Impact of Migration and Remittances on Children's Human Capital in Cambodia

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วิทยานิพนธ์ฉบับนี้ศึกษาผลกระทบของการย้ายถิ่นและเงินส่งกลับที่มีต่อการพัฒนาทุนมนุษย์ของเด็กที่ถูกทิ้งไว้ข้างหลังในกัมพูชา มีการนำเสนอหลักฐานใหม่รองรับข้อถกเถียงในวรรณกรรมเกี่ยวกับผลกระทบระยะยาวของการย้ายถิ่นและเงินส่งกลับที่มีต่อเด็ก จากมุมมองด้านการศึกษา ด้านสุขภาพและด้านการบริโภคในครัวเรือนที่รับเงินส่งกลับเปรียบเทียบกับในครัวเรือนที่ไม่ได้รับเงินกลับ โดยอาศัยข้อมูลรวมภาคตัดขวางจากการสำรวจเศรษฐกิจและสังคมของประเทศกัมพูชาในปี 2552 และ 2557 ซึ่งแต่ละครั้งประกอบด้วยครัวเรือนประมาณ 12,000 ครัวเรือนทั้งในชนบทและในเมือง ทั้งหมด 25 จังหวัดทั่วประเทศ ในการศึกษาผลกระทบต่อการลงทุนในครัวเรือนด้านการศึกษาของเด็กนั้น เริ่มจากการใช้ Hurdle Regression เพื่อควบคุมปัญหา endogeneity ก่อนแล้วตามด้วย Generalized Linear Model เพื่อจัดการกับปัญหาข้อมูลกระจายตัวแบบไม่ปกติ และความคลาดเคลื่อนในลักษณะที่มีความไม่เท่ากันของความแปรปรวน ส่วนการศึกษาอิทธิพลของเงินส่งกลับที่มีต่อสุขภาพของเด็กนั้น ใช้รูปแบบ Two Stage Least Squares ในขณะที่การศึกษาผลกระทบต่อการบริโภค มีการสร้างสภาพการณ์จำลองของผลลัพธ์ในทางตรงกันข้ามเมื่อไม่มีการย้ายถิ่นและไม่มีการส่งเงินกลับ และใช้เป็นเกณฑ์เปรียบเทียบกับสภาพการณ์ของครัวเรือนที่รับเงินส่งกลับจริง ทั้งนี้ ใช้การประมาณสองขั้นตอนของ Heckman เพื่อควบคุมการเลือกสำหรับการย้ายถิ่นด้วย

การค้นพบที่สำคัญแม้ว่าจะไม่ครบถ้วนสมบูรณ์มีดังต่อไปนี้: (1) ในประเทศหนึ่งๆ การใช้วิธีการที่แตกต่างกันในการศึกษาประเด็นเดียวกันอาจนำไปสู่ข้อสรุปที่ขัดแย้งกัน (2) เวลาที่แตกต่างกันในการรับเงินส่งผลสามารถนำไปสู่รูปแบบค่าใช้จ่ายที่แตกต่างกันอย่างมีนัยสำคัญ (3) แหล่งที่มาของเงินส่งกลับมีความสำคัญมากกว่าจำนวนเงินในการส่งผลกระทบต่อทุนมนุษย์ของเด็ก (4) เงินส่งกลับจากต่างประเทศส่งผลเชิงลบต่อการลงทุนในครัวเรือนด้านการศึกษาของเด็ก (5) อย่างไรก็ตาม วิทยานิพนธ์นี้พบว่า เงินส่งกลับจากต่างประเทศนั้น ส่งผลเชิงบวกอย่างมีนัยสำคัญต่อสุขภาพของเด็ก ตลอดจนโภชนาการและการบริโภคทั่วไป (6) ครัวเรือนมีจุดประสงค์อยู่ก่อนแล้วทั้งในการส่งสมาชิกให้ย้ายถิ่นออกไป การได้รับเงินส่งกลับตลอดจนประเภทของค่าใช้จ่ายที่จะใช้จากเงินส่งกลับนั้น จึงจำเป็นต้องมีการแทรกแซงเชิงนโยบายให้มีการนำส่งเงินกลับไปใช้ลักษณะที่เป็นการลงทุนภาคครัวเรือนระยะยาวมากขึ้น เช่น กิจกรรมการเกษตร ธุรกิจ และเด็กๆ

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This dissertation investigates the impacts of migration and remittances on human capital development of left-behind children in Cambodia. It contributes new evidence to a controversial debate in the literature on long-term impacts of migration and of remittances on the children. This is from the perspective of education, health, and consumption in remittance-recipient households compared with those in non-recipient ones. It relies on pooled data from Cambodia Socio-Economic Survey of 2009 and 2014, each of which comprises around 12,000 households in both rural and urban areas across all 25 provinces there. To evaluate the impact on household educational investment, the study firstly uses Hurdle Regression to correct for endogeneity, then Generalized Linear Model to deal with non-normality and heteroskedasticity of error. To evaluate the influence of remittances on children's health, a classic Two Stage Least Squares is employed. For the effect on consumption, a counterfactual scenario of no migration and no remittances is constructed and used as a benchmark to compare with actual recipient household conditions. Heckman Two-Step estimation is also applied to control for selection into migration.

The principal findings, though not exhaustive, are as follow: (1) Even for a specific country, different methods used to examine the same issues can lead to conflicting conclusions. (2) Different timing in the receipt of remittances can significantly lead to different expenditure patterns. (3) Source of remittances matters more than their amount in term of impact on children's human capital. (4) International remittances are found to have reduced household investment in children's education. (5) Nevertheless, they tend to have a positively significant influence on children's health outcome, nutrition, and general consumption. (6) Households indeed have prior purposes of sending migrants and receiving remittances and what types of expenditure remittances will be channeled toward. Policy intervention is encouraged to direct more of these financial aids towards long-term household investment such as agricultural and business activities and

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CHAPTER 1

INTRODUCTION

1.1. Statement of Problems

Globalization has not only increased the flow of technologies, capitals, and goods but also affected the way people around the world live and interact. As many countries commit to regional integration for the sake of economic development, they continue to allow freer movement. As a result, barriers to mobility in general diminish considerably, and thereby labor migration proliferates. Statistically speaking, there were only 173 million international migrants in 2000, but in 2010, it was increased to 222 million and to 258 million people in 2017 or equivalent to 3.4 percent of the world population (United Nations, 2017a). Officially recorded global remittances have also grown impressively. They are projected to reach USD 586 billion of which USD 440 billion are sent to developing world (World Bank, 2017), and since the late 1990s, the latter amount has already begun to exceed official development assistance and foreign direct investment there (Yang, 2011). To put how significant they are into perspective, international remittances generally constitute 30-40 percent of household income in less developed countries (Adams, 2011).

With such an enormous magnitude and importance, it comes with almost no surprise that nexus between labor migration, remittances, and economic growth has

been an extensive topic of discussion for many researchers and policymakers who intend to understand the consequences of migration on sending countries. Among them, some are also interested in knowing how much remittances affect left-behind family members and how these resources are used or allocated within household. Even though it is generally irrefutable that remittances supplement income and bring migrant's family to a higher socio-economic status, a more important question conventionally asked in these research studies is to what extent they will spur household earning in long-term or whether or not remittances being used productively.

The early wave of discussion normally judges the use of remittances to be negative or positive, depending on whether they fund mere daily consumption or extend to productive investments like agricultural and business activities or human capital development of children, the potential mechanisms through which positive impacts could occur for long (Page & Plaza, 2006). In another word, if recipient households are able to allocate remittances to investment or to their children which would allow them to accumulate more education than their counterparts from non-migrant household, one can expect migration and thereby remittances to have a substantial and long-lasting influence on household income. On the contrary, migrant families can probably fall into an endless cycle of intergenerational poverty if they fail to acknowledge those. However, we do not know for sure which one is generally the case. Recent literature unfortunately offers little understanding and continues to be plagued with inconsistent findings precipitating a controversial debate (Adams, 2011; Antman, 2013; Brown & Jimenez-Soto, 2015).

It can also be argued that even though remittances help reduce household budget constraint and allow them to increase investment in children, child development, at the same time, suffers from just being physically left behind due to migration of adults especially that of their parents. Remittances may increase household members' reservation wage, which reduces labor participation and the need for children to generate income. But they also encourage households to regard migration as a mean to cope with economic hardship or difficulties in seeking local employment since international remittances also imply higher possible income, job opportunities, and lower return to education of the country of origin. This notion can be corroborated by Kandel & Kao (2001) who examine the effects of remittances on children schooling in Mexico and notices that migrant households with high probability of sending members to USA, invest less in education while children are found to have poor motivation to enter upper secondary school, as household's perceived solution to poverty is migration not educational investment.

However, social scientists are typically more fascinated to know the net impact of the trade-off between migration and remittances. To put it another way, research studies aim to understand to which extent absence of adult members can be cushioned by in-flow of remittances. In the current body of literature, net positive effects of remittances on children human capital are reported in many contexts (Acosta, 2011; Acosta et al., 2007; Fujii, 2015; Hanson & Woodruff, 2003; Hildebrandt & McKenzie, 2005; Mansour et al., 2011; Valatheeswaran & Khan, 2018; Yang, 2008). These studies assert that remittances augment educational attainment of school age children, withdraw them from labor market, and allow them

to have more time for school activities hence their performances at school. Remittances also increase children's nutritional intake (Graham & Jordan, 2013) and household healthcare expenditure (Amuedo-Dorantes & Pozo, 2011).

On the other hand, the net negative influence is also documented in another set of studies (Jampaklay, 2006; Lu, 2012, 2014; Meng & Yamauchi, 2017; Zhou et al., 2014). The authors assert that remittances do not offset the adverse effect of migration, as left-behind children's human capital or cognitive skills development tend to fare worse off compare to those who do not live in migrant-households. These papers usually attribute their results to prolonged period of adult absence and thereby lack of caregiving which tends to have considerably deleterious effect and disrupt child growth. It has also been indicated that alternative caregivers do not always pay attention to children day-to-day needs for scholastic progression and nutrition intake. In addition, migration delivers a harmful message for children because it forces them to assume household responsibility in replacement of adults which they are not yet ready to handle and thus increase propensity of dropping out of school (McKenzie & Rapoport, 2011).

Despite these findings, oddly enough, using Vietnamese data, it has been found that transnational migration does not generate any significant impact on children's education or health attainment (Binci & Giannelli, 2018; Graham & Jordan, 2013). But domestic migration does even if the amount of internal remittances is much smaller than international inflow (Binci & Giannelli, 2018). Moreover, Sawyer (2016) insists that mother's education, instead of remittances, significantly explains the variation of children enrollment and completion in the upper secondary school in

Mexico. Even though Lu & Treiman (2011) discover a positively impact of migration on black South African children's education, similar effect does not exist for white South Africans. In this sense, remittances effect is neutral meaning it is neither increasing educational progression nor decreasing it.

Conflicting results in cross-sectional studies may be explicable because each data they use is prone to omitted variable bias, measurement error, or a slightly distinct definition of migration or remittances from one country to another. Furthermore, it can be the unobservable characteristics of specific country such as political institutions or culture which bring about the mixed picture. Nevertheless, it is perhaps surprising that Lu (2012), Lee (2011), Mu & de Brauw (2015), and Zhang et al. (2015) all of which employ the same China Health and Nutrition Survey yet still supply an ambivalent findings in term of net effect between migration and remittances. Antón (2010) and Ponce et al. (2011) also reach different and inconsistent conclusions drawn from a similar dataset called Ecuador Living Standard Measurement Survey 2006. This has raised an important question whether or not the disagreement indeed comes from different methodology.

However, it has been suggested that the discrepancies in previous studies seem to follow some specific but dynamic circumstances briefly influencing people behavior in a particular country during data collection period. And these conditions are not very well understood (Lu, 2014). Supporting this statement, Yang (2011) claims that we have little knowledge on how remittances are sent and used despite their numerous advantages. As a result, the impacts of migration and of remittances particularly on children accumulation of education and health assets is still anyone's

guess, yet if the development of left-behind children is compromised due to adult migration, not only will they fail to reach their potentials, but there is a possibility that they may become an economic and social onus which should also be of main interests to policymakers rather than just proliferating magnitude of remittances flowing into their countries.

Such inadequate knowledge is also explicable given that most studies on migration focus mainly on South-North migration. Much of this research has also centered on adult immigrants (Sweetman & van Ours, 2015). With the exception of research focusing on rural-urban migration in China, a small but growing literature examining migration's impacts on migrants' children has also concentrated on international mobility, leaving the studies on the impact of internal migration on children relatively marginalized in the literature. This dimension is, nonetheless, important, for one can always argue that if migration of adult household members leads to more investment in children's human capital, we can expect that migration will also stimulate long-term economic growth. But due to the lack of understanding, socio-economic development has thus been hindered, and policy-making process cannot be properly initiated to grapple with increasing movement of people.

1.2. Research Objectives and Questions

Following the problems stated above, the main objective of this dissertation is to extend and present new empirical evidence from the global south perspective in

order to contribute to the unfinished businesses. Particularly, I focus on impact of migration and remittances on development of children's human capital and consumption/poverty. My goals for the thesis derive from my fascination in the fact that through human's life course, physical development, learning, and acquisition of knowledge and better health are built on the fundamental growth founded in the first years of life. Literature confirms that the early years of life is a very critical point of individual's cumulative health, readiness to learn, academic success, and general well-being during which the juvenile's foundation is determined formatively and considerably by caregiving and social environment around them that nurtures the sense of safety and early opportunities for learning (Kroeger & Anderson, 2014; Loizillon et al., 2017). Loizillon et al. (2017) assert that children living under harsh conditions will face a broad range of risk factors for the remainder of their life including poverty, poor nutritional growth, violence, and low education, skills and productivity.

On research questions, each chapter of the thesis investigates the effects of migration and/or of remittances on one dimension of children human capital development. As a result, research questions in each chapter are quite different due to sample under study and outcome indicators used to measure human capital. Questions are posed specifically in their respective introduction part, but broadly speaking, the entire thesis generally seeks to answer these following inquiries:

1. Do remittances influence children human capital development and consumption? If, yes, to what extend?

2. Relative to other kinds of income, do remittances have a larger or smaller effect?
3. Is the impact of internal remittances different from that of international?
4. Does impact of remittances differ among sub-group of population?

