9-2015

Impact of International Remittances on Schooling in the Philippines: Does the Relationship to the Household Head Matter?

Tomoki FUJII
Singapore Management University, tfujii@smu.edu.sg

DOI: https://doi.org/10.1111/asej.12058

Published in Asian Economic Journal, 2013, 29 (3), 265-284.
https://doi.org/10.1111/asej.12058
Pre-print version

Impact of remittances on schooling in the Philippines: does the relationship to the household head matter?

Tomoki Fujii

*School of Economics & Social Science, Singapore Management University,

90 Stamford Road, Singapore 178903

Phone: +65-6828-0279

Fax: +65-6828-0833

e-mail: tfujii@smu.edu.sg

Impact of remittances on schooling in the Philippines: does the relationship to the household head matter?[1]

Abstract

The remittances have emerged as one of the most important sources of international flows. In the Philippines, the amount of remittance receipts has more than doubled over a decade since early 1990s. As a result, the way remittances are used has become extremely important for economic development. Unlike the previous studies, we allow for the potential heterogeneity in the impact of remittances across various relationships to the head of household and take into account the potential negative effects of being guarded by someone other than the parents. We find that the impact of remittances on schooling is generally positive and the negative impact is outweighed by the positive impact of remittance flows.

[1]School of Economics, Singapore Management University. email: tfujii@smu.edu.sg. The author thanks the Matsushita International Foundation for financial support.

1 Introduction

International remittances have become one of the most important sources of global financial flows in developing countries. Reported remittances to developing countries have soared from around $30 billion dollars in 1990 to over $160 billion dollars in 2005 (Bank, 2006). This amount is approximately double the amount of official development assistance, and comparable to the magnitude of foreign direct investment and foreign portfolio investment. Since reported remittances do not include unofficial remittances, which may be as large as formal flows (Brown, 2006), international remittances may well be larger than any other type of financial flows once unofficial remittances are included.

International remittances have also been remarkably stable. They are not subject to the conditionalities imposed by donors or the herd behavior of private investors (Kapur and McHale, 2003). Further, remittances flow from households to households. Thus, they are less likely to be influenced by official corruption or haphazard institutional changes than other types of international flows.

(Chami et al., 2005) find that there is a negative correlation between remittances growth and per capita GDP growth unlike other types of financial flows. Thus, the remittances are countercyclical, so that the economic slowdown can be alleviated by increased flow of remittances. At the individual level, remittances could serve as a form of insurance. Yang (2007) find that roughly 60 percent of declines in household income are replaced by remittance inflows from overseas.

Insurance motives are not the only reason why migrants send remittances. Remittances may also be due to altruistic considerations. For example, Osili (2007) find that poorer origin families tend to receive higher transfers, other things being equal. Agarwal and Horowitz (2002) find that per-migrant remittances tend to decline with the number of migrants in the household, indicating that altruistic motives to remit may be more important than insurance motives. Therefore, if altruistic motives are indeed important, poor countries can potentially receive a disproportionately large amount of remittances.

It is, therefore, no surprise that researchers and policy-makers have increasingly become interested in the role of remittances in development. Using cross-country regressions,

Adams and Page (2005) find that remittances tend to reduce poverty in the developing world. Similar findings are made using household surveys in ten Latin American countries (Acosta et al., 2008) and in the Philippines (Sawada and Estudillo, 2007).

One channel through which remittances may promote development is investment in human capital. In El Salvador, Edwards and Ureta (2003) find that incomes from remittances help children remain in school. Other sources of incomes have a similar effect, but their effects are much smaller. Calero et al. (2009) find that remittances tend to increase school enrollment for the poor but not for the non-poor in Ecuador, suggesting that the remittances may help the poor overcome binding resource constraints. Yang (2008) find that favourable exchange-rate shocks are associated with more child schooling and less child labor in the Philippines.

This study also aims to shed light on the impacts of remittances on human capital investment using household survey data in the Philippines. The Philippines is an interesting and important country to study, because the size of remittances is large in the Philippines. Remittances accounted for 10 percent of the Gross Domestic Product Goldin and Reinert (2007) in 2003. This is more than seventy times larger than the foreign direct investment and official development assistance combined.

There have been a number of studies on the impact of remittances on development (Ang, 2009; Lauby and Stark, 1988; Sawada and Estudillo, 2007; Yang, 2007, 2008). Unlike previous studies, however, we explicitly consider the relationship between the children of the emigrant worker and the characteristics of the households that the children belong to. This is important, because the money remitted from the emigrant worker may not necessarily benefit the children of the emigrant worker, if the remittance is "intercepted" by the head of household. Therefore, the impact of remittances on human capital investment may well depend on the relationship between the household head and the child.

We explore the potential importance of the relationship between the child and the household head with two different regression models. The first model uses the schooling outcome directly. We test whether the characteristics of the households receiving the remittances affect the education outcome. We also estimate a model of education

expenditure share. This allows us to see whether the transfer money go to education.

This paper is organized as follows: In Section 2, we describe the data used in this study and present key summary statistics. Section 3 presents the regression results followed by conclusions in Section 4.

