational attainment of the members of a household, their demographic characteristics, some details on the household's neighborhood and community, and remittance behavior within households. Using an instrumental variables (IV) framework in order to address the issue of endogeneity of remittance behavior, it was found that the receipt of remittances has a positive and statistically significant effect on the probability of graduating from high school for Filipino male children aged 17 to 22 years, in line with the expected positive relationship between remittances and educational attainment. However, in contrast with a priori expectations, the effect of the receipt of remittances on the probabilities of graduating from elementary school and college, respectively, for female children aged 13 to 22 years and 21 to 22 years, has been observed to be negative. It was also shown that parental education has some of the largest contributions to changes in the probabilities of graduation across the three age groups studied and that the effects of having a highly-educated mother are greater than that of having a highly-educated father. Limited household resources also adversely affect the educational attainment of children and there are regional disparities with regard to the educational attainment of children.

While there is a preponderance of earlier work regarding the relationship between remittances and household behavior, there has been relatively little work, thus far, on the relationship between remittances and human capital accumulation. At the same time, this study aims to contribute to studies related to the educational attainment of children, especially in developing countries, in general, and East Asia, in particular, as the vast majority of the literature in this area have focused on high-income countries or countries in Latin America. It is hoped that the results of this study will be able to assist policymakers in assessing their outlook on labor migration as a policy tool for development.

The rest of the paper is organized as follows: The succeeding section provides a brief profile of the Philippines. Part three provides a review of the literature regarding the relationship between remittances and the educational attainment of children. The fourth section discusses the theoretical model that will guide the formulation of the empirical model, which is then discussed in part five. Part six contains a brief discussion of the data used in the study. The empirical findings are presented and discussed in part seven while the concluding remarks are provided in the final section.

Chapter 2 - The Philippines

The Republic of the Philippines is an island nation consisting of 7,107 islands located in Southeast Asia between the Pacific Ocean and the West Philippine Sea. It was colonized as part of the Spanish Empire beginning in 1565 and was ceded to the United States in the aftermath of the Spanish-American War in 1898. It came under the control of the Empire of Japan in 1942 during World War II and was liberated in 1945. On 4 July 1946, the Philippines was granted its independence by the United States.

The next subsection highlights some broad economic trends in the Philippines since its independence while the succeeding subsection will look at the government's labor export policy. This section will conclude with a brief introduction with regard to the contemporary stituation of Philippine education.

The Economy

The Philippine experience with regard to economic development stands out as the exception to the "development miracles" experienced by its neighboring East Asian countries (see Table 2.1). Indeed, the Philippines was second in Asia next to Japan in terms of per capita gross domestic product (GDP) in 1960 (Martin, et al., 2004) but the succeeding three decades saw its ranking drop considerably. Various reasons have been propounded as to its lackluster performance, one of which is the misallocation of resources due to excessive import substitution between the 1950s and the 1960s (Williamson, 1969). Other reasons point to the political economy fostered during the presidency of Ferdinand E. Marcos between 1965 and 1986, during which cronyism and corruption became rampant such that by 1983, a financial crisis had ensued brought about by massive capital flight coupled with unsustainable public debt levels (see Overholt (1986) for a detailed analysis). In 1986, President Marcos was overthrown in a peaceful "people power" revolution and a new, democratic constitution was ratified in 1987, paving the way for the election of a new government.

Table 2.1 Average Annual Growth Rates of Real GDP of Selected East Asian Countries and Territories, 1950-2009

Country/Territory	1951-60	1961-70	1971-80	1981-90	1991-2000	2001-09
Hong Kong	9.2	7.1	6.8	5.4	3.0	3.2
Singapore	5.4	7.4	7.1	5.0	4.7	2.0
South Korea	5.1	5.8	5.4	7.7	5.2	3.5
Taipei, China	7.6	9.6	9.3	8.2	5.5	2.7
Malaysia	3.6	3.4	5.3	3.2	4.6	2.2
Thailand	5.7	4.8	4.3	6.3	2.4	3.1
Indonesia	4.0	2.0	5.3	4.3	2.9	3.8
Philippines	3.3	1.8	3.1	-0.6	0.9	2.3

Source: National Economic and Development Authority (2010)

By the 1990s, macroeconomic and trade policy reforms were instituted by the succeeding administrations such that between 1994 and just until the eve of the 1998 Asian financial crisis (AFC), the economy had been growing at around five percent per year (The World Bank, 2012). However, between 1998 and 2001, the economy began to be beset not only by the AFC but by a political crisis brought about by corruption charges being levied against President Joseph Ejercito Estrada. By the 2000s, the economy had started to pick up steam and grew at a moderate pace of around 4.6 percent per year for the decade, even hitting a 30-year high of 7.6 percent growth in 2010. It is expected that this pace will be sustained in the coming years as the current government's anti-corruption drive is intensified and is coupled with reforms in terms of institutions and economic policies. However, in spite of the gains posted in terms of its economy, poverty incidence among the population grew in the late-2000s such that by 2009, the country was said to be eight years behind its poverty reduction targets (with some administrative regions lagging by as much as 20 to 80 years behind their 2009 targets) [1] (Virola, 2011).

In the long term, Groff (2012) identifies a number of key areas that must be addressed in order for the Philippines to achieve a higher growth path. These include: (i) introducing structural adjustments in employment; (ii) increasing investments in infrastructure and social services, including education; (iii) reversing

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[1] In particular, Caraga, the Zamboanga Peninsula, and the Autonomous Region in Muslim Mindanao are said to be 21, 27, and 81 years behind their respective 2009 poverty reduction targets.

the decline in the country's natural environment; and (iv) improving governance and political economy.

The Labor-Export Policy

The Philippines's promotion of overseas employment began in in 1974 as a stopgap measure to the balance of payments crisis that arose from the oil price shock that occurred in 1973 (Solomon, 2009). It was during this time that the government created agencies that were specifically tasked to recruit and deploy workers to foreign countries (Pernia, 2009). Of the flow of overseas migrants, the bulk is comprised of temporary workers (primarily land-based workers vis-à-vis sea-based workers) who make up between 60 and 75 percent of all deployments between 1985 and 2005 (Orbeta & Abrigo, 2009). It is also worth noting that the share of service workers in the deployment of land-based temporary migrants has been increasing between 1975 and 2010 and has had the largest share since the start of the 21st century. The top three occupations are rounded out by production workers and those in the professional, medical, technical, and related fields (see Table 2)[2].

Table 2.2 Distribution of (Land-based) Temporary Migrants by Occupation, 1985-2010

Occupation	1975	1980	1985	1995	2000	2005	2010
Professional, medical, technical and related workers	53.5	15.5	22.5	20.4	31.1	22.5	12.3
Administrative and managerial workers	0.6	0.5	0.4	0.2	0.1	0.2	0.4
Clerical workers	1.8	3.4	4.5	1.6	0.9	1.9	3.1
Sales workers	0.4	0.3	0.8	0.9	0.8	1.5	2.1
Service workers	22.0	14.9	27.1	37.8	36.0	47.1	45.4
Agricultural workers	0.9	1.0	0.4	0.5	0.2	0.1	0.3
Production workers	20.8	64.4	44.4	38.6	30.8	26.7	35.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Data for the years 1975 to 2010 is taken from Orbeta and Abrigo (2009) while the data for 2010 is taken from the POEA (2011).

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[2] Service workers are comprised primarily of housekeepers and household help; production workers are mainly comprised of factory and construction workers; while professionals are comprised mainly of architects, engineers, and those in the medical and allied health services (POEA, 2005).

As mentioned earlier, accompanying the rise of overseas migrants from the Philippines is the continuous increase in the country's receipt of remittances from abroad. The remittances received in 2011 have been estimated to be seven percent higher than the amount remitted in 2010 and is expected to grow a further five percent over 2011 by 2012 (BSP, 2012b).

Education in the Philippines

The Philippine educational system is mainly comprised of two levels: basic (which includes preschool, grade school, and high school) and tertiary (which includes college, graduate school, and technical/vocational education) (Department of Education, 2008). This is the existing structural arrangement as provided for by law since the basic level falls under the purview of the Department of Education while the tertiary level is regulated by the Commission on Higher Education (for college and graduate education) and the Technical Education and Skills Development Authority (for technical/vocational education). In 2001, a new law was enacted whereby elementary education was made compulsory for those aged 6 to 11; preschool for those aged 3 to 5 and secondary schooling for those aged 12 to 15 is optional but free (Department of Education, 2008). This setup has resulted to the Philippines having one of the shortest basic education cycles in the world (Mariñas & Ditapat, 1999).

The National Economic and Development Authority (2010) writes that there has been inadequate delivery of educational services for over the past 20 years. A glaring observation is that the net enrollment rate for primary education, which peaked at 97 percent in 1999, has since dropped to around 85 percent for most of the 2000s. This is accompanied by a cohort survival rate that has averaged between 70 to 75 percent for most of the same decade, in spite of primary education being mandatory. At the same time, these figures are striking since the largest share of the government budget must go to education, according to the constitution[3] (Department of Education, 2008).

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[3] In spite of this requirement, the percentage share of public expenditure on education to GDP has actually declined from 3.3 percent in 2000 to 2.7 percent in 2008 (The World Bank, 2012).

In general, the Department of Education (2008) maintains that the Philippine educational system has been perennially beset with a number of issues in spite of the accommodations provided to it in terms of increased budgets and improved institutional arrangements. Indeed, while gains have been made in the past few years, issues regarding "high dropout rates, high number of repeaters, low passing grades, lack of particular language skills, failure to adequately respond and address the needs of people with special needs, overcrowded classrooms and poor teacher performances" (p. 2) have yet to be addressed fully.

Chapter 3 - Related Literature

Before highlighting the previous work done on the relationship between remittances and educational attainment, this chapter begins by underpinning the decision of migrants to send remittances home. Lucas and Stark (1985) provide an early model of the motives to remit, wherein the process of remitting may be thought of "as part of an intertemporal, mutually-beneficial contractual arrangement between migrant and home" (p. 904). Their hypothesis goes beyond the notion that remittances just act to augment or diversify income. In particular, the possible motives to remit include: (i) altruism, (ii) inheritance, (iii) investment back home, (iv) intention to go home, and (v) insurance. Lucas and Stark (1985) and Stark and Lucas (1988), who looked at the motives of remitting based on data from Botswana, provide some of the earliest empirical studies that attempted to tease out these determinants.

Remittances in the Developing World

Between the 1990s and the 2000s, remittances began to emerge as an important source of external funding for developing countries (Ratha, 2003). In particular, remittances have been observed to become the second largest source of external finance after foreign direct investment (FDI) for most of the 2000s and are much more consistent than FDI or private debt and portfolio flows, in addition to growing faster than private capital flows and official development assistance between 1995 and 2004 (The World Bank, 2011). It is also worth noting that in just the first half of the 2000s, remittances to lower middle income countries grew by 86 percent, and remittances sent to Sub-Saharan Africa, Latin America and the Caribbean, and East Asia and the Pacific grew by 72 percent, 74 percent, and 114 percent, respectively (The World Bank, 2006).

In tandem with this upsurge in remittances, researchers concomitantly began looking at the more specific development effects of remittances. Studies in this area have typically fallen in one the following strands: (i) macroeconomic effects in general (see Barajas, et al. (2009) for the relationship with the growth of per capita GDP for a panel of countries; López, et al. (2008) for a panel data analysis on the

relationship with the real exchange rate; Durand, et al. (1996) for a panel data analysis on the multiplier effect in Mexico; and Korovilas (1999) for a comparative analysis of the effect on GDP growth in Albania), (ii) poverty and inequality (see Shroff (2009) for an analysis on the effect on poverty using household surveys in Mexico; Acosta, et al. (2008) for a panel analysis of the effect on poverty using the headcount measure and inequality using the Gini coefficient, in Latin America; and Adams and Page (2005) and Gupta, et al. (2007) for panel analyses of the effect on poverty as measured by the poverty headcount, poverty gap, et al.), (iii) labor outcomes (see Cox Edwards & Rodriguez-Oreggia (2008) for a study using propensity score matching regarding the relationship with labor force participation in Mexico, Hanson (2007) for an ordinary least squares (OLS) analysis using cross-sectional data of the relationship with labor force participation in Mexico, Bussolo and Medvedev (2007) for a general equilibrium analysis of the effect on labor force participation in Jamaica, and Rodriguez and Tiongson (2001) for a probit analysis of the effect on labor supply in the Philippines), and (iv) human capital (see Ponce, et al. (2011) and Antón (2010) for an IV approach regarding the effect on children's health and nutritional status and household health expenditures in Ecuador; López-Córdova (2005) for the effect on infant mortality rates at the municipal level in Mexico; and Acosta, et al. (2008) who looked at the relationship with children's anthropometric indicators in Guatemala and Nicaragua).

Determinants of Educational Attainment

Educational attainment is perhaps one of the most conspicuous components of an individual's human capital and as such, it is not neglected in the literature, especially in the light of the generally accepted notion of the positive relationship between the accumulation of human capital and economic growth. In this regard, studies have looked at the process by which individuals attain education, and were mainly empirical applications of the human capital model as set out in Becker (1965), Becker and Lewis (1973) and Becker and Tomes (1976), which relates individual, household, and community characteristics to an individual's educational attainment (see, among a myriad of others, the work of Lillard and Willis (1994) and Woodruff

and Binder (1999) for the relationship between parental education and children's education; Biblarz and Raftery (1999), Mahler and Winkelmann (2004), and van Eijck and de Graaf (1995) for the relationship between family structure and family size on the educational attainment of children; Plug and Vijverberg (2001) for the relationship between familly income and children's educational outcomes; and Simonsen and Kessy (2006) and Alderman, et al. (2001) for the effect of children's health on educational attainment).