To answer my research questions, I compare those who are affected by migration or remittances with their compeers whose households do not have migrants or receive such fund using recent nationally-representative data from Cambodian Socio-Economic Survey in 2009 and 2014. Further discussion about dataset and sample is given in following section. Due to econometric challenges arising from nature of dependent variables and dataset themselves such as endogeneity, heteroskedasticity, and non-normality of error term, different analysis techniques are employed to deal with discrete problems (as explained later). The methodology used in this dissertation is also a big advantage over previous studies many of which talk either exclusively about internal or international remittances and/or do not address potential bias, so their findings may be substantially distorted. I will talk extensively about this in chapter 2 when I review previous literature.

To additionally make my study distinctive and contribute new knowledge to the field, I use Cambodia, a developing country in Southeast Asia, as a case study. Cambodia is well-suited for empirical evaluation because of its notably increasing migration rate and potential roles of remittances in shaping rural economy as described comprehensively in chapter 2. My findings can also be more or less applied to understand the ASEAN setting which shares similar characteristics of migration (Deshingkar, 2006) and the context of south-south migration (developing-developing

countries). Interest in the Cambodian context originated from Adams' (2011) and Brown & 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 in general Southeast Asia in particular is sparse albeit slowly growing but also limiting our insight. This is, however, astonishing given that the region has the highest rate of migration (UN, 2017).

Cambodia is also a fascinating context in itself. It 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), but with no restrictions such as on visas and work permits, it is not surprising that internal migration happens at a high rate. International migration to its neighboring country, Thailand, is also increasing at a remarkable pace with remittances, on average, amounted to 2.5% of its GDP from 2000 to 2007. Given such an enormous amount, the value of remittances has risen so high for Cambodia. The beginning of the new millennium has seen remittances quickly rise to be a main 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). Moreover, the Cambodian government has acknowledged the importance of migrant workers.

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). They also 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). This fact alone makes Cambodia an interesting case study on the effect of remittances on left-behind children's human capital since education and health are regarded as a form of investment. Therefore, for a population that aims to boost their savings through remittances, remittances themselves should lead to even more investment in them if the statement is true. In addition, 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 claim, there is very little evidence that those households treat remittances as sporadic rather than fungible income and that they are really investing such funds.

1.3. Research Methodology

1.3.1. Dataset and Sample

With the exception of an instrumental 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. CSES is used to measure living standard and monitor the National Strategic Development Plan as well as the progress toward Sustainable Development Goals. 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 annual living situations of Cambodians.

CSES contains comprehensive information covering a wide range of data on the general socio-economic situation of households including household size and structure, amount and origin of income and expenditure in the previous 12 months. Information on household members (age, sex, education, marital status etc.) are also collected, and that of those who are not present at the time of the survey is reported by other members. It should be highlighted that the CSES does not consider those who are absent from the household less than 12 months as migrants but rather merely "not present during the survey." In addition, the survey gathers details from village heads about recent socioeconomic situations of the villages where sampling households are located. It is worth noting that the village is the smallest administrative unit in Cambodia, and, in rural areas, a village typically comprises several hundred people.

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 25 provinces including the capital, Phnom Penh. 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 get a more precise estimation and better statistical power. But because the dissertation mainly concentrates on the effect of migration and remittances, in some models I restrict my study sample to only those who live in the provinces where migration and remittances-receiving phenomena are most prevalent. Some provinces have fewer out-migrants and receive hardly any remittances at all, so they are

excluded. Detail information about what relevant samples are used, are described in each chapter. Descriptive statistics of variables are also presented there as well.

As for remittances, the surveys define 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 I can differentiate between internal and international remittances, without information about a sender's background, I am unable to distinguish migrant remittances from private transfers. Therefore, it is important to clarify that throughout the study, my focus was on general remittances rather than just on migrant worker's remittances or determinants of remittances themselves and not on remittances in-kind. For the sake of international comparison, I turn all the monetary value from local currency called Khmer Riel (KHR), into United States Dollar (USD) with the exchange rate of 4,000 KHR/USD. The exchange rate has remained constant at 4,000 since 2004 with very small fluctuation (World Bank Databank, 2019), so comparison across time is largely possible.

1.3.2. Data Analysis Method

The study uses only quantitative method, particularly econometrics, to answer research questions posed in previous section. But a straightforward statistical method such as OLS can hardly be employed, for estimated results will be biased on account of endogeneity of remittances. Reviewing the literature, Adams (2011) suggests a few

lurking variables that can be potentially correlated with both remittances and children's education or health outcome but that are not normally reported by survey. First, households can simultaneously make a decision to earn remittances and invest in the left-behind members. Second, a decision to earn remittances may be driven by household desire to increase spending on human capital development. Third, some unobservable characteristics such as motivation, ability, or ambition can determine both migration, remittances, investment and even outcome variables. Therefore, although we manage to include a wide range of control variables, it is still unlikely that the issues are fully addressed.

To deal with the challenges in my estimation, this study implements a two-stage methodology in which the first stage is to correct for endogeneity issues revolving around remittances. Thus, it is worth noting that in every model, at least an instrumental variable is needed to impose an exclusion restriction. My choices of instrument are the percentage of out-migrants to total population in the district and distance from village to the nearest Micro-Finance Institute (MFI) in 2008. The former is a good proxy for migration network which, in theory, plays a crucial role in increasing possibility of migration for prospective migrants and likelihood of receiving remittances for left-behind household members (McKenzie & Rapoport, 2011). The percentage of out-migrants to total population in the district is calculated using information from the 2008 Cambodia census, which was collected by the National Institute of Statistics. On the other hand, the latter instrument represents access to credit loan unit which, based on New Economics of Labor Migration theory (further explored in chapter 2), will reduce migration rate in developing countries.

Information regarding of the distance is available in the Cambodia Socio-Economic Survey collected at village level. The strengths and possible weaknesses of my instrumental variables are also discussed in detail in each chapter when we encounter models/frameworks which are used to guide data analysis, some of which do not require both instruments.

In term of analysis technique, to investigate the influence of remittances on household investment in education, I employ an ad hoc two-stage estimation. In the first stage, I model decision to remit to not only eliminate substantial bias but also allow for the possibility that households may never earn remittances at all or happen not to get any remittances during the referenced period (previous 12 months) due to difficulties for migrants to send them, but these households normally do obtain such money. After correcting for endogeneity, in the second stage, I model remittances effects on household educational expense and use Generalized Linear Models (GLM) to cope with non-normality and heteroskedasticity of error term arising from the fact that expenditure cannot be negative, and a fraction of household has zero educational expense. Moreover, the variance of expenditure is normally large hence has a potential to mislead the results.

The method to evaluate the effect of remittances on children's health is much less complicated since the dependent variables are Height-For-Age and Weight-For-Age, whose unit of measurement is standard deviation and whose magnitude ranges somewhere between ±6. Furthermore, the distribution of variable is adjusted to make it bell-shaped using box-cox power transformation and a re-computation formula for

extreme value. As a result, Two Stage Least Squares will suffice in order to examine the effect since my challenge in this model is only endogeneity of remittances.

Onto impact of remittances on per capita household consumption and poverty, model and statistical approach used here are quite different from what are done in the other chapters. To examine the effect, I construct a counterfactual scenario of no migration and no remittances. That is, I attempt to predict what migrant-households situation would have been like, had migration not occurred, and thereby migrants would have stayed at home instead, and household would not have received such remittances. In the model, I consider remittances as substitute rather than extra income of recipient households in which case I will overestimate their effect, as it is largely possible that household total consumption is lower relative to that in pre-migration scenario. To impute their consumption, I opt for a Heckman Two-Step estimation to control for selection into migration, which still requires an instrument in the first step. But as I find out later that such selection bias is small and hence negligible, bias correction is rather unnecessary. As a result, I simply use OLS and proceed to estimate the impact.

1.4. Significance of the Study

The main significance of this dissertation in general is to add more evidence to the growing interest in understanding mechanisms through which remittances will spur development in migrant-sending and remittances-receiving countries especially

those at the early stage of migration phenomenon such as Cambodia. More specifically, the thesis sheds light on south-south migration and its subsequent impacts on human capital formation of children living in remittances-recipient households which is a relatively more untouched field research compared to the others concerning determinants of remittances or migration. However, this dissertation also makes three other major contributions to the general literature.

First, the study distinguishes between internal and international remittances in order to look at their impacts separately and at different timing of receiving such money. In addition, I delve deeper comparing different types of household income and involving subgroup of population so that we can identify who is more vulnerable because policies will be more effective when they target specific groups. Arguably better indicators such as household educational expenses, the WHO's (2006) Child Growth Standard, and per capita household consumption are employed to measure household investment in education, health, and general development, respectively. These variables alone hold significant advantage over many previous studies which use other kinds of measurement for education, health, and welfare but can loosely determine its outcomes.

Second, my statistical methods are also distinct from most studies. Household rather than individual is the main unit of analysis. In addition, I recognize econometric challenges in the estimation of effects of remittances in every model by correcting for biases. Furthermore, I implement regression techniques such as Generalized Linear Model that takes into account not only endogeneity issue but also other possible circumstances concerning remittances and dependent variable. To the

best of my knowledge, this is the first study in remittances research that has used such econometric approach which is borrowed from the field of health economics. My attempt is to approximate the effect as closed to population parameters as possible. In other words, I try to measure the causal impact rather than just to understand relationship between remittances and human capital indicators.

Third, it is among a few studies that separate the effect of migration from that of actual amount of remittances. Doing so allows me to estimate the amount of remittances that can be used to offset average effects of migration. In addition, it enables policymakers to know whether they should choose a policy that encourages migration or remittances. The latter is less controversial in many societies. This dissertation also advocates that the New Economics of Labor Migration is not applicable in Cambodian context as better access to credit loans commensurately intensifies labor migration rather than reducing it as conventionally accepted and as the theory suggested.

1.5. Limitation of the Research

Despite the insight, there are also a number of limitations in my study that I should pinpoint.

First, this study is a quantitative research. Representativeness of whole population is a strength, but definite, deep, and detail explanations for certain phenomena are also limited. For example, one may ask through which mechanism

remittances positively affect children's health? The answer, however, can be multiple. Remittances might have directly increased consumption of nutritious food which influence health straightaway, or they might have allowed households to purchase better sanitation and hygiene or even healthcare which in turn improve health condition. Nevertheless, we cannot know for sure which one is the case.

Second, Cambodia Socio-Economics Survey 2014 collects no data on individual migrants (whether they are remitters or non-remitters) such as age, gender, education, or their current whereabouts. Therefore, it is not possible to understand who has sent what. In other words, we cannot know whether migrants are household members or distant relatives, whether the amounts of remittances differ greatly among migrants with different characteristics, or how many migrants the household has. Ignoring migrant characteristics is the main weakness of the survey and of the New Economics of Labor Migration theory, which considers household a more important and relevant entity as well as a unit of analysis. Furthermore, the theory entirely disregards intra-household differences such as age and gender of individuals and generational conflicts of interest. Some migrants may leave their households to escape social punishment or family violence.

Third, the study does not include remittances in-kind (given as imputed value). Due to lack of information in the survey on what types of goods are sent and why or how households obtained them, it is not plausible to distinguish remittances in-kind from gifts or rewards that households acquire for other reasons. It is possible that migrants send back remittances in the form of in-kind transfers because such goods may not be available domestically for consumption or perhaps it is cheaper to buy and

send them from abroad than to purchase them from domestic market. But it is quite impossible to determine if such transfers are really remittances in-kind sent by migrants or merely gifts sent to households by random people for other purposes. Moreover, certain types of goods are not officially considered as basic consumption items for maintaining development and growth and for the purposes of poverty calculation. Therefore, the study might have underestimated the actual impact of remittances.

Fourth, total remittances from local sources or from abroad are recorded at household level. Remittances may be sent by both migrant workers and non-migrant workers–those who migrate for other intentions but employment. It is very well-known that many Cambodian students abroad also work part-time at the destination countries to earn money to support their education. Some of them have also sent remittances home to help their families, and such cases are not unheard of elsewhere in the world. As amount of remittances is recorded at household level, it is not possible to separate those sent by labor migrants from those transferred by other types of migrant. Therefore, the focus of this study is on migrant remittances rather than only on migrant worker remittances. If we only consider the latter, then the study might have overestimated the impact.

Fifth, the econometric methods used in this study such as Heckman regression and Two Stage Least Squares are better than OLS in estimating the coefficients and causal relationship when model suffers from endogeneity. However, such two-step estimations have a main weakness in themselves. Their standard error is normally large and generally much larger than that of the OLS because the estimators also take

into account correlation between instrumental variables and endogenous variables from the first step/reduced form equation.

1.6. Organization of the Dissertation

This thesis consists of six chapters. After this introductory chapter, the whole dissertation is organized as follows: Chapter 2 reviews relevant literature on the fundamental concepts in research concerning the effects of migration and remittances which cover New Economics of Labor Migration and the Friedman's (1953) life cycle Permanent Income Hypothesis. I also present infamous challenges and resolutions in remittances research as well as what has been found so far regarding of the impact. At the end of the chapter, I introduce the readers to migration in Cambodian context, which is a relatively short section since the country is just a newcomer for this global phenomenon. In this chapter alone, the aim is to improve general understanding about my topic.

In chapter 3, I begin my data analysis by first investigating the impacts of remittances and of other types of household income on household educational expenditure. I delve into the controversy as to how remittances are spent by discussing new evidence on the impact of remittances according to the timing of receiving them, origin of the funds, and the population subgroups involved. Following that, chapter 4 demonstrates the results deriving from the examination of influence of

migration and of remittances on individual children's quality of health measured by WHO's (2006) Child Growth Standard.

Next, chapter 5 evaluates the effect of remittances on general welfare and poverty in a broader view indicated by per capita household consumption which includes food and non-food expenditure on what are considered as basic necessities of life, physical growth, and development. The former expenditure consists of consumption of various food in order to gain 2,200 kilocalories (defined by the Referenced Food Basket), and the latter comprises such expenses on health, education, recreation, communication, hygiene, utilities, energy etc., but excludes durable goods and household construction as deemed not necessary for growth and subsistence. The expenditure also includes neither amount of money spent on improving business or agricultural activities.

Chapter 6 comes with a concluding synopsis and discussion which are drawn from all the body chapters, policy implications, and suggested topics for future research.

CHAPTER 2

THEORIES AND PRIOR RESEARCH ON MIGRATION EFFECTS

This chapter provides literature review on major relevant theories and prior research. There are quite a number of theories in migration. Some, especially those being theorized in early wave of migration study, focuses on pattern of the flow while others highlight on factor contributing to migration. However, a few subsequent studies raise not only the driver of migration but also that of remittances such as the New Economics of Labor Migration, a famous notion on which many studies about remittances based. It is also the first theory that tries to understand succeeding influence of migration on households in country of origin. That is, impact of migration through remittances on households. As a result, the effects of migration are of relatively recent development in both theoretical and empirical perspectives compared to its determinants. This is particularly from the perspectives of remittances.