2 Data and Summary Statistics

We use the Family Income and Expenditure Survey (FIES), the Labor Force Survey (LFS) and the Survey on Overseas Filipinos (SOF), the Consumer Price Index (CPI) for various years. These data are collected by the National Statistics Office of the Philippines and available for purchase. The FIES data contain detailed household expenditure and income data, and the LFS data contain employment, demographic, and education variables for each individual in the household. The SOF data contain information on remittances and the characteristics of the emigrant workers. The FIES and LFS can be merged at the unit-record level for 1997, 2000, and 2003.

For the analysis of the education expenditure share, we further merge the annual CPI data into the merged FIES-LFS data by a combination of year and province. The prices are normalized so that the national average price for year 2000 for each good is equal to 100. Since the definitions of goods in the CPI and FIES data are not the same, we have aggregated goods in both data sets to match the definitions. As a result, we have the following ten categories: (i) cereal (CR), (ii) meat, fish and dairy products (MF), (iii) fruits and vegetables (FV), (iv) other food (OF), (v) housing related expenditure (HS), (vi) utilities, communication and transportation (UT), (vii) personal care and household maintenance (PH), (viii) other good (OG), (ix) education (ED), and (x) other services (OS).

Table 1 shows the changes in the amount of remittances and other modes of transfers over time. As we can see in Column (1), a majority of overseas Filipino workers send remittances to home, and the amount of remittances has more than doubled over a decade. The cash brought home has also grown substantially (Column (4)). Though the proportion of households receiving a cash transfer brought back by overseas Filipino

Table 1: Remittances and other transfers in the Philippines 1993-2002.

	Remittance		Cash brought home		In-kind brought home		Total	
Year	% positive	Amount	% positive	Amount	% positive	Amount	transfer	# Obs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1993	71.3	24365	15.2	36869	24.1	11775	25794	2280
1994	70.3	25050	11.7	39972	21.9	10752	24651	2275
1995	73.4	26476	9.8	43111	23.1	15354	27229	1862
1996	70.6	27513	10.9	37175	20.7	14917	26554	1992
1997	77.8	27724	15.4	40248	28.9	14178	31864	2768
1998	77.4	39676	19.5	56767	24.1	14630	45285	3064
1999	74.6	43903	18.1	50323	23.4	13405	44989	1994
2000	72.9	47688	16.6	70854	20.3	19052	52048	3112
2001	72.7	46704	17.5	64101	21.2	15898	48545	3176
2002	71.9	55334	18.3	77056	20.9	17768	57599	3128
2003	76.0	58625	18.0	81459	19.3	19553	63419	2585

Note: Author's calculation based on SOF data for 1993 to 2003. All the transfer amounts are for the six months period between April and September each year. All the numbers are appropriately weighted.

Table 2: Profile of contract overseas Filipino workers and other workers 1993-2002.

	Age		Female Ratio (%)		High School Grad (%)		College Grad (%)		Contract	
	Contract	Philippines	Contract	Philippines	Contract	Philippines	Contract	Philippines	Share (%)	# Obs
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1993	33.6	35.9	42.0	36.9	83.1	42.0	27.1	11.9	3.8	47,321
1994	33.4	36.2	45.5	36.7	85.2	42.7	25.5	11.5	3.7	47,818
1995	34.1	36.1	46.5	37.3	83.6	43.9	26.3	11.6	3.4	48,165
1996	34.6	35.6	43.9	37.1	84.4	45.6	28.5	12.9	3.6	48,260
1997	34.3	36.0	45.0	37.7	85.4	46.4	24.1	12.2	3.8	74,807
1998	34.7	36.2	47.1	37.9	85.8	47.5	25.8	12.9	3.9	71,220
1999	35.3	36.7	46.2	38.4	85.2	48.0	26.5	13.2	3.7	45,794
2000	35.2	36.9	47.0	38.1	86.6	49.0	31.3	13.5	3.7	73,106
2001	35.3	36.7	48.1	39.3	90.7	49.8	35.2	14.0	3.3	74,928
2002	35.6	37.1	47.5	39.2	90.5	50.5	35.4	14.2	3.4	71,765
2003	35.2	36.1	49.2	38.3	90.9	51.1	35.5	14.1	2.9	75,459

Note: Author's calculation based on LFS data for October. All the numbers are appropriately weighted.

workers is relatively small (Column (3)), the average amount is larger than the other two modes of transfers. The amount of in-kind transfers has not changed as much as other modes of transfers (Column (6)). This table clearly indicates the increasing importance of remittances in the Philippines over time.

Table 2 compares the characteristics of contract overseas Filipino workers against average Filipino workers. The proportion of the overseas contract workers have not changed much between 1993 and 2002 (Column (9)), but their characteristics have changed. The overseas workers are slightly younger than average workers (Columns (1) and (2)). The proportion of female workers has increased over time, and this proportion is larger for overseas Filipino workers than other workers (Columns (3) and (4)). One major difference between the contract overseas Filipino workers and average Filipino workers is the level of education. The former is much better educated. Overwhelming majority of the overseas workers have at least high-school diploma, but the corresponding proportion for the average Filipino worker is 50% or less. The difference is even more striking for college graduates. More than one in three overseas workers are a college graduate, but the corresponding proportion is less than on in seven for other workers (Columns (7) and (8)).