Remittances and Educational Attainment

Studies specifically looking at the relationship between remittances and educational attainment are relatively recent. It is widely held that remittances typically act to ease the liquidity constraints of households and so the receipt of remittances should allow households to increase investments in human capital, among others. However, analyses involving the effects of remittances on educational outcomes should be done in the light of the notion that remittances are often due to a household member migrating abroad, which in turn might adversely influence a child's educational attainment by affecting family structure. In this regard, the question of the (total) effect of migration (in general) on educational attainment is mainly an empirical question (Hanson & Woodruff, 2003), and as López-Córdova and Olmedo (2006) write, analyses of the effects of remittances on educational outcomes may well be specific to the particular location under study and may not be generalizable to another context.

The work of Hanson and Woodruff (2003) is one of the earliest studies linking remittances and children's education. Using an IV approach, they find that the receipt of remittances from the United States significantly increases the years of schooling completed by a child. This effect was also found to be stronger for girls who are 10 to 15 years and whose mothers have relatively low educational attainment.

Acosta (2011), meanwhile, finds that remittances have practically zero or insignificant effect on the enrollment of children in El Salvador using estimates from (i) an IV framework and (ii) by using propensity score matching. However, when

the interaction between remittances and gender is taken into account, it was shown that girls living in households that receive remittances see an increase in the probability of staying in school by 10.9 percent compared to girls who do not receive remittances. For boys, the effect of remittances was still found to be statistically insignificant. Using IV, López-Córdova (2005) also found that as the proportion of households receiving remittances in a particular municipality in Mexico increased, child illiteracy decreased by around 40 percent and school attendance increased by almost 4 percent. Amuedo-Dorantes, et al. (2010) also use the IV method when looking at the effect of remittances on the probability of being a student and they find that the effect is indeed positive and statistically significant among children in Haiti. Similarly, using the same technique, Calero, et al. (2009) found that remittances increase the enrollment into private school for the case of Ecuador, on the average.

Using OLS estimation, Acosta, et al. (2008) find that households receiving remittances see a significant and positive effect on years of schooling for children aged 10 to 15 years for most Latin American countries in their analysis and that this positive effect becomes larger for children whose parents have low education. Cox Edwards and Ureta (2003), meanwhile, estimated a Cox proportional hazard model to study the probability of dropping out of school in El Salvador. They show that remittances tend to reduce the probability of dropping out of school and that this effect is stronger for students in the rural areas vis-à-vis those who are in urban areas with the same result being arrived at by Bredl (2011) for Haiti using the same method as Cox Edwards and Ureta's (2003). Yang (2003), on the other hand, exploited the experiment that unwittingly arose from the exchange rate shock experienced by the Philippines due to the 1997-98 Asian financial crisis. He found that a ten percent increase in remittances relative to a household's initial income increased the proportion of children aged 17 to 21 years who are students by roughly the same percentage.

To sum, the analyses presented in this subsection, which have looked at the role of remittances in a child's educational outcomes, point to the notion that there is indeed a relationship between these two variables. However, this observed

relationship is not clear-cut. Indeed, it has been shown that the impact of remittances may well vary depending on individual-, household-, or community-level characteristics. In this regard, it bears repeating that the results obtained from such analyses may not be as generalizable to different contexts.

Chapter 4 - Theoretical Perspective

This chapter begins by briefly introducing the human capital model, which has traditionally guided studies on educational attainment while the next subsection will relate remittances to educational attainment. These theories will underlie the empirical analysis undertaken in this study.

The Human Capital Theory

Education is regarded as investment in the human capital theory and as such, individuals compare the costs (both direct and opportunity costs) to the future benefits of education (Schultz, 1960). In order to obtain a basis, meanwhile, for the evaluation of the determinants of investments in schooling, production models were paired with the human capital theory, with the household acting as a production unit (e.g., Becker, 1965; Becker & Lewis, 1973; Becker & Tomes, 1976). In particular, Becker and Tomes (1993) propose that the adults in the production unit (i.e., the household) make decisions regarding the supply of economic resources and that the allocation within the household is affected by the nature of these resources as well as the timing of the distribution.

In these mated models of human capital and production, parents are assumed altruistic and maximize household utility as a function of the number of children within the household, the quality of children, a "composite" consumption good, and leisure. Maximizing utility subject to income and time constraints yields a set of reduced-form household demand equations for, among others, the education of the children in the household. Holmes (1999) provides such an example of a reduced-form demand equation for the quantity of schooling and its determinants:

$$S^* = F(W, P_m, P_n, V, X, Z) \tag{4.1}$$

where S^* is the completed years of schooling for child, W refers to wages as well as expected future earnings of the members of the household, P_m is a vector of market input prices, P_n refers to non-market prices, V is unearned household income, X is a vector containing individual and family characteristics, while Z represents

community characteristics not otherwise subsumed in P_m and P_n. If schooling is regarded as a normal good, higher income and wealth increases schooling; if schooling were to be regarded as an investment good in the light of imperfect capital markets, the positive relation between income and schooling still exists since an increase in income eases this constraint.

A Theory of Remittances and Educational Attainment

McKenzie and Rapoport (2006) proposed a model of educational attainment, which can potentially be affected by the receipt of remittances by a household. In particular, a household's schooling decision is to choose a particular level of educational attainment, $s \in \{0,1,2,\dots,N\}$, such that the discounted net present value of schooling is maximized subject to the condition that the costs of schooling are borne out of the household's resources:

$$s_i^* = \arg\max \sum_{j=1}^{s} \left(r_{i,j} - c_{i,j} - k_{i,j} \right) s.t. \sum_{j=1}^{s} c_{i,j} \le A_i; s \in \{0,1,2,\dots,N\} \qquad (4.2)$$

Here, $r_{i,s}$ refers to the discounted return of each additional level of schooling s to child i and $c_{i,s}$ refers to the additional monetary cost of completing the additional level of schooling; $k_{i,s}$ refers to additional non-financial costs (e.g., income foregone due to going to school). It should be noted that costs are incurred at the time of schooling while the associated returns are realized in the future. The monetary costs of schooling are financed via the current resources of the household net of its subsistence requirements, represented by A_i.

The McKenzie-Rapoport model then introduces an unconstrained level of schooling for each child, s_i^U, which holds if the financing constraint is non-binding, and is increasing in mother's education as well as with household resources. At the same time, the term s_i^P is introduced, which refers to the maximum possible level of schooling that may be attained in the presence of the budget constraint; this is expected to be increasing in household wealth and mother's education. Therefore, $s_i^* = \min\left(s_i^U, s_i^P \right)$, and child i's schooling is increasing in household resources

perhaps because of a relaxation of the household's credit constraints and to higher desired levels of schooling owing to being in a household with more resources[4].

In the light of households being constrained by lack of credit or scarce resources, the receipt of remittances by a household would then tend to increase the value of its resources, A_i. This is then expected to increase the affordable level of schooling, which is attainable in the presence of the budget constraint, s_i^P, and households thus able to move closer to attaining s_i^U, resulting to higher educational attainment for their children[5]. This is shown in the following figure:

Figure 4.1 The Effect of Remittances on Schooling
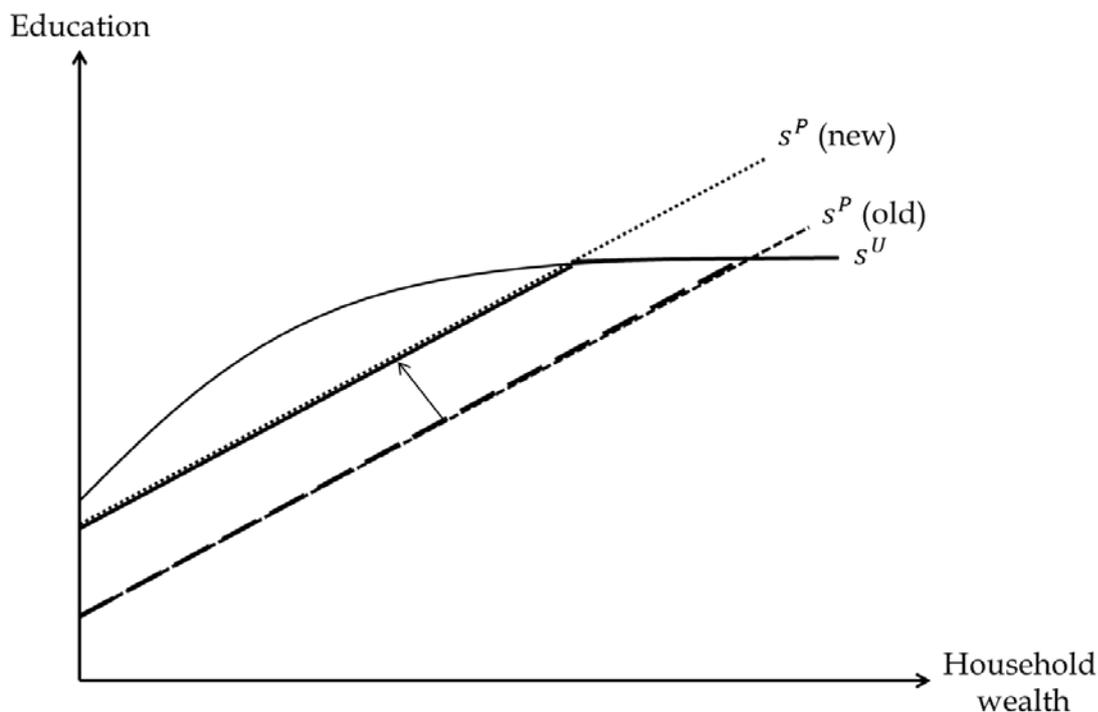
Source: McKenzie and Rapoport (2006, p.34)

Here, the receipt of remittances by the household shifts the possible schooling line up and to the left from s^p (old) to s^p (new), moving it closer to the unconstrained level of schooling, which is denoted by s^U.

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[4] McKenzie and Rapoport (2006) also expect maternal education to be correlated with household resources.

[5] It should be noted, however, that if the credit constraint is non-binding, then remittances would have no effect on the educational attainment of children.

Chapter 5 - Methodology

In this section, the empirical methods with which to analyze the relationship between remittances and educational attainment are presented. In particular, issues on endogeneity and variable measurement, the model used, and the variables involved will be discussed in this chapter.

Methodological Issues

From the literature review presented earlier, it is conspicuous that the IV technique has seen great use with regard to studies relating remittances and educational attainment. This is suggestive of the notion that analyses of this sort potentially suffer from the problem of endogeneity between the receipt of remittances and educational outcomes. Hanson and Woodruff's (2003) seminal paper gives an example wherein an exogenous shock affects both a child's education and the household's probability of receiving remittances at the same time, leading to biased estimates via OLS. In this regard, more reliable estimates may then be arrived at through the use of the IV method. Indeed, Hanson and Woodruff (2003), López-Córdova (2005), Acosta, et al. (2008), Calero, et al. (2009), Amuedo-Dorantes, et al. (2010), and Acosta (2011), are the works cited in the literature review that employed IV in their analyses.

In particular, one family of instruments that stands out is that which relates to historical migration patterns. The argument for the use of these instruments is that migration patterns act as networks that reduce the transaction costs of migrating for those who are just about to leave the home country. The use of long lags, in particular, as in Hanson and Woodruff (2003), who used historical migration patterns for each of the Mexican states in the 1950s to instrument for migration status, reflects the state-level characteristics that affect migratory behavior, and not the state-level conditions that were prevailing at the time of migration. López-Córdova (2005) also uses the instrument of Hanson and Woodruff (2003) but with the inclusion of the distance of the municipality to Mexico's border with the United States. Acosta (2011), meanwhile, uses a variant of historical migration patterns in the form of the proportion of families in a particular municipality that has an

international migrant and the number of migrants (who have been away for two or more years) who have returned home. Similarly, Acosta, et al. (2008) use the share of households with a migrant worker, per province as an instrument.

In contrast to the use of the above instrument, Calero, et al. (2009) note that historical migration patterns may not adequately explain the variation with regard to remittances. In this regard, they use the variation in the transaction costs incurred when sending remittances to explain the variation in remittances. In particular, they use the (i) source country of the remittance and the (ii) number of Western Union remittance offices in a particular region as instruments, the argument being that a higher number of Western Union offices reduces the costs of sending remittances back home. Indeed, they find that the number of Western Union offices interacted with country dummies significantly predicts the probability of receiving remittances.

Ameudo-Dorantes, et al. (2010), meanwhile, use the labor market conditions in the most likely destination country of the migrants to instrument remittances. In particular, they use the weekly earnings of American workers who are similar in characteristics to Haitian migrants and the unemployment rates in the states to which the household is most likely to migrate. Avila and Schlarb (2008) use instead household-level instruments, which are: (i) the household's knowledge of a migrant and (ii) whether the household had a member with a foreign nationality as instruments for the receipt of remittances.

Turning away from the IV framework, Yang (2003), as mentioned earlier, used the experiment arising from the 1997-98 Asian financial crisis, which affected remittances via the exchange rate shock experienced by the country. Acosta (2011) also used a fairly non-traditional method in his analysis by employing propensity score matching, which is based on the condition that only observable characteristics affect both educational attainment and the decision to remit. It is, however, acknowledged that this condition may be quite restrictive especially since it is entirely possible that households with migrant members are systematically different vis-à-vis those who do not have migrants.