In this chapter, I will focus on the important aspects of impacts rather than drivers of remittances which will only be reviewed briefly. I will also discuss lessons learnt from previous research from the perspectives of challenges. Given the main objective of the dissertation which is to extend and present new evidence concerning effects of migration and remittances on left-behind children's human capital

development, this chapter, furthermore, reviews other previous research papers related to the impacts on children and summarize their findings. The organization of this chapter is along this order: fundamental theories concerning migration and remittances effects, challenges and resolution for research regarding of the impacts, migrants' motivation to remit, previous studies and findings related to impacts of remittances on education, health, consumption, and poverty. Finally, I will end this chapter with a section talking about background and migration situation in Cambodia.

2.1. Fundamental Concept of Migration Effects

2.1.1. New Economics of Labor Migration

Most empirical studies in remittances research are more or less based on a theory called the New Economics of Labor Migration (NELM), which extensively investigates the determinants and consequences of migration–remittances effect, in less developed countries, where the vast majority of migrants come from rural agricultural households. It was pioneered in the 1980s by Lucas & Stark (1985) and Stark & Bloom (1985) to challenge the main assumptions of neoclassical economic concept that migration choice is made by isolated individuals. In contrast, NELM argues that the household or family rather than a single person is the main actor in migration decision-making and that remittances are the most obvious, central, and direct outcome of an implicit contract between households and migrants. To put it another way, the decisions to migrate and determining who is to migrate are made collectively within a household that wants to diversify sources of income to minimize

agricultural hazards (ibid). Thus, migration is not necessarily a method to maximize household earnings but rather a risk-sharing approach, and thus wage differential is not always a motive for migration, and migration does not necessarily stop even when the wage gap is eliminated.

In many developing countries (or imperfect market), where poor families are mainly those in rural areas practicing cultivation as a main source of income, migration is seen as a strategy to guarantee household survival and smooth consumption over time. The crucial insight is that households can maintain the same level of their utilities only as long as their income is steady, but the risk of income shock for rural households is high in agrarian countries, where banking and insurance systems are underdeveloped and usually impose a limit on the amount farmers can borrow. To cope with natural calamities and liquidity constraints, households have to carve out a backup plan to sustain their level of consumption and manage risks. One such plan is to allocate family labor to pursue different income-generating activities. While some members may be assigned to local economic activities such as harvesting or running a small family business, others may be chosen and financed to migrate. But migration is costly, so a household tends to wisely select members with the highest human capital (education, skills, or experience) since they are more likely to succeed in what can be a risky venture, which in turn will allow the household to gain the most from its investment (Stark & Taylor, 1989).

In developed countries, risks to household income such as harvest failure or crop price fluctuation are normally kept at a minimum by governmental programs or affordable insurance policies that insure against future loss of crops, a new technology

backfire, or a sudden drop of market price (Massey et al., 1993). But when these guarantees are not available or accessible due to high cost, households need to resort to self-insurance through international migration. Consequently, a flow of remittances can also reduce risk-averseness for very poor families and motivate them to adopt a riskier agricultural investment or new production technology with higher potential returns, which they would not have done if they had not had access to migration (or insurance) (Brown & Jimenez, 2008). For example, some Mexican farmers who own a large amount of land but lack the money to invest in it migrate to the United States just to generate capital for their economic activities, which in turn improves their agricultural income and household welfare (Castles et al., 2014).

Some households may also want to increase their assets, improve consumption, or make additional investment in their children's education due to perceived higher returns to schooling, but, given budget constraints, they cannot simply increase a particular kind of consumption and hold the others constant unless there is a surge in family earning. A possible and attractive way for households to positively alter their income in the absence of banking and a credit loan system would be to send members away for higher-paying employment in another place (Stark & Bloom, 1985). Mutual assistance and support within households and decisions to allocate resources and secure subsistence for all members make households themselves the most relevant unit of analysis. However, the NELM entirely ignores intra-household differences such as age and gender of individuals and generational conflicts of interest.

Another important proposition of NELM is that households have significant motivation to send members away to not only increase their absolute income but to also improve their relative income in comparison with other households in the community and thus reduce relative deprivation and inequality (Stark & Taylor, 1989, 1991). To put it another way, internal and international migration is motivated by a household's desire to improve its comparative economic position with respect to relevant reference-group income distribution, say, that of other households in the village. But NELM also suggests that the role of relative deprivation may work quite differently for internal and international migration due to continuities of social and cultural homogeneity within and across national borders. However, it generally acknowledges that the propensity for sending migrants and receiving remittances is higher for more relatively deprived households (those at the bottom of income distribution) than their less relatively deprived counterparts, as the former have a stronger feeling of relative deprivation in the community.

As a result of households' intention to improve their social rank through migration, remittances are said to favorably affect income distribution and increase demand for consumption of goods and services by poor families. Nevertheless, in two Mexican villages it was found that the impact of remittances on rural inequality depends critically on the return to migrants' human capital and that it is the middle-income groups and not the poorest ones in the village that possess better schooling/skills and ability to afford migration (Stark et al., 1988). In another study using Mexican data, Stark et al. (1986) assert that internal remittances are largely a result of the return to education, rather than other components that lead to migration

or characteristics of migrants, which is also highly associated with household income (the positive correlation between education and income is intuitive and can be seen in daily life). Therefore, the impact of migrant remittances on income distribution and inequality among households in the village stems mostly from the distribution of human capital across households (ibid). In short, human capital mainly explains inequality, and hence its importance is highlighted.

2.1.2. Theory of Migrant Selectivity

Introduced by Borjas (1987) who applies Roy's (1951) model of self-selection into employment, the notion of migrant selectivity is certainly one of the most consequential findings in migration and remittances literature. His theory is that migrants (and migrant households if it does matter) are not randomly selected from the population. In other words, migrant and non-migrant or remittances-recipient and non-remittances-recipient households symmetrically differ, and degree of selectivity relies on both observable (such as age, gender, and education) and unobservable characteristics (such as ability or determination). As a result, the characteristics that motivate migration at the first place are more likely to also drive remittances amount, so any direct comparison between these two types of individuals or households will lead to a biased estimation and thereby mislead the interpretation. His groundbreaking theory provides a foothold that guides subsequent research to better estimate impacts of migration on earning of immigrants and other left-behind household indicators by taking selection bias into account.

Additionally, Borjas divides migrants into two broad groups, positive and negative selection. The former refers to those with advantageous background whereas the latter are immigrants who have lower skills and education and come from poorer rural households relative to non-migrants in their own source country. He asserts that under some reasonable circumstances, destination countries will be populated by immigrants with "below-average productivity" of their own nationals. In his empirical study, Borjas (1987) also argues that one can never be so sure that migrants are always positively selected from the origin countries. That is, better-educated people will generally emigrate. His empirical analysis in the context of United States indeed confirms a negative selectivity (Borjas, 1991).

His research, however, contradicts the human capital theory in migration pioneered by Sjaastad (1962) which believes that highly educated individuals in developing agrarian countries are more likely to migrate to the developed world to maximize benefits from their skills. This concept is favorably supported by Chiswick (1999) who develops on Sjaastad's model and suggests a general positive selectivity of immigrants in line with human capital theory. Borjas's assumption was, furthermore, challenged by Chiquiar & Hanson (2005) who investigate the selection of migrants from Mexico to the United States. Using census data and counterfactual method to predict migrants' pre-migration income, they argue that Mexican immigrants in the U.S tend to be positively selected and come from middle-high income families. They attribute their findings to the expensive cost of international migration which cannot be simply afforded by the poor. Furthermore, because of their favorable household background, these Mexican immigrants are likely to have more

education than average Mexican population at their home country.

Nevertheless, one needs to understand that the counterfactual method relies solely on observable characteristics of individual or household under study and hence entirely ignores any unobserved information which may explain variety of income or income distribution. Due to this shortcoming, Borjas et al. (2018) later re-assert his claim and refute the conclusion made by Chiquiar & Hanson (2005) by showing that the crucial roles of unobservable characteristics can greatly bias the results deriving from counterfactual method, and the estimation tends to underreport actual effect of self-selection.

2.1.3. Remittances for Investment or Consumption?

The significant growth in the amount of remittances worldwide has been impressive and has attracted increasing attention over the years (UN, 2017). Therefore, it is not surprising that many studies are motivated by the aim to understand through which mechanism remittances will potentially spur 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 are different from one context to another. Chami et al. (2005) report that in many countries, a large proportion of remittances is spent on 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 outcome is positive only for some restricted groups of people in a few certain countries while there is not enough evidence to generalize the findings for the entire region (Acosta et al., 2007). Similarly, Adams et al. (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, 2006a; Woodruff & Zenteno, 2007), housing (Adams & Cuecuecha, 2010a), 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 et al., 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 between internal and 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 et al., 2015; Taylor &

Mora, 2006). But why is such money being used differently? Should remittances be allocated proportionately to other types of household consumption rather than being specified for a particular purpose?

There are at least two standpoints. Common perspectives have regarded remittances as fungible (McKenzie & Sasin, 2007; Adams & Cuecuecha, 2010a). 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 do so straightaway (Stark, 1991; Adams & Cuecuecha, 2010a). Friedman's (1953) life cycle 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. In line with the PIH, Amuedo-Dorantes & 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 how their transfers should be used.

To further elaborate the PIH, in theory, the Permanent Income Hypothesis links individual’s consumption at one point in time to their total income over entire lifetime (Aguiar & Hurst, 2016). In other words, any individual makes decision to consume particular goods or services based on their perceived income in a reasonably long horizon. Thus, current consumption pattern will change based on the expectation of change in income in the future rather than on current earnings which is the conventional views. Income as well as consumption is separated into “permanent” and

"transitory". If individual expects to earn one type of income regularly (known as permanent income), they will have a plan to use that to smooth their consumption over time. On the other hand, they are more likely to save or invest it if they believe that their income is irregular/transitory. As a result, PIH makes clear why consumption is less volatile even when income fluctuates particularly that of agricultural households in developing countries. However, the PIH has also been criticized over the years especially for the assumption that individuals have capability to realize their long-term future income on which their consumption decisions are based.

Because of its potentials to describe the differences between permanent and temporary income and consumption, in remittances research, the PIH has been used to describe household behavior in using remittances and other types of earning and to explain why remittances have different effects on different consumptions in different countries (McKenzie & Sasin, 2007). Based on the theory, one can make certain assumption whether or not migrant(s) remits constant amount of money regularly by looking at how households use remittances. Households are judged to have considered remittances as transitory income if they have significant effect on human capital development or business/agricultural activities which are deemed long-run investment. In the Caribbean, Lim & Simmons (2015) argue that remittances are channeled toward less productive activities because migrants in the United States can become permanent residents or even U.S citizens, so there is a constant inflow of remittances to left-behind household members who in turn consider remittances as permanent income.

2.2. Challenges and Resolutions in Research on Impact of Migration

Regardless of direction of impact, migration both within and across political border can be substantiated with substantive evidence which is now accepted as having a significant magnitude as well as consequence for sending and receiving countries or areas. Although there is an increasingly broader literature over the years which examine the association between migration, remittances and economic growth on the macro level and household wellbeing on the micro, this relationship or particularly human behavior is not very well understood (Yang, 2011). Not to mention a relatively new field of research concerning impacts on left-behind members due to separation of family particularly children and spouse which normally revolves around their economic well-being. Consequently, literature has been plagued with inconsistency, but it is explicable because conducting remittances research routinely face serious challenges which may also lead to severe bias if it is not done carefully.

it is documented that many recent studies that evaluate the impact of migration or remittances do not separate remittances from migration effect. Households receiving remittances may not have a migrating member whereas migrant households may not receive remittances at all, or they may receive money from people who are not their migrating household members. But surveys often record only the amount of remittances at the household level which is misleading because they do not distinguish remittances sent by distant relatives or friends from those transferred by labor migrants. Thus, we tend to think that those who received zero remittances have no household member migrating and that, on the other hand, those who did receive remittances received them only from migrating household members (Amuedo-

Dorantes et al., 2010). Furthermore, being a family member does not necessarily mean that a person is a household member. Such relatives may be permanent residents and send large amounts of money back to family, in which case remittances are not a substitute for loss of household labor, but only a source of extra income. It can be assumed that there will be no negative impact on children's schooling, but lumping these amounts of money with migrant's remittances will exaggerate the latter actual effect.

Using Haiti and Dominican Republic data, Amuedo-Dorantes et al. (2010) and Amuedo-Dorantes & Pozo (2007), respectively, differentiate such effects and suggest that only remittances from other people oversea increase education of children in the households, as they only experience remittances effect but not migration effect. In other words, these households do not face disruption or loss of caregivers. These authors go on to claim that most national surveys do not provide sufficient information on the amount of remittances sent by each family members, so many papers assume that remittances received by households only come from its migrating members.

Nevertheless, a more crucial issue in migration and remittances research is the exogeneity/endogeneity of migration/remittances which routinely plagues quantitative studies with methodological problems. Reviewing the literature, Adams (2011) and Brown & Jimenez-Soto (2015) advocate several possible ways that remittances are potentially correlated with some household characteristics about which we generally lack information. But Adams (2011) also argues that even if a study manages to include a range of control variables, remittances are still likely to be endogenous.

Accordingly, the estimation results are biased, and the association between dependent and independent variables may be spurious. These challenges are: First, a household can simultaneously send migrants, decide to earn remittances, and at the same time it pays for its members' education. As a result, it is generally conceded that the amount of remittances received by households and amount of spending on human capital development of children are associated with the same household characteristics that influences migration at the first place (Antman, 2013).

Second, it is now very well-accepted that migration is not a random but selective phenomenon (Massey et al., 1993). That is, it happens only to some selected groups of people not randomly to everybody, and so do remittances. Therefore, certain observed and unobservable characteristic of migrant-sending and remittances-recipient families systematically differ from that of those who do not receive such money. For example, migrant households may be those who are already relatively well-off in term of economic situation even before migration of their member. This is why they can finance a costly journey of one or more of its members and invest in education and health of the others. But cross-sectional data rarely includes retrospective questions about wealth of migrant household pre-migration experience. Having said that, there is also a potential recall bias caused by respondents who may not remember exactly what they had or had not before and after migration of its members. Therefore, we are still unable to reconstruct and really pick up the effect of wealth, as we only observe a snapshot of wealth or in a broader term, idiosyncrasy, at one particular time typically after migration occurrence. Consequently, a simple

comparison between migrant and non-migrant households is likely to lead to bias, the direction and magnitude of which are also complicated to predict.