Table 3 reports various household characteristics by the relationship of the individuals aged between 10 and 14 with the head of household. We categorize the relationship of those aged between 10 and 14 to the household head into the following four main categories: child, grandchild, other relative and non-relative. For example, child means that the person is either son or daughter of the head of household, and this group accounts for 86.9 percent of the children aged between 10 and 14 in 2003. Those children whose household heads are grand parents account for 8.2 percent, and other relatives—including brother, sister, niece, and nephew— account for 4.3 percent. The group of children under the non-relative category includes boarders and domestic helpers, and they account for 0.6 percent. These proportions are similar in 1997 and 2000.

The reason we restrict the sample to those aged between 10 and 14 is as follows: First, the LFS data do not contain direct observations of school attendance. Thus, we define the school attendance by the usual occupation over the last twelve months. Second, the usual

Table 3: Profile of individuals between 10 and 14 by relationship to the head of household

Relationship with the household head	1997	2000	2003
Female ratio			
Child	48.1	48.3	48.9
Grand child	49.1	47.0	48.9
Other relative	54.6	51.0	55.1
Non-relative	65.4	65.2	65.1
Philippines	48.5	48.4	49.3
Per capita expenditure			
Child	14,873	17,161	19,248
Grand child	16,960	19,315	23,083
Other relative	18,241	22,909	27,169
Non-relative	37,824	32,978	41,550
Philippines	15,341	17,700	20,044
Share of incomes from abroad			
Child	4.0	4.1	4.7
Grand child	10.3	9.9	10.6
Other relative	7.6	8.5	10.8
Non-relative	4.4	6.6	8.2
Philippines	4.7	4.9	5.5
Proportion of Students			
Child	92.1	88.6	87.2
Grand child	94.8	89.1	86.6
Other relative	88.6	88.6	85.5
Non-relative	46.5	39.7	54.7
Philippines	91.9	88.4	86.9

occupation is not recorded for individuals under age 10. Thus, we exclude individuals under age 10. Finally, we also exclude observations for individuals above age 14, because older individuals may have completed compulsory education.

The exact definition of being a student is slightly different from year to year due to the design of the LFS survey. For year 1997, student is one of the possible usual occupations, and we use this as the school attendance variable. For years 2000 and 2003, we defined as students those who are not engaging in a gainful activity due to study. As a result, some of those who are studying and working simultaneously are included in 1997, but excluded in 2000 and 2003, though the proportion of such people is likely to be small.

It should be noted that the drop of the proportion of students between 1997 and 2000 is not driven by the slight discrepancy in the definition described above. Education statistics also suggest similar drop. According to the World Development Indicators published by the World Bank, the net enrollment ratio (NER) for primary education, which measures the proportion of primary-school-age children enrolled in a primary school, has dropped from 92.9% in 1998 to 90.2% in 2001 and the number of out-of-school children has increased by 42% during the same period.[2]

As we can see from Table 3, there is a clear pattern between the child's relationship to the household head and the proportion of girls. The proportion of girls is much higher than the national average for "other relative" and "non-relative" groups. This is because many of the girls in this group work as a domestic helper. This also explains why the average household expenditure per capita is high for these groups, because only wealthier households can afford to hire domestic helpers.

Table 3 also shows that the share of income transferred from abroad varies with the child's relationship with the head of household. The share is higher for "grandchildren" and "other relative" groups. This is because many of the children in these groups have parents working abroad. Thus, while the remittances parents send for the children may increase the schooling, the fact that they are not taken care of their parents may negatively affect schooling.

[2]We took a year after since we do not have the figures for years 1997 and 2000.

The bottom part of Table 3 indicates that such negative effect may exist. The proportion of students is on average highest for the "child" and "grandchild" groups. They are followed by the "other relative" and "non-relative" groups. Given that the parents and grandparents are likely to care about (and potentially benefit most from) the education of their children or grandchildren more than other relatives and non-relatives, this observation is not totally surprising. However, the higher income due to remittances does not, on average, seem to offset the effect of being taken care of a relative other than parents and grandparents. In the next section, we try to separate the effect of increased remittances from the "guardian" effect in regression analyses.

3 Regression Results

We first look at the effects of remittances and guardian on the schooling outcome variable directly. Let S_i be the indicator variable that takes one if individual i (aged between 10 and 14) is a student and zero otherwise. We assume that there is a latent variable S_i^* such that $S_i = \text{Ind}(S^i \geq 0)$, $\text{Ind}(\cdot)$ is the indicator function which takes one if the argument is true and zero otherwise. Further, we assume that S_i^* can be written as $S_i^* = X_i^T\beta + \epsilon$, where X_i a column vector of covariates for individual i, and β is a parameter to estimate. With an additional assumption that ϵ_i has a standard normal distribution, we have the probit model as follows:

$$P(S_i = 1|X_i) = P(\epsilon_i \geq -X_i^T\beta|X_i) = E[\epsilon_i \geq -X_i^T\beta|X_i] = \Phi(-X_i^T\beta),$$

where $\Phi(\cdot)$ is the cumulative distribution function for a standard normal distribution. We estimate β by the maximum likelihood estimation.