While acknowledging the problem of unobserved characteristics that might potentially plague the receipt of remittances and educational attainment, Acosta, et

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al. (2008) nonetheless use OLS in their estimation with the qualification that including parental education in the estimation would reduce the effect of the unobservable variables. They add that while IV estimation may be appropriate, data limitations, such as the relatively small sample size of children in their analysis, may preclude its use.

As evidenced by the literature, perhaps the main concern with regard to analyses of the effect of remittances on educational outcomes has to do with the presence of unobserved variables that affect both remittances and educational attainment. In this regard, studies have used a variety of methods to study this effect and the most prominent of which seems to be the IV approach.

In addition to the concern regarding the possible endogeneity of educational attainment with remittances, a number of studies have also raised an issue regarding the measurement of the educational attainment of children. In particular, this arises when the children involved in the analysis are still enrolled in school and so their level of actual or eventual educational attainment is unknown. De Haan and Plug (2006) compare various methods for alleviating this concern and write that replacing the observed educational attainment levels by the expectation of parents with regard to their children's eventual schooling attainment best solves the issue but that this data is not widely available. In this case, looking at the children who are above graduation ages for various educational attainment levels comes up as the next best solution.

Tansel (2002) also employed the aforementioned technique in her analysis of the determinants of educational attainment of children in Turkey where she carried out her estimation on different samples that are restricted to children who are above graduation ages with respect to various levels of schooling. This method limits the samples to older children, discarding observations from younger children as their eventual schooling attainment is not yet known. In particular, she restricted her sample to individuals aged 14 to 19 when studying the determinants of completing primary school since children aged 14 must have finished primary schooling by that age. When doing the analysis for the determinants of middle school education, the sample is restricted to those aged 16 to 19 since those aged 16 must have already

finished middle school by that age, with an analogous argument for analyzing high school education by looking at those aged 19 and 20.

Empirical Model

An ordered probit model of school attendance specified as follows:

$$S_{ih}^* = \beta'\mathrm{x} + \varepsilon \tag{5.1}$$

where S_{ih}^* refers to a latent dependent variable with regard to child i in household h, and is related to a set of individual and household characteristics, including the receipt of remittances by the household, in the vector $\mathbf{x}$, and ε is a well-behaved error term.

Note that the ordinal variable S represents the educational attainment of children (to be discussed in detail in the next subsection) and is the observed counterpart of S^*. Since S^* is unobserved, what is observed (as in Greene, 2003) is:

$$S = \begin{cases} 0 \text{ if } S^* \leq 0 \\ 1 \text{ if } 0 < S^* \leq \mu_1 \\ 2 \text{ if } \mu_1 < S^* \leq \mu_2 \\ \quad\vdots \\ J \text{ if } \mu_{J-1} < S^* \end{cases} \tag{5.2}$$

where the μs are threshold parameters denoting the transition from one educational attainment level to another. Seven categories are defined in this study:

$$S = \begin{cases} 0 \text{ if no grade completed} \\ 1 \text{ if highest grade completed is some elementary school} \\ 2 \text{ if highest grade completed is elementary school} \\ 3 \text{ if highest grade completed is some secondary school} \\ 4 \text{ if highest grade completed is secondary school} \\ 5 \text{ if highest grade completed is some college education} \\ 6 \text{ if highest grade completed is college education} \end{cases} \tag{5.3}$$

For a normally distributed error term, the probabilities for each category are:

$$\Pr(S = 0) = \Phi(-\beta'\mathrm{x}),$$

$$\Pr(S = 1) = \Phi(\mu_1 - \beta'\mathrm{x}) - \Phi(-\beta'\mathrm{x}),$$

$$\Pr(S = 2) = \Phi(\mu_2 - \beta'\mathrm{x}) - \Phi(\mu_1 - \beta'\mathrm{x}), \tag{5.4}$$

$$\vdots$$

$$\Pr(S = J) = 1 - \Phi(-\beta'\mathrm{x})$$

where Φ is the standard normal cumulative density function. The respective marginal effects of the independent variables on the probability of attaining the Jth level of schooling is given by:

$$\frac{\partial \Pr(S = J|\mathrm{x})}{\partial \mathrm{x}} = \beta\big[\phi(\mu_{J-1} - \beta'\mathrm{x}) - \phi(\mu_J - \beta'\mathrm{x})\big] \tag{5.5}$$

where ϕ is the standard normal density function

Dependent Variable

The dependent variable is *educational attainment* which is an ordinal variable representing the highest grade completed of child *i*, who is aged between 13 and 22 years, inclusive. It should be noted that this only considers a person's highest attainment in the formal educational system. The selection of this age range is inspired by Tansel (2002), who mentions that the eventual schooling attainment for the children under analysis is unknown. The samples are then restricted to include only those children who are above the likely age of school completion, which is also expected to reduce the bias that might otherwise ensue due to the massing of children with regard to lower educational attainment levels.

In particular, three samples are to be constructed and will be restricted to the following ages: 13 to 22 years, 17 to 22 years, and 21 to 22 years. Children aged 13 to 22 shall be a sample set corresponding to elementary school graduates and is fit with three categories of schooling, 0, 1, and 2, corresponding to *no grade completed*, *some elementary schooling*, and *elementary schooling completed*, respectively. Children aged 17 to 22 is another sample that is fit with five categories of schooling, 0, 1, 2, 3, and 4 corresponding to *no grade completed*, *some elementary schooling*, *elementary schooling*

completed, *some secondary schooling*, and *secondary schooling completed*. Finally, children aged 21 to 22 is the final sample and is fit with six categories of schooling, ranging from 0 to 6, representing the abovementioned categories with 5 corresponding to *some college education* and 6 representing *college education completed*.

Independent Variables

Father's and Mother's Education. The human capital model relates parental education (as part of family characteristics) with that of the children's education. It is expected that parents who have higher educational attainment would have children whose own educational attainment is at least as high as that of their parents'. The educational attainment of both the father and mother are respectively represented by four dummy variables each of which represents a particular level of educational attainment, in particular:

$$S = \begin{cases} 1 \text{ if the parent has no schooling or has some elementary schooling} \\ 2 \text{ if the parent has completed elementary schooling or has some} \\ \quad \text{secondary schooling} \\ 3 \text{ if the parent has completed secondary schooling or has some} \\ \quad \text{college education} \\ 4 \text{ if the parent has completed college education} \end{cases}$$

It should be noted that when one level of education is considered, other levels of education would take a value of 0.

Age. The theoretical underpinning for this particular variable lies in the human capital theory; it is expected that an individual gains more education as he grows older.

Number of Co-resident Siblings. The theoretical underpinning for this variable lies in the theories on resource dilution, it is expected that an individual gains less education as family size increases. In particular, the study will take into account two variables: (i) the number of siblings who are aged less than six, and (ii) the number of those who are between the ages of six and 22 years, inclusive (i.e., these are children who are expected to be in school). It is assumed that the resource

requirements are different for these two age groups and so might have different effects with regard to the educational attainment of children.

Rural Location. Community characteristics are also expected play a role in the educational attainment of the child. This dummy variable is then included, which takes a value of 1 if the household is located in a rural area.

Locational Dummies. Dummy variables representing residence in one of the three island groupings of the Philippines are also included to control for further regional differences in educational attainments. The reference region is the island of Luzon, where the National Capital Region is located. These variables are expected to pick-up the different area-specific influences on educational attainment that are not contained in the other variables in the study.

Wealth. Wealth is expected to affect the educational attainment of children and in order to capture this effect, a wealth index will be constructed following Antón (2010) and Acosta (2011), among others. This wealth index is to be constructed using the first principal component of a principal component analysis of a household's assets holdings. The asset holdings available under consideration include information on ownership of dwellings, access to utilities (e.g., sanitation, telephone, electricity), and ownership of durables (e.g., vehicles, refrigerator, washing machine, et al.). In particular, all the asset holdings available in the dataset are used: (i) having a water-sealed toilet, access to (ii) electricity and an (iii) own-use faucet, ownership of a (iv) radio, (v) television set, (vi) video tape recorder, (vii) stereo system, (viii) refrigerator, (ix) washer, (x) air-conditioner, (xi) living room set, (xii) dining set, (xiii) car, (xiv) telephone, (xv) computer, (xvi) microwave, and (xvii) motorcycle. Variation in the ownership of these assets is said to be reflective of a household's long-run socio-economic status (Acosta, 2011). Following Antón (2010), the asset index for household h may be constructed as:

$$A_h = \sum_v f_v \frac{a_{hv} - m_v}{s_v} \tag{5.6}$$

where a_{hv} denotes a dummy variable that equals one if asset v is found in household h, m_v and s_v, meanwhile, refer to the sample mean and standard deviation, respectively for asset v across households and f_v represents the weight assigned to asset v by the principal components analysis. Using this methodology, the asset index was observed to have values from around -5 to 8.

Receipt of remittances. The remittance variable takes a value of one if the household receives remittances and 0 otherwise. A binary variable was chosen since the amounts reported in the survey data are based on recall and might therefore be plagued with measurement errors. As mentioned in the previous section, there is a concern that the receipt of remittances may be related with unobserved characteristics related to the schooling variable. In this case, the use of instrumental variables will enable a more credible estimation of the effect of remittances. In particular, following Calero, et al. (2009), the share of households with a migrant member (by region) is used as an instrumental variable, as this is expected to proxy for the presence of migration networks abroad. In order to first estimate this potentially endogenous variable, a linear probability model will first be run following Angrist (2001). The IV-ordered probit model will then be estimated using the `cmp` module of Stata, as proposed by Roodman (2009).

A Priori Expectations

The literature on the educational attainment of children has consistently shown that the educational attainment of both parents, as well as the age of the child, positively determines his educational attainment. The sibling variables are all expected to take a negative sign since a larger family size implies that there is less resources available on a per capita basis. Children, meanwhile, whose respective households are in an urban area are expected to have access to better educational facilities and are thus expected to achieve higher levels of educational attainment as opposed to those who live in rural areas.

The sign for the locational dummies is expected to be negative, conditional on the island of Luzon being the base region since this island group is the most developed among the three island groups in the Philippines. In addition, Luzon is

also where Manila, the country's capital, as well as the National Capital Region for that matter, is located. For the wealth/asset index, it is expected that a higher level of resources for a family would yield higher levels of educational attainment for the children in the household. Finally, the remittance variable is expected to take on a positive sign, as proposed earlier in the chapter on the theoretical perspective.

Chapter 6 - Data

The data used in this study is taken from the 2003 Labor Force Survey and the 2003 Family Income and Expenditure Survey, both of which are administered by the National Statistics Office. The Labor Force Survey (LFS) is a nationwide survey of households that is conducted quarterly and as with surveys of this type, its principal aim is to estimate the levels of employment and unemployment in the country. The Family Income and Expenditure Survey (FIES), meanwhile, is the main source of data on family income and expenditures in the Philippines. Information in these three surveys may be linked together by using a unique identification number attached to each household.

Descriptive statistics for the variables used in this study are presented in Table 3. It may be seen that between 22 to 24 percent of children aged 13 to 22 years, 17 to 22 years, and 21 to 22 years, are members of households who receive remittances from abroad. At the same time, this same proportion increases somewhat for those aged 17 to 22 years and 21 to 22 years. With regard to father's education, Table 3 shows that close to 70 percent of fathers have educational attainment levels that are between no schooling and the completion of just some secondary education. Roughly one quarter of fathers have finished secondary schooling or have some college education and around 7 percent have been observed to have graduated from college. This final observation contrasts with the findings for mothers. Indeed, around nine percent of mothers have finished college education. In addition, a larger proportion of mothers have completed elementary schooling compared to fathers; at the same time, a smaller proportion of mothers have been observed in the "no schooling or has some elementary schooling" category.

It also bears mentioning that around 45 percent of children aged 13 to 22 years are females and this proportion goes down to 42 percent for those aged 17 to 22 years, and 40 percent for those aged 21 to 22 years. The mean age for those in the first age group is around 17 years, 19 years for the second, and 21 years for the last age group. The wealth variable, meanwhile, stands at around 0.09 but is observed to

have a standard deviation of around 2.8. This is hardly surprising given the pervasive income and wealth inequality that is observed in the Philippines. The mean number of siblings who are aged less than six years is also found to be less than one for all the three age groupings while the mean number of school-aged siblings stands at around three for the first two age groups, and goes down to around two for those aged 21 to 22 years.

About half of the children across the three age groups are located in the island group of Luzon, close to 19 percent are in the Visayas, while the rest are in the island group of Mindanao; more than half of the children are also located in rural areas. Finally, with regard to the instrument, around 5 percent of the households in each region have a member who is a migrant.