Third, a decision to earn remittances may be driven by household intention to spend more on education/health investment or just consumption as suggested by NELM, in which case there is a reverse causality. That is, dependent variable causes independent variable or observed outcome, in reality, leads to the decision to migrate and higher amount of remittances rather than the other way around. In addition, there can be a case that observational survey only captures the condition that precipitated an event but not the effect that the events had on family condition (Antman, 2013). For example, Adams (2011) asserts that remittances may help alleviate poverty and increase household income, but the current level of poverty or income itself may influence subsequent amount of remittances received by household. In fact, studies like Lucas & Stark (1985) and Vanwey (2004) prove that while prior remittances improve livelihood, income level determines the size of remittances that household will get later.

Fourth, 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. In another scenario, ambitious and hardworking parents with innately high ability may be more determined and capable to migrate, are able to find suitable and well-paid employment, and thus remit large amount of money. And the same extraordinary genetics and personality of parents or households themselves may be passed to children hereditarily who in turn perform well in school. In addition, other

omitted variables, a classic bias in econometric analysis, can have the potentials to influence our results or cause spurious correlation.

Fortunately, there are also approaches to counter them. Possible methods are identified and grouped into two broad categories: experiment and non-experiment. The former, also known as randomized controlled trial, is ideal but requires randomization, so remittances must be controlled by researchers and allocated to households randomly. Henceforth, we can start observing the outcome variable and make a direct comparison between households that receive remittances and those who do not. This method is not quite possible at least in a large scale. Therefore, some research studies opt for quasi-experiment such as a change in policy or visa lottery program with a random ballot. One such example for the latter can be found in Gibson et al. (2011) and Stillman et al. (2012). Another convincing quasi-experimental method is to use exogenous shock such as the exchange rate shock which is utilized by Yang (2008) and Yang & Martínez (2006). These authors cleverly exploit a sudden and large change in exchange rate in the Philippine caused by the Asian Financial Crisis in 1997 to investigate the impact of remittances on various household welfare indicators. Nevertheless, even the quasi-experimental strategy is also rare in remittances research due to the nature of data requirement.

Consequently, most studies rely on non-experimental approaches, and the most compelling and least controversial one is panel data method involving repeatedly observe the changes over time of family as well as individual's condition, say, before and after migration. Panel data method can eliminate many challenges arising from omitted variable bias and endogeneity, but there is still a chance that

some unobserved time-varying variables are not included in the survey producing an idiosyncratic error (Antman, 2013). In this regard, we can only assume that those unobserved effects are time-constant, and any error will be taken care of using first-differenced or fixed effects estimator. However, it is not always possible to take something for granted such as wealth which changes frequently. Moreover, panel data containing information related to household income, migration, and remittances is very rare especially in the developing world (Adams, 2011).

Culling from prior literature, a few other practical resolutions are, indeed, identified for cross section data to deal with potential endogeneity. One of them is the instrumental variable (IV) estimator. But IV approach requires a strongly valid IV itself, which is the biggest obstacle because finding a suitable IV for a model is not easily achieved. An IV has to be highly correlated with independent variable of interest, in our case remittances, but are not associated with error term. It means IV has to be an exogenous variable which do not has any significant direct effect on dependent variable (Wooldridge, 2016). These requirements bar researchers from using IV approach, for many assumingly exogenous variables that can be used as an IV are weakly correlated with regressor whereas the validity of some other IVs is arguable. However, without correcting for endogeneity, results can be remarkably different. For example, Acosta (2011) and Cox-Edwards & Ureta (2003) both investigate the effect of external remittances on schooling outcome of children using data from El Salvador, but the former uses IV approach and does not find any significant overall impact of remittances whereas the latter indicates otherwise.

Nevertheless, from the literature, only a few practical and least controversial IV have so far been employed. The most popular one is the historical state migration rate first utilized by Hanson & Woodruff (2003). Subsequently, using historical migration rate as an IV can be seen in many papers but mainly in the context of Latin America – US migration (Hildebrandt & McKenzie, 2005; Lopez-Cordova, 2005; McKenzie & Rapoport, 2011). Several other papers also employ migration rate or Western Union office per 100,000 people at provincial level as IV (Acosta, 2011; Amuedo-Dorantes et al., 2007; Antón, 2010; Li et al., 2015). The former is the proportion of migrant households to total households in province. Distinctively, Meng & Yamauchi (2017) instrument independent variable using weather shock and distant to provincial capital.

Another reliable way to cope with the same issues given unavailability of panel data is to use Propensity Score Matching (PSM). For example, Roth & Tiberti (2017) and Zhou et al. (2014) use PSM technique by matching the treated individuals or households to those in the control groups (do not receive treatment) based on their similarity in observed characteristics or simply called Propensity Score which is estimated using logit or probit regression. Then, they observe the difference in outcome variables between the treated and the untreated. PSM was first proposed by Rosenbaum & Rubin (1983) and has been arguably the best possible method if a suitable instrumental variable is not obtainable to address endogeneity.

Some research studies also attempt to construct a counterfactual scenario of no migration and no remittances. That is, what migrant-household situation would have been like, had migration not occurred. Under this scenario, remittances are substitute

rather than extra income, as migrants would have also contributed some positive amount of money to household pre-migration. The counterfactual method involves using linear regression to predict income of remittances-receiving households under the condition that migrants had stayed based on sub-sample of non-recipient households. But such imputation needs to take into account selection into migration because the expected income of recipient households will suffer from selection bias if non and remittances-receiving households systematically differs. The counterfactual method was first developed by Adams (1989) and later improved by other studies which attempt to correct for selection bias while imputing the predicted income using Heckman Two-Step estimation. But a potential challenge when employing Heckman Self-Selection Model is that the technique requires strong normality and homoskedasticity assumption otherwise the estimated coefficients may be distorted (Wooldridge, 2010). As a result, this approach is only commonly used to estimate impact of remittances on household poverty and inequality (see Brown & Jimenez-Soto, 2015 for literature review).

Regardless of these attempts to take care of the stumbling block in migration and remittances research, Gibson et al. (2013) argue that there are actually quadruple selection biases. Firstly, households select into migration. Secondly, households may choose to send one or more members or even everyone to migrate, the latter case of which survey do not capture since no one is there to be questioned. Thirdly, some migrants choose to return but some do not. Finally, migrants choose when to return to their area of origin. The latter two create another selectivity complication. As a result, even if previous studies mentioned above have addressed selection into migration, it

still does not deal with selection into return. But unless we can carry out a true experimental design, which is not possible in the field of social science, method to obtain a very accurate estimation is extremely difficult to find, if not impossible at all.

2.3. Motivation to Remit

Remittances are household incomes received from domestic or oversea migrants. Officially recorded amount of global remittances worldwide, which includes flow to high income countries, has increased considerably in recent years. The World Bank has documented a rebound of remittances reaching USD 466 billion in 2017 after two consecutive years of decline in low and middle-income countries (World Bank, 2018). The highly sensitive recovery has been driven by higher oil price and economic growth in migrant-receiving destinations such as the EU, Russia, and the United States. Excluding China, remittances are notably larger than foreign direct investment in less developed nations and relatively more stable (ibid).

The aggregate amount of remittances compiled by the World Bank is, however, somewhat inaccurate, for data on remittances from most countries only counts official monetary transfer which is done through formal channels such as bank or financial institutions. On the other hand, migrants often send remittances in-kind other than just money, and they frequently prefer or have no other options than to use informal methods called Alternative Remittances Systems to transfer them to their families in home countries (Brown & Jimenez-Soto, 2015). These informal money

transferring systems generally operate outside of any traceable method, and reason of using them are usually the lower cost of transaction and availability/feasibility. Besides, migrants also send remittances through hand carry which means it is very unlikely to appear in individual country data hence the compilation of the World Bank. Regardless of what and how migrant remits, the overall purpose of doing so is to elevate family income and livelihood.

International remittances generally constitute 30 to 40 percent of household income in developing countries (Adams, 2011). Such magnitude has drawn attention of many researchers who have attempted to investigate both direct and indirect effects of remittances on various household welfare and indicators such as poverty and inequality. With regard to that, the economic literature has, for a considerable length of time, placed emphasis on the analysis of remittances as substantial contributors to economic growth in sending countries. The earlier wave of research regarding of the effect of migration primarily addressed issues concerning poverty reduction, financial conditions, consumption trend and pattern, and expenditure of entire household (Adams & Page, 2005; Stark & Lucas, 1988). In the attempt to investigate the impacts of remittances on poverty, most research finds that remittances have improved living conditions (Acosta et al., 2008; Adams Jr & Page, 2005; Adams, 2011), an expected result given the purpose of migration. But in the meantime, remittances may also increase inequality, for migrants tend to be selective by wealth and human capital, and only those who come from richer households, can afford migration cost.

Analysis of remittances conventionally also sheds light on the underlying reasons that motivate migrants to remit which is usually an intra-household choice

(Lucas & Stark, 1985). In other words, why do people remit? Economic literature generally divides these motives into three broad groups. (1) Altruism: migrants remit money because they genuinely desire to help their left-behind families at home out of altruism. (2) Insurance: migrants transfer remittances to their families to insure them against agricultural risks or income shock. (3) Investment: migrants remit money to households in order to make investment in their home countries such as buying farmlands or livestock so that they can secure a livelihood when they return or get repatriated. Some migrants may also remit to maintain good relationship with household head with expectation to inherit potential family bequests later (Rapoport & Docquier, 2006; Yang, 2011). But given complicated methodological challenges provided in section 2.3, many studies cannot distinguish between altruism and insurance. Therefore, most research work concludes that generally remittances are not driven by a single motive, but there can be a dominant motivation which is important from a policy perspective (Brown & Jimenez-Soto, 2015).

For example, in Botswana, Lucas & Stark (1985) and Stark & Lucas (1988), the ground-breaking works in determinants of remittances, highlight a family protection role, and thus they tend to support the notion of insurance rather than altruism as the main motivation to remit. They also concluded that households that were exposed to higher level of disasters such as flood or drought would receive more remittances to cope with such shocks, but households also financed migration journey of its member at the beginning. To differentiate between altruism and insurance, Aggarwal & Horowitz (2002) theorize that if altruism is the motive to remit, per-migrant remittances will decrease as income or number of migrants from the same

household increase. But under insurance, per-migrant remittances received by household will not be affected since family protection arrangement between each migrant and left-behind household is not made collectively but individually and independently from one migrant to another even in the same household. Using Guyanese data, altruism was found as the main motivation (Aggarwal & Horowitz, 2002).

Whether through altruism, insurance, or other contractual agreements, the pattern of sending remittances between man and woman and high and low educated sojourners differs. It has been observed that female migrants remit more money and more frequently than their male counterparts (de la Brière et al., 2002; Vanwey, 2004). Cultural value may be a key explanation for complicated remittances sending behavior. In rural Thailand, woman's behavior is more altruistic than is man reflecting gender norm in Theravada Buddhism, but alternative accounts are possible (Vanwey, 2004). Many families are hesitant to let their daughters migrate to big cities because they do not want them to practice "modern and dangerous lifestyles" of urban population. They may also lose a housekeeper in the process. As a result, female migrants will continue to send remittances to their households until they are married and no longer under their parental control so that they can remain away from home. Vanwey (2004) argues that remittances in this sense act as an inducement in exchange for a favor.

Before leaving this section, it is worth noting that the aforementioned theories in determinant of remittances are major motives but not an exhausted list. Some studies have also introduced other motivations to remit such as exchange for services:

migrants remit to household in order to ask left-behind adults to look after their children, loan-repayment: young adult migrants desire to “repay” their parents’ past expenses for childrearing cost, or even income uncertainty. For example, using a case of Mexican undocumented migrant workers with work experience in the United States to test for motivation to remit, Amuedo-Dorantes & Pozo (2006b) assert that due to their unauthorized status, high possibility of losing employment, and nature of jobs of many Mexican immigrants, remittances are sent in a larger amount and relatively more frequent when level of income uncertainty starts to increase. In this regard, a conclusion is drawn that undocumented labor migrants are more likely to remit money back to their family compared to their legal peers to accumulate wealth and deal with future precariousness in the United States.

2.4. The Impact of Migration and Remittances

2.4.1. On Children’s Education

Migration of one or more members can have myriad effects both positive and negative on multiple persons in households and communities ranging from the closest people to migrants like spouse, parents, children to the further proximity such as other relatives, villagers, and even macroeconomic growth, but the focus of this study is the impact on left-behind children human capital development so that we will limit reviewing only relevant literature. It is worth noting that vast majority of papers concerning impact of migration/remittances on children talk frequently about education or educational performance rather than any other dimensions of human

capital namely health or early childhood development. The latter is rarely encountered although it is believed to be the key to improve cognitive skills, prepare children to enter formal education, retain children in schooling system, and enhance their health status as they grow (Loizillon et al., 2017). A simple explanation why education is a more popular indicator for human capital is that it is more tangible and the data on education is also more available than health or physical growth/development. Some types of educational measurement exist in virtually every individual survey.

Migration is a complex and double-edged sword. It reduces child labor and other financial constraints that disallow households to perform proper care provision to children such as sending them to school, paying for associate cost of education, allowing them to access to better health care services, and providing them more nutritious meals (Bouoiyour & Miftah, 2016; Bryant, 2005; Hanson & Woodruff, 2003; Lu & Treiman, 2011). However, migration also minimizes guardian's effect, parental input, or other kinds of childrearing that require physical engagement like attention on child's socialization, education, health, nutrition, and sanitation, participation in parent-teacher meeting, and helping children with their homework or other social activities. Nevertheless, most literature tend to only estimate the positive effect of migration through remittances (Acosta et al., 2007; Calero et al., 2009; Cox-Edwards & Ureta, 2003; Fujii, 2015; Hanson & Woodruff, 2003; Yang, 2008) rather than both remittances and migration or their net impact (McKenzie & Rapoport, 2011; Meng & Yamauchi, 2017; Zhou et al., 2014) because survey often collects only data on remittances at household level and ignore the characteristics of senders. Nonetheless, prior research can generally be understood to conduct under somewhere

between one to four settings/questions listed below ranking from the most to the least frequently encounter.

The first and most frequently seen question pertains to impact of adult or parental migration on children educational outcome in a broad aspect. It can be a single country case study or comparative study of international migration/remittances to see if the patterns are consistent across countries (Acosta et al., 2007; Lu, 2014). Or a study, such as ours and Binci & Giannelli (2018), that compares between international and internal migration within a cultural context to understand if the degree of impact is different. The findings are, however, inconsistent as mentioned in chapter 1, and each study is supported by certain evidence one way or another and no paper is strongly refuted. Therefore, we still cannot fully understand if children living in migrant household tend to fare better off compared to their counterparts in non-remittances-receiving household. However, literature, but not all and to name a few, in Latin American context seems to find a more positive effect of migration or remittances on children (Cox-Edwards & Ureta, 2003; Hanson & Woodruff, 2003; Acosta et al., 2007) whereas majority of studies in Asian countries indicate otherwise (Hu, 2013; Jampaklay, 2006; Meng & Yamauchi, 2017; Zhou et al., 2014).

