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Do Remittances Increase Household Investment in Education? Evidence from Cambodia During and After the Global Financial Crisis

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Abstract

Contributing to the growing interest in understanding the mechanism through which remittances spur development, this paper, by looking at the timing of the receipt of remittances, the origin of remittances, and household-income level, presents new evidence on the controversial debate concerning the impact of remittances on education. We apply an ad-hoc two-stage modelling methodology to pooled cross-section data from the Cambodia Socio-Economic Surveys of 2009 and 2014. Several principal findings emerge: (1) Even for a specific country, the timing of receipt of income from different sources can lead to significantly different expenditure patterns; (2) Cambodian households do not view remittances as transitory income; (3) Only international remittances have a significant effect, yet a USD 1.00 increase in such leads to a decrease in educational investment by USD 0.25; (4) Despite this, the marginal effect is statistically significant only for households that receive more than USD 50 and for poor families.

Keywords

Cambodia; remittances; education; investment; pooled cross-section data

Introduction

From the late 1990s, international remittances began to exceed official development assistance, and in some countries, remittances have also matched or surpassed foreign direct investment (Yang, 2011). The significant growth in the amount of remittances worldwide has been impressive and has attracted increasing attention over the years (United Nations, 2017). Therefore, it is not surprising that many studies are motivated by the aim to understand through which mechanism remittances will potentially spur the development of remittance-receiving countries. Even though it is obvious that remittances increase household income and general welfare, one can always argue that they will improve household conditions in the long term only if such resources are allocated to increase investment in business or agricultural activities or human capital development instead of mere food consumption. But do remittances fund such investment or merely raise consumption?

The answer to this question is, however, unclear a priori. Studies have found that the pattern of spending remittances and thus their impacts differ from one context to another. Chami, Fullenkamp and Jahjah (2005) report that in many countries, a large proportion of remittances is spent on the consumption of basic commodities such as food rather than being channeled into productive investment. In Latin America, the effect of remittances on education and health outcomes is positive only for some restricted groups in a limited number of countries

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while there is not enough evidence to generalize the findings for the entire region (Acosta, Fajnzylber, & Lopez, 2007). Similarly, Adams, Cuecuecha and Page (2008) observe no significant impact of remittances on household investment and conclude that Ghanaian households treat remittances as "fungible". Remittances are also more likely to support consumption in Fiji (Brown & Leeves, 2011).

Contrary to the aforementioned findings, some published research has discovered evidence that remittance-recipient households tend to invest in entrepreneurial or agricultural activities (Amuedo-Dorantes & Pozo, 2006; Woodruff & Zenteno, 2007), housing (Adams & Cuecuecha, 2010), and accumulation of health assets (Amuedo-Dorantes & Pozo, 2011). In some Asian countries, such as Pakistan and Thailand, households use remittances to hire labor and buy farm equipment (Giannetti, Federici & Raita, 2009). In the Philippines, Yang (2008) found that positive exchange-rate shocks due to the 1997 Asian Financial Crisis led households to spend more of their remittances on education. Some studies have also looked at the different effects of internal as compared to international remittances. For example, in Nepal and Mexico it was found that households receiving domestic remittances invested more in education relative to those that received external remittances (Bansak, Chezum & Gir, 2015; Taylor & Mora, 2006). However, the question remains as to why such money is being used differently.

There are at least two standpoints regarding this. Common perspectives have regarded remittances as fungible (McKenzie & Sasin, 2007; Adams & Cuecuecha, 2010). Due to this fungibility, most individuals consider remittances essentially similar to other types of income and believe that remittances may eventually increase investment even if they do not immediately do so (Stark, 1991; Adams & Cuecuecha, 2010). Friedman's (1953) Permanent Income Hypothesis (PIH) contradicts the principle of the fungibility of money and argues that regular and permanent income is more likely to be consumed because individuals expect to enjoy it over a long period. In contrast, irregular and transitory income is likely to be saved or invested as households find it difficult to predict their future gain. Amuedo-Dorantes and Pozo (2011) also assert that the differences in the use of household income and remittances are a result of intra-household bargaining with respect to expenditure as remitters may insist on deciding how their transfers should be used.

In this paper, we pursue two objectives related to the current debate. First, we test whether or not the PIH holds and whether one form of income is used differently from other forms. By doing so, we also seek to learn the importance of remittances relative to other income. Second, we delve into the controversy of how remittances are spent by discussing new evidence on the impact of remittances according to the origin of the funds and the population subgroups involved. To be more specific, the paper answers four questions: (1) To what extent do households spend remittances on education? (2) Relative to other kinds of income, do remittances have a larger or smaller impact? (3) To what extent does the impact of internal remittances differ from that of international remittances? (4) Does the effect of remittances differ between poorer households and their richer counterparts? The latter question is motivated by evidence that richer households are more likely to spend remittances on healthcare relative to poorer families who face more resource constraints. Hence, the effect of remittances is greater for the rich (Amuedo-Dorantes & Pozo, 2011).

To accomplish our goals, we implement an ad hoc two-stage estimation methodology. In the first stage, we model remittance decisions to correct for endogeneity and selection bias issues and allow for the possibility that households may not receive remittances due to constraints/difficulties or that they may never receive them at all. In the second stage, we employ Generalized Linear Models to relax normality and homoskedasticity assumptions required by general linear regression. But these assumptions are rarely present for models

related to income or expenditure as the distribution is heavily skewed to the right with a spike at zero.

We apply the method on pooled nationally representative data derived from the Cambodia Socio-Economic Surveys of 2009 and 2014. Interest in the Cambodian context originated from Adams's (2011) and, Brown and Jimenez-Soto's (2015) papers, which review the literature and indicate that research regarding the impact of remittances on household resource allocation in an Asian context is sparse. This is, however, astonishing given that the region has the highest rate of migration (United Nations, 2017). Cambodia itself has experienced one of the highest urbanization rates in the world, fueled by internal migration into Phnom Penh, the capital and heart of Cambodia's economy (Zimmer & Van Natta, 2018). In addition, it has been claimed that Cambodian households consider migration as an investment and the subsequent remittances as a way to reach saving targets (Bylander, 2014). If this is true, it would shed light on how remittances are used in a country where migration is not seen as just another way to reduce unemployment. Yet despite such a claim, there is very little evidence that these households treat remittances as sporadic rather than fungible income and that they are really investing such funds.

Our fascination also stems from the two periods during which migration and the economic situation of the country greatly differ. In 2008 and 2009, Cambodia was still a low-income economy (by 2014 it had become a lower-middle-income country), but it was nevertheless severely impacted by the Global Financial Crisis. Particularly in 2009, when the year-on-year growth was 0.1%, many private-sector employees, especially construction and garment-sector workers, the vast majority of whom were internal migrants, were laid off (Chandararot, Sina & Dannet, 2009; Roth & Tiberti, 2017; World Bank Databank, 2019). Since then, the country recovered and experienced an annual growth rate of 7%. During the recession, the inflow of international remittances also declined from USD 188 million in 2008 to USD 140 million in 2009, but this was followed by a steady increase (World Bank Databank, 2019). This was a result of the same depression faced by Thailand, which in recent years has hosted roughly a million unskilled Cambodian labor migrants, many of whom then also lost their jobs (Abella & Ducanes, 2009; Asian Development Bank, 2015). Even though the emigration of a million people is neither new nor rare, it is still a remarkable figure for a country with a population of barely 16 million.