The basic regression results are reported in Table 4. These results are based on the merged LFS-FIES data pooled for years 1997, 2000, and 2003. Because of the slight discrepancy in the definitions of being a student across years, we have also run regressions separately year by year. These results are reported in Table 6 in the Appendix. Since the sample size becomes smaller, some of the coefficients become insignificant. However, most

of the results we discuss here are consistent with the year-by-year regression results. We shall highlight the cases where the pooled regression and year-by-year regressions yield noticeable discrepancy.

Column (S1) in Table 4 reports the results for the simplest model with a minimum set of regressors. $LPCTOT$ is the logarithmic total expenditure per capita in the household. As expected, richer households are more likely to send their children to school, and the marginal impact of the per capita expenditure is decreasing since the coefficient on $LPCTOT^2$ is negative (and significant). $ABSHARE$ is the share of household income received from abroad. This coefficient is positive and significant, suggesting that the income from abroad (mostly remittances) has a positive impact on schooling of children in the household over and above the impact due to increased income. These findings are consistent with the literature and robust with respect to the choice of regressors.

Column (S2) provides the estimation results with household and individual variables and their interaction terms with $ABSHARE$. Columns (S3) to (S5) are the estimation results for the same model except that they include fixed effect terms. Column (S3) includes age fixed effects. The age fixed effects are potentially important as children tend to quit school when they get older. Column (S4) includes all the variables in (S3) and region fixed effects. Because the Philippines are heterogeneous across regions, the region fixed effects are also potentially important. Column (S5) includes all the variables in (S4) plus year fixed effects, as various factors may have changed over time.

The coefficient on $ABSHARE$ is positive and significant in all cases in Table 4. Therefore, the remittances do seem to help increase schooling, even after controlling for a number of factors. Notice that there is a potential endogeneity problem here. Those households that receive income from abroad may be the type of households that care about schooling more than other households. Hence, positive coefficient on $ABSHARE$ may reflect, to some degree, the preferences of households, rather than the foreign income effect. As a result, the impacts of the foreign remittance may be exaggerated in these estimations.

The coefficient on $HHFEM$, an indicator variable that the household head is female,

Table 4: Probit regression of being a student.

Model	(S1)			(S2)			(S3)			(S4)			(S5)		
Variable	Estimate		(S.E.)	Estimate		(S.E.)	Estimate		(S.E.)	Estimate		(S.E.)	Estimate		(S.E.)
$LPCTOT$	1.939	***	(0.188)	1.544	***	(0.194)	1.618	***	(0.198)	1.383	***	(0.206)	1.774	***	(0.207)
$LPCTOT^2$	-0.082	***	(0.010)	-0.063	***	(0.010)	-0.066	***	(0.010)	-0.056	***	(0.011)	-0.074	***	(0.011)
$ABSHARE$	0.384	***	(0.059)	0.454	***	(0.112)	0.473	***	(0.115)	0.388	***	(0.115)	0.358	***	(0.115)
$HHFEM$				-0.098	***	(0.026)	-0.083	***	(0.026)	-0.104	***	(0.026)	-0.103	***	(0.027)
$HHHIGH$				0.299	***	(0.018)	0.284	***	(0.018)	0.307	***	(0.019)	0.298	***	(0.019)
$GRAND$				0.048	*	(0.028)	0.027		(0.029)	0.036		(0.029)	0.035		(0.030)
$OTHREL$				-0.217	***	(0.035)	-0.184	***	(0.035)	-0.164	***	(0.036)	-0.179	***	(0.037)
$NONREL$				-1.635	***	(0.071)	-1.553	***	(0.069)	-1.526	***	(0.069)	-1.584	***	(0.070)
$ABSHARE \times HHFEM$				0.234	*	(0.123)	0.208	*	(0.125)	0.273	**	(0.126)	0.250	*	(0.127)
$ABSHARE \times HHHIGH$				-0.171		(0.121)	-0.179		(0.123)	-0.216	*	(0.123)	-0.182		(0.124)
$ABSHARE \times GRAND$				-0.300	*	(0.157)	-0.309	*	(0.160)	-0.282	*	(0.162)	-0.295	*	(0.163)
$ABSHARE \times OTHREL$				-0.025		(0.213)	-0.013		(0.214)	-0.001		(0.215)	0.016		(0.217)
$ABSHARE \times NONREL$				-0.768	**	(0.362)	-0.705	**	(0.347)	-0.738	**	(0.346)	-0.661	*	(0.357)
$CONSTANT$	-9.725	***	(0.889)	-7.735	***	(0.918)	-7.953	***	(0.934)	-6.459	***	(0.974)	-8.307	***	(0.978)
Age fixed effect	N			N			Y			Y			Y		
Region fixed effect	N			N			N			Y			Y		
Year fixed effect	N			N			N			N			Y		
Pseudo R^2	0.0418			0.0657			0.0861			0.1143			0.1267		
Number of observations	78620			78620			78620			78620			78620		

Note: Author's calculation based on the merged FIES-LFS data for 1997, 2000 and 2003. Robust standard errors are reported in the parentheses. *, ** and *** indicate that the coefficient is statistically significant at a 1, 5, and 10 percent respectively.

is negative and significant. The coefficient on $HHHIGH$, an indicator variable that the household head has graduated from high school, is positive and significant. Thus, other things being equal, the children living in a household headed by a female is less likely to be a student than those in a household with a male head. Also, the children whose household heads have graduated from high school are more likely to be in school than others after controlling for various factors.