Second, many papers also prefer to investigate the influence of migration on children based on their characteristics namely age and sex because it is believed that children are liable to compete among each other to get household support. But very small number of research have touched upon birth order despite the fact that not even children in the same household will be given equal care or support not even from their own biological parents (Booth & Kee, 2009; Hotz & Pantano, 2015). Having said

that, findings are also controversial in this setting, and previous research also draw various conclusions specifically when it comes to the impact of international migration or remittances on boys and girls (Cortes, 2015; Hu, 2013).

But the mixed picture here can be better understood and attributed to cultural value of some countries. For example, there is a strong preference for son especially the eldest one in some contexts such as India, China, and Vietnam because son is tasked to carry on the family name and take care of their elderly parents when they are retired. Daughters, on the other hand, have a high tendency to move out and live with their in-law family upon marriage and look after their husband's parents. As a result, daughters are likely to be deprived of education first if household economic circumstances are prone to deteriorate. But remittances impact on them will also be significantly large, as remittances improve household income hence allow them to remain in school, a condition that might not have been so, had household situation not improved (Antman, 2012; Hanson & Woodruff, 2003; Jampaklay, 2006). In China, however, Meyerhoefer & Chen (2011) argue that girls are likely to be withdrawn from school when household chore become increasingly intensive due to absence of adult members.

The third question asks about effect of post-migration and new migrant household structure on children schooling. It is intended to raise an important awareness regarding of guardianship and children's relationship to household head. Fewer papers have addressed it, and beautiful insight is normally drawn from other relevant fields in family demography such as living arrangement, single parenthood, and marriage dissolution of parents to capture the consequences of impaired parenting

quality and parent-child disconnection (Arguillas & Williams, 2010; Astone & McLanahan, 1991; Bronfenbrenner, 1979; Edwards & Daire, 2006; Krein & Beller, 1988; Lu & Treiman, 2011). These investigations suggest that children exhibit poor educational completion if raised by single-parent or experienced household disruption relative to their peers living in an intact family marking central roles of family in children's human capital development.

But even if they are, to some extent, related in some ways, the effect of family structure is clearly distinct in many other ways from that of adult or parental migration because separation due to migration is different from family dissolution because of divorce, spousal or parental death, or marriage separation. These types of nuptial termination usually imply permanent dissociation, total absence from household, and lack of material and emotional support accompanying by immediate decline in economic condition even if they may be entitled to alimony. In addition, in many parts of the world, migration is circular and recurrent, though it can take up to several years. Therefore, migrants and their families are not necessarily disentangled, and migration itself is not an abandonment of family support duties but instead a dedication to undertake these responsibilities through providing remittances that enhances family income (Lu, 2014). More importantly, migrant families are not always in economically disadvantaged circumstances like single-parent households while children growing up with one or both parents migrated are not similar to their counterparts living with a divorced or widowed parent (Bryant, 2005).

But one parent vs. both parents' migration and mother/female vs father/male migration yields different sequels. That is, gender of migrant is also an important

factor determining magnitude of impact of migration. Leng & Park (2010) claim that father-migration is more likely to be positively correlated with better school performance of daughter. Furthermore, other studies show that mother or female migration prompts the risk associated with education outcome of both boys and girls (Jampaklay, 2006; Zhang et al., 2014; Zhou et al., 2014). In the Philippines, Cortes (2015) finds that maternal migration is more detrimental to children education than paternal mobility. Such distinct effect is attributed to increasing woman's bargaining power and change in distribution of power among family members and intra-household resources allocator (Duflo, 2003). To simply put it another way, gender of household head (those holding power to make decisions within a household when migrants leave) is essential.

The fourth question is very rarely seen. Very few papers have provided an important answer related to channels through which remittances and/or migration affect children education (Antman, 2011a, 2011b; McKenzie & Rapoport, 2011; Meng & Yamauchi, 2017). In particular, these studies attempt to investigate and understand how educational outcome of children is influenced by remittances. Evidence suggests that household resources allocation (on what the money is spent) and study/work hours of children during adult migration experience have a huge effect on their education. Nevertheless notably, none of these research studies is done qualitatively which is why detail explanation is limited, as quantitative work is not intended to provide in-depth understanding of specific phenomenon.

2.4.2. On Children's Health Outcome

Published papers that examine the impact of migration on child's health are, in general, considerably less common compared to research work that talks about their education (Antman, 2013). The majority of initial studies in this field employ various indicators to measure health, such as infant mortality rate, vaccination status, psychological well-being, and birth weight (Frank & Hummer, 2002; Graham & Jordan, 2011; Hildebrandt & McKenzie, 2005; Kanaiaupuni & Donato, 1999; Lopez-Cordova, 2005). Of these studies, most have discovered that children who are born to or living in migrant households are in a more favorable situation relative to those who are not. In subsequent studies, researchers shift their attention to focus more on using indicators that are better proxies for health investment. For instance, remittances are found to have increased household ability to spend on healthcare (Amuedo-Dorantes & Pozo, 2011).

Two reasons posited as explanation for migrant's children advantages found in aforementioned research are suggested by Frank & Hummer (2002). First, cross-border migrants in United States are usually in good health upon arrival, and those who are not healthy enough cannot migrate. Secondly, migrants may have better health behavior and social support different from non-migrants Therefore, there is (1) a selection into migration, and (2) children living in those migrant households are also more likely to be in good health as other members or their parents genetically or behaviorally due to homogeneity among household members. Moreover, it can be the case that parents of unhealthy children are less likely to become transnational

migrants, for they have to take care of their kids who are constantly sick (Graham & Jordan, 2013).

Some investigations pertaining to the question that are closest to our interests (dissertation) also find positive and significant effects of migration on left-behind children's health in Ecuador (Antón, 2010), Tajikistan (Azzarri & Zezza, 2011), and Guatemala (Carletto et al., 2011), as well as on those who migrated with their family to New Zealand (Stillman et al., 2012). In these countries, the authors report children having better access to a healthier diet and hygiene which is likely an impact of increasing income from remittances for household. Using a migration lottery program, Gibson et al. (2011) additionally locate an improvement in stature for children that migrate with their family to New Zealand compared to those who are left behind.

In contrast, Gibson et al. (2011) argue that migration of household members leads to consumption of less nutritious food and hence poorer health outcomes for the left-behind Tongan children. A negative effect is also documented by Meng & Yamauchi (2017) in the context of China and Davis & Brazil (2016) in another study using Guatemalan data. The latter paper discovers that parental absence reduces a child's height by 22%. The result is somewhat surprising, for poverty and malnutrition are two conditions that often go hand in hand, and migration is usually seen as a method to address food insecurity. However, migration can also cause an immediate loss of income and incur considerable debt which may be devastated to poor households.

Regardless of that, more astonishingly, Ponce et al. (2011) find no significant difference in health outcome between children of migrant households and other children. In Vietnam and the Philippines, Graham & Jordan (2013) also find neither advantages nor disadvantages of having a migrant parent, but this study also relies on small sample size collected within a restricted geographical region and does not address potential endogeneity problems. Therefore, it is hard to interpret the estimated effects as causal. Using a panel data from 2003–2006 and PSM technique in combination with difference-in-differences, Guo et al. (2017) agree that on average migration has no significant effect on children's health outcome, as increasing income through remittances and declining parental care tend to offset each other.

Though a comprehensive understanding of influence of remittances on children's health has remained elusive, there seems to be an agreement that female migration is more harmful to children health than that of male. Many studies, regardless of context, put one important emphasis on negative impact of maternal absence on children's health ranging from preventive method to mental well-being (Azzarri & Zezza, 2011; Graham & Jordan, 2013; Jordan & Graham, 2012; Meng & Yamauchi, 2017; Zhang et al., 2016). The authors attribute their finding to the fact that in many societies, father is normally deemed a main breadwinner while mother is the main caregiver, and her incomparable childrearing cannot be substituted under normal circumstance. In addition, Kroeger & Anderson, (2014) and Zhang et al. (2015) assert that similar to what it does to children educational outcome, male and female migration influences children differently and also different between sons and daughters.

Of various indicators which have been used to measure children's health, "early childhood development" is receiving increasing attention. Although it is a relatively new outcome of interest compared to the others, it may be a more important factor to break intergenerational poverty (Macours & Vakis, 2010). Literature that directly talks about its association with migration or remittances is quite thin and of course bifurcated as what have been discussed so far. Researchers tend to also use different measurement for early childhood development. For example, Macours & Vakis (2010) employ TVIP (Test de Vocabulario de Imagenes Peabody) while Jampaklay et al. (2018) use Denver Development Screening Test or popularly known as Denver II.

But their conclusions, again, are inconsistent. Macours & Vakis (2010) provide an evidence that maternal seasonal migration has a positive effect on early cognitive development of children in Nicaragua. In contrast, Thai children who are cared for by other people instead of their mother are more likely to have worse early childhood development outcome (Jampaklay et al., 2018). However, paternal migration presents no threat to children. Their recent results raise concern that parent-children separation in Thailand far outweighs the benefit deriving from remittances, and it is even more deleterious when left-behind households receive very limited or no remittances at all especially during the early stage of migration. Having said that, the early childhood development indicator used by both studies is not a very good measurement or globally accepted and comparable index since what is vaguely defined as "normal development" in one context may not be the same in another culture and environment.

2.4.3. On Consumption and Poverty

Following a period of stagnation during the recent Global Financial Crisis, there has been a significant growth in the absolute number of migration phenomena worldwide and thereby an increase in funds remitted to countries in the developing world (United Nations, 2017). Remittances usually constitute between 30 to 40 percent of household income in the Global South (Adams, 2011), and it is in this context that the economic advantages of such money have increasingly caught the attention of governments of migrant-sending countries. However, the early wave of research on impact of remittances concentrated mostly on increasing income and poverty reduction. Their reason is that decisions to migrate and subsequent inflow of remittances have the potential to play a crucial role in the development of low- and middle-income countries on both macro and micro levels even if such remittances are merely used for consumption purposes (Acosta et al., 2007; Brown & Jimenez-Soto, 2015).

Findings from the empirical literature on the impact of remittances on households suggest that in most context, remittances contribute to poverty alleviation. For instance, using macroeconomic data from 71 developing countries, Adams & Page (2005) find that a 10% increase in per capita international remittances leads to a 3.5% decline in the share of people living in poverty. In Nepal, it is estimated that one-fifth of the poverty reduction that occurred between 1995-2004 was attributed to labor migration and remittances inflow (Lokshin et al., 2010). Using Propensity Score Matching, Roth & Tiberti (2017) show that internal and international remittances in 2009 reduced the poverty rate of recipient households by 3-7 percent in Cambodia.

But in some instances, remittances are also found to have negatively impacted poverty and inequality (Adams, 2011; Brown & Jimenez-Soto, 2015 and references therein). It is worth noting that among these aforementioned studies, some, particularly those conducted during earlier waves, such as Barham & Boucher (1998), Brown & Jimenez (2008), and Rodriguez (1998), do not attempt to control for selection bias and/or opportunity cost of migration. That is, what household income would have been like had migrants decided to stay instead of migrating. These challenges may affect their estimations, so their findings have to be interpreted with caution.

When remittances are considered as purely exogenous extra household income, it is assumed that there can be no negative impacts on various household indicators. However, if we treat remittances as a substitute for the missing migrants and their pre-migration income contribution, a household can actually be in a more disadvantageous position if remittances are less than what migrants would have earned had migration not occurred. Cases like this are not rare and have been observed in some Latin American countries (Acosta et al., 2008; Brown & Jimenez-Soto, 2015). In addition, remittances may directly increase household income and consumption, but they also have an indirect influence on household income risk (Lucas & Stark, 1985) and household production/investment decisions (Stark & Levhari, 1982). Remittances may, moreover, act as an insurance and reduce risk-averseness for low-income households who are then more willing to resort to riskier investments or agricultural activities with higher potential returns (Brown & Jimenez, 2008; Stark & Bloom, 1985).

It is also arguable whether remittances help improve situation and general welfare of the poor, for a migration journey, especially an international one, is normally expensive and hence affordable only by those from relatively well-off families rather than really impoverished peasants. Therefore, remittances may not flow toward the poorest. On the contrary, they may increase inequality since richer households tend to have better access to migration. Empirically, many studies indeed discover that international remittances are more likely to aggravate income inequality on national level because most international migrants come from middle- to upper-income families (Adams, 2011). Nevertheless, some research suggests that inequality may fade away over time as a larger portion of the population is able to migrate due to lower costs, a result from migration network (McKenzie & Rapoport, 2007), and others also argue that the indirect influence of remittances on other household earnings and agricultural activities will redistribute income in migrant-sending areas in the long term (Taylor, 1992).

However, problem of using income to measure household welfare and poverty is that income fluctuates frequently especially in developing country where many households' main source of income is agriculture or small family business. What I mean here is that increase in inequality and/or poverty rate during a referenced period under study may be due to fluctuation in income rather than impact of remittances. Migrant households may have a more stable income from remittances while non-migrant families who rely heavily on agriculture may experience a huge loss of income because of natural disasters. Moreover, income tends to have a large variance and is likely to suffer from classic measurement error. That is, people tend to

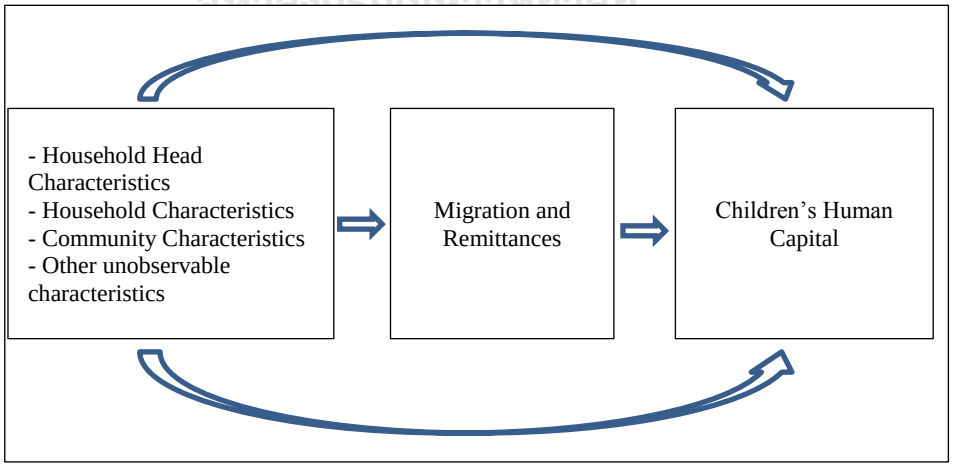
underreport their income. Under this condition, an estimation will reveal an increase in income inequality. As a result, a few recent studies have resorted to employing indicators that are less volatile to measure household welfare.