Table 6.1 Descriptive Statistics for the Variables Used

Variable Description	Aged 13 to 22		Aged 17-22		Aged 21-22	
	Mean	SD	Mean	SD	Mean	SD
Receipt of remittance	0.201520	0.401141	0.222489	0.415930	0.241557	0.428073
Father's education						
No schooling or has some elementary schooling	0.354192	0.478275	0.364676	0.481353	0.367391	0.482146
Graduated from elementary schooling or has some secondary schooling	0.314851	0.464463	0.308071	0.461710	0.302646	0.459453
Graduated from secondary schooling or has some college education	0.260635	0.438988	0.252522	0.434472	0.248871	0.432405
Graduated from college	0.070322	0.255693	0.074730	0.262963	0.081093	0.273007
Mother's education						
No schooling or has some elementary schooling	0.275216	0.446629	0.281499	0.449744	0.272747	0.445420
Graduated from elementary schooling or has some high school education	0.376988	0.484639	0.372830	0.483572	0.382878	0.486141
Graduated from secondary schooling or has some college education	0.257378	0.437196	0.252522	0.434472	0.249086	0.432530
Graduated from college	0.090418	0.286784	0.093149	0.290649	0.095289	0.293646
Female	0.450742	0.497575	0.418876	0.493390	0.399226	0.489792
Age	16.827670	2.797019	19.225830	1.691849	21.476660	0.499509
Wealth	0.089700	2.796384	0.086300	2.771172	0.078600	2.728419
Number of siblings aged six years and below	0.367101	0.703383	0.239559	0.580962	0.153797	0.461755
Number of school-aged siblings	3.318665	1.645765	3.082356	1.742575	2.493439	1.807784
Child is in Luzon	0.506220	0.499969	0.522055	0.499528	0.547215	0.497819
Child is in the Visayas	0.190547	0.392739	0.183130	0.386784	0.189288	0.391779
Child is in Mindanao	0.303233	0.459662	0.294815	0.455973	0.263498	0.440577
Child is in a rural location	0.579299	0.493679	0.552909	0.497207	0.520757	0.499623
Proportion of households with a migrant per region	0.050230	0.024397	0.051563	0.024425	0.053158	0.024454
N	34,086		17,048		4,649	

Source: Author's own calculations based on the 2003 Family Income and Expenditure Survey and the 2003 Labor Force Survey.

Chapter 7 - Results and Discussion

This chapter presents the empirical results of the estimations for the ordered probit estimates of the determinants of elementary, high school, and college education for children aged 13 to 22 years, 17 to 22 years, and 21 to 22 years. To facilitate the reporting of the results, the findings are grouped according to the following major variables: (i) receipt of remittances, (ii) parents' education, (iii) demographic and household variables, and (iv) locational variables.

Before delving deeper into the findings, separate estimations were each run for the male and female subsamples for all the three age groupings to look at how different the results might be for each gender. Testing was done using a likelihood ratio test[6], which is the counterpart to a Chow Test when implementing a linear regression (Greene & Hensher, 2009). Based on the test results, the null hypothesis of group homogeneity was rejected for all three age groups.

Before proceeding to the main findings, it bears mentioning as a recapitulation that children aged 13 to 22 years is a sample comprised of those who have graduated from elementary schooling and are thus fit with three possible levels of educational attainment: *0* for *no grade completed*, *1* corresponding to *some elementary education*, and *2* for *elementary graduate*. It is interesting to note that that the probability of no schooling for both the male and female samples was found to be zero. However, the probability of attaining just some elementary schooling is higher for males (at around 14 percent) compared to females (who show a probability equal to just around eight percent). Finally, the probability of male children to graduate from elementary schooling stood at around 86 percent compared to the 91 percent observed in female children.

Meanwhile, children aged 17 to 22 years comprise a sample of children who are most likely to have finished high school and are fit with five categories of schooling: *0* for *no grade completed*, *1* for *elementary undergraduate*, *2* for *elementary*

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[6] The test statistic is given by $LR = 2[\sum_{g=\text{groups}} \log L_g - \log L_{\text{pooled}}]$, with a limiting chi-squared distribution that has degrees of freedoms that are equal to $g - 1$ times the number of parameters in the model.

graduate, 3 corresponding to *high school undergraduate*, and 4 for *high school graduate*. Similar to the probabilities reported for the sample of children aged 13 to 22 years, the probability of attaining no schooling is nil for both the male and female samples. However, there is a noticeable uptick in the probability of attaining just some elementary schooling for male children, whose corresponding probability stands at around 8 percent while that for female children is still practically zero. The probability, meanwhile, of finishing elementary schooling is higher for male children at around 10 percent compared to just three percent for female children. The same pattern of male children having higher probabilities of not finishing a particular educational attainment level vis-à-vis female children is also observed with regard to attaining just some high school education (at 30 percent probability for male children versus around 20 percent for female children). It also bears noting that male children have only a roughly 50 percent chance of finishing high school education compared to the 75 percent probability observed for female children.

Finally, children aged 21 to 22 years are those who are assumed to have already been finished with college education have seven possible categories of educational attainment: *0* for *no grade completed*, *1* for *elementary undergraduate*, *2* for *elementary graduate*, *3* corresponding to *high school undergraduate*, *4* for *high school graduate*, *5* for *college undergraduate*, and *6* for *college graduate*. In contrast to the probabilities seen in the earlier samples, the probabilities observed in this age grouping tend to peak at lower levels of educational attainment (i.e., at the categories corresponding to high school graduate and college undergraduate). Similar to the probabilities observed in the earlier age samples, the probability of attaining no schooling is zero for both male and female children. However, male children saw higher probabilities for the following lower educational attainment levels: (i) elementary undergraduate (seven percent for males versus two percent for females), (ii) elementary graduate (nine percent for males versus four percent for females), (iii) high school undergraduate (19 percent for males versus just nine percent for females), and (iv) high school graduate (32 percent for males versus 27 percent for females). On the other hand, the female sample saw higher probabilities for both college-level educational attainment levels. To be sure, the probability of

attaining just some college education stood at around 36 percent for female children compared to 29 percent for male children, while the probability of finishing college education stood at 21 percent for female children compared to just four percent for male children.

As the coefficients of ordered probit estimates are not directly interpretable (Greene & Hensher, 2009), the marginal effects are reported in the tables contained in this chapter.

The Effect of Remittances

As a starting point for the analyses, ordered probit estimations were run on the samples for male and female children for the three aforementioned age groups without the use of IV. The effect of the receipt of remittances on educational attainment was shown to be statistically significant[7] and with the expected positive sign for all estimations except for that of the female sample for children aged 21 to 22 years (see Appendices A and B).

However, when estimating the models using IV, the remittance variable is only statistically significant for the following: (i) female children who are aged 13 to 22 years at the five percent level, (ii) male children who are aged 17 to 22 years at the one percent level, and (iii) female children aged 21 to 22 years at the ten percent level. It should be noted that since the first stage is estimated as a linear probability model, the remittance variable is now interpreted as the probability of receiving remittances.

Table 7.1 shows the marginal effects of the IV-ordered probit estimates for male and female children aged 13 to 22 years. Here, the remittance variable is statistically insignificant for estimates carried out for male children but is statistically significant at the five percent level for female children. However, the remittance variable enters negatively, contrary to the a priori expectations set out earlier. The marginal effects show that a ten percentage point increase in the probability of receiving remittances results to: (i) a 0.3 percentage point ($0.1 \times 0.032 = 0.0032$) increase in the probability of not finishing any schooling, (ii) an increase in the

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[7] The remittance variable is statistically significant at the five percent level for all estimations.

probability of attaining just some elementary schooling by 1.9 percentage points, and (iii) a 2.2 percentage point reduction in the probability of finishing elementary schooling.

Table 7.1 Marginal Effects of IV-Ordered Probit Estimation on Elementary Schooling, Aged 13 to 22 Years

Variables	MALES			FEMALES		
	No Schooling	Elementary Under-graduate	Elementary Graduate	No Schooling	Elementary Under-graduate	Elementary Graduate
Receipt of remittance	-0.0049953	-0.1097621	0.1147574	0.0317304	0.1903444	-0.2220748
Father's education						
Graduated from elementary schooling or has some high school education*	-0.0036149	-0.0691118	0.0727267	-0.0022621	-0.0251622	0.0274243
Graduated from secondary schooling or has some college education*	-0.0045261	-0.0925389	0.0970649	-0.0037635	-0.0434290	0.0471925
Graduated from college*	-0.0038471	-0.0943307	0.0981778	-0.0022173	-0.0264375	0.0286548
Mother's education						
Graduated from elementary schooling or has some high school education*	-0.0039289	-0.0725364	0.0764653	-0.0046795	-0.0516885	0.0563680
Graduated from secondary schooling or has some college education*	-0.0048576	-0.0999488	0.1048064	-0.0061861	-0.0735669	0.0797529
Graduated from college*	-0.0039811	-0.0959125	0.0998936	-0.0043969	-0.0590207	0.0634177
Wealth	-0.0011889	-0.0211146	0.0223035	-0.0017600	-0.0188302	0.0205902
Number of siblings aged six years and below	0.0011865	0.0210722	-0.0222587	0.0015359	0.0164324	-0.0179683
Number of school-aged siblings	0.0004442	0.0078882	-0.0083324	0.0004474	0.0047871	-0.0052345
Age	-0.0011530	-0.0204766	0.0216296	-0.0018393	-0.0196790	0.0215182
Child is in the Visayas*	0.0024586	0.0396031	-0.0420617	0.0015130	0.0154516	-0.0169646
Child is in Mindanao*	0.0014582	0.0248515	-0.0263097	0.0045243	0.0440996	-0.0486239
Child is in a rural location*	-0.0001104	-0.0019572	0.0020676	-0.0003947	-0.0042115	0.0046063

* Marginal effect is for a discrete change of the dummy variable from 0 to 1

Tables 7.2 and 7.3, meanwhile, reports the marginal effects of the same estimation carried out for male and female children who are aged 17 to 22 years. In this case, and in contrast to the results shown for female children aged 13 to 22 years, the remittance variable is positive and statistically significant for male children at the one percent level while it is insignificant for female children. Here, a ten percentage point increase in the probability of remittance receipt has practically no effect on the probability of not finishing any schooling but is accompanied by around a one percentage point decrease in the probability of finishing just some elementary schooling as well as for graduating from elementary schooling. At the same time, this ten-percentage point increase in the probability of receiving remittances is accompanied by a 1.8 percentage point decrease in attaining just some high school education and about a four-percentage point increase in the probability of graduating from high school.

Table 7.2 Marginal Effects of IV-Ordered Probit Estimation on the Elementary Schooling of Male Children Aged 17 to 22 Years

Variables	No Schooling	Elementary Undergraduate	Elementary Graduate	High School Undergraduate	High School Graduate
Receipt of remittance	-0.0097101	-0.1085080	-0.0981507	-0.1817648	0.3981336
Father's education					
Graduated from elementary schooling or has some high school education*	-0.0037009	-0.0369922	-0.0289074	-0.0378153	0.1074157
Graduated from secondary schooling or has some college education*	-0.0063699	-0.0686486	-0.0577022	-0.0880259	0.2207467
Graduated from college*	-0.0049532	-0.0602409	-0.0551701	-0.0964599	0.2168242
Mother's education					
Graduated from elementary schooling or has some high school education*	-0.0033085	-0.0322242	-0.0246564	-0.0309461	0.0911352
Graduated from secondary schooling or has some college education*	-0.0064970	-0.0699700	-0.0588371	-0.0899462	0.2252503
Graduated from college*	-0.0058661	-0.0739237	-0.0704557	-0.1339240	0.2841695
Wealth	-0.0012563	-0.0119265	-0.0089126	-0.0106226	0.0327180
Number of siblings aged six years and below	0.0016479	0.0156440	0.0116907	0.0139338	-0.0429164
Number of school-aged siblings	0.0007120	0.0067592	0.0050511	0.0060203	-0.0185426
Age	-0.0011112	-0.0105493	-0.0078835	-0.0093960	0.0289400
Child is in the Visayas*	0.0018126	0.0164032	0.0118249	0.0131392	-0.0431798
Child is in Mindanao*	0.0008425	0.0078756	0.0058175	0.0067802	-0.0213157
Child is in a rural location*	0.0007634	0.0072792	0.0054593	0.0065543	-0.0200562

* Marginal effect is for a discrete change of the dummy variable from 0 to 1

Table 7.3 Marginal Effects of IV-Ordered Probit Estimation on the Elementary Schooling of Female Children Aged 17 to 22 Years

Variables	No Schooling	Elementary Undergraduate	Elementary Graduate	High School Undergraduate	High School Graduate
Receipt of remittance	0.0009672	0.0059337	0.0078358	0.0275451	-0.0422818
Father's education					
Graduated from elementary schooling or has some high school education*	-0.0009895	-0.0064393	-0.0088631	-0.0333520	0.0496439
Graduated from secondary schooling or has some college education*	-0.0021637	-0.0144807	-0.0204221	-0.0806448	0.1177113
Graduated from college*	-0.0014573	-0.0102336	-0.0148833	-0.0614957	0.0880698
Mother's education					
Graduated from elementary schooling or has some high school education*	-0.0019962	-0.0129412	-0.0178207	-0.0674839	0.1002419
Graduated from secondary schooling or has some college education*	-0.0033127	-0.0222725	-0.0318087	-0.1304985	0.1878924
Graduated from college*	-0.0024206	-0.0180411	-0.0276603	-0.1272668	0.1753887
Wealth	-0.0009260	-0.0058789	-0.0079461	-0.0289800	0.0437310
Number of siblings aged six years and below	0.0004901	0.0031118	0.0042061	0.0153397	-0.0231477
Number of school-aged siblings	0.0003112	0.0019759	0.0026707	0.0097402	-0.0146980
Age	-0.0009940	-0.0063108	-0.0085299	-0.0311092	0.0469439
Child is in the Visayas*	0.0006358	0.0039258	0.0052060	0.0184140	-0.0281815
Child is in Mindanao*	0.0018139	0.0109075	0.0142256	0.0491261	-0.0760731
Child is in a rural location*	0.0003772	0.0023962	0.0032406	0.0118321	-0.0178461

* Marginal effect is for a discrete change of the dummy variable from 0 to 1

Finally, Tables 7.4 and 7.5 show the marginal effects for male and female children aged 21 to 22 years. The findings for this age group is similar to that of those aged 13 to 22 years in that the remittance variable is insignificant for male children but is statistically significant but negative for females (at the ten percent

level). In particular, the associated marginal effects show that a ten percentage point increase in the probability of receiving remittances is associated with: (i) a 0.5 percentage point increase in the probability of not attaining any schooling, (ii) a 0.9 percentage point increase in the probability of finishing just some elementary schooling as well for graduating from elementary schooling, (iii) a 1.2 percentage point increase in the probability finishing just some secondary schooling, (iv) a 0.9 percentage point increase in the probability of finishing high school, (v) a 1.7 percentage point reduction in the probability of attaining just some college education, and (vi) a 2.6 percentage point decrease in the probability of finishing college education.