The dramatic migration and macroeconomic situation in Cambodia are relevant in terms of offering us a new opportunity to understand how different economic times may affect household decisions regarding remittance spending and the roles of remittances in potential economic growth. In addition, while most studies use only data that capture one specific period, we add robust evidence from a particular country, albeit at varying stages of development, because we believe that some of the differences in the findings from previous literature may be explained by considering not only the country context itself but also the period under study. The knowledge thus gleaned is certainly significant in terms of increasing understanding of migrant-sending countries in general as well as those in the ASEAN region, which has experienced an increasing amount of internal and international migration (Deshingkar, 2006). It should be emphasized that we are not claiming that any particular change in the use of remittances can be solely attributed to the Global Financial Crisis nor are we attempting to understand the impact of the crisis itself. Rather, we claim that it is the timing and evolution of the society as a whole that is likely to influence people's behavior, and that household investment, particularly in education, also depends on the realization of current income (Yang, 2008).

Our results show that households certainly changed behavior in how they used remittances after the economic crisis in 2009, as indicated by the direction of the coefficient, which

switched from negative in 2009 to positive in 2014, but there is not enough evidence to show that remittances increase household scholastic spending. However, another sporadic income source, labeled "Other Earnings", had a substantially larger effect than regular income from agricultural and non-agricultural activities. An explanation for this finding is that Cambodian households are unlikely to view remittances as transitory income. When we distinguish between domestic and international remittances, results show that only the latter lower household expenditure on education. A one-dollar increase in international remittances will proportionately decrease educational investment by USD 0.25. But this marginal effect is statistically significant only for households that receive more than USD 50 and for poor families.

Remittances in Cambodian Context

Cambodia is a developing country in Southeast Asia that has experienced a rapid increase in migration rate—both locally and across its political borders—since the end of its three-decades-long civil war (1970–99) and the infamous Pol Pot's genocidal regime (1975–79). In 1998, only one out of 20 Cambodians lived in the capital city and heart of its economy, Phnom Penh. By 2011, this number had increased to about 1 in 10 (Ministry of Planning, 2012) whereas the number of Cambodian migrant workers abroad, the vast majority of whom work in Thailand, was estimated to be more than a million in 2014 (ADB, 2015)—a considerable figure for a population of just 16 million. Given such an enormous number of migrant workers, it is not surprising that the value of remittances in Cambodia has risen to such a high level. The beginning of the new millennium has seen remittances quickly rise to be a major source for economic development, and the total amount of these remittances surpassed the figure for foreign direct investment in 2003 and 2004 (World Bank Databank, 2019).

The Cambodian government also acknowledges the importance of migrant workers. Remittances represent a principal route out of poverty to the extent that migration is seen by rural households as a strategic and low-risk productive investment (Bylander, 2014; Bylander & Hamilton, 2015). Thus, many Cambodians are willing to take out loans from moneylenders at usurious rates or from local microfinance institutes to finance migration journeys with the expectation that future remittances will increase their savings (Bylander, 2014). For 40% of migrant households, remittances are the main source of income used to pay for daily consumption, healthcare services, and household appliances (Tunon & Rim, 2013). But 58% of Cambodian migrant workers in Thailand also reported having used remittances to invest in the education of other household members (Jampaklay & Kittisuksathit, 2009). This statistic is relatively higher than the 49.2% reported by Myanmar workers who comprise the largest percentage of total migrant workers in Thailand. Moreover, migrants from Myanmar remit a larger average amount (5,292 Baht/transaction) relative to their Cambodian counterparts (4,333 Baht) (ibid). Nevertheless, a subsequent study of Cambodian return migrants indicates that in 2016 only 28% of them spent a proportion of remittances on education—a major reduction (Harkins et al., 2017). A similar trend is apparent in the case of Myanmar and Laos labor migrants where the reduction is also apparent.

Model and Estimation Strategy

We will begin to explore the effect of remittances on household educational expenditure by first modeling a rudimentary equation and then simply modifying it to answer each research

question. The empirical analysis closely follows the ad hoc two-stage modeling methodology adopted by Brown et al. (2014) and, Amuedo-Dorantes and Pozo (2011). This method is not new in remittances research and has become popular (Brown & Jimenez-Soto, 2015). Our hypothesis is also similar to that of the PIH, which asserts that money is not fungible, so income from different sources is not used the same way. As for the case of remittances that we deem sporadic, households would be more inclined to spend such funds on investment, as reflected by educational spending. From a statistical perspective, this hypothesis can be corroborated if remittances have a largely different marginal effect relative to other household income such as that coming from wages or agriculture, which are more permanent in nature. The specification for scholastic expense as a function of remittances and other income realization is given by:

$$HEE_h = \alpha_0 + \beta_1 R_h + \beta_j HI_h + X'\beta + u \qquad (1)$$

Where the subscript h indexes household; Household Expenditure on Education (HEE) is the dependent variable; R_h is the household remittances; HI_h is a vector of other types of household income; X is a vector of other control variables, all of which are arguably important determinants of household investment in education, and which include the characteristics of a household and its head along with regional differences; $\propto_0$ is the intercept; and u is the error term. Our parameters of interest are β_1 and β_j, particularly with regard to their significant effects and direction of relationship with HEE, which can be evaluated by linear regression. But to estimate using such a model, we need to consider a few well-known econometric challenges emerging from the empirical research in order to avoid research bias.

The structural equation (1) assumes exogeneity of remittances, yet such an assumption is unlikely to hold. Reviewing the literature, Adams (2011) advocates several possible ways that remittances are potentially correlated with household characteristics about which we generally lack information. First, a household can simultaneously decide to earn remittances at the same time it pays for its members' education. Second, a decision to earn remittances may be driven by a household's intention to spend more on education, in which case reverse causality is exhibited. Third, some unobservable characteristics, such as motivation, ability, or ambition of the household head (decision-maker within the household) can determine both the amount of remittances a household receives and the educational expense it is willing to pay. As a result, Adams (2011) argues that even if a study manages to include a range of control variables, remittances and household expenditure are still likely to be endogenous. Accordingly, the estimation results are biased, and the association between dependent and independent variables may be spurious.

Fortunately, there are a number of practical solutions for this issue as put forward by Brown & Jimenez-Soto (2015). The most popular and effective of these for cross-section data is the instrumental variable (IV) approach. With a good instrument, potential endogeneity can easily be eliminated as the instrumental variable (IV) can purge the correlation between remittances and the error term and disentangle reverse causality to make remittances exogenous. This results in the estimation of equation (1) giving a consistent result and reflecting a causal relationship (Wooldridge, 2010) between remittances and household expenditure. This is of great potential interest to academics and policymakers who strive to promote human capital development.

Modeling household remittances

Generally speaking, this model is essentially extended from the structural equation (1). It is designed to split remittances and allow us to use the part of remittances that is uncorrelated

with the error term for the main estimation. However, because remittance income cannot be negative, another methodological challenge arises concerning the statistical tool that should be used to estimate the remittances model and predict the expected value. As noted by Brown and Jimenez-Soto (2015), the estimator should have the ability to predict only a positive value. Furthermore, one has to make an assumption about non-remittance-recipient households (remittances = 0). These households may never receive any remittances at all (type 1) or happen not to be sent such funds during the referenced period due to constraints or difficulties (type 2). In the latter case, such households are considered "would-be receivers", and if such an assumption is made, then the Heckman Selection Model is appropriate whereas the Tobit model is suggested for type 1 cases (Brown & Jimenez-Soto, 2015; Wooldridge, 2010).