The relationship of the individual to the household head also matter. $GRAND$, $OTHREL$ and $NONREL$ are indicator variables that the relationship of the individual to the household head is grandchild, relative other than children or grand children, and non-relative, respectively. Thus, if the individual is a grandchild to the head of household head, the individual is more likely to be a student, other things being equal. In Column (S2), the coefficient on $GRAND$ is positive and significant at a 10 percent level. However, the results are not robust as the coefficients are not significant in Columns (S3) to (S5).

The coefficients on $OTHEL$ and $NONREL$ are both negative and significant. This indicates that, other things being equal, the children whose household heads are not a parent or grandparent are less likely to go to school. Further, the absolute value of the estimated coefficient is particularly large for $NONREL$, suggesting that the non-relatives are very unlikely to sent to school after controlling for other factors.

In Columns (S2) to (S5), the coefficients on $ABSHARE \times HHFEM$ is positive and significant, though only at a 10 percent level. Therefore, women may be more likely to spend the remittance incomes to education. We shall get back to this point later when we discuss the expenditure share equation. On the other hand, the coefficients on $ABSHARE \times HHHIGH$ is not significant except for Column (S4). Hence, the fact that the household is headed by a high school graduate does not appear to change the impact of remittances on child schooling.

The interaction terms between the relationship to the head of household and $ABSHARE$ also exhibit interesting patterns. First, $ABSHARE \times NONREL$ is negative and significant as expected. Further, in all cases, the absolute value of the coefficient is higher on the interaction term than the coefficient on $ABSHARE$. This indicates that those children

who fall under the non-relative category are unlikely to go to school if their households rely more on remittances. This makes sense as they are likely to be working as a domestic helper and so on.

Second, $ABSHARE \times GRAND$ is also negative and significant, though only at a 10% level. Therefore, among the households where the guardian of the school-age children is a grandparent, the children are less likely to be a student if the share of income from abroad is larger. However, we are unable to draw strong conclusions as the corresponding coefficients in the year-by-year regressions are not significant. Finally, $ABSHARE \times OTHREL$ is not significant. This indicates that the impacts of remittances may be similar between those children whose guardian are parents and those children whose guardian are other relatives.

The regressions results discussed so far tell us how remittances are related to the student status of children. However, they don't tell us whether the income received from abroad is indeed used for education. Therefore, we also estimate some models of educational spending.

Formally, let w_h be the education expenditure share, or the education expenditure over the total expenditure. Theoretically, this function depends on prices and total expenditure. In addition, we include additional covariates ξ_h including a constant term. Assuming a linear relationship, we have the following model:

$$w_h = \alpha_0^T p_h + \alpha_1 LPCTOT_h + \alpha_2^T \xi_h,$$

where p_h is a column vector of logarithmic prices, $LPCTOT$ is the logarithm of the total expenditure per capita in the household as before. Since w_h is homogeneous in degree zero in prices and total expenditure, we may drop the price for any single good to (implicitly) impose this constraint. Thus, we drop the price of the other services from the regression.

Table 5 reports the regression results for expenditure shares expressed in percentage. The LP variables are the logarithmic prices. For example, LP_{CR} is the logarithmic price for the cereal. $NCLCHILD$ is the number of school-age individuals in the household aged between 6 and 15. $GRAT$, $ORAT$ and $NRAT$ are the ratio of individuals who are

Table 5: The regression results for the education expenditure share model.