Table 7.4 Marginal Effects of IV-Ordered Probit Estimation on the College Education of Male Children Aged 21 to 22 Years

Variables	No Schooling	Elementary Under-graduate	Elementary Graduate	High School Under-graduate	High School Graduate	College Under-graduate	College Graduate
Receipt of remittance	-0.0022871	-0.0241569	-0.0222776	-0.0289019	-0.0014580	0.0583575	0.0207241
Father's education							
Graduated from elementary schooling or has some high school education*	-0.0025439	-0.0263202	-0.0239208	-0.0305024	-0.0005072	0.0622454	0.0215491
Graduated from secondary schooling or has some college education*	-0.0052258	-0.0587723	-0.0578335	-0.0825846	-0.0221366	0.1564188	0.0701341
Graduated from college*	-0.0042021	-0.0532390	-0.0570492	-0.0898665	-0.0420800	0.1589404	0.0874963
Mother's education							
Graduated from elementary schooling or has some high school education*	-0.0029056	-0.0293223	-0.0261839	-0.0326966	0.0007970	0.0675945	0.0227168
Graduated from secondary schooling or has some college education*	-0.0053405	-0.0597795	-0.0586625	-0.0835523	-0.0220397	0.1584901	0.0708844
Graduated from college*	-0.0051554	-0.0685991	-0.0780416	-0.1349059	-0.0962922	0.2129214	0.1700728
Wealth	-0.0015876	-0.0156940	-0.0137410	-0.0166716	0.0014583	0.0350817	0.0111542
Number of siblings aged six years and below	0.0018712	0.0184973	0.0161954	0.0196495	-0.0017188	-0.0413480	-0.0131466
Number of school-aged siblings	0.0006671	0.0065942	0.0057736	0.0070049	-0.0006127	-0.0147403	-0.0046867
Age	-0.0002747	-0.0027159	-0.0023779	-0.0028851	0.0002524	0.0060710	0.0019303
Child is in the Visayas*	-0.0004347	-0.0043584	-0.0038569	-0.0047427	0.0002863	0.0098971	0.0032093
Child is in Mindanao*	-0.0005305	-0.0053115	-0.0046956	-0.0057670	0.0003620	0.0120437	0.0038989
Child is in a rural location*	0.0012818	0.0127149	0.0111702	0.0136204	-0.0010417	-0.0285736	-0.0091720

* Marginal effect is for a discrete change of the dummy variable from 0 to 1

Parents' Education

The effect of the education of parents has some of the largest effects on the educational attainment of children among the other explanatory variables included in the study judging by the marginal effects. In particular, these dummy variables have a positive and statistically significant effect regardless of whether the estimation was run on male or female children (see Appendix B). In addition, it will

also be shown in the succeeding paragraphs that the parental education categories with the most effect on their children's educational attainment are: (i) being a high school graduate and (ii) graduating from college. It is also the case that the effect of having a highly-educated mother tends to be larger than the effect of having a highly-educated father. At the same time, the marginal effects owing to parental education are stronger for male children than for female children.

Table 7.5 Marginal Effects of IV-Ordered Probit Estimation on the College Education of Female Children Aged 21 to 22 Years

Variables	No Schooling	Elementary Under-graduate	Elementary Graduate	High School Under-graduate	High School Graduate	College Under-graduate	College Graduate
Receipt of remittance	0.0470644	0.0859773	0.0872715	0.1154307	0.0923791	-0.1697545	-0.2583684
Father's education							
Graduated from elementary schooling or has some high school education*	-0.0012853	-0.0034852	-0.0045193	-0.0075996	-0.0108066	0.0071218	0.0205743
Graduated from secondary schooling or has some college education*	-0.0028440	-0.0078203	-0.0102506	-0.0174519	-0.0255948	0.0154341	0.0485275
Graduated from college*	-0.0024623	-0.0069263	-0.0092270	-0.0159863	-0.0244033	0.0130375	0.0459677
Mother's education							
Graduated from elementary schooling or has some high school education*	-0.0045205	-0.0123429	-0.0161178	-0.0273588	-0.0399650	0.0242423	0.0760626
Graduated from secondary schooling or has some college education*	-0.0074992	-0.0212339	-0.0286193	-0.0505208	-0.0817609	0.0339534	0.1556806
Graduated from college*	-0.0076248	-0.0236879	-0.0343686	-0.0661003	-0.1305374	0.0074975	0.2548215
Wealth	-0.0034007	-0.0091218	-0.0117346	-0.0195587	-0.0272177	0.0189933	0.0520403
Number of siblings aged six years and below	0.0029890	0.0080174	0.0103139	0.0171907	0.0239225	-0.0166938	-0.0457397
Number of school-aged siblings	0.0003918	0.0010510	0.0013521	0.0022536	0.0031360	-0.0021884	-0.0059961
Age	0.0007805	0.0020935	0.0026931	0.0044888	0.0062465	-0.0043590	-0.0119434
Child is in the Visayas*	-0.0000188	-0.0000503	-0.0000648	-0.0001080	-0.0001503	0.0001048	0.0002874
Child is in Mindanao*	0.0054799	0.0138674	0.0171430	0.0273962	0.0345112	-0.0302376	-0.0681601
Child is in a rural location*	-0.0008281	-0.0022218	-0.0028588	-0.0047663	-0.0066386	0.0046211	0.0126925

     * Marginal effect is for a discrete change of the dummy variable from 0 to 1

Table 7.1 shows the marginal effects of the estimations run for children aged 13 to 22 years. At first glance, it may be seen that the effects of parents' education on the probability of attaining schooling levels that are lower than that of graduating from elementary school are all negative. In addition, relative to the base case of having a mother or father who has no schooling or has some elementary schooling, a roughly ten-percentage point increase in the probability of graduating from elementary schooling is observed for male children when either parent has at least graduated from high school or if the parent is a college graduate, respectively. For female children, the associated increases in probability stand at five percentage points for a father who has at least graduated from high school and just three

percentage points for a father who is a college graduate; the corresponding increases due to mother's education are larger, at eight percentage points for a mother with at least high school education, and six percentage points for a mother who is college educated.

For children aged 17 to 22 years, the marginal effects are reported in Tables 7.3 and 7.4. Similar to the results seen earlier for those aged 13 to 22 years, the effects of parental education on the probability of attaining educational attainment levels that are lower than graduating from high school are all negative. It may also be seen that relative to the base category of having a father with no education or only has some elementary schooling, male children whose fathers have at least graduated from elementary school increases the probability of finishing high school education by around 11 percentage points while that for female children increases by five percentage points. For male children, this increase in probability goes up to around 22 percentage points each if the father is at least a high school graduate or has graduated from college, respectively while the corresponding increases in probability for female children are 12 and nine percentage points, respectively. With regard to mother's education, male children whose mothers have at least graduated from elementary school see an increase in the probability of graduating from high school of around nine percentage points while that for female children stands at 10 percentage points. For mothers who at least graduated from high school, the associated increase in probability is around 23 percent for male children and 19 percent for females. Finally, when the mother is college-educated, the probability of graduating from high school increases by 28 percentage points for male children compared to just 18 percentage points for female children.

Finally, with regard to children aged 21 to 22 years, it will be seen from Appendix Table B.3 that while all the parental education variables are statistically significant for male children, only the maternal education variables are statistically significant at the one percent for female children. From the marginal effects for male children shown in Table 7.5, it will also be seen that the effects of paternal education on male children are not always negative for educational attainment levels lower than that of graduating from college. Indeed, the marginal effects start to turn

positive for the category corresponding to being a college undergraduate. In addition, it could be seen that the marginal contributions of parental education to the probability of attaining just some college education tend to be higher than the marginal contributions to the probability of graduating from college. In particular, while the probability of attaining just some college education increases by around 16 percentage points for male children whose fathers have at least graduated from high school or is college-educated, respectively, the corresponding contributions by these paternal education categories to the probability of graduating from college is just seven percentage points and eight percentage points, respectively. However, the effect of maternal education is nevertheless higher; relative to having a mother who has no schooling or just some elementary schooling, the probability of being in college increases by 16 percentage points for male children whose mothers have at least graduated from high school. For mothers who are college educated, the associated increase in the probability of being in college is 21 percentage points while the probability of graduating from college increases by 17 percentage points. With regard to female children, it can also be seen that mothers who at least graduated from high school increase the probability of female children to be college undergraduates by around 16 percent while college-educated mothers increase the probability of female children to graduate from college by 25 percent.

Demographic and Household Variables

Demographic and household variables are those related to characteristics of the child or to the household to which the child belongs. It should be noted that *wealth* and *number of siblings aged less than six years* are both statistically significant at the one percent level in all of the estimations that have been run while the variable *age* is always statistically significant at the one percent level except for children who are aged 21 to 22 years where it is insignificant. Finally, the *number of siblings who are of school age* is always statistically significant at the one percent level except for the estimation run on female children aged 21 to 22 years where it is insignificant (see Appendix B).

With regard to the child's age, it is the general finding that it is positively related with educational attainment (see Tables 7.1 to 7.5). In particular, a one-year increase in both male and female children aged 13 to 22 years is associated with a two-percentage point increase in the probability of graduating elementary schooling. The associated increase in the probability of graduating from high school for children aged 17 to 22 years is three percentage points for male children and five percentage points for female children.

On the other hand, the sibling variables are consistently negative with respect to their effect on the educational attainment of children as may be seen in Tables 7.1 to 7.5. It also bears noting that the marginal effects owing to an additional sibling aged less than six years tend to be greater than the associated effects of having an additional school-aged sibling. In particular, having an additional sibling aged less than six years reduces the probability of graduating from elementary school by around two percentage for both male and female children aged 13 to 22 years compared to a one percentage point reduction in the same probability for male children when there is an additional sibling of school age with this effect being practically nil for female children. For children aged 17 to 22 years, an additional sibling aged less than six is associated with a four-percentage point reduction in the probability of graduating from elementary schooling for male children and a reduction of two percentage points for female children. The corresponding effect when there is an additional school-aged sibling is just a reduction of two percentage points for male children and a reduction by one percentage point for female children. However, while male children tend to see larger marginal effects with regard to the sibling variables, the results observed for those aged 21 to 22 years show that female children see a higher reduction in the probability of graduating from college equal to five percentage points for each additional sibling aged less than six compared to a reduction of just one percentage point for male children. The effect on male children aged 21 to 22 years of an additional school-aged sibling is practically nil.

Finally, the results show that the wealth variable is positively related to educational attainment for all age groups (see Tables 7.1 to 7.5). In particular, male

and female children aged 13 to 22 years see an increase in the probability of graduating from elementary school by around two percentage points for every unit increase in the wealth index. The marginal effects of wealth on the probability of graduating from high school see a slight uptick for those aged 17 to 22 years with the probabilities for female children increasing by four percentage points while those for male children increasing by three percentage points. For those aged 21 to 22 years, the associated increases in the probability of graduating from college is one percentage point for male children and five percentage points for female children.

Locational Variables

Locational variables are those that are primarily related to the characteristics of the setting in which the child is located. In particular, dummy variables specify in which island group the child is located as well as whether it is a rural location. Tables 7.1 to 7.5 contain the marginal effects for the three age groups.

The base category with regard to the island variables is the island of Luzon. As has been mentioned earlier, this is the largest of the three island groups of the Philippines and contains eight of the 17 administrative regions of the country. The results show that being in the Visayas reduces the probability of graduating from elementary school by four percentage points for male children aged 13 to 22 years and by two percent for female children. For those aged 17 to 22 years, the associated reduction in the probability of graduating from high school is two percentage points for male children and is three percentage points for female children. However, the effect on the probability of finishing college is nil for both male and female children.

Meanwhile, relative to the child being in Luzon, being located on the island of Mindanao results to a reduction in the probability of graduating from grade school by three percentage points for male children aged 13 to 22 years and by five percentage points for female children. The probability of graduating from high school, meanwhile, is reduced by two percentage points for male children aged 17 to 22 years and the same probability is reduced by a considerably larger eight percentage points for female children. Finally, while the effect of being in Mindanao on the probability of graduating from college is practically nil for male children aged

21 to 22 years, female children of the same age suffer from a reduction of eight percentage points.

With regard to the child being in a rural location, the results show that there is practically zero effect on the probability of graduating from elementary school for both male and female children aged 13 to 22 years. However, the effect rises to a reduction of two percentage points on the probability of graduating from high school for both male and female children aged 17 to 22 years. Finally, being in a rural location reduces the probability of graduating from college by one percentage point for both male and female children aged 21 to 22 years.