However, the issue with the Tobit and the Heckman models, which are often used to analyze remittance data, is that they only assume type 1 or 2, respectively. Furthermore, Tobit considers zero remittances as a censoring point arising as a result of corner solution while Heckman regards zero as a truncated value; but zero remittances are truly zero. Both also require strong homoskedasticity and normality conditions, which rarely obtain for expenditure data (Deb, Norton & Manning, 2017; Wooldridge, 2010). Perhaps the most severe shortcoming though is that Tobit makes an assumption that a single mechanism governs both the probability that households will receive remittances and the amount they will receive; that is, the coefficient of each independent variable must have the same sign, and that may not be the case in a real-life situation (Wooldridge, 2010).

For better precision, Brown and Jimenez-Soto (2015) recommend considering an estimator that is more flexible than Heckman's or Tobit's and allows for both types of household with no remittances to be in the same framework. Amuedo-Dorantes and Pozo (2011) and Brown et al. (2014) show that one way of proceeding is to use the Double-Hurdle model, which is naturally a better fit because it relaxes the assumptions of both Tobit and Heckman. Following previous studies, we will opt for the double-hurdle regression, specifically, the lognormal hurdle model developed by Cragg (1971) and, Duan, Manning, Morris and Newhouse (1984). This is a product of a two-part estimation in which each step can be estimated individually (Wooldridge, 2010). The calculation is straightforwardly completed in two steps, in which the first step is to evaluate the probability that a household will receive remittances using Probit and is given by:

$$Prob(R > 0|IV, X) = \Phi(\gamma_0 + \gamma_1 IV + X'\gamma + \nu_1),\ \nu_1 \sim Normal\ (0, 1). \qquad (2)$$

Where Φ denotes the cumulative distribution function; R is the remittances; IV is the instrumental variable, which we will discuss later; and X is a vector of control variables, all of which are identical to those found in equation (1). The second step of hurdle regression is the examination of the linear model conditional on only a household that receives remittances (remittances > 0), and thereby observations with actual remittances = 0 are excluded. The dependent variable is also put in a log-transformed scale following a log-normal distribution to deal with heteroskedasticity. It is for this reason that the double-hurdle model is preferable. Additionally, we compute robust standard error in test statistics to produce satisfactory results. The second step can be best expressed in terms of specifications as follows:

$$ln(R|R > 0, IV, X) = \delta_0 + \delta_1 IV + X'\delta + \nu_2,\ \nu_2 \sim Normal\ (0, \sigma^2). \qquad (3)$$

Where ν_2 is the error term of equation (3) and independent of that in equation (2). Equations (2) and (3) are also assumed to be independent of each other, and their product gives us the unconditional expected logged dollar amount of remittances that need to be retransformed back to the unlogged scale for our final estimation. In the retransformation process, we follow Wooldridge (2010), who points out that one may not uncover unbiased log-transform values

if the assumptions of normality of the error term, ν_2, fail. Ensuring an unbiased estimation, we examine the normality of the error term using a skewness and kurtosis test and conclude that it is not normally distributed. We address this issue using Duan's (1983) Smearing Estimate.

We also provide a full list of the variables used to predict the exogenous expected value of remittances and the regression results for equations (2) and (3) in table A in the appendix. It is worth noting that the IV only appears in the remittances model because to initiate the IV approach, we need to have at least a variable that is excluded from the structural equation. More importantly, it has to be strongly correlated with remittances but uncorrelated with household spending except through remittances (Wooldridge, 2010). Our choice of instrument is the percentage of out-migrants to total population in the district in 2008. This is calculated using information from the 2008 Cambodia census, which was collected by the National Institute of Statistics. The census considers individuals to be migrants if they move across a district border and are then asked to identify their former region of residence before migration and hence the place to which their remittances tend to go. With that knowledge, we apply sampling weight and sum up the estimated number of out-migrants from a particular district before dividing it by the total population of that district to get the proportion of out-migrants. The percentage of out-migrants varies considerably, ranging from 9.4% to as high as 71.3% with a mean of 26.7 and standard deviation of 12, indicating a wide range of variation.

The reasoning for our selection of this variable as an instrument is as follows: In migration and remittances research, the percentage of migrants in a total population typically signifies the size of the "migration network" or the prevalence of migration in that area. A large percentage signifies a broad network and how endemic migration in that particular region is. Moreover, migration networks play an important role in the potential for future migration and the receipt of larger remittances by those left behind (Hanson & Woodruff, 2003; McKenzie & Rapoport, 2011). Besides this, it is the most prominent and least controversial IV used in empirical studies that investigate the impact of remittances (Antman, 2013; Brown & Jimenez-Soto, 2015). Our assumption is similar to those found in previous studies that, after controlling for regional differences, the instrument does not have any direct partial effect on the dependent variable. That is, the percentage of out-migrants to the total population in the district does not have any correlation with the amount of money a household spends on education.

One potential threat to such an assumption is that a household may not intend to invest or may find no incentive to spend money on education if the return to education is lower than the return on migration. Nevertheless, McKenzie and Rapoport (2011) and Bansak et al. (2015) argue that this surmise is likely to hold only if households have a member migrating internationally, in which case they may learn that their local education is not highly appreciated in the destination country. But such an effect is rather insubstantial if the migration network is at the regional rather than the household level (ibid). That is, recipient and non-recipient households can both be randomly located in the district to which a proportion of unrelated people migrate internally and internationally. We are also aware of the serious consequences of a poor IV, which is described as having a weak association with the endogenous variable (Wooldridge, 2010), so we rigorously adhere to the recommendation and check the strength of the relationship to confirm its validity. Table A shows that the percentage of out-migrants is strongly and positively correlated with either the possibility or amount of remittances a household received both in 2009 and 2014, hence verifying its suitability as an IV.

Re-modeling household educational expenditure

Concerning the main model's estimation, the exogenous expected value, $\hat{R}_h$, which derives from the evaluation of the remittances model, is used to replace the actual value. Nevertheless, apart from correcting for endogeneity, we still face another challenge: we need to consider the fact that the expenditure variable does not have a normal distribution as the amount of spending can never be negative, and a significant fraction will be zero. Econometrically speaking, our dependent variable is censored from below at zero and continuously distributed over a large range of strictly positive values, but the zero expenditure is genuinely zero and not merely a result of non-observable responses or missing data. One option we have in order to evaluate this kind of model is to use the double-hurdle regression that we previously utilized. Even so, a number of published studies in the field of health economics, such those by as Deb et al. (2017) and Mullahy (1998), suggest that the double hurdle regression should not be used, especially if one is interested particularly in the marginal effect of covariates. Instead, they advocate a flexible generalization of OLS known as Generalized Linear Models (GLM), which was introduced by Nelder and Wedderburn (1972) and is arguably the best estimator for expenditure and cost data.

GLM has many desirable properties, especially its ability to accommodate non-normality and heteroskedasticity of the error term without needing to log-transform the response variable whereby it avoids retransformation bias (Deb et al., 2017). It allows for the dependent variable to have a distribution other than the normal distribution and allows for its variance to be a function of its expected value. In addition, it allows for the linear index of the regressors to be related to the expected value of dependent variables via a *link function*. GLM is also relevant to our pooled cross-section data since it is possible that the error variance is not constant over time. But more importantly, our ultimate interest lies in its ability to make inferences in natural units of real and not logged dollars. Thus, we employ GLM instead of the hurdle model so that we can compare the impact of remittances with other income of the same amount. The model is given as follows:

$$E(HEE_h|\hat{R}_h, HI_h, X') = g^{-1}(\alpha_0 + \beta_1\hat{R}_h + \beta_j HI_h + X'\beta + u). \qquad (4)$$

Where g is the link function. If the expected value of HEE is an exponential function, then the link function, g, is the natural log. However, GLM estimation requires a proper selection of the link function and the distribution family, and ours is determined by statistical test information proposed by Deb et al. (2017) called the Akaike Information Criterion and the Bayesian Information Criterion. Based on the test results, we choose the log link function and the gamma distribution. It should be noted that for GLM models with a log link function, the inverse of g, that is g^{-1} in equation (4), is the exponentiated function. In addition, we compute robust standard errors as a remedy.