In a paper, Adams & Cuecuecha (2010a) use marginal expenditure on various types of consumption including food, durable goods and construction. They find that households receiving international remittances in Guatemala spend more on education and housing. In another study, the same authors claim that Indonesian households are more likely to spend remittances on food consumption (Adams & Cuecuecha, 2010b). Their latter study contradicts what they have found in the similar research in Guatemala, and they attribute their result to the largely different amount of international remittances received by both countries. In Senegal, one study has discovered that remittances did not affect household marginal spending behavior at all (Randazzo & Piracha, 2019). To put it another way, they do not influence expenditure pattern. This statement is supported by Adams et al. (2008) who use data in Ghana and assert that there are no significant changes in marginal spending patterns for households receiving remittances, and any differences in consumption of particular types of goods are explained by other characteristics of households rather than remittances.

2.5. Conceptual Framework

For better comprehension of NELM and the Self-Selection theory, figure 2.1 visualizes how household, household head and regional characteristics affect migration and remittances which in turn influence left-behind household members' human capital development and other various household indicators (outcome variables) such as per capita consumption and poverty. Econometrically speaking, unobservable characteristics are called the error term and conventionally denoted by "u". It can never be completely removed from regression model, but using Heckman Two-Step estimator, we can actually take into consideration Borjas's self-selection theory. However, it is worth noting that the error term comprises more than just selection bias. A detail explanation of how the counterfactual method works and how to correct for self-selection bias will be demonstrated in chapter 5.

Figure 2. 1: Conceptual Framework



2.6. Background of Migration in Cambodia

Before we proceed to examine the impact of migration and of remittances, it is probably useful to first understand causes and characteristics of Cambodian migration since migration and remittances are strongly intertwining in nature. And because having knowledge of purposes of migration will lead to fundamental understanding of why Cambodian migrants remit and what remittances are intended for in the first place.

We shall begin with a basic knowledge of the Khmer Rouge's (KR) legacy and the Cambodian civil war after a coup d'état in March 1970 led by general Lon Nol to remove Prince Sihanouk from power and establish the Khmer Republic. Cambodian demographic and socio-economic context today owe much to its recent tragic history. Between 1970 to 1975 before the KR staged a successful revolution and began their reign of terror, Cambodia was crumbled by an internal political strife between the unstable republican government and those who opposed the junta takeover or their decision to end Sihanouk's neutral policy and take part in the Second Indo-Chinese War in South Vietnam. The spillover effect of the war and American massive bombardment along the Cambodian-Vietnamese border also destroyed the entire eastern half of Cambodian economy, infrastructure, and tens of thousands of civilians' life. As a result, it stimulated bitter hatred and only further encouraged vast population to join the Khmer Rouge's insurgency.

In April 1975, the KR led by French-educated intellectuals such as Kieu Samphan and Saloth Sar, known as Pol Pot, defeated the Khmer Republic and

consolidated power over Phnom Penh. They immediately began to empty the capital city and other urban areas and evicted the whole Cambodian population to countryside to do agriculture, an infamous mass urban-rural migration in the 20st century. Utterly, they even demolished socio-economic structure and financial system just to pursue their ideal agricultural nation consisting of only an echelon, the peasantry. It was done by shutting down all economic and market activities, taking all kind of currencies out of circulation, demonetizing precious metals, and rendering all assets worthless.

In January 1979, the KR was toppled by Vietnam. A socialist authority known as People's Republic of Kampuchea (PRK) was established in Phnom Penh with military reinforcement and material aids from the Soviet Bloc. But despite the KR's collapse, the civil war continued for another two decades leaving many thousand more combatants and civilians slaughtered. It should be highlighted that even though the Paris Peace Treaty Accord was signed in 1991 marking an official end of the Third Indo-Chinese War, the internal conflict in Cambodia actually ceased in 1999 after the remaining KR's guerilla and their upper cadres, who still had maintained control over the western part of the country, surrendered themselves completely in a government's amnesty. The three-decade long war has resulted in economic disruption, eradication of social infrastructure, and widespread destitution. Consequently, many Cambodian populations suffer the worst form of deprivation and can hardly escape it.

Cambodia lies between Vietnam and Thailand with its north-eastern border shared with Lao PDR. The country is divided geographically into four different regions: Plain, Tonle Sap, Coastal, and Plateau/Mountainous area or administratively into 24 provinces excluding Phnom Penh, the capital and largest city and home to about 10 percent of its population (Ministry of Planning (MoP), 2012). Each province also has a capital known as municipality and is further partitioned for management purpose. A smaller unit is district which is divided even further into commune and then into village, the smallest component. Dominant income generating activities for rural population in Plain and Tonle Sap regions, where large majority of citizens live, are fishing, rice cultivation, and animal husbandry. Therefore, Cambodia is considered a predominantly rural country with 32 percent of its labor forces mainly employed in the agricultural sector (National Institute of Statistics, 2013). It is, thus, not surprising that its 7 percent annual economic growth for the past two decades is driven by rice export with other large contribution from manufacturing industry, construction/real estate, and tourism (World Bank, 2014).

The population of Cambodia is roughly 14 million in 2009 and 16 million in 2017 with a large proportion dominated by children and youth bulge (United Nations, 2017b). This is a result of a combination of an estimated 2–3 million deaths during the KR regime (Gellman, 2010) and the subsequent baby boom that occurred in the 1980s and 1990s. For a young country such as that, there are roughly 300,000 workers entering the labor market annually, but this figure predominantly consists of young rural dwellers with low skills (Ministry of Labour & ILO, 2014). With rural economic growth that cannot absorb large surplus of menial hands, these young Cambodian

people are left with limited choices but to migrate to work in the cities or other countries of better development such as Thailand, South Korea, and Japan.

Cambodia has begun to undergo a substantial surge in migration since the early 1980s. Then, rural-urban movement was extremely high, as a huge influx of previous urban residents returned to cities which were abandoned when the KR assumed power. During the late 1980s and early 1990s, migration within Cambodia continued at an immense rate. The top purposes of movement at that time were family search and reunion and to escape the ongoing war between the PRK and the in-exile KR. After the end of war, the nature of migration wave has changed from forced to voluntary, but this movement is mostly a rural-urban phenomenon, more specifically rural-Phnom Penh (MoP, 2012). In term of international destination, Thailand has remained a principal transnational labor market for unskilled Cambodians. It hosts roughly 81 percent of total migration outflow rate on account of rising structural demand for menial hands in the Thai industries precipitated by accumulating aging population, low fertility, and thriving economy (ibid). The exemption of visa requirement among ASEAN member states and creation of brief border pass have also fueled regional movability.

Cambodian migrants are generally single young adults ages between 20–34 years old with primary education. Of them, many migrate from heavily populated provinces such as Prey Veng, Kampong Cham, and Banteay Meanchey (MoP, 2012). External labor mobility tends to be overwhelmed by males who are predominantly found working in blue-collar sectors at the bottom of Thai economic pyramid such as construction, fishing, light industry, and plantation which are mostly located in the

eastern half of Thailand and in the Bangkok Metropolitan Area. These migrant workers seek long-term employment but do not commonly have any plan for permanent settlement in Thailand (Jampaklay & Kittisuksathit, 2009). Most of them opt for the country just to search for a temporary job with the intention to accumulate wealth, but when their expectation is achieved, a return migration to Cambodia is the choice. This kind of migration has become popular among low-educated youth who get information from Cambodian brokers or their social network. Both the former and the latter are either current or former migrants themselves who recruit other prospective migrants using their successful migration experience and uplifting socio-economic status via remittances. With their prowess, it is amply possible to even arrange a job placement.

There was no reliable data regarding of number of Cambodian labor migrants both regular and undocumented in Thailand available until late 2014 following an unprecedented exodus when Thai government moved to curb 225,000 irregular migrant workers. As a result of law enforcement, 700,000 migrants came forward and registered with both authorities (Ministry of Labor & ILO, 2014). Some official sources also estimated further that the stock of Cambodian migrants and their dependents in Thailand was close to a million (Asian Development Bank, 2015; Ministry of Labour & ILO, 2014). And the statistic was apparently proven to be accurate by another somewhat similar mass registration conducted recently in 2018. It is worth noting that a surge in figure of migrant workers between 2015 and 2018 can possibly be a consequence of remarkable improvement and more simplified

registration process and relaxed approach to obtain legal documentations eased by both governments.

But before that, migration through legal mean was costly and time-consuming, and therefore it was a big constraint to rural Cambodian population. As a consequence, many migrants prefer to cross into Thailand without documentation and showed no interest or intention of seeking a legal status. It is also a result of the nature of 803 kilometers long porous and secluded border between the two countries which makes border control difficult to carry out. In addition, regional integration, demographic pressure, international trade, spatial economic disparity, and increasing better communication and transportation facilities have all facilitated and contributed to increase movement of Cambodians across its political boundary. But even if irregular migration by large scale is a recent phenomenon in the country, it is relatively neither new nor rare in global perspective especially in the southern hemisphere. However, Cambodia is also lacking an exhaustive regulation and management of labor mobility.

CHAPTER 3

IMPACT OF REMITTANCES ON HOUSEHOLD INVESTMENT IN EDUCATION

3.1. Introduction

In this chapter, I investigate the effects of remittances on children's education. I pursue two objectives. First, I test whether or not the PIH holds and whether one form of income is used differently from other forms. By doing so, I also seek to learn the importance of remittances relative to other income. Second, I delve into the controversy as to 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, this chapter 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 resource constraints. Hence, the effect of remittances is greater for the rich (Amuedo-Dorantes & Pozo, 2011).

To accomplish my goals, I divide total household income into several types namely, wages, agricultural income, nonagricultural/business income, internal remittances, international remittances, and other earnings. In the final step of analysis, I separate poorer from richer households based on their income. On data analysis, I implement an ad hoc two-stage estimation methodology. In the first stage I model remittance decisions to correct for endogeneity and selection bias issues and allow for the possibility that households may not receive remittances because of constraints/difficulties or they may never receive them at all. In the second stage, I 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. I apply the method on pooled cross section data derived from Cambodia Socio-Economic Surveys of 2009 and 2014.

My fascination for pooling cross section data 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 percent, many private-sector employees, especially construction and garment sector workers, the vast majority of whom were internal migrants, got laid-off (Chandararot et al., 2009; Roth & Tiberti, 2017; World Bank Databank, 2019). But since then the country recovered and experienced an annual growth rate of 7 percent. 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 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, I add robust evidence from a particular country but at varying stages of development because I believe that some of the differences in 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 I am not saying that any particular change in the use of remittances can be solely attributed to the Global Financial Crisis nor am I attempting to understand the impact of the crisis itself. Rather, it is the timing and evolution of the society as a whole that is likely to influence people's behavior, and

household investment, particularly in education, also depends on the realization of current income (Yang, 2008).

This chapter is outlined as follows: my model and analysis strategy will be discussed in the following section, which is section 3.2. In section 3.3, I will describe in detail about sample and variables while results from regression analysis are presented in section 3.4. This chapter ends with a conclusion in section 3.5.

3.2. Model and Estimation Strategy

I 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 & Pozo (2011). This method is not new in remittances research and has become popular (Brown & Jimenez-Soto, 2015). My hypothesis is also similar to 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 is deemed 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:

$$\boldsymbol{HEE_h = \alpha_0 + \beta_1 R_h + \beta_j HI_h + X'\beta + u} \quad (3.1)$$

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 thought to be important determinants of household investment in education such as the characteristics of household and its head and regional differences; $\boldsymbol{\propto_0}$ is the intercept; u is the error term. My parameters of interest are $\boldsymbol{\beta_1}$ and $\boldsymbol{\beta_j}$, particularly their significant effects and direction of relationship with HEE, which can possibly 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; otherwise the results will be biased.

The structural equation (3.1) assumes exogeneity of remittances, yet such an assumption is unlikely to hold as suggested by previous studies. Fortunately, there are also a few practical solutions to address these issues, and the most popular and effective one for cross-section data, which I will also use in this chapter is the instrumental variable (IV) approach. With a good instrument, potential endogeneity can easily be eliminated, as IV can purge the correlation between remittances and the error term and disentangle reverse causality to make remittances exogenous. Consequently, the estimation of equation (1) will give a consistent result and reflect a causal relationship (Wooldridge, 2010) between remittances and household

expenditure, which should be of great interest to academics and policymakers who strive to promote human capital development.

3.2.1. Modeling Household Remittances

Generally speaking, this model is essentially extended from the structural equation (3.1). 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. But 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 & Jimenez-Soto (2015), the estimator should have the ability to predict only 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 if one makes the former surmise (Brown & Jimenez-Soto, 2015; Wooldridge, 2010).

But the issue with the Tobit or 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 condition, which are rarely true for expenditure data (Deb et al., 2017; Wooldridge, 2010). But perhaps the most severe shortcoming is that Tobit makes an assumption that a single mechanism governs both the probability that households will receive remittances and how much they will receive. That is, the coefficient of independent variables must have the same signs, which can be false in a real life situation (Wooldridge, 2010).

For better precision, Brown & Jimenez-Soto (2015) recommend considering an estimator that is more flexible than Heckman and Tobit and allows for both types of household with no remittances to be in the same framework. Amuedo-Dorantes & 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 Tobit's and Heckman's assumption. Following previous studies, I will opt for the double-hurdle regression, specifically, the lognormal hurdle model developed by Cragg (1971) and Duan et al. (1984). It is simply a product of a two-part estimation that can be estimated individually (Wooldridge, 2010). The mechanism is straighforwardly done 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:

$$\boldsymbol{Prob}(\boldsymbol{R} > \boldsymbol{0}|\boldsymbol{IV}, \boldsymbol{X}) = \boldsymbol{\Phi}(\boldsymbol{\gamma_0} + \boldsymbol{\gamma_1 IV} + \boldsymbol{X'\gamma} + \boldsymbol{\nu_1}),\ \boldsymbol{\nu_1} \sim \boldsymbol{Normal}\ (\boldsymbol{0}, \boldsymbol{1}). \quad (3.2)$$

Where $\boldsymbol{\Phi}$ denotes the cumulative distribution function; R is the remittances; IV is the instrumental variable, which I will discuss later; X is a vector of control

variables, all of which are identical to those found in equation (3.1). 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. This is why the double-hurdle model is preferable. Additionally, I compute robust standard error in test statistics to produce satisfactory results. The second step can be best expressed in terms of specifications as follows:

$$\boldsymbol{ln(R|R>0, IV, X) = \delta_0 + \delta_1 IV + X'\delta + \nu_2,\ \nu_2 \sim Normal\ (0, \sigma^2)}. \quad (3.3)$$

Where $\boldsymbol{\nu_2}$ is the error term of equation (3.3) and independent of that in equation (3.2). Equation (3.2) and (3.3) 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 my final estimation. In the retransformation process, I follow Wooldridge (2010), who points out that one may not uncover unbiased log-transform value if the assumptions of normality of the error term, $\boldsymbol{\nu_2}$, fail. Ensuring unbiased estimation, I examine the normality of the error term using a skewness and kurtosis test and conclude that it is not normally distributed, so I address the issue using Duan's (1983) Smearing Estimate.