Discussion

One of the key findings observed from the estimates presented earlier is that female children tend to achieve higher probabilities of finishing elementary schooling, high school education, and college education. This is an interesting finding given that the educational attainment of male children tends to be greater than that of female children in Asia (Maitra, 2003). In the context of the Philippines, this finding may be guided by the fact that by age 13, around 16 percent of male children are not in school compared to around 9 percent of girls; however, it should be noted that this gap narrows for older age groups (e.g., by age 17, 45 percent of 17-year-old male children were not in school compared to about 43 percent of female children) (Yabut as cited in Hindin, 2005). Santa Maria (2002) suggests that one of the reasons children drop out from school is in order to look for employment. In addition, she posits that the youth are sometimes forced to drop out from school due to constraints that are not of their own doing such as overcrowding in schools or the lack of adequate facilities, or because of reasons unrelated to the schools themselves such as poverty or ill health. In light of these, it may be the case that male children are given the burden of helping support the family or that they may be those who are unwittingly hampered by the effects of overcrowded schools, say, such as making it harder for students to assimilate information (Earthman, 2002). It has also been the case that the development of education in the Philippines over the past few decades has resulted to programs that aim to give children, particularly female

children, access to education such as the United Nations' Girls' Education Initiative and Oxfam's Education for All (United Nations Girls' Education Initiative, 2008). This may then help to account for the higher educational attainment observed in female children.

The astute reader will note that the disparity between educational outcomes between male and female children that has just been presented becomes a recurring theme as the other findings shown earlier are discussed. Indeed, there are disparities related to the marginal effects that have been observed for male and female children primarily with regard to the effect of parental education, the sibling variables, and the regional variables. These might point to the notion that households approach education differently when it comes to children of either sex. These will be discussed in detail in the following paragraphs.

The effect of parental education, was also shown to have an unambiguously positive and statistically effect of increasing the probability of a child graduating from each of the three levels of educational attainment under study. It was also shown from the marginal effects that these have some of the largest magnitudes with regard to contributions to the respective probabilities of graduation. At the same time, one of the most conspicuous results is that the effect of a highly educated mother is larger than the effect borne from a highly educated father. In the Philippine context, this may not be surprising. Indeed, Liwag, de la Cruz, and Macapagal (1998) write that it is the Filipino mother who takes charge as the primary caretaker of children and that Filipino fathers have a limited role in the family—primarily that of providing for its needs. In particular, they add that the role that Filipino fathers tend to play in the rearing of their children is limited to carrying, talking, or playing with them. It was also shown that the effect of parental education has a larger effect on the educational attainment of male children compared to female children. It might then be the case that the distribution of intrahousehold resources may favor male children in the Philippines and indeed, this has been observed before (e.g., Senauer, et al., 1988 regarding the intrahousehold distribution of nutritional resources).

It was also observed from the results with respect to the sibling variables that a greater number of siblings aged less than six years has a consistently negative and statistically significant effect on the educational attainment of children, reducing the probability of attaining education by as much as five percentage points (as in the case for females aged 21 to 22 years). While having more school-aged children in the household has also been shown to have a similarly negative effect on educational attainment, the magnitude of the reduction tends to be smaller and in some cases, even nil. Overall, the results have shown that as the number of siblings increases, the resources of the household, possibly in terms of money and time, are strained. This result is in conformity with what has been observed in earlier studies (e.g., see Blake, 1981 for the theory; Gomes, 1984 for an application in the Kenyan setting; Knodel & Wongsith, 1991 for a Thai case; Downey, 1995 using the National Educational Longitudinal Study; van Eijck & de Graaf, 1995 for a study in Hungary; Kuo & Hauser, 1997 using the Wisconsin Longitudinal Study; and Patrinos & Pscharopoulus, 1997 for a Peruvian case, to cite a few). The finding that there is a larger effect of an additional sibling aged less than six years compared to an additional school-aged sibling may point to different resource requirements in terms of raising a younger child, which then adversely affect the available resources for those who are of school age. The relatively large reduction in the probability of graduating from college for female children aged 21 to 22 years compared to male children (a reduction of five percentage points compared to one percentage point) may also point to the possibility that female children are given domestic responsibilities especially in the rearing of young children in the household.

The variable for wealth was also shown to have a positive and statistically significant effect on the educational attainment of children. This result concurs not only with the hypothesis presented earlier in the paper but with other theories proposed in the literature. For example, Taubman (1989) proposes that if children's education were to be regarded as a form of consumption, then increasing educational attainment redounding to the child due to increases in parental wealth or income would imply that schooling is a normal good. At the same time, an increase in parental wealth leads to increases in the expenditures on education, even

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if education were to be regarded as an investment. It is also interesting to note that for children aged 17 to 22 years and for those aged 21 to 22 years, the marginal effect of an increase in the wealth index on the probability of graduating from high school or college, respectively, is higher for female children than for male children. For a given amount of wealth (the distribution of which may prefer male children as proposed earlier), it may be the case that increases to this stock might benefit female children more than the male children in the sense that there are more resources available for each member of the family. This might then account for the larger marginal effects observed for older daughters.

The dummies representing the island group in which the child resides also show the noticeable variations with regard to educational attainment in the different regions of the Philippines. First, even though elementary and high school education is said to be universal in the Philippines (see Department of Education, 2008), residing in the Visayas or Mindanao (as compared to the base case of residing on the island of Luzon) reduces: (i) the probability of graduating from elementary school by around three or four percentage points, and (ii) the probability of graduating from high school by anywhere from three to eight percentage points. Noteworthy, too, is the finding that while the reduction in the probability of graduating from college is practically zero for a child residing in the Visayas, this is only true for male children who reside in Mindanao. Indeed, female children who reside in Mindanao see a reduction in the probability of college graduation of seven percentage points. In addition, female children aged 17 to 22 years and 13 to 22 years who live in Mindanao experience a "penalty" of eight percentage points and five percentage points, respectively, as regards the corresponding probabilities of graduating from high school and elementary school. Of course, the island of Mindanao is primarily Muslim and the view regarding son preference has been found to be more prevalent in this area compared to the other regions of the country (Stinner & Mader, 1975). At the same time, while children aged 13 to 22 years do not see their probability of graduation affected by residing in a rural area, children aged 17 to 22 and 21 to 22, respectively, see reductions in their probabilities of graduation. In this regard, it is widely held that schools in rural areas have inadequate facilities or that there are

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fewer schools to begin with in these areas. In addition, there is also a prevalent notion that infrastructure tends to be poor in rural areas as compared to urban areas.

Finally, it has been shown that when the remittance variable was statistically significant in female children aged 13 to 22 years and 21 to 22 years, respectively, it reduced the probability of graduating from elementary and high school. On the other hand, this variable was statistically significant only for male children who were aged 17 to 22 years. The findings obtained for female children are not in conformity with the theory earlier presented in the paper. There have been a few studies that have come across similar findings. One such study is that of López-Córdova (2005) who observed that remittances actually decreased school attendance for students aged 15 to 17 years. She suggests that there might be inadequate educational infrastructure for students aged as such or that in communities where migration tends to be prevalent, there is actually a disincentive for further investments in schooling. McKenzie (2005) also proposes that it may be the case that the returns to schooling accruing to children who have a high probability of migrating might be lower, which then creates a disincentive to investing in education. In order to shed light on this intriguing result, it may be helpful to look at the peculiarities of the Philippine context with regard to migrant workers. It will be recalled from Table 2.2 that the share of service workers[8] in the deployment of Overseas Filipino Workers (OFWs) has been rising between 1975 and 2005. It is also helpful to note that female OFWs work primarily as service workers, (i.e., those who are hired primarily as housekeepers and household or domestic help) (National Statistical Coordination Board, 2012). If the receipt of remittances induces an "aspiration" effect whereby female children are encouraged to be migrant workers themselves, then it may be plausible to think that further investments in schooling are no longer needed when it is realized that the migrant jobs, which women usually take, do not require practically any significant educational requirement. In contrast, male OFWs are those who tend to be hired in occupations that are at least semi-

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[8] It will be recalled that service workers are those who are hired as laborers, unskilled workers, clerks, or as shop or market workers.

skilled in nature all the way to those that are professional[9] in nature. These are then job positions that require higher educational attainment vis-à-vis those that are needed for service occupations, in which female OFWs are usually placed. The possibility, then, that the returns to education for male children with higher educational attainment might be greater if they work as migrants, might help explain the positive and statistically significant effect on the probability of graduating from high school for male children aged 17 to 22 years.

[9] Occupations in these categories include "precision instrument makers," "supervisor production and general foremen," "engineering technicians," and nurses.

Chapter 8 - Conclusion

This study aimed to contribute to the literature on the role of remittances on the educational attainment of children particularly in the Philippines in particular, and Southeast Asia in general. As noted earlier, international migration and remittances have played key roles in the economic life of the Philippines. Indeed, Filipinos working overseas make up close to ten percent of the population and the annual receipt of remittances making up ten percent of the country's gross national income. The continuing stream of remittances is widely held to help prop the country and as such, these Overseas Filipinos Workers are regarded as "modern-day heroes" within the country. It is in these contexts that this study was undertaken for it was deemed relevant in the milieu in which the country finds itself.

Using IV methodology, it was found that the receipt of remittances has a positive and statistically significant effect on the probability of graduating from high school for Filipino male children aged 17 to 22 years, in keeping with the expected positive relationship between remittances and educational attainment. However, in contrast with what a priori expectations, the effect of the receipt of remittances on the probabilities of graduating from elementary school and college, respectively for female children aged 13 to 22 years and 21 to 22 years, was observed to be negative. It is suggested that the expectation of being migrants may play a role as to whether to undertake (and thus pursue) further investments in education. In particular, since female OFWs tend to take on jobs with low educational requirements, the incentive for further study be female children is diminished. On the other hand, since male OFWs tend to work in occupations that require a higher level of educational attainment, male children may have better incentives to pursue studying. As mentioned earlier, the phenomenon of Filipino labor migration is expected to persist into the future. As it currently stands, however, the jobs that OFWs primarily take are those that are skilled and semi-skilled in nature, particularly for women. In 2010, "Household Service Workers" was the top occupational category for deployed land-based Filipina OFWs, owing to the fact that almost 95,000 Filipino women were deployed to those jobs in that year (Philippine Overseas Employment Agency, 2011).

In this regard, the government must strive to: (i) look for new markets that require jobs with higher educational attainment for women in order to open up occupations that would decrease the vulnerability of women and (ii) improve the training of prospective OFWs in order to be qualified for occupations requiring a higher skillset. There are hopeful signs that these are plausible. Conspicuously, the second top occupation category for land-based OFWs is already "Professional Nurses," with around 10,300 Filipina nurses deployed last year. This has already even displaced the category "Charworkers, Cleaners, and Related Workers." As more skilled and professional jobs are opened up to Filipino women in particular, it is hoped that the expectation of improved returns to higher education for female OFWs also increases and that occupations that are less risky be opened up for OFWs in general.

It is no secret that the migration of Filipinos is primarily due to the lack of opportunities for gainful employment within the Philippines. In this regard, the government must take concrete steps to ensure that Filipinos are adequately employed within the country. In this regard, certain initiatives must be stepped up such as strengthening technical and vocational education. Indeed, the Department of Labor and Employment (2011) holds that there are adequate jobs that are available within the country but that the skills workers are hold are mismatched with the opportunities that are available.

It was also shown that the parental education has some of the largest contributions to changes in the probabilities of graduation across the three age groups studied. In particular, the effects of having a highly educated mother are greater than that of having a highly educated father. These results point to the need for more efforts to highlight the potential for close mother-and-child bonds in order to help children stay in school longer. The methods by which these should be done are, of course, hotly debated in the literature. The finding that maternal education has a stronger effect on the educational attainment of children vis-à-vis that of paternal education may also point to the notion that increasing the bargaining power of the mother within a household may have a stronger effect on the educational attainment of the child.

The findings have also shown that the educational attainment of children in the Philippines is indeed adversely affected by limited household resources. Having additional siblings, whether under six years of age or of school age, reduces the probabilities of graduation. Each additional child, therefore, may be seen as a "regressive tax" on the other children in the family. Since the poor tend to be desirous of higher family sizes (Orbeta, 2005), it is expected that they will be the ones who will bear the brunt of this effect. In this regard, the government has to increase its efforts regarding population management and promote smaller family sizes, particularly to poor households. On a related vein, the results also showed that wealth has a positive and statistically significant effect on the probabilities of graduation for Filipino children. On the part of the government, a conditional cash transfer program is already being implemented with the aim of augmenting the income of poor households and one of the criteria for the grant was that the children in the household should be made to attend school. It will be insightful to evaluate this relatively new policy of the government.

In general, the state of Philippine education may be considered as dismal, especially in the light of the findings presented earlier that there are high probabilities of not completing at least high school. Indeed, these outcomes are even worse for college education. The potential for labor migration may have therefore influenced expectations about future earnings, especially for female children, such that pursuing higher education may not pay off when the possibility for migrating is present. At the same time, the findings regarding the intergenerational transmission of education from parent to child point to the possibility that if the educational attainment of the current crop of students is not improved, then the next generation may be consigned to achieving poor levels of schooling as well.

It goes without saying that education and human capital accumulation are essential components of economic development. This paper has identified some of the individual-, household-, and community-/regional-level characteristics that affect the educational attainment of children in the Philippines. Given the problem of poverty as well as the country's high population and fertility rates, improving the educational attainment of Filipino children should be of utmost concern.

Future research in this field should then aim to look at other potential determinants of children's education. In this regard, school quality, which is widely held to be an important factor in a child's schooling, must also be studied. Various other measures such as teacher quality or class sizes must also be looked into and to the knowledge of the author, no studies have yet been done for the Philippines. Indeed, these are the areas wherein the effects of government intervention, through its use of the power of the purse and regulatory supervision, are expected to come in.

Bibliography

Acosta, P. A., 2011. School attendance, child labour, and remittances from international migration in El Salvador. *Journal of Development Studies,* 47(6), pp. 913-936.

Acosta, P., Calderón, C., Fajnzylber, P. & López, J. H., 2008. Do remittances lower poverty levels in Latin America?. In: P. Fajnzylber & J. H. López, eds. *Remittances and development: lessons from Latin America.* Washington, D.C.: The World Bank, pp. 87-132.