Data, Sample, and Variables

With the exception of a variable stemming from the 2008 Cambodia census, the empirical analysis uses pooled data from the Cambodia Socio-Economic Surveys (CSES) in 2009 and 2014, conducted by the National Institute of Statistics. The CSES is used to measure living standards and monitor the National Strategic Development Plan. The procedure for data collection was deliberately designed to be identical in both cases, and the main content of the questionnaires in the 2009 survey was retained for use in 2014, making dataset combination and comparison possible. In addition, data collection spanned one year (January to

December). This timeframe ensured that the survey was conducted the entire year, so as to provide a complete picture of the annual living conditions of Cambodians. CSES contains comprehensive information covering a wide range of data on the general socio-economic situation of the households, including household size and structure, amount and origin of income, and expenditure in the previous 12 months.

Each original CSES dataset on which the analysis is based comprises a sample of around 12,000 households in both rural and urban areas across all provinces. As Cambodia is a small country in terms of land area and population, one reason for pooling data is to increase sample size and thereby achieve a more precise estimation and better statistical power. However, because the paper concentrates on the effect of remittances, we restrict our study sample to only those who live in the provinces where migration and remittances-receiving phenomena are most prevalent. These provinces include Banteay Meanchey, Battambong, Kampong Cham, Kampong Speu, Kandal, Prey Veng, Siem Reap, and Takeo (National Institute of Statistics, 2009). Other provinces have fewer out-migrants and receive hardly any remittances at all, so they are excluded. The initial number of household samples in these eight provinces was 13,868, but some of them did not have the complete information that we needed while some were extreme outliers in terms of income or educational expenditure. Hence, we had to remove them. Ultimately, this study uses data of 13,695 households for empirical analysis, of which 7,161 derive from 2009 data and 6,534 from 2014. Among the total number of households in the sample, 5,244, or 38.3%, received some remittance income (38% in 2009 and 38.6% in 2014). Of the 5,244, 4,413 received funds only from internal sources, 584 from international sources, and 247 from both.

As for remittances, the 2014 survey defines them as money transferred by any individual—not only migrating household members but also other people such as relatives and friends who were not necessarily migrant workers. However, data on the characteristics of senders was not collected. While we can differentiate between internal and international remittances without information about a sender's background, we are unable to distinguish migrant remittances from private transfers. Therefore, it is important to clarify that throughout the study, our focus was on general remittances rather than just on migrant remittances or migration itself, and not on remittances in-kind.

Households were also asked to provide details on other kinds of income. We divided them into four categories: wages, agricultural income, nonagricultural/business income, and other earnings (bank interest, dividends, gambling, scholarships, sale of properties, loans, etc.). To compute household educational expenditure, we summed up the amount of money spent on the education of each individual member over the previous academic year. Such school expenses comprise the money that was paid for school fees (formal education), tuition (private lessons), school supplies (such as textbooks), allowances, transportation, and gifts/donations for schools or teachers. For the sake of international comparison, we express the monetary value in United States Dollars (USD) rather than the local currency, Khmer Riel (KHR), using an exchange rate of 4,000 KHR/USD. The exchange rate has remained constant at 4,000 since 2004 with very small fluctuations (World Bank Databank, 2019), so accurate comparison across time is largely possible.

Table 1: Mean of different types of income by type of household and year

Variables	Receive no Remittances		Receive Internal Remittances		Receive International Remittances	
	2009	2014	2009	2014	2009	2014
Education Expenditure	63.1	171.0	54.7	138.2	89.6	169.2
Remittances	-	-	134.6	279.5	511.3	973.9
Wage	583.9	1,824.0	596.3	1,793.7	687.8	2,098.4
Agricultural Income	971.1	1,382.3	1,135.7	1,206.0	862.5	1,136.4
Non-agricultural Income	445.6	1,084.6	313.5	673.6	330.6	593.9
Other Earnings	44.8	168.6	49.7	119.7	39.6	108.4

Source: authors' tabulation.
Note: the amount is reported in United States Dollar (USD).

For the first step of our analysis, we present table 1 to compare the means of educational expenditure and different types of income in 2009 and 2014. The sample is divided into three subgroups: households receiving no remittances, households receiving internal remittances, and households receiving international remittances. The 247 households that received both domestic and external remittances appear in both of the latter two groups. Overall, the amount of each type of income and expenditure is quite different across groups and across time within each group. In 2014, remittances and non-agricultural income, generally, were double the amount calculated for 2009 for all groups while wages and other earnings, on average, tripled. In contrast, income from agricultural activities remained stagnant or showed little growth. Profit from agriculture was the most prominent source of income for Cambodian households with or without remittances in 2009, but wages predominated in 2014, signifying some societal changes. Nonetheless, the former still comprises a large share of total income.

In terms of type of household, external remittance-recipient households had the highest amount of wages and spent 1.5 times more on education than the other two types of households in 2009 but spent about the same as households who had no access to remittances in 2014, indicating that the latter tended to increase their educational investment as their income rose. Among the three types of households, those with internal remittances continued to spend the least on education. In general, households receiving remittances had lower agricultural and non-agricultural income relative to non-recipient households, whose income from these categories also grew more rapidly. One explanation is that households have to trade certain members and a fraction of other income to gain remittances. In other words, the cost of receiving remittances is sending off adult members to emigrate, but this also results in a loss of manpower and thus a decrease in agricultural and business production.

Table 1 provides an overview of our dependent and main independent variables of interest, but in the empirical analysis, we incorporate a range of control variables that arguably determine the variation in household expenses. These variables include characteristics of the household head and age composition of the household captured by the percentage of children (under 6 years old), the percentage of school-age children (6-17 years old), the percentage of adults (18-59 years old), and the percentage of older people (60+ years old) in the household. The latter is used as the baseline for the regression as all percentages sum to one hundred, leading to perfect collinearity. Finally, we employ binary variables for urban areas and provinces to capture regional differences and account for a development level that may affect scholastic spending. For example, better-quality schools are likely to be located in urban regions where the living cost is also higher. Kandal is chosen as the baseline for a provincial dummy variable, for it is the area around Phnom Penh.