Model	(E1)			(E2)			(E3)			(E4)			(E5)		
Variable	Estimate		(S.E.)	Estimate		(S.E.)	Estimate		(S.E.)	Estimate		(S.E.)	Estimate		(S.E.)
LP_{CR}	-0.14		(0.59)	-0.18		(0.59)	-0.17		(0.59)	-0.30		(0.61)	-0.29		(0.59)
LP_{MF}	-0.92	*	(0.49)	-0.93	*	(0.49)	-0.94	*	(0.49)	0.27		(0.51)	0.27		(0.53)
LP_{FV}	2.92	***	(0.27)	2.99	***	(0.27)	2.99	***	(0.27)	1.15	***	(0.29)	1.15	***	(0.27)
LP_{OF}	-1.24	***	(0.38)	-1.35	***	(0.38)	-1.35	***	(0.38)	-1.54	***	(0.43)	-1.55	***	(0.42)
LP_{HS}	0.23		(0.17)	0.24		(0.17)	0.24		(0.17)	0.12		(0.18)	0.12		(0.18)
LP_{UT}	1.38	***	(0.39)	1.47	***	(0.39)	1.47	***	(0.39)	-0.23		(0.44)	-0.22		(0.42)
LP_{PH}	-1.19	***	(0.41)	-1.17	***	(0.41)	-1.17	***	(0.41)	-0.42		(0.46)	-0.41		(0.48)
LP_{OG}	-4.31	***	(0.67)	-4.34	***	(0.66)	-4.34	***	(0.66)	0.09		(0.80)	0.09		(0.79)
LP_{ED}	-0.31		(0.21)	-0.32		(0.21)	-0.32		(0.21)	0.82	***	(0.24)	0.83	***	(0.23)
$LPCTOT$	2.19	***	(0.04)	2.00	***	(0.04)	2.00	***	(0.04)	2.40	***	(0.05)	2.44	***	(0.04)
$ABSHARE$	2.42	***	(0.20)	2.57	***	(0.20)	2.53	***	(0.42)	2.34	***	(0.41)	2.30	***	(0.25)
$NSCLCHILD$	0.30	***	(0.02)	0.24	***	(0.02)	0.24	***	(0.02)	0.28	***	(0.02)	0.29	***	(0.02)
$HHFEM$				0.03		(0.07)	0.01		(0.07)	0.07		(0.07)	0.07		(0.07)
$HHHIGH$				0.59	***	(0.05)	0.58	***	(0.05)	0.58	***	(0.05)	0.56	***	(0.05)
$GRAT$				-0.82	***	(0.07)	-0.79	***	(0.07)	-0.79	***	(0.07)	-0.79	***	(0.07)
$ORAT$				-0.36	***	(0.12)	-0.41	***	(0.13)	-0.48	***	(0.13)	-0.48	***	(0.10)
$NRAT$				-1.23	***	(0.34)	-1.16	***	(0.34)	-1.60	***	(0.34)	-1.64	***	(0.25)
$ABSHARE \times HHFEM$							0.08		(0.39)	0.09		(0.39)	0.09		(0.24)
$ABSHARE \times HHHIGH$							0.06		(0.41)	0.13		(0.40)	0.15		(0.25)
$ABSHARE \times GRAT$							-0.35		(0.49)	-0.36		(0.49)	-0.36		(0.32)
$ABSHARE \times ORAT$							0.55		(0.81)	0.61		(0.82)	0.61		(0.46)
$ABSHARE \times NRAT$							-1.02		(2.35)	-1.35		(2.38)	-1.34		(1.30)
Constant	-18.37	***	(0.36)	-16.59	***	(0.38)	-16.59	***	(0.38)	-19.81	***	(0.44)	-20.20	***	(0.39)
Year and region fixed effects	N			N			N			Y			Y		
R^2	0.1019			0.1077			0.1078			0.1220			0.1220		
# Obs	74308			74308			74308			74308			74308		
Estimation	OLS			OLS			OLS			OLS			IV		

Note: Author's calculation based on the FIES-LFS-CPI data for 1997, 2000 and 2003. Robust standard errors are reported in the parentheses. *, ** and *** indicate that the coefficient is statistically significant at a 1, 5, and 10 percent respectively.

grandchildren, other relatives and non-relatives of the household head to $NSCLCHILD$, respectively. We use these household-level variables because the expenditure shares are measured at that level.

Column (E1) in Table 5 reports the estimation results for a smallest model based on the ordinary least squares (OLS) estimation. The results indicate that richer households send to spend a larger share of income. For example, a 1 percentage point increase in total expenditure is associated with an approximately 0.02 percentage point increase in the expenditure share. Also, the coefficient on $ABSHARE$ is positive and significant. The households with larger share of income coming from abroad tend to spend a larger share of income on education. These observations are consistent with the schooling regressions discussed earlier.

As with the schooling regression model, the interpretation of the coefficient on $ABSHARE$ requires some caution. The kind of households that receive a larger share of income from abroad—which may be the kind of households that would take pains to send a household member abroad to finance education— may coincide with the kind of households that spend more share on education. Therefore, our results in part may reflect the preference of households, rather than the causal effect of the incomes from abroad.

The coefficient on $NSCLCHILD$ is significant and positive, as expected. Households with a larger number of school-age children tend to have a larger education expenditure share. One additional child is associated with about 0.3 percentage point increase in education expenditure share.

In Column (E2), we report the estimation results for a model with additional controls at the household level. While the coefficient on $HHFEM$ is very close to zero, suggesting that the gender of the head does not affect the education expenditure share. However, the coefficient on $HHHIGH$ is positive and significant. Therefore, when the head of the household is a high school graduate, a larger share of expenditure tends to go to education.

The coefficient on $GRAT$ is negative and significant. This is unexpected from the schooling regression results. This may reflect the fact that the households in which the

school-age members are guarded by their grand parents may have additional needs that do not appear in other households.

Also, the coefficients on $ORAT$ and $NRAT$ are negative and statistically significant. Therefore, other things being equal, the share of expenditure that goes to the spending on education tends to be smaller when the proportion of school children who are not children or grandchildren of the head of the household is larger. This result is expected from the schooling regression results, because the school-age children who are an other relative or non-relative are less likely to be a student than others.

Column (E3) reports the estimation results for a model that includes all the regressors in Column (E2) and some interaction terms between $ABSHARE$ and various household-level variables. This regression tells us whether the way income from abroad is used may be different across different households.

The coefficients on $ABSHARE \times HHFEM$ and $ABSHARE \times HHHIGHT$ are not significant both statistically and economically. Hence, whether the head is a female and whether the head has graduated from high school do not seem to change the way remittances are used.