Adams, R. H. & Page, J., 2005. Do international migration and remittances reduce poverty in developing countries?. *World Development,* 33(10), pp. 1645-1669.

Alderman, H., Behrman, J. R. L. V. & Menon, R., 2001. Child health and school enrollment: a longitudinal analysis. *The Journal of Human Resources,* 36(1), pp. 185-205.

Amuedo-Dorantes, C., Georges, A. & Pozo, S., 2010. Migration, remittances, and children's schooling in Haiti. *The ANNALS of the American Academy of Political and Social Science,* 630(1), pp. 224-244.

Angrist, J. D., 2001. Estimation of Limited Dependent Variable Models with Dummy Endogenous Regressors: Simple Strategies for Empirical Practice. *Journal of Business & Economic Statistics,* 19(1), pp. 2-16.

Antón, J.-I., 2010. The impact of remittances on nutritional status of children in Ecuador. *International Migration Review,* 44(2), pp. 269-299.

Avila, R. & Schlarb, E., 2008. *Bank accounts and savings - the impact of remittances and migration: a case study of Moldova, Kiel advanced studies working papers, No. 448,* Kiel, Germany: Leibniz-Informationszentrum Wirtschaft.

Bangko Sentral ng Pilipinas, 2012a. *Online statistical interactive database.* [Online] Available at: http://www.bsp.gov.ph/statistics/statistics_online.asp [Accessed 21 January 2012].

Bangko Sentral ng Pilipinas, 2012b. *Selected economic and financial indicators.* [Online] Available at: http://www.bsp.gov.ph/statistics/keystat/sefi.pdf [Accessed 21 January 2012].

Barajas, A. et al., 2009. *Do workers' remittances promote economic growth?,* Washington, D.C.: International Monetary Fund.

Becker, G. S., 1965. A theory on the allocation of time. *The Economic Journal,* 75(299), pp. 493-517.

Becker, G. S. & Lewis, H. G., 1973. On the interaction between the quantity and quality of children. *The Journal of Political Economy,* 81(2), pp. S279-S288.

Becker, G. S. & Tomes, N., 1976. Child endowments and the quantity and quality of children. *Journal of Political Economy,* 84(4), pp. S143-S162.

Becker, G. S. & Tomes, N., 1993. Human capital and the rise and fall of families.. In: G. S. Becker, ed. *Human capital: a theoretical and empirical analysis with special reference to education.* 3rd ed. Chicago, IL: University of Chicago Press, pp. 257-298.

Biblarz, T. J. & Raftery, A. E., 1999. Family structure, educational attainment, and socioeconomic success: rethinking the "pathology of matriarchy". *American Journal of Sociology,* 105(2), pp. 321-365.

Blake, J., 1981. Family size and the quality of children. *Demography,* 18(4), pp. 421-442.

Bredl, S., 2011. Migration, remittances, and educational outcomes: the case of Haiti. *International Journal of Educational Development,* 31(2), pp. 162-168.

Bussolo, M. & Medvedev, D., 2007. *Do remittances have a flip side? A general equilibrium analysis of remittances, labor supply responses, and policy options for Jamaica,* Washington, D.C.: The World Bank.

Calero, C., Bedi, A. S. & Sparrow, R., 2009. Remittances, liquidity constraints and human capital investments in Ecuador. *World Development,* 37(6), pp. 1143-1154.

Commission on Filipinos Overseas, 2010. *Stock estimate of overseas filipinos.* [Online] Available at: http://www.cfo.gov.ph/index.php?option=com_content&view=article&id=1340:stock-estimate-of-overseas-filipinos&catid=134:statisticsstock-estimate&Itemid=814 [Accessed 21 January 2012].

Cox Edwards, A. & Rodriguez-Oreggia, E., 2008. Remittances and labor force participation in Mexico: an analysis using propensity score matching. *World Development,* 37(5), pp. 1004-1014.

Cox Edwards, A. & Ureta, M., 2003. International migration, remittances, and schooling: evidence from El Salvador. *Journal of Development Economics,* 72(2), pp. 429-461.

de Haan, M. & Plug, E., 2006. *The effects of parents' schooling on children's schooling using censored and uncensored samples,* Bonn, Germany: Institute for the Study of Labor.

Department of Education, 2008. *Philippines: EFA mid-decade assessment,* Pasig City, The Philippines: Department of Education.

Department of Labor and Employment, 2011. *Philippine labor and employment plan 2011-2016,* Manila, the Philippines: Department of Labor and Employment.

Downey, D. B., 1995. When bigger is not better: family size, parental resources, and children's educational performance. *American Sociological Review,* 60(5), pp. 746-761.

Ducanes, G. & Abella, M., 2009. *Prospects for future outward migration flows: China and Southeast Asia,* Bangkok, Thailand: Asian Regional Programme on Governance of Labour Migration, ILO Regional Office for Asia and the Pacific.

Durand, J., Parado, E. A. & Massey, D. A., 1996. Migradollars and development: a reconsideration of the Mexican case. *International Migration Review,* 30(2), pp. 423-444.

Earthman, G. I., 2002. *School facility conditions and stduent academic achievement,* Los Angeles, CA: Williams Watch Series: Investigating the Claims of Williams v. State of California, UCLA's Institute for Democracy, Education, and Access.

Gomes, M., 1984. Family size and educational attainment in Kenya. *Population and Development Review,* 10(4), pp. 647-660.

Greene, W. H., 2003. *Econometric analysis.* 5th ed. Upper Saddle River, NJ: Prentice Hall.

Greene, W. H. & Hensher, D. A., 2009. *Modeling Ordered Choices,* New York: New York University.

Groff, S. P., 2012. *Asian Development Bank speeches: prospects for the Philippines.* [Online]
Available at: http://beta.adb.org/news/speeches/focap-prospects-philippines?ref=countries/philippines/speeches
[Accessed 21 February 2012].

Gupta, S., Pattillo, C. & Wagh, S., 2007. *Impact of remittances on poverty and financial development in Sub-Saharan Africa,* Washington, D.C.: International Monetary Fund.

Hanson, G. H., 2007. *Emigration, remittances, and labor force participation in Mexico,* Buenos Aires, Argentina: Inter-American Development Bank.

Hanson, G. H. & Woodruff, C., 2003. *Emigration and educational attainment in Mexico,* San Diego, California: University of California, San Diego.

Hindin, M. J., 2005. Family dynamics, gender differences and educational attainment in Filipino adolescents. *The Journal of Human Resources,* Volume 28, pp. 229-316.

Holmes, J., 1999. *Measuring the determinants of school completion in Pakistan: analysis of censoring and selection bias,* New Haven, CT: Yale University Economic Growth Center.

Knodel, J. & Wongsith, M., 1991. Family size and children's education in Thailand: evidence from a national sample. *Demography,* 28(1), pp. 119-131.

Korovilas, J., 1999. The Albanian economy in transition: the role of remittances and pyramid investment schemes. *Post-Communist Economies,* 11(3), pp. 399-415.

Kuo, H.-H. D. & Hauser, R. M., 1997. How does size of sibship matter? Family configuration and family effects on educational attainment. *Social Science Research,* Volume 26, pp. 69-94.

Lillard, L. & Willis, R., 1994. The family and intergenerational relations. *The Journal of Human Resources,* 29(4), pp. 1126-1166.

Liwag, M. E. C., de la Cruz, A. & Macapagal, M. E., 1998. How we raise our daughters and sons: Child-rearing and gender socialization in the Philippines. *Philippine Journal of Psychology,* Volume 31, pp. 1-46.

López-Córdova, E., 2005. Globalization, migration, and development: the role of Mexican migrant remittances. *Economía,* 6(1), pp. 217-256.

López-Córdova, E. & Olmedo, A., 2006. *International remittances and development: existing evidence, policies, and recommendations,* Buenos Aires, Argentina: Inter-American Development Bank.

López, J. H., Molina, L. & Bussolo, M., 2008. Remitances, the real exchange rate, and the Dutch disease phenomenon. In: P. Fajnzylber & J. H. López, eds. *Remittances and development: lessons from Latin America.* Washington, D.C.: The World Bank, pp. 217-252.

Lucas, R. E. B. & Stark, O., 1985. Motivations to remit: evidence from Botswana. *Journal of Political Economy,* 93(5), pp. 901-918.

Mahler, P. & Winkelmann, R., 2004. *Single motherhood and (un)equal educational opportunities: evidence for Germany,* Bonn, Germany: Institute for the Study of Labor.

Maitra, P., 2003. Schooling and educational attainment: evidence from Bangladesh. *Education Economics,* 11(2), pp. 129-153.

Mariñas, B. O. & Ditapat, M. P., 1999. Philippines curriculum development. In: J. Hallak, ed. *Globalization and living together: The challenges for educational content in Asia.* Paris, France/Delhi, India: UNESCO International Bureau of Education, pp. 112-119.

Martin, P., Abella, M. & Midgley, E., 2004. Best practices to manage migration: the Philippines. *International Migration Review,* 38(4), pp. 1544-1559.

McKenzie, D., 2005. Beyond remittances: the effects of migration on Mexican households. In: Ç. Ozden & M. Schiff, eds. *International migration, remittances and the brain drain.* Washington, DC: The World Bank, pp. 123-148.

McKenzie, D. & Rapoport, H., 2006. *Can migration reduce educational attainment? Evidence from Mexico,* Washington, DC: The World Bank.

National Economic and Development Authority, 2010. *Medium term Philippine development plan, 2011-2016.* Pasig City, The Philippines: National Economic and Development Authority.

National Statistical Coordination Board, 2012. *The Pinoy diaspora: where do our OFWs come from and where do they go?.* [Online]
Available at: http://www.nscb.gov.ph/sexystats/2012/SS20120516_ofw.asp#tab3
[Accessed 30 May 2012].

National Statistics Office, 2007. *2003 family income and expenditure survey,* Manila, Philippines: National Statistics Office.

Orbeta, A. & Abrigo, M., 2009. *Philippine international labor migration in the past 30 years: trends and prospects,* Makati City, The Philippines: Philippine Institute for Development Studies.

Orbeta, A. C., 2005. *Poverty, vulnerability, and fmaily size: evidence from the Phililppines ADB Institute discussion paper no. 29,* Tokyo, Japan: ADB Institute.

Overholt, W. H., 1986. The rise and fall of Ferdinand Marcos. *Asian Survey,* 26(11), pp. 1137-1163.

Patrinos, H. A. & Psacharopoulos, G., 1997. Family size, schooling and child labor in Peru – an empirical analysis. *Journal of Population Economics,* 10(4), pp. 387-405.

Pernia, E. M., 2009. *Is labor export good development policy?.* Bangkok, Thailand, United Nations Economic and Social Commission for Asia and the Pacific.

Philippine Overseas Employment Agency, 2005. *OFW global presence: a compendium of overseas employment statistics 2005.* [Online]
Available at: http://www.poea.gov.ph/stats/OFW_Statistics_2005.pdf
[Accessed 21 January 2012].

Philippine Overseas Employment Agency, 2011. *OFW statistics.* [Online]
Available at: http://www.poea.gov.ph/stats/
[Accessed 21 January 2012].

Plug, E. & Vijverber, W. P., 2001. *Schooling, family background, and adoption: does family income matter?,* Bonn, Germany: Institute for the Study of Labor.

Ponce, J., Olivié, I. & Onofa, M., 2011. The role of international remittances in health outcomes in Ecuador: prevention and response to shocks. *International Migration Review,* 45(3), pp. 727-745.

Ratha, D., 2003. Workers' remittances: an important and stable soure of external development finance. In: *Global development finance 2003.* Washington, D.C.: The World Bank, pp. 157-175.

Rodriguez, E. R. & Tiongson, E. R., 2001. Temporary migration overseas and household labor supply: evidence from the Philippines. *International Migration Review,* 35(3), pp. 709-725.

Roodman, D., 2009. *Estimating fully observed recursive mixed-process models with cmp,* Washington, DC: Center for Global Development working paper 168.

Santa Maria, M., 2002. Youth in Southeast Asia: living within the continuity of tradition and the turbulence of change. In: B. B. Brown, R. Larson & T. S. Saraswathi, eds. *The world's youth: adolescence in eight regions of the globe.* New York, NY: Cambridge University Press, pp. 171-206.

Schultz, T. W., 1960. Capital formation by education. *The Journal of Political Economy,* 68(6), pp. 571-583.

Senauer, B., Garcia, M. & Jacinto, E., 1988. Determinants of the intrahousehold allocation of food in the rural Philippines. *American Journal of Agricultural Economics,* 70(1), pp. 170-180.

Shroff, K., 2009. *Impact of remittances on poverty in Mexico,* New Haven, CT: Yale College.

Simonsen, M. & Kessy, F., 2006. *On the quality of health care and educational outcomes in a developing country.* Los Angeles, CA, Population Association of America.

Solomon, M. S., 2009. State-led migration, democratic legitimacy, and deterritorialization: the Philippines' labour export model. *European Journal of East Asian Studies,* 8(2), pp. 275-300.

Stark, O. & Lucas, R. E. B., 1988. Migration, remittances, and the family. *Economic Development and Cultural Change,* 36(3), pp. 465-481.

Stinner, W. F. & Mader, P. D., 1975. Sons, daughters or both?: an analysis of family sex composition preferences in the Philippines. *Demography,* 12(1), pp. 67-79.

Tansel, A., 2002. Determinants of school attainment of boys and girls in Turkey: individual, household and community factors. *Economics of Education Review,* 21(5), pp. 455-470.