Table 2: Descriptive statistic of control variables by household type

Variable	Receive No Remittances		Receive Internal Remittances		Receive International Remittances	
	Mean	SD	Mean	SD	Mean	SD
Household Head Age	42.25	12.50	54.07	13.80	53.06	13.42
Household Head is Male	0.83	0.38	0.69	0.46	0.65	0.48
Household Head is Married	0.85	0.36	0.68	0.47	0.65	0.48
Household Head Year of Education	4.99	3.78	3.90	3.47	3.86	3.45
Percentage of Children	13.21	16.02	7.95	13.04	9.41	13.76
Percentage of School-Age Children	24.86	21.06	19.17	20.42	24.34	22.02
Percentage of Adult	56.58	20.75	53.90	26.65	50.84	26.86
Percentage of Elderly (baseline)	5.34	14.28	18.97	27.41	15.42	23.79
Total Number of Household Member	4.71	1.78	4.43	1.99	4.6	2.0
Number of Children Under 6 Yrs Old	0.62	0.75	0.41	0.65	0.47	0.66
Number of School-Age Children	1.31	1.24	0.98	1.12	1.21	1.17
Number of Adult Member	2.56	1.18	2.42	1.47	2.36	1.54
Number of Old-Age Member	0.22	0.52	0.62	0.74	0.55	0.71
Urban (rural is baseline)	0.16	0.37	0.13	0.34	0.15	0.36
Banteay Meanchey	0.09	0.29	0.06	0.23	0.23	0.42
Battambong	0.12	0.32	0.10	0.30	0.20	0.40
Kampong Cham	0.20	0.40	0.24	0.42	0.17	0.38
Kampong Speu	0.12	0.33	0.11	0.31	0.04	0.20
Kandal (baseline)	0.14	0.34	0.14	0.34	0.08	0.27
Prey Veng	0.12	0.33	0.14	0.35	0.11	0.31
Siem Reap	0.10	0.30	0.10	0.30	0.08	0.27
Takeo	0.11	0.31	0.11	0.31	0.09	0.28

Source: Authors

Table 2 shows the descriptive statistics of other control variables by type of household. It should be emphasized that we also include information related to actual number of household members by age group. These variables are, however, excluded from the regression analysis, and the percentage of each age group is used instead. On interpretation of the table, a few variables that demonstrate the most notable differences between these households are age of household head, gender of household head, and percentage of older people. These characteristics are mainly related to the nature of migration itself because in many societies migrants are mostly young adult males, and the left-behind members are often female and/or older people. This is why a household that receives no remittances is more likely to be headed by younger and male members as opposed to remittance-recipient households, and the percentage of older persons in the former also tends to be much smaller. To be more specific, households that receive no remittances, on average, contain a larger number of children and adults but a much smaller number of older members compared to those who receive some kind of remittances. Age composition may also explain why non-recipient households earn more agricultural and non-agricultural income as well as other earnings relative to recipient families, as the former contain more potential earners of these types of income.

On the dummy variables for province, people living in Banteay Meanchey and Battambong, which share a border with Thailand, are more likely to receive external remittances than others but less likely to receive domestic transfers. In contrast, those who live in Kampong Cham, Kampong Speu, and Kandal tend to receive internal remittances given that these regions are closer to Phnom Penh, the main destination for internal migration. This statistic attests to the gravity theory which insists that distance plays a major role in the possibility of migration and of receiving remittances (Anderson, 2011).

Regression Results and Discussion

Effect of remittances relative to other income

To gain insight on the overall impact of remittance inflows on household investment in scholastic spending in different economic situations, we first use the total amount of remittances but separately estimate the data for 2009, 2014, and use a pooled dataset to compare the results. The regression outcome is demonstrated in table 3, which answers our first and second research questions simultaneously. In table B in the appendix, we also present the results of the estimation using the actual amount of remittances, but we do not take into account this outcome since the correlation and coefficient may be spurious due to omitted variable bias and/or reverse causality. Moreover, we do not consider a significance level at 10% because we want to obtain solid evidence when using an ad hoc two-stage mechanism. It is worth noting that the conditional mean has an exponential form, so the coefficient can be directly interpreted as percentage change in household expenditure given a unit change in covariate. On top of that, we compute marginal effects (ME), which is, as mentioned above, of particular interest to us. ME is the slope of the tangent line which measures the ceteris paribus effect of the expected instantaneous change in Y given a change in certain X.

Table 3: Impact of remittances on household educational spending

Independent Variables	2009		2014		Pooled Data	
	Coef (1)	ME (2)	Coef (3)	ME (4)	Coef (5)	ME (6)
Remittances	-0.00169	-0.133	0.00133	0.308	0.0000956	0.0152
	(0.00163)	(0.130)	(0.000952)	(0.225)	(0.000595)	(0.0950)
Wage	0.000116***	0.00916**	0.00000442	0.00102	0.0000197	0.00314
	(0.0000337)	(0.00284)	(0.0000137)	(0.00317)	(0.0000137)	(0.00221)
Agricultural Income	0.000100***	0.00790***	0.0000733***	0.0170***	0.0000795***	0.0127***
	(0.0000226)	(0.00192)	(0.0000182)	(0.00462)	(0.0000149)	(0.00267)
Non-Agricultural	0.0000839***	0.00663***	0.0000761***	0.0176**	0.0000737***	0.0118***
Income	(0.0000220)	(0.00189)	(0.0000167)	(0.00542)	(0.0000149)	(0.00317)
Other Earnings	0.000113	0.00890	0.000176***	0.0407**	0.000147***	0.0235**
	(0.0000591)	(0.00468)	(0.0000512)	(0.0129)	(0.0000425)	(0.00719)
Household Head Age	0.200***	15.83***	0.151***	34.88***	0.182***	28.96***
	(0.0217)	(1.918)	(0.0249)	(7.040)	(0.0185)	(3.809)
Household Head Age	-0.00156***	-0.123***	-0.00111***	-0.256***	-0.00137***	-0.218***
Squared	(0.000217)	(0.0180)	(0.000261)	(0.0683)	(0.000190)	(0.0356)
Household Head is	-0.337	-26.61	-0.125	-29.02	-0.225	-35.92
Male	(0.191)	(15.23)	(0.134)	(30.97)	(0.144)	(23.23)
Household Head is	0.646**	51.03**	0.442**	102.3**	0.488**	77.88**
Married	(0.225)	(18.12)	(0.146)	(35.56)	(0.162)	(26.90)
Household Head Year	0.110***	8.728***	0.108***	25.09***	0.114***	18.20***
of Education	(0.0136)	(1.315)	(0.0105)	(3.381)	(0.00881)	(2.109)
Percentage of Children	-0.00560	-0.442	0.00858	1.985	0.00196	0.313
	(0.00547)	(0.430)	(0.00448)	(1.068)	(0.00358)	(0.573)
Percentage of School-	0.0523***	4.135***	0.0598***	13.83***	0.0562***	8.965***
Age Children	(0.00542)	(0.554)	(0.00407)	(1.698)	(0.00340)	(0.946)
Percentage of Adult	0.0297***	2.343***	0.0333***	7.696***	0.0320***	5.106***
	(0.00485)	(0.437)	(0.00386)	(1.177)	(0.00310)	(0.653)
Urban	0.913***	72.15***	0.629***	145.5***	0.739***	117.9***
	(0.120)	(11.22)	(0.0944)	(26.12)	(0.0752)	(15.53)
Dummy Variables for Each Province	Yes	Yes	Yes	Yes	Yes	Yes
Year 2014	-	-	-	-	0.971***	155.0***
					(0.0694)	(16.64)
Constant	-5.613***	-	-4.120***	-	-5.537***	-
	(0.629)		(0.626)		(0.476)	
Observations	7,161		6,534		13,695	

Robust standard errors in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

For both 2009 and 2014, remittances in general apparently do not contribute to increases in household educational investment as the variable for remittances is not statistically different from zero. Nevertheless, the direction of association changes from negative in 2009 to positive in 2014, indicating that differences in the time of receiving remittances can also lead to different expenditure patterns. The same statement also applies to other sources of income. For the pooled data, results on the marginal effect suggest that a dollar increase in remittances increases household schooling spending by 0.0152, or USD 1.52, if remittances increase by USD 100. The effect is quite small and almost similar to that of agricultural and non-agricultural income. Thus, they are not spent disproportionately. Nonetheless, there is still no significant evidence that remittances have any effect on educational expenditure even after we combine sample size to improve statistical power.