I also provide a full list of the variables used to predict the exogenous expected value of remittances and the regression results for equation (3.2) and (3.3) in table 3A in the appendix. It is worth noting that IV only appears in the remittances

model because to initiate IV approach, we need to have at least a variable that is excluded from the structural equation. My choice of instrument is the percentage of out-migrants to total population in the district in 2008. It is calculated using information from the 2008 Cambodia census, which was collected by the National Institute of Statistics. The census considers individuals migrants if they move across a district border and who 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, I apply sampling weight and sum up the estimated number of out-migrants from a particular district and divide it by the total population of that district to get the proportion of out-migrants. The percentage of out-migrants varies a lot, ranging from 9.4 percent to as high as 71.3 percent with the mean of 26.7 and standard deviation of 12, indicating a wide range of variation.

What is the logical notion behind my selection of this variable as an instrument? In migration and remittances research, the percentage of migrants to total population is typically a proxy for "migration network" and prevalence of migration in that area. A large percentage signifies a broad network and how endemic migration in that particular region is. Moreover, migration network plays an important role in the possibility of future migration and of receiving larger remittances by those left behind (Hanson & Woodruff, 2003; McKenzie & Rapoport, 2011). Besides, 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). My assumption is similar to those found in previous research that, after controlling for regional differences and their development level, the instrument does not have any

direct partial effect on the dependent variable. Econometrically speaking, the percentage of out-migrants to the total population in the district are neither directly nor significantly correlated with the error term.

One potential threat to such an assumption is that a household may not intend to invest or find no incentive to spend money on education if the return to education is lower than the return on migration. Nevertheless, McKenzie & 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 local education is not highly appreciated at the destination country. Another possibility that may invalidate the IV is related to the quality of education in the area where the survey could not capture. That is, the quality of education may drive both amount of remittances sent to households and of household educational spending. But such an effect is rather insubstantial if the migration network is at the wider regional rather than household level (ibid). That is, recipient and non-recipient households can be both randomly located in the district where some or many unrelated people migrate internally and internationally. I am also aware of the serious consequences of poor IV, which is described as having weak association with the endogenous variable (Wooldridge, 2010), so I rigorously adhere to the recommendation and check the strength of the relationship to confirm its validity. Table 3A 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 to be employed as IV.

3.2.2. Re-modeling Household Educational Expenditure

In the main model estimation, the exogenous expected value, $\widehat{\boldsymbol{R}}_{\boldsymbol{h}}$, which derives from the evaluation of the remittances model, is used to replace the actual value. Nevertheless, we still face another challenge apart from correcting for endogeneity. 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, my 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 response or missing data. An option we have to evaluate this kind of model is to use the double hurdle regression that I previously utilized. Even so, a number of published studies in the field of health economics such as Deb et al. (2017) and Mullahy (1998) suggest not to use double hurdle regression, 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 & 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 and hence avoid retransformation bias (Deb et al., 2017). It allows for the dependent variable to have any 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 with my pooled cross-section data since it is possible that the error variance is not constant over time. But more importantly, my ultimate interest lies in its ability to make inferences in natural units of real and not logged dollars. Thus, I will go for GLM instead of the hurdle model so that I can compare between the impact of remittances and other income of the same amount. The model is given as follows:

$$\boldsymbol{E(HEE_h|\widehat{R}_h, HI_h, X') = g^{-1}(\alpha_0 + \beta_1 \widehat{R}_h + \beta_j HI_h + X'\beta + u)} \quad (3.4)$$

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 both of which will affect the inference statistics if it is not done correctly. Many studies which use GLM conventionally employ log link and gamma distribution, but in this chapter, to determine a correct combination of link function and distribution, a statistical test information proposed by Deb et al. (2017) called the Akaike Information Criterion and the Bayesian Information Criterion was performed. The purpose of performing such a test is to compare between different value of Criterions across various choices of link function (such as log or power transformation) and distribution (such as Gamma, Gaussian, or Poisson), and whichever combination of the two that has the smallest value is considered the best. Based on the test results, I 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 (3.4), is the exponentiated function. In addition, I compute robust standard errors as a remedy.

3.3. 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 in 2009 and 2014. 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 get a more precise estimation and better statistical power. But because this chapter concentrates on the effect of remittances, I restrict my 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 complete information that I needed while some were extreme outliers in terms of income or educational expenditure. Hence, I had to remove them. Ultimately, this chapter 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 percent received some remittance income (38 percent in 2009 and 38.6 percent 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 I can differentiate between internal and international remittances, without information about a sender's background, I am unable to distinguish migrant remittances from private transfers. Therefore, it is important to clarify that throughout the study, my 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. I divided them into four categories, namely, wages, agricultural income, nonagricultural/business income, and other earnings (bank interest, dividends, gambling, scholarships, sale of properties, loans, etc.). To compute household educational expenditure, I 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), allowance, transportation, and gifts/donations for school or teachers.

Table 3. 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: Author.
Note: the amount is reported in United States Dollar (USD).

For the first step of my analysis, I present table 3.1 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 a group. In 2014, remittances and non-agricultural income, generally, were double the amount in 2009 for all groups while wages and other earnings, on average, tripled. Yet 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 time 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 have 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 another 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 3.1 provides an overview of my dependent and main independent variables of interest, but in the empirical analysis, I incorporate a range of control variables that arguably determine the variation in household expense. These variables include characteristics of the household head and age composition of the household, captured by the percentage of children (under 6 years old), percentage of school age children (6-17 years old), percentage of adults (18-59 years old), and percentage of old-age members (60+ years old) in the household. The latter is used as the baseline for the regression, as all shares add up to a hundred, which will prompt perfect collinearity. Finally, I encompass binary variables for urban area and provinces to capture the regional differences and account for 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 provincial dummy, for it is the area around Phnom Penh.

Table 3. 2: Descriptive Statistic of Control Variables by Household Type

VARIABLES	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 Old-Age People (baseline)	5.34	14.28	18.97	27.41	15.42	23.79
Number of Household Member	4.71	1.78	4.43	1.99	4.6	2.0
Number of Children Under 6 Years 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
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: Author.

Table 3.2 shows the descriptive statistics of other control variables by type of household. It should be emphasized that I also include information related to actual number of household members by age group. These variables are, however, excluded from regression analysis, and percentage of age composition is used instead. On

interpretation of the table, a few variables that demonstrate the most notable differences between these households are age and gender of household head and percentage of old-age persons. These characteristics are mainly related to the nature of migration itself. Because in many societies, migrants are mostly young adult males, 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 compared to remittance-recipient households, and the percentage of older persons in the former is also much smaller. To be more specific, households that receive no remittances, on average, have a larger number of children and adults but much smaller number of old-age 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 has 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 the rest 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).

3.4. Regression Results and Discussion

3.4.1. 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, I first use the total amount of remittances but separately estimate the data for 2009, 2014, and a pooled dataset to compare the results. The regression outcome is demonstrated in table 3.3, which answers my first and second research questions for this chapter simultaneously. In table 3B in the appendix, I also present the results of the estimation using the actual amount of remittances, but I 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, I do not consider a significance level at 10% because I 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, I compute marginal effects (ME) which is, as mentioned above, of particular interest to me. 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.

For both 2009 and 2014, remittances in general apparently do not contribute to increase 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 will increase 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 do have any effect on educational expenditure even after I combine sample size to improve statistical power.

Adams et al. (2008) have 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 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 & Pozo (2011) and McKenzie & Sasin (2007) also assert that remittances may be embarked on 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.

Table 3. 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 Income	0.0000839***	0.00663***	0.0000761***	0.0176**	0.0000737***	0.0118***
	(0.0000220)	(0.00189)	(0.0000167)	(0.00542)	(0.0000149)	(0.00317)
Other Eamings	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 Squared	-0.00156***	-0.123***	-0.00111***	-0.256***	-0.00137***	-0.218***
	(0.000217)	(0.0180)	(0.000261)	(0.0683)	(0.000190)	(0.0356)
Household Head is Male	-0.337	-26.61	-0.125	-29.02	-0.225	-35.92
	(0.191)	(15.23)	(0.134)	(30.97)	(0.144)	(23.23)
Household Head is Married	0.646**	51.03**	0.442**	102.3**	0.488**	77.88**
	(0.225)	(18.12)	(0.146)	(35.56)	(0.162)	(26.90)
Household Head Year of Education	0.110***	8.728***	0.108***	25.09***	0.114***	18.20***
	(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-Age Children	0.0523***	4.135***	0.0598***	13.83***	0.0562***	8.965***
	(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)
Year 2014	-	-	-	-	0.971***	155.0***
					(0.0694)	(16.64)
Observations	7,161		6,534		13,695	

Note: The regression controls for dummy variable for urban region and dummy for each province but were excluded from the table due to space limitation. Constant term is not shown either. Robust standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001

It should be highlighted that when I do not correct for endogeneity, I 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 3.B). A dollar increases in remittances 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 remarkably drops by more than a half. It means that the association and its magnitude are mainly explained by some unobserved characteristics of the households such as the decisions to receive remittance income.

Variables for other kinds of income show the expected sign, except for wages. Since wages are considerably permanent and also a main source of income for Cambodian households, especially in 2014 (table 3.1), 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 "consumption" of education in general. But interestingly, Other Earnings, which refer 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 the other income. From the comparison, I would 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 business.

As for other control variables, male-headed households are not significantly different from those headed by females. This is fascinating, considering that some studies have found remittances in female-headed household are better used and influence human capital investment (Brown & Jimenez-Soto, 2015 and references therein). But my finding is consistent with that of Amuedo-Dorantes & 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 do pressure households to spend money on schooling, yet 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 little youngsters to attend kindergarten, and their education starts only after children reach the compulsory age for general schooling. But the good news is that the allocation of income to education grew by USD 155 in 2014 compared to that in 2009, as indicated by variable for 2014, suggesting that households indeed augmented human capital investment as their income rose.

3.4.2. Effects of Remittances by Their Origin

I am now answering 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 Bansak et al. (2015) and Taylor & 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, I distinguish domestic and international remittances and repeat the procedure that is used to obtain the results for table 3.3. Nonetheless, I only report the outcome of some selected variables of interest (the complete table is available upon request, however). Table 3.4 displays regression results for the impact of remittances on educational spending according to their origin.

Table 3. 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			

Note: The regression controls for characteristics of household, characteristics of household head, dummy variable for urban region, and dummy for each province but were excluded from the table due to space limitation. Robust standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001

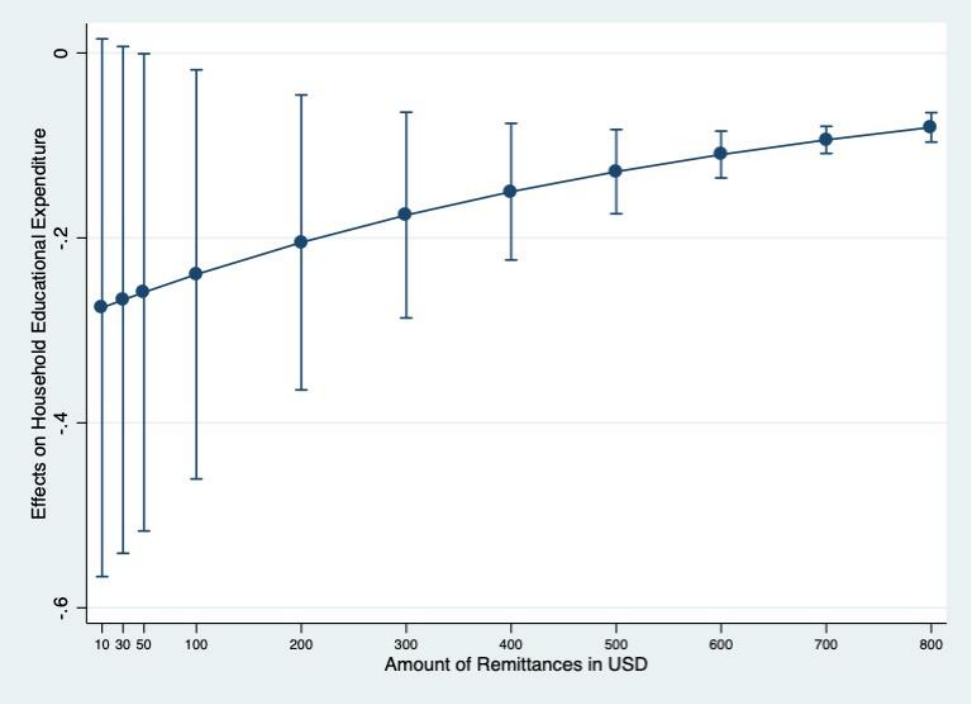
Remarkably, domestic remittances have no significant effects on spending on schooling, as the test statistics is not different from zero. But international remittance-receiving households spend even less on members' education as their remittances grow, and the coefficient is significant at 5 percent. The marginal effect suggests that a dollar increase in external remittances would reduce household investment by USD 0.25. It seems counterintuitive, for households should have more ability to invest in education if they receive more money. 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 if households intend to select members to emigrate abroad in the future, they feel that it is pointless for them to invest in an education which 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, in general, might have sent multiple individuals outside the country. This notion is based on table 3.1, which shows that the average amount of international remittance is almost four-fold higher than 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, the left-behind 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

the left-behind will drop out or reduce the time and money expended on education on account of a heavy workload being foisted upon them. 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 household will send more of them in order to earn larger remittances.

Instead of focusing on the overall mean, I further calculate the marginal effect for different amounts of international remittances and depict them in figure 3.1 below. 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 is 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.

Figure 3. 1: Marginal Effects of International Remittances by Amount



Source: Author.