Taubman, P., 1989. Role of parental income in educational attainment. *The American Economic Review,* 79(2), pp. 57-61.

United Nations Girls' Education Initiative, 2008. *Towards gender equality in education: progress and challenges in Asia-Pacific region,* New York, NY: UNICEF.

van Eijck, K. & de Graaf, P. M., 1995. The impact of family structure on the educational attainment of Hungarian siblings. *European Sociological Review, 11 (1995), pp. 273–292,* 11(3), pp. 273-292.

Virola, R. A., 2011. *Refinements on the official poverty estimation strategy and the sources of differences of the official poverty statistics and the NHTS-PR estimates,* Pasig City, The Philippines: National Statistical Coordination Board.

Williamson, J. G., 1969. Dimensions of postwar Philippine economic progress. *Quarterly Journal of Economics,* 83(1), pp. 93-109.

Woodruff, C. M. & Binder, M., 1999. *Intergenerational mobility in educational attainment in Mexico,* Rochester, NY: Social Science Research Network.

The World Bank, 2006. Trends, determinants, and macroeconomic effects of remittances. In: *Global economic prospects 2006: economic implications of remittances and migration.* Washington, D.C.: The World Bank, pp. 85-117.

The World Bank, 2011. *Migration and remittances factbook 2011.* Washington, D.C.: The World Bank.

The World Bank, 2012. *World databank.* Washington, DC: The World Bank.

Yang, D., 2003. *Essays in development economics.* Cambridge, MA: Harvard University.

Appendix A - Results of Non-Instrumental Variables Ordered Probit Estimations

Table A.1 Non-IV Ordered Probit Estimates of Elementary Schooling, Aged 13 to 22 Years

Variables	MALES			FEMALES		
	Coefficient		SE	Coefficient		SE
Receipt of remittance	0.099507	***	0.035674	0.111176	**	0.046475
Father's education						
Graduated from elementary schooling or has some high school education	0.344068	***	0.027764	0.216735	***	0.036533
Graduated from secondary schooling or has some college education	0.518249	***	0.038420	0.324589	***	0.048840
Graduated from college	0.624964	***	0.092816	0.203694	**	0.097889
Mother's education						
Graduated from elementary schooling or has some high school education	0.358082	***	0.027453	0.422638	***	0.036187
Graduated from secondary schooling or has some college education	0.568693	***	0.038372	0.621873	***	0.050490
Graduated from college	0.595561	***	0.074332	0.601237	***	0.091045
Wealth	0.120967	***	0.006025	0.101298	***	0.007642
Number of siblings aged six years and below	-0.106324	***	0.015405	-0.111347	***	0.018692
Number of school-aged siblings	-0.039777	***	0.007209	-0.029341	***	0.009431
Age	0.097840	***	0.004285	0.145960	***	0.006339
Child is in the Visayas	-0.190646	***	0.030144	-0.080316	**	0.040852
Child is in Mindanao	-0.143743	***	0.027154	-0.248528	***	0.034347
Child is in a rural location	0.007794		0.026587	0.051446	*	0.034339
/cut1	-0.655375		0.087136	-0.047718		0.118769
/cut2	0.956151		0.085287	1.317523		0.116386
Log likelihood	-8,330.053			-4,900.664		
Number of observations	18,722			15,364		
LR chi-square(14)	3,896.35			2,393.33		
Prob > chi-square	0.0000			0.0000		
Pseudo R-squared	0.1895			0.1963		

***, **, and * denote statistical significance at the one percent level, five percent level, and ten percent level, respectively.

Table A.2 Non-IV Ordered Probit Estimates of High School Education, Aged 17 to 22 Years

Variables	MALES			FEMALES		
	Coefficient		SE	Coefficient		SE
Receipt of remittance	0.157115	***	0.033733	0.084493	**	0.042825
Father's education						
Graduated from elementary schooling or has some high school education	0.273759	***	0.029255	0.163081	***	0.039493
Graduated from secondary schooling or has some college education	0.647809	***	0.038276	0.395333	***	0.050562
Graduated from college	0.682381	***	0.077917	0.310449	***	0.097640
Mother's education						
Graduated from elementary schooling or has some high school education	0.241114	***	0.029597	0.326242	***	0.040150
Graduated from secondary schooling or has some college education	0.661242	***	0.039248	0.652707	***	0.052536
Graduated from college	0.819592	***	0.070690	0.685502	***	0.088653
Wealth	0.128668	***	0.006078	0.129741	***	0.008106
Number of siblings aged six years and below	-0.127236	***	0.020094	-0.071128	***	0.027251
Number of school-aged siblings	-0.055101	***	0.007328	-0.044556	***	0.009729
Age	0.077096	***	0.007223	0.147967	***	0.009996
Child is in the Visayas	-0.133139	***	0.032448	-0.077732	*	0.044445
Child is in Mindanao	-0.102087	***	0.028565	-0.219352	***	0.037893
Child is in a rural location	-0.055052	**	0.026801	-0.053589	*	0.035971
/cut1	-0.925293		0.152881	0.327121		0.207018
/cut2	0.370094		0.149380	1.144294		0.203115
/cut3	0.866904		0.148904	1.568285		0.202324
/cut4	1.795965		0.149471	2.520017		0.202952
Log likelihood	-10,401.72			-5,401.69		
Number of observations	9,907			7,141		
LR chi-square(14)	3,936.30			2,086.29		
Prob > chi-square	0.0000			0.0000		
Pseudo R-squared	0.1591			0.1619		

***, **, and * denote statistical significance at the one percent level, five percent level, and ten percent level, respectively.

Table A.3 Non-IV Ordered Probit Estimates of College Education, Aged 21 to 22 Years

Variables	MALES			FEMALES		
	Coefficient		SE	Coefficient		SE
Receipt of remittance	0.145866	***	0.050935	0.0704444		0.0586853
Father's education						
Graduated from elementary schooling or has some high school education	0.227786	***	0.050598	0.093246		0.066108
Graduated from secondary schooling or has some college education	0.599888	***	0.061723	0.253447	***	0.074104
Graduated from college	0.643866	***	0.101537	0.215953	*	0.118042
Mother's education						
Graduated from elementary schooling or has some high school education	0.247629	***	0.052052	0.286895	***	0.069169
Graduated from secondary schooling or has some college education	0.610260	***	0.064906	0.485240	***	0.080235
Graduated from college	0.997700	***	0.101520	0.865453	***	0.114436
Wealth	0.131208	***	0.010036	0.151516	***	0.012673
Number of siblings aged six years and below	-0.149842	***	0.043069	-0.153259	***	0.060839
Number of school-aged siblings	-0.054752	***	0.012110	-0.022100		0.015576
Age	0.020360		0.041208	-0.025642		0.052805
Child is in the Visayas	0.032738		0.054738	0.041598		0.067429
Child is in Mindanao	0.040229		0.049214	-0.172896	***	0.062456
Child is in a rural location	-0.104521		0.043681	0.028397		0.055274
/cut1	-1.816570		0.897526	-2.978353		1.151291
/cut2	-0.654282		0.896341	-2.281757		1.148191
/cut3	-0.181361		0.895985	-1.823267		1.147114
/cut4	0.442951		0.895407	-1.267570		1.146290
/cut5	1.272254		0.895156	-0.305952		1.144779
/cut6	2.566714		0.896924	0.830548		1.145348
Log likelihood	-4,253.28			-2,556.89		
n	2,793			1,856		
LR chi-square(14)	1,289.86			632.88		
Prob > chi-square	0.0000			0.0000		
Pseudo R-squared	0.1317			0.1101		

***, **, and * denote statistical significance at the one percent level, five percent level, and ten percent level, respectively.

Appendix B - Results of Instrumental Variables Ordered Probit Estimations

Table B.1 IV Ordered Probit Estimates of Elementary Schooling, Aged 13 to 22 Years

| | MALES | | | FEMALES | | |
Variables	Coefficient		SE	Coefficient		SE
Receipt of remittance	0.629734		0.452638	-0.992030	**	0.435155
Father's education						
Graduated from elementary schooling or has some high school education	0.344397	***	0.028055	0.183111	***	0.040621
Graduated from secondary schooling or has some college education	0.491748	***	0.049364	0.332508	***	0.046570
Graduated from college	0.580664	***	0.103446	0.206306	**	0.090677
Mother's education						
Graduated from elementary schooling or has some high school education	0.354085	***	0.028838	0.381798	***	0.047263
Graduated from secondary schooling or has some college education	0.537704	***	0.052486	0.611697	***	0.055173
Graduated from college	0.582853	***	0.076174	0.551635	***	0.094576
Wealth	0.098693	***	0.021943	0.131267	***	0.010426
Number of siblings aged six years and below	-0.098494	***	0.017483	-0.114551	***	0.018007
Number of school-aged siblings	-0.036871	***	0.007801	-0.033371	***	0.008853
Age	0.095711	***	0.005500	0.137183	***	0.010937
Child is in the Visayas	-0.176012	***	0.033733	-0.103466	***	0.038734
Child is in Mindanao	-0.113656	***	0.038909	-0.287141	***	0.032724
Child is in a rural location	0.009141		0.026284	0.029289		0.033798
/cut1	-0.530200		0.146348	-0.228721		0.130282
/cut2	1.049431		0.105359	1.009908		0.203569
Log likelihood	-16,344.15			-11,965.94		
n	18,722			18,722		
LR chi-square(28)	5,862.05			4,122.10		
Prob > chi-square	0.0000			0.0000		

***, **, and * denote statistical significance at the one percent level, five percent level, and ten percent level, respectively.

Table B.2 IV Ordered Probit Estimates of High School Education, Aged 17 to 22 Years

Variables	MALES			FEMALES		
	Coefficient		SE	Coefficient		SE
Receipt of remittance	1.108397	***	0.350158	-0.130064		0.542252
Father's education						
Graduated from elementary schooling or has some high school education	0.270784	***	0.030154	0.159479	***	0.040852
Graduated from secondary schooling or has some college education	0.568956	***	0.060300	0.395127	***	0.050655
Graduated from college	0.570335	***	0.096360	0.304317	***	0.099131
Mother's education						
Graduated from elementary schooling or has some high school education	0.229223	***	0.031278	0.325395	***	0.040451
Graduated from secondary schooling or has some college education	0.581063	***	0.061646	0.664951	***	0.057860
Graduated from college	0.771851	***	0.079228	0.688151	***	0.088446
Wealth	0.082031	***	0.021720	0.137403	***	0.019743
Number of siblings aged six years and below	-0.107601	***	0.022603	-0.072730	***	0.027422
Number of school-aged siblings	-0.046490	***	0.008615	-0.046181	***	0.010379
Age	0.072559	***	0.008052	0.147498	***	0.010317
Child is in the Visayas	-0.108297	***	0.034418	-0.086950	*	0.049731
Child is in Mindanao	-0.053440	*	0.035028	-0.232208	***	0.048433
Child is in a rural location	-0.050295	*	0.026476	-0.056125	*	0.036382
/cut1	-0.623610		0.203488	0.268147		0.256234
/cut2	0.581299		0.161630	1.082319		0.262701
/cut3	1.043485		0.151890	1.504746		0.267313
/cut4	1.908094		0.146856	2.452843		0.280184
Log likelihood	-14,861.12			-9,113.02		
n	9,907			7,141		
LR chi-square(28)	4,717.12			2,706.51		
Prob > chi-square	0.0000			0.0000		

***, **, and * denote statistical significance at the one percent level, five percent level, and ten percent level, respectively.

Table B.3 IV Ordered Probit Estimates of College Education, Aged 21 to 22 Years

Variables	MALES			FEMALES		
	Coefficient		SE	Coefficient		SE
Receipt of remittance	0.2144034		0.050935	-1.134795	*	0.6421179
Father's education						
Graduated from elementary schooling or has some high school education	0.2286075	***	0.050598	0.0706306		0.0682048
Graduated from secondary schooling or has some college education	0.5998621	***	0.061723	0.1639297	*	0.1001933
Graduated from college	0.6382336	***	0.101537	0.1521074		0.1264053
Mother's education						
Graduated from elementary schooling or has some high school education	0.2483115	***	0.052052	0.2574032	***	0.0792166
Graduated from secondary schooling or has some college education	0.6079184	***	0.064906	0.4994582	***	0.0860426
Graduated from college	1.000799	***	0.101520	0.7434754	***	0.1776386
Wealth	0.1283589	***	0.010036	0.1806614	***	0.0125792
Number of siblings aged six years and below	-0.1512864	***	0.043069	-0.1587886	***	0.0610461
Number of school-aged siblings	-0.0539327	***	0.012110	-0.0208159		0.0155576
Age	0.0222128		0.041208	-0.0414622		0.0523186
Child is in the Visayas	0.0362028		0.054738	0.0009975		0.0709106
Child is in Mindanao	0.0440577		0.049214	-0.2488097	***	0.0664354
Child is in a rural location	-0.1046105	***	0.043681	0.0440422		0.0546947
/cut1	-1.75707		1.124429	-3.312796		1.134374
/cut2	-0.595237		1.117546	-2.712393		1.129619
/cut3	-0.1224721		1.115058	-2.317268		1.133126
/cut4	0.5016558		1.111837	-1.839168		1.144005
/cut5	1.330664		1.107664	-1.011971		1.17838
/cut6	2.624598		1.102522	-0.0344249		1.244
Log likelihood	-5,599.26			-3,603.51		
n	2,793			1,856		
LR chi-square(28)	1,484.58			758.91		
Prob > chi-square	0.0000			0.0000		

***, **, and * denote statistical significance at the one percent level, five percent level, and ten percent level, respectively.