Adams et al. (2008) documented a similar puzzle when they found that such resources do not significantly impact household investment or consumption in Ghana. The authors attribute their findings to the context of the country under study itself, which has a low-income economy, and they say that it is entirely possible for households in richer countries to treat income from various sources differently. But it is perhaps not the case for households in poorer nations that largely rely on remittances. Amuedo-Dorantes and Pozo (2011) and, McKenzie and Sasin (2007) also assert that remittances may be embarked on for specific purposes, in which case they do not necessarily extend to other purposes. Another possible explanation for why we do not observe a responsiveness of educational investment to remittances at the margin is that the variable for remittances is likely to have captured the purely negative effect of migration (loss of members/spenders), and both effects tend to offset each other.

It should be highlighted that when we do not correct for endogeneity, we find a strong and positive correlation between household investment in education and remittances, and the marginal effect is substantially larger than that of other regular income (table B). A dollar increase in remittances in this case would raise household educational spending by USD 0.037 or USD 3.7 for every hundred dollars. But once the endogeneity is taken into account, the correlation is gone, and the coefficient drops by more than a half. This means that the association and its magnitude are mainly explained by some unobserved characteristics of the households, such as decisions to receive remittance income.

Variables for other kinds of income, except for wages, show the expected sign. Since wages are considerably permanent and also a main source of income for Cambodian households, as they were especially in 2014 (table 1), it is conceivable that wages are fungible, and there should be no specific, sole purpose on which they should be spent. Moreover, it would be typical for agricultural and non-agricultural income to increase household consumption, including the "consumption" of education in general. Interestingly though, the variable, other earnings, which refers to more irregular income, has a positive and significant effect on educational spending. The regression result demonstrates that every USD 100 increment in other earnings increases household human capital investment by USD 2.35. This has the largest impact and is nearly twice that of other income. From this comparison, we can conclude that the PIH does not hold true for remittances in the case of educational investment. Either remittances are directed toward other uses or Cambodian households do not consider remittances as sporadic or transitory income. Future research could investigate whether or not remittances are used for other types of investment such as agriculture and family businesses.

As for other control variables, male-headed households are not significantly different from those headed by females. This is a result of considerable interest, considering that some studies have found that remittances in female-headed households are better used and

influence human capital investment (Brown & Jimenez-Soto, (2015) and references therein). However, our finding is consistent with that of Amuedo-Dorantes and Pozo (2011), who assert that there is no significant difference in terms of the use of remittances between female- and non-female-headed households in Mexico. However, the percentages of school-age children and of adults does pressure households to spend money on schooling whereas the percentage of children under six years old does not seem to have this effect. It is more likely that Cambodian households do not generally send their young children to attend kindergarten, and their education starts only after children reach the compulsory age for general schooling. However, more positively, the allocation of income to education grew by USD 155 in 2014 compared to the 2009 figure as indicated by the variable for 2014, suggesting that households indeed augmented human capital investment during this period as their income rose.

Effects of remittances by their origin

Here we answer the third question: whether or not the effect of domestic remittances is different from that of the international remittances. This question is motivated by studies such as those by Bansak et al. (2015) and, Taylor and Mora (2006), who maintain that internal and international remittances do not have similar impacts. Households that receive the latter tend not to invest since they believe that education in the country of origin is not appreciated by the labor market at the destination, so the amount spent for local education is rather low for overseas migrants. To see if this is also the case for Cambodia, we distinguish domestic and international remittances and repeat the procedure that is used to obtain the results for table 3. Nonetheless, we only report the outcome of some selected variables of interest (the complete table is available upon request, however). Table 4 displays regression results for the impact of remittances on educational spending according to their origin.

Table 4: Impact of remittances on household investment in education by origin of resources

Independent Variables	Pooled Data			
	Coef	SE	ME	SE of ME
Domestic Remittances	-0.0000149	(0.00142)	-0.00237	(0.225)
International Remittances	-0.00156*	(0.000754)	-0.248*	(0.121)
Wage	0.0000256	(0.0000138)	0.00407	(0.00223)
Agricultural Income	0.0000821***	(0.0000150)	0.0130***	(0.00268)
Non-Agricultural Income	0.0000740***	(0.0000149)	0.0118***	(0.00317)
Other Earnings	0.000143***	(0.0000431)	0.0228**	(0.00729)
Year 2014	1.061***	(0.0715)	168.7***	(17.38)
Constant	-5.694***	(0.491)		-
Observations		13,695		

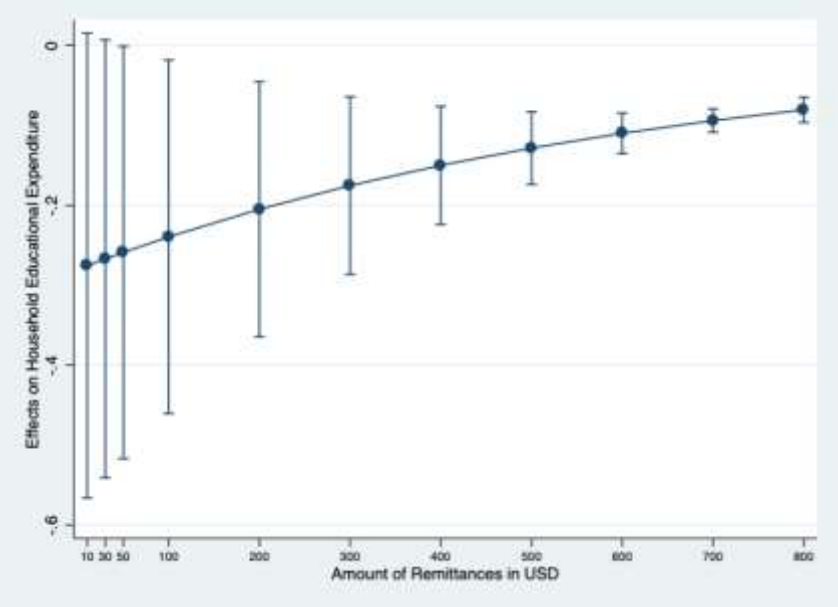
Robust standard errors in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

Remarkably, the test shows domestic remittances to have no significant effects on spending on schooling. International remittance-receiving households are found to spend even less on members' education as their remittances grow, and the coefficient is significant at 5%. The marginal effect suggests that a USD 1.00 increase in external remittances reduces household investment by USD 0.25. This seems counterintuitive, for households receiving more money would, on average, be expected to have proportionately more ability to invest in education. However, some studies argue that this is not always the case for remittances. It is found that many households are prone to rely on international migration and remittances as a quicker and easier way to improve living conditions than scholastic investment (Clement, 2011; McKenzie & Rapoport, 2011). Bansak et al. (2015) insist that households intending to select

members to emigrate abroad in the future may not invest in an education for those members on the basis that such an education is not practically necessary for jobs in the destination country. This may be true considering that the labor market in the developing global South, particularly Thailand, primarily desires low-skilled migrant workers from neighboring countries.

This finding can also be attributed to the fact that households receiving international remittances might, in general, have sent multiple individuals outside the country. This notion is based on table 1, which shows that the average amount of international remittance is almost four times that of internal remittance, and the former comprises a large share of the total income, denoting how important it is to households receiving it. Moreover, non-migrating members may have to substitute for migrants in terms of contributing to household income and non-income activities that those who have left would normally perform. This increases the likelihood that those left behind will drop out of education on account of the heavy workload being foisted upon them, therefore reducing or eliminating this cost. Bylander (2014) has also documented this possibility in her qualitative study in one particular area in Cambodia. She notes that some youths are encouraged tacitly to leave school and find jobs in Thailand, and that the household will send more of them in order to earn larger remittances.