The coefficients on $ABSHARE \times GRAT$, $ABSHARE \times ORAT$ and $ABSHARE \times NRAT$ are also not statistically significant. However, the point estimates are large. According to the estimates in Column (E3), one percentage point increase in the share of income from abroad is associated with 0.023 percentage point increase in the share of education spending when the household head is a parent of all the school-age children in the household, whereas the corresponding figures for 0.020 0.029 and 0.011, when relationship of all the school-age children to the head of household in the households is grandchildren, other relatives, and non-relatives.

Column (E4) reports the regression results for a model that includes both year and region fixed effects. The inclusion of these fixed effects is potentially important, but it does not change the main results that have been discussed so far. One notable difference is that the coefficient on LP_{ED} becomes positive and significant. One explanation for this difference is that prices may have capture a number of confounding factors that vary

across regions or years. Thus, once we control for the region and year as well as other observable characteristics, higher education price is associated with higher expenditure share for education, suggesting that education expenditure may be inelastic.

Columns (E1) to (E4) are based on the OLS estimation. The results are good if the measurement of $LPCTOT$ is not subject to errors. However, if it is, the measurement error will also end up in the left-hand-side of the equation, causing the OLS estimate to be biased. Therefore, as a robustness check, it is important to address this potential source of bias.

The standard procedure to deal with this issue is to use the instrument variable (IV) approach. Therefore, we instrument $LPCTOT$ by the logarithm of total income per capita in the household. The estimation results due to the IV estimation are reported in Column (E5). As the comparison between Column (E4) and Column(E5) makes clear, the potential bias due to $LPCTOT$ is small, if any and it does not change the qualitative nature of the results we have discussed so far. Note that the

4 Conclusions

Remittances have increasingly become an important driver of development in many developing countries. The Philippines is one notable example of such countries. This study has shed light on how income from abroad is used using schooling and education expenditure share regressions.

We have found that the income from abroad tends to increase both schooling and education expenditure share. This indicates that international remittances tend to help households finance human capital investment, which in turn is likely to help improve the long-term prospect of the country's development, provided that the human capital formed due to the income from abroad stay in the Philippines.

Whether or not international remittances help the development of the Philippines in the long run, our finding does indicate that they are likely to improve the education of school-age children in the Philippines. One qualification that has to be made is that our results may be in part driven by the heterogeneous preferences across households.

Previous studies, however, have also found that international remittances are indeed used to finance human capital investment.

One important difference of this study from previous studies is that we explicitly take into account the relationship of the school-age children to the head of household. This is potentially important because it is not uncommon for the Filipino parents to ask other people, including relatives, to look after the school-age children while they are working abroad.

We find that the incomes from abroad do not benefit the school-age individuals in the households who are not related to the head of the household. International remittances appear to affect the education of those school-age individuals who are grandchildren of the head differently from those school-age children who are relatives but not children or grandchildren of the head.

In the absence of incomes from abroad, it is also the case that those school-age individuals who are a relative of but not a child or a grandchild of the head are less likely to be a student than those individuals whose household head is a parent or grandparent. However, when the parents ask their relatives to look after their children to work abroad, remittances could compensate for being an "other relative." This can be seen by the fact that, after controlling for various factors, a larger proportion of the income from abroad goes to the education spending in households with a high share of other relatives among school-age children (though the coefficient on $ABSHARE \times ORAT$ is not statistically significant).

The question is how large the compensation by international remittances is large. To answer this question, let us do a simple calculation with a realistic parameter values. Consider a typical school-age individuals who is a relative of, but not a child or a grandchild of, the head of household. Then, for such a child, $LPCTOT = 10 (\approx \ln 22,0026)$ and $ABSHARE = 0.1$ would be a reasonable choice given the summary statistics reported in 3.

Now, consider a counter factual where the child stayed with his parent. Assume this parent is the same in all aspects as the actual head of household for the child, except that

the parent has not income from abroad, so that $LPCTOT = 9 (= 10 \times (1 - 0.1))$ and $ABSHARE = 0$. While this is obviously a strong assumption, this is not an unreasonable assumption.

By comparing between the actual outcome with this counterfactual, we can measure the impact of emigration and remittances combined on schooling. Taking the estimates from Column (S5) in Table 4, the combined impact on the systematic component ($X\beta$) in the schooling regression is $\Delta X_i^T \beta = 1.774 \cdot (10 - 9) - 0.074 \cdot (100 - 81) + 0.358 \cdot 0.1 - 0.179 \cdot (1 - 0) - 0.001 \cdot (0.1 - 0) = 0.225 > 0$. Thus, the net impact is still positive around the observed averages.

Using similar calculations, we can also see that the negative effect of being an "other relative" on schooling outweighs the positive effect of foreign incomes when $ABSHARE$ is less than 0.049 (assuming $LPCTOT = 10$). Thus, our results indicates that remittances from abroad tends to compensate for the fact that the child is an "other relative," if a reasonably large amount of income comes from abroad.