3.4.3. Effects of Remittances by Origin and Household Income Level

I also extend my investigation to compare the marginal effect between poorer and richer households to understand the impacts of remittances across subgroups. I divide my 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. I repeat the analysis procedure and estimate the model independently for each subgroup.

Table 3. 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	

Note: The regression controls for characteristics of household, characteristics of household head, dummy variable for urban region, and dummy for each province but were excluded from the table due to space limitation. Robust standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001

Presented in table 3.5 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 3.4 is only significant for poorer households. If international remittances grow a dollar for a poorer family, the investment will go down by roughly USD 0.24. Why would this be the case? It is possible 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. But at the same time, it reduces the amount of expenses that they would have spent, should migrants have stayed at home instead. 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 the richer households. Finally, agricultural and non-agricultural income, and other earnings also have largely different effects on scholastic spending for poorer and richer households. This implies that the impacts of income are different across various sources and subgroups who receive them. The findings from Amuedo-Dorantes & Pozo (2011) share this notion.

3.5. Conclusion

This chapter estimates and compares the impact of various sources of income on household investment in educational spending by origin of funds and household income level. I apply a two-stage modeling to a 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, which 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 receiving various income can significantly lead to 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 though it does for other irregular income. It is entirely possible that Cambodian households do not think of remittances as transitory

income that should not be relied upon in long-term. It leads to my conclusion that remittances are fungible. In another word, individuals use remittances just like any other permanent income.

When I distinguish between internal and international remittances, another picture develops. Contrary to some studies mentioned before and which find that external remittances have a positive impact on household educational expenditure, I conclude that international remittances have a negative impact in the Cambodian context. Household expenses tend to decrease commensurately as the amount of such funds grows. The marginal effect indicates that, on average, a dollar rises in international remittances would reduce spending by USD 0.25 or USD 25 for every USD 100 increase in remittances. However, upon further breaking down the data, I 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 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 cannot tell exactly why there is a divergence in marginal spending behavior.

Because poorer households are more likely to send migrants and receive international remittances, overall, I find that that migration and remittances may not be a viable avenue for long-term development and economic growth because they do not essentially contribute to building human capital. Nevertheless, more evidence is required to increase understanding of what kind of investments remittances are being

put towards vs. what the Cambodian households have claimed. But it is certainly not education.

CHAPTER 4

IMPACT OF REMITTANCES ON CHILDREN'S HEALTH

4.1. Introduction

As a consequence of globalization, the growth in the absolute amount of remittances has been quite impressive, and thereby has become a main wellspring of resources for developing countries around the globe (Yang, 2011). This is particularly true for Cambodia, where remittances, on average, amounted to 2.5-3% of its GDP since 2000. Remittances surpassed even foreign direct investment in the country in 2003 and 2004 (World Bank Databank, 2019). As a result, there has been an understandable growing tendency in research studies to concentrate on the impact of migration on children's human capital development, which is inherent in the nature of development since their potential will decide the future of the society.

Nevertheless, it is found that migration and subsequent inflow of remittances do not always promote investment in children's health (Brown & Jimenez-Soto, 2015). An important caveat worth noting is that despite increasing household income through remittances, migration also precipitates detrimental impacts on those who are left behind, especially children whose health may suffer from the disadvantages of losing household members who would otherwise provide physical care and a

nurturing environment. Therefore, it is uncertain that migration is a viable method for long-term development if its drawbacks exceed its benefits.

The overall aim of this chapter is to investigate the impact of migration and of remittances on children's health accumulation and thereby contribute to the current body of literature. I will answer a very essential question: Do migration and remittances significantly influence investment in children and, in particular, the quality of health as reflected by nutritional status? And, if so, to what extent? Unlike many previous studies in this area that use various indicators to measure health (briefly discussed in section 4.2), I use the World Health Organization's (WHO) (2006) international Child Growth Standards that closely document health outcomes. In addition to that, I distinguish migration from remittances' effects. Doing so will permit me to compute the amount of remittances required to offset the effects of migration. Additionally, separating each effect will allow policymakers to know whether they should choose a policy that encourages migration (a controversial area) or remittances (much less controversial) (McKenzie & Sasin, 2007). Regarding of methodology, I address the aforementioned question using data from 2009 Cambodia Socio-Economic Survey with sample of children under 5 years old (0-59 months). In order to correct for endogeneity, I also use a Two Stage Least Squares estimator with two instruments.

My interest in investigating the impact of remittances on children's health in Cambodia lies in the fact that remittances in the country are found to have been used for household daily consumption but, surprisingly, also for increasing healthcare expenditure (Jampaklay & Kittisuksathit, 2009). If this is true, as Cambodian migrants

have claimed but for which there is no supporting evidence, the potential findings from my study should attract considerable attention from academics and policymakers who strive to promote children's health capital. Such interest has peaked in recent years, for Cambodia is also among the countries where prevalence of malnutrition is severe. In 2010, 40% of children were stunted, and 13.6% were severely stunted while 28.3% were underweight, and 6.7% were severely underweight (National Institute of Statistics et al., 2015). Because there is a preference for using remittances to purchase some specific types of goods, as found by Jampaklay & Kittisuksathit (2009), I also test whether or not the PIH holds and to learn more about the importance of remittances relative to other income in accumulating health assets. Therefore, I set a second, minor objective, namely, to understand household behavior in terms of using different types of income. I ask a simple question: Is there any difference between the impact of remittances and of other income on children's health outcome?

This chapter consists of five sections. Following this introductory section, section 2 talks about model and analysis strategy. In section 3, I will discuss about data and sample as well as what formula I use to measure quality of child health. Then, I will demonstrate the results of my analysis in section 4. This chapter also comes with a conclusion in section 5.

4.2. Model and Analysis Strategy

This section outlines the theoretical model to investigate the impact of migration and of remittances on children's nutritional status and growth. I start my analysis by adopting the Behrman & Skoufias (2004) framework that suggests a common standard model for the investment in the quality of children's health. In this framework, a household is assumed to try to maximize their investment in children as well as consumption of goods and services, all of which jointly increase as income grows. But similar to other production and investment activities, health investment/input is also subject to budget constraints and a variety of factors thought to be important determinants of health. The Behrman & Skoufias framework can be written as an econometric specification given by:

$$\boldsymbol{H_{ijc} = \propto_0 + \beta_1 R_j + \beta_2 M_j + \beta_3 I_j + \beta_4 X_i + \beta_5 X_j + \beta_6 X_c + u.} \quad (4.1)$$

Where the subscript i, j, and c index individual, household, and community, respectively; H is children's health outcome; R is household remittances; M is a vector of variables that captures the migration effect; I is other household income excluding remittances; X_i is a vector of child characteristics; X_j is a vector of household characteristics; X_c is a vector of community characteristics; u is the error term. A detailed description of variables is given in section 4.3. In addition, I cluster standard errors by province. The decision to do so is based on Abadie et al. (2017), who strongly recommend to apply cluster-robust standard errors if the sampled data was drawn from the population using clustered sampling as in my case. It is also because the residual is likely to be correlated within the local situation and ecological

conditions such as the surrounding environment, disasters, or public healthcare programs.

If remittances relax budget constraints, thus allowing households to increase investment in children's health, we would expect them to have a significant and positive effect. Furthermore, if the PIH holds true for remittances, that is, if remittances are indeed directed deliberately toward healthcare expenditure, we should also find remittances to have a remarkably larger influence relative to other income. However, equation (4.1) should not be simply estimated by general linear regression (OLS), for remittances cannot be treated as exogenous (Brown & Jimenez-Soto, 2015). Economic studies conventionally acknowledge that a direct comparison between recipient and non-recipient households would result in an underestimation of true effect due to a number of substantive econometric issues as mentioned in chapter 2.

As suggested by Brown & Jimenez-Soto (2015), a practical method to correct for potential endogeneity when estimating the impact of remittances is to use Instrumental Variable (IV). With a good instrument, we can easily purge the correlation between remittances and the error term and at the same time disentangle any reverse causality to make remittances exogenous. But to initiate such a method, we need to have at least a variable to be used as an instrument that is excluded from the equation (1). More importantly, the IV has to be strongly correlated with the endogenous variable but uncorrelated with the error term (Wooldridge, 2016). My choices of instrument are the percentage of out-migrants to total population in the

district and distance from village to the nearest Micro-Finance Institute (MFI) in 2008.

As for the percentage of out-migrants, it is computed using variables from the 2008 Cambodia census, which was collected by the National Institute of Statistics. The percentage of out-migrants varies a lot, ranging from 9.4 percent to as high as 71.3 percent, indicating a wide range of variation. In migration research, the percentage of out-migrants conventionally represents the "migration network" that plays a key role in the possibility of future migration and of left-behind members receiving remittances (McKenzie & Rapoport, 2011). It is also the most popular and least controversial IV in the literature (Antman, 2013; Brown & Jimenez-Soto, 2015), but not without a shortcoming. A threat to the validity of this instrument is the transmission of health knowledge and healthy lifestyle from migrants to rural households (Amuedo-Dorantes & Pozo, 2011). But some research argues that this assumption is likely to hold if we base the migration network on the household level rather than a higher regional level, the latter of which is out of any individual control. That is, recipient and non-recipient households can be both randomly located in the district where some or many unrelated people have migrated (McKenzie & Rapoport, 2011).

What is my assumption behind the selection of the second instrument? Distance from village to the nearest MFI proxies for accessibility to credit loans, which in theory will reduce migration. This notion is suggested by Stark & Bloom's (1985) New Economics of Labor Migration. Empirically, Bylander & Hamilton (2015) indeed find a strong association between the expansion of MFIs in Cambodia

and out-migration and hence remittances inflow. One potential threat to the validity of this IV is that MFIs are only situated in certain migrant-sending areas or cities and thus will be correlated with some unobservable characteristics of the area that may also determine the health outcome. However, since Cambodia is one of the top five countries in the world in terms of the MFI penetration rate and is thus a "microfinance-saturated country," MFIs are also found in rural Cambodia and not only in the cities or certain developed regions (Bateman, 2010; Bylander & Hamilton, 2015).

Along with the assumption above is that after controlling for village development, remoteness, and other regional differences, in addition to clustering standard errors, both instruments do not significantly have any direct partial effect on children's health outcome. To confirm the validity of my IVs, I thoroughly check and perform a few tests as suggested by Wooldridge (2016). First, I examine whether or not the instruments are highly associated with remittances. Table 4.2 below confirms this. Second, I review the literature and find no empirical or theoretical evidence or logical reasons that suggest that both instruments have any direct effect on children's health except through remittances that would allow households to increase health input. Thus, both IVs satisfy the requirements.

4.3. Data and Variables

4.3.1. Data Sources and Sample

This chapter draws its sample from nationally-representative data from the 2009 Cambodia Socio-Economic Survey (CSES) conducted by the National Institute of Statistics. The total number of individual samples are 57,105, living in 11,971 households in both rural and urban regions across all 24 provinces. However, I primarily utilize the information from samples of children under 5 years old (0-59 months). In addition, because my study focuses on the impact of migration and remittances, I limit my sample to only those who lived in major migrant-sending provinces, namely Banteay Meanchey, Battambong, Kampong Cham, Kandal, Prey Veng, Siem Reap, and Takeo. The former two (Banteay Meanchey and Battambong) share a border with Thailand. Other provinces have very small numbers of out-migrants and thus hardly ever receive remittances, so they are excluded. The initial number of child samples from these 7 provinces was 3,184, but some of them did not have complete data necessary for my analysis while some were extreme outliers in terms of household income or anthropometric indicators (beyond ±6 standard deviations and to be discussed later). As recommended by WHO (2006), they should be removed from the sample because these extreme values are more likely to be a result of measurement or data entry error. Finally, this study utilizes a sample of 2,767 children for empirical analysis. Of them, 26 percent are living in households that receive some remittances. It should also be highlighted that some households may have more than one child under 5 years old included in the sample.

4.3.2. Measuring Children's Health Outcome

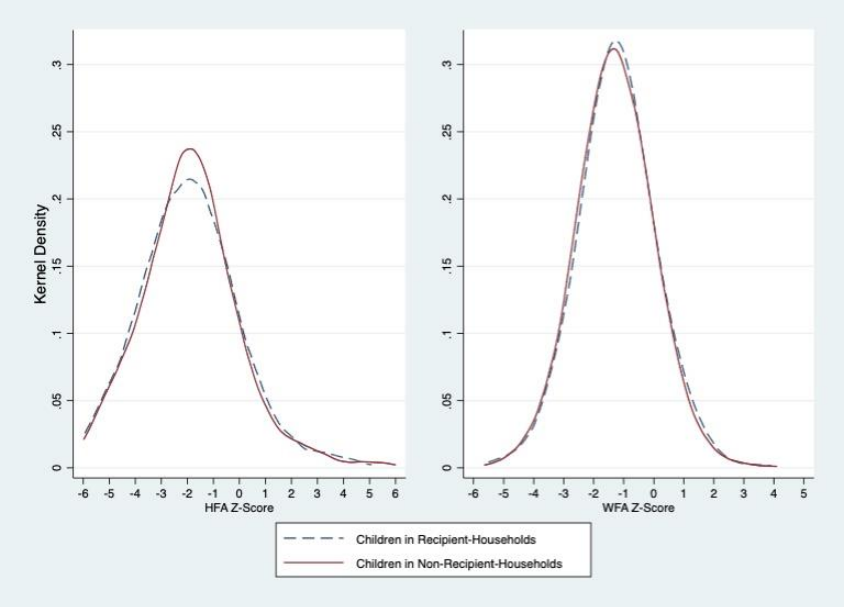
To measure the quality of children's health outcome, I employ WHO's (2006) standard measurement called Height-For-Age (HFA) and Weight-For-Age (WFA). Both indices are internationally accepted and recommended to evaluate children's cumulative health stock and growth. HFA is a long-term component of nutritional history and is hardly affected by any short-lived disruption or recent dietary intake. It also reflects recurrent and chronic illness. On the other hand, WFA is a composite indicator that accounts for both acute and chronic undernutrition. I use the latter to provide a robustness check for the results of HFA and to determine whether or not there is a consistent estimation. But I do not utilize Weight-for-Height or Body Mass Index since both indicators only consider recent changes in nutrition due to diet or temporary illness. The construction of HFA and WFA Z-score requires variables for child's age in months, sex, weight, height, and whether or not the height is measured by standing up or lying down, all of which are available in the 2009 CSES. The measuring of weight and height was done by the enumerators who were trained by medical personnel and who followed WHO guidelines. The equation used to calculate Z-score is given by:

$$y = \frac{\left[\left(\frac{Y}{M}\right)^{L} - 1\right]}{(S * L)}$$

Where y denotes HFA or WFA Z-Score; Y is the