Figure 1: Marginal effects of international remittances by amount



Instead of focusing on the overall mean, we further calculate the marginal effect for different amounts of international remittances and depict them in figure 1. As shown, a constant change in international remittances does not lead to a constant change in expenditure, but instead a geometrical change. The negative impact of international remittances is only statistically significant if households receive funds amounting to more than USD 50, and it tends to be smaller as the amount rises. It accords to less than a USD 0.2 per dollar increase in remittances if a household receives USD 200 in total, and about USD 0.1 if they receive roughly USD 800. This means that the effect decreases at a decreasing rate as households receive more and more remittances.

Effects of remittances by origin and household income level

We also extend our investigation to compare the marginal effect between poorer and richer households to understand the impacts of remittances across subgroups. We divide our whole sample into poorer and richer households based on the average total income of the sample. Those who have an above-average total income are considered richer whereas households with total income at or below average are deemed poorer. The average income of household samples in 2009 was USD 2,124 while it was USD 4,361 in 2014. We repeat the analysis procedure and estimate the model independently for each subgroup.

Table 5: Impact of remittances by their origin and income-level of household

Independent Variables	Poorer Household		Richer Household	
	Coef	ME	Coef	ME
Domestic Remittances	-0.0000185	-0.00199	0.000532	0.109
	(0.00202)	(0.217)	(0.00173)	(0.357)
International Remittances	-0.00221*	-0.236*	-0.00100	-0.207
	(0.00105)	(0.113)	(0.000831)	(0.172)
Wage	-0.0000171	-0.00183	-0.0000161	-0.00330
	(0.0000451)	(0.00483)	(0.0000124)	(0.00255)
Agricultural Income	0.000139*	0.0149*	0.0000337**	0.00694*
	(0.0000540)	(0.00590)	(0.0000130)	(0.00274)
Non-Agricultural Income	0.0000243	0.00260	0.0000499***	0.0103***
	(0.0000319)	(0.00342)	(0.0000105)	(0.00256)
Other Earnings	0.000733**	0.0785**	0.0000833**	0.0171**
	(0.000257)	(0.0289)	(0.0000293)	(0.00612)
Year 2014	1.237***	132.5***	0.892***	183.4***
	(0.107)	(14.42)	(0.0950)	(22.19)
Constant	-6.697***	-	-3.258***	-
	(0.628)		(0.703)	
Observations	8,915		4,780	

Robust standard errors in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

Presented in table 5 is the responsiveness of household educational expenditure to remittances by origin of resources and household income level. Results show that the negative effect of international remittances we have seen in table 4 is only significant for poorer households. For every dollar international remittances grow for a poorer family, investment shrinks by roughly USD 0.24. One explanation for this is that poorer households are more dependent on remittances for daily consumption, a more pressing need than education, and have more members migrating compared to their richer counterparts. At the same time though, this migration reduces the potential for expenses of those staying at home. Furthermore, it may be the case that they are unable to afford to keep members in school longer or appreciate the return to education as much as richer households. Finally, agricultural and non-agricultural income along with other earnings also have significantly different effects on scholastic spending for poorer and richer households. This implies that the impacts of income are different across various sources and the subgroups who receive them. The findings from Amuedo-Dorantes and Pozo (2011) support this notion.

Concluding Remarks

This paper estimates and compares the impact of various sources of income on household investment in educational spending by origin of funds and household income level. We apply

two-stage modeling to pooled cross-sectional data from the Cambodia Socio-Economic Surveys of 2009 and 2014 in order to correct for endogeneity and accommodate non-normality and heteroskedasticity of the error term as these two issues tend to plague research studies. A few principal findings emerge, one of which is that, even for a particular context, differences in the time of receipt of various forms of income can lead to significantly different expenditure patterns. This is likely due to societal evolution itself; but in general, the Permanent Income Hypothesis does not hold true for the case of remittances whereas it does for other irregular sources of income. It is entirely possible that Cambodian households do not think of remittances as transitory income that should not be relied upon long-term. This leads to our conclusion that remittances are fungible. In other words, individuals use remittances similarly to other types of permanent income.

When we distinguish between internal and international remittances, another picture develops. Contrary to previously mentioned studies that find that external remittances have a positive impact on household educational expenditure, we conclude that international remittances have a negative impact in the Cambodian context. Household expenses tend to decrease in inverse proportion to increases in remittances. The marginal effect indicates that, on average, a dollar rise in international remittances reduces spending by USD 0.25 or USD 25 for every USD 100 increase in remittances. However, upon further analysis, we discover that the effect is only statistically significant for households that receive more than USD 50 and for households whose total income is at or below the sample average. Therefore, it is possible that the impact and fungibility of different kinds of income lies not only in how a household intends to use remittances but also in how their relative importance is perceived. Unfortunately, cross-section data does not fully explain the divergence in marginal spending behavior.

Because poorer households are, overall, more likely to send migrants and receive international remittances, we find that that migration and remittances may not be a viable avenue for long-term development and economic growth because they are not crucial in building human capital. Nevertheless, more evidence is required to increase understanding of what kind of investments remittances are being put towards vs. what Cambodian households have claimed. This is certainly not education. However, it is worth noting that migrant children — that is, those who migrate with adults, are not included in the survey. It is common for many Cambodian migrant workers to move with their families to urban areas or even to Thailand, and many young children also accompany them. Some are then sent to attend school at their destination, and hence they do not appear in the survey. As a result, our study can include in its data analysis neither migrant children nor households from which everyone has migrated. If data allows, future research should focus on these children as their situation may be completely different from those who are left behind in rural regions. It is also known that migrant children in Thailand are entitled to a free education, so most of them may be enrolled in school whereas the left-behind may be forced to leave school due to increasing household chores which can influence the amount of household spending on education.

As a final remark, it should be emphasized that although remittances may not have a direct effect on household educational investment, they may do so on other indicators which are not under our study. Recipient households may be those who started from a very low consumption level and were unable to make a living, but through remittances, their general conditions may be better relative to that of a pre-migration situation. Remittances may also reduce child labor and allow other household members such as migrant's parents to have more time for childrearing which may be difficult to perform if the grandparents are required to work outdoors to earn their living. In addition, many empirical studies, especially those conducted in Latin America, have indicated a substantially positive relationship between

remittances and the left-behind household members' health outcome and knowledge (Adams, 2011; Antman, 2013; Brown & Jimenez-Soto, 2015). Such findings can be attributed to the fact that in many developing countries in which education is limited and rate of return to schooling is low, and non-schooling investment, such as in health, is preferred because people can enjoy longer labor force participation if they are healthy. Therefore, even if household income increases through remittances, it will have little or no significant effect on education, as most expenses are directed toward improving health conditions.