The calculations above are essentially based on the assumption that the (potential) senders of remittances have the same characteristics as the receivers. What if we drop this assumption? If the senders are wealthier in the first place, then our results would exaggerate the possibility of compensation. That is, by letting the child be taken care of by a poorer relative, the child may be less likely to go to school, even if remittances may partially compensate for being an "other relative."

Despite this caveat, it is still the case that international remittances are indeed used for education, Further, if the opportunities abroad are attractive enough, they help improve schooling in the Philippines, even after the potential negative effects of being guarded by non-parent relatives are taken into consideration.

References

Acosta, P., C. Calderón, P. Fajnzylber, and H. Lopez (2008) 'What is the impact of interantional remittances in latin america.' *World Development* 36(1), 89–114

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

Agarwal, R., and A.W. Horowitz (2002) 'Are international remittances altruism or insurance?: Evidence from guyana using multiple-migrant households.' *World Development* 30(11), 2033–2044

Ang, A. (2009) 'Workers' remittances and its impact on rural development in the philippines.' *Asia-Pacific Social Science Review* 9(2), 63–77

Bank, World (2006) *Global Economic Prospects 2006: Economic Implications of Remittances and Migration* (World Bank)

Brown, S.S. (2006) 'Can remittances spur development? a critical survey.' *International Studies Review* 8, 55–75

Calero, C., A.S. Bedi, and R. Sparrow (2009) 'Remittances, liquidity constraints and human capital investments in ecuador.' *World Development* 37(6), 1143–1154

Chami, R., C. Fullenkamp, and S. Jahjah (2005) 'Are immigrant remittance flows a source of capital for development.' *IMF Staff Papers* 52(1), 55–81

Edwards, A.C., and M. Ureta (2003) 'International migration, remittances, and schooling: evidence from el salvador.' *Journal of Development Economics* 72(2), 429–461

Goldin, I., and K. Reinert (2007) *Globalization for Development: Trade, Finance, Aid, Migration, and Policy* (World Bank)

Kapur, D., and J. McHale (2003) 'Migration's new payoffs.' *Foreign Policy* 139, 48–57

Lauby, J., and O. Stark (1988) 'Individual migration as a family strategy: Young women in the philippines.' *Population Studies* 42(3), 437–486

Osili, U.O. (2007) 'Remittances and savings from international migration: Theory and evidence using a matched sample.' *Journal of Development Economics* 83, 446–465

Sawada, Y., and J.P. Estudillo (2007) 'Trade, migration and poverty reduction in the globalizing economy: the case of the philippines.' In *Globalization and the Poor in Asia: Can Shared Growth be Sustained?,* ed. M. Nissanke and E. Thorbecke (Palgrave Macmillan) chapter 4, pp. 90–114

Yang, D. (2008) 'International migration, remittances and household investment: Evidence from philippine migrants' exchange rate shocks.' *Economic Journal* 118, 591–630

Yang, D. abd Choi, H.J. (2007) 'Are remittances insurance?: Evidence from rainfall shocks in the philippines.' *World Bank Economic Review* 21(2), 219–248

Appendix: Additional Table

Table 6: Additional school regression results

Variable	Estimate		(S.E.)	Estimate		(S.E.)	Estimate		(S.E.)
$LPCTOT$	2.659	***	(0.376)	1.796	***	(0.353)	1.955	***	(0.338)
$LPCTOT^2$	-0.125	***	(0.020)	-0.074	***	(0.019)	-0.080	***	(0.018)
$ABSHARE$	0.816	***	(0.260)	0.027		(0.185)	0.402	**	(0.175)
$HHFEM$	-0.104	*	(0.057)	-0.103	**	(0.046)	-0.110	***	(0.040)
$HHHIGH$	0.454	***	(0.041)	0.235	***	(0.032)	0.268	***	(0.029)
$GRAND$	0.217	***	(0.068)	0.031		(0.050)	-0.073	*	(0.044)
$OTHREL$	-0.273	***	(0.071)	-0.079		(0.066)	-0.216	***	(0.056)
$NONREL$	-1.717	***	(0.128)	-1.725	***	(0.126)	-1.249	***	(0.115)
$ABSHARE \times HHFEM$	0.223		(0.276)	0.286		(0.200)	0.256		(0.200)
$ABSHARE \times HHHIGH$	-0.613	**	(0.273)	0.029		(0.191)	-0.113		(0.200)
$ABSHARE \times GRAND$	-0.554		(0.368)	-0.335		(0.247)	-0.018		(0.274)
$ABSHARE \times OTHREL$	-0.408		(0.401)	0.296		(0.443)	-0.014		(0.308)
$ABSHARE \times NONREL$	-2.449	***	(0.939)	0.100		(0.579)	-1.014	**	(0.502)
$CONSTANT$	-12.301	***	(1.758)	-8.709	***	(1.680)	-9.731	***	(1.609)
Age fixed effect	Y			Y			Y		
Region fixed effect	Y			Y			Y		
Year	1997 only			2000 only			2003 only		
Pseudo R^2	0.1471			0.1259			0.121		
Number of observations	25125			26985			26510		

Note: Author's calculation based on the FIES-LFS data for 1997, 2000 and 2003. Robust standard errors are reported in the parentheses. *, ** and *** indicate that the coefficient is statistically significant at a 1, 5, and 10 percent respectively.