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Appendix

Table A: Double hurdle model for household remittances

Independent Variables	2009		2014	
	First Part (Probit)	Second Part (OLS)	First Part (Probit)	Second Part (OLS)
Percentage of Out-Migrants	0.00856***	0.00703**	0.00431**	0.00708*
	(0.00158)	(0.00272)	(0.00167)	(0.00275)
Wage	0.00000305	-0.0000139	0.0000176*	0.00000132
	(0.0000155)	(0.0000256)	(0.00000709)	(0.0000137)
Agricultural Income	0.0000259*	-0.0000134	-0.00000727	0.0000107
	(0.0000107)	(0.0000153)	(0.00000847)	(0.0000190)
Non-Agricultural Income	-0.0000125	0.0000245	-0.0000180**	0.0000123
	(0.00000839)	(0.0000180)	(0.00000629)	(0.0000118)
Other Earnings	0.00000749	-0.0000458	-0.0000669**	0.0000550
	(0.0000359)	(0.0000447)	(0.0000221)	(0.0000441)
Household Head Age	0.0569***	0.0341*	0.0536***	0.0235
	(0.00997)	(0.0136)	(0.00945)	(0.0152)
Household Head Age Squared	-0.000229*	-0.000213	-0.000318***	-0.000110
	(0.000103)	(0.000131)	(0.0000952)	(0.000141)
Household Head is Male	-0.0688	-0.111	-0.0334	-0.0616
	(0.0704)	(0.107)	(0.0712)	(0.126)
Household Head is Married	-0.155*	-0.0694	-0.316***	-0.120
	(0.0731)	(0.105)	(0.0727)	(0.125)
Household Head Year of Education	-0.00439	0.0475***	-0.0168***	0.0373***
	(0.00494)	(0.00861)	(0.00502)	(0.0100)
Percentage of Children	-0.00793***	-0.00642*	-0.00798***	0.00201
	(0.00170)	(0.00251)	(0.00170)	(0.00270)
Percentage of School-Age Children	-0.00763***	-0.00286	-0.0120***	0.00556**
	(0.00141)	(0.00171)	(0.00139)	(0.00186)
Percentage of Adult	-0.00282*	-0.00693***	-0.0106***	-0.000466
	(0.00126)	(0.00141)	(0.00124)	(0.00142)
Urban	-0.434***	0.555***	0.00928	-0.127
	(0.0571)	(0.108)	(0.0489)	(0.0819)
Banteay Meanchey	-0.213**	0.536***	0.431***	0.587***
	(0.0731)	(0.135)	(0.0762)	(0.136)
Battambong	-0.281***	-0.0410	0.405***	0.290*
	(0.0676)	(0.114)	(0.0731)	(0.128)
Kampong Cham	0.0582	-0.112	0.264***	0.0633
	(0.0549)	(0.0881)	(0.0639)	(0.116)
Kampong Speu	0.180**	-1.003***	0.0638	-0.336**
	(0.0694)	(0.108)	(0.0673)	(0.121)
Prey Veng	-0.0491	-0.0288	0.437***	0.145
	(0.0630)	(0.101)	(0.0704)	(0.128)
Siem Reap	0.246***	-0.447***	0.267***	-0.0943
	(0.0690)	(0.110)	(0.0756)	(0.144)
Takeo	-0.204**	0.0486	0.283***	0.270*
	(0.0678)	(0.116)	(0.0719)	(0.131)
Constant	-1.963***	3.126***	-1.181***	3.413***
	(0.249)	(0.369)	(0.249)	(0.436)
Observations	7,161	2,724	6,534	2,520

Robust standard errors in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

Table B: Impact of remittances on household educational spending without instrument

Independent Variables	2009		2014		Pooled Data	
	Coef	ME	Coef	ME	Coef	ME
Remittances	0.000448**	0.0363**	0.000133*	0.0311*	0.000230***	0.0371***
	(0.000152)	(0.0134)	(0.0000557)	(0.0137)	(0.0000601)	(0.0105)
Wage	0.000123***	0.00996***	0.00000780	0.00183	0.0000201	0.00324
	(0.0000341)	(0.00300)	(0.0000138)	(0.00324)	(0.0000138)	(0.00226)
Agricultural Income	0.000100***	0.00811***	0.0000729***	0.0171***	0.0000800***	0.0129***
	(0.0000229)	(0.00200)	(0.0000182)	(0.00469)	(0.0000149)	(0.00273)
Non-Agricultural Income	0.0000818***	0.00662***	0.0000761***	0.0178**	0.0000744***	0.0120***
	(0.0000219)	(0.00197)	(0.0000168)	(0.00563)	(0.0000149)	(0.00326)
Other Earnings	0.000111*	0.00902*	0.000179***	0.0420**	0.000150***	0.0242**
	(0.0000565)	(0.00459)	(0.0000532)	(0.0137)	(0.0000426)	(0.00739)
Household Head Age	0.197***	15.92***	0.159***	37.31***	0.182***	29.35***
	(0.0215)	(1.968)	(0.0249)	(7.430)	(0.0184)	(3.890)
Household Head Age Squared	-0.00158***	-0.128***	-0.00114***	-0.266***	-0.00138***	-0.222***
	(0.000217)	(0.0187)	(0.000259)	(0.0699)	(0.000190)	(0.0363)
Household Head is Male	-0.293	-23.73	-0.158	-37.07	-0.218	-35.18
	(0.196)	(15.96)	(0.132)	(31.01)	(0.145)	(23.75)
Household Head is Married	0.664**	53.74**	0.385**	90.26**	0.497**	80.15**
	(0.225)	(18.81)	(0.134)	(32.76)	(0.160)	(27.07)
Household Head Year of Education	0.107***	8.645***	0.112***	26.35***	0.114***	18.45***
	(0.0123)	(1.278)	(0.0102)	(3.585)	(0.00868)	(2.162)
Percentage of Children	-0.00361	-0.292	0.00730	1.710	0.00173	0.279
	(0.00536)	(0.430)	(0.00439)	(1.055)	(0.00355)	(0.576)
Percentage of School-Age Children	0.0543***	4.391***	0.0583***	13.65***	0.0559***	9.016***
	(0.00536)	(0.608)	(0.00400)	(1.735)	(0.00334)	(0.972)
Percentage of Adult	0.0315***	2.551***	0.0312***	7.309***	0.0320***	5.161***
	(0.00476)	(0.468)	(0.00356)	(1.118)	(0.00296)	(0.658)
Urban	0.854***	69.06***	0.607***	142.3***	0.730***	117.9***
	(0.110)	(10.76)	(0.0930)	(25.93)	(0.0747)	(15.78)
Banteay Meanchey	-0.185	-14.96	-0.371*	-86.79*	-0.254*	-40.98*
	(0.184)	(14.93)	(0.148)	(35.51)	(0.121)	(19.82)
Battambong	-0.267	-21.60	-0.400**	-93.60**	-0.314**	-50.70**
	(0.175)	(14.04)	(0.127)	(31.22)	(0.117)	(19.27)
Kampong Cham	-0.522***	-42.24***	-0.126	-29.59	-0.319***	-51.45***
	(0.117)	(9.557)	(0.128)	(30.28)	(0.0899)	(14.92)
Kampong Speu	-0.915***	-73.99***	-0.656***	-153.6***	-0.804***	-129.8***
	(0.150)	(12.85)	(0.121)	(32.44)	(0.0921)	(18.10)
Prey Veng	-0.810***	-65.55***	-0.253	-59.19	-0.559***	-90.23***
	(0.137)	(11.73)	(0.144)	(33.96)	(0.100)	(17.22)
Siem Reap	-0.258	-20.90	-0.261	-61.07	-0.239*	-38.58*
	(0.181)	(14.54)	(0.142)	(32.87)	(0.119)	(19.37)
Takeo	0.198	16.01	0.0276	6.477	0.102	16.42
	(0.149)	(12.32)	(0.131)	(30.82)	(0.103)	(16.85)
Year 2014	-	-	-	-	0.962***	155.3***
					(0.0567)	(15.88)
Constant	-5.761***	-	-4.155***	-	-5.557***	-
	(0.636)		(0.623)		(0.481)	
Observations	7,161		6,534		13,695	

Robust standard errors in parentheses
** p<0.05, ** p<0.01, *** p<0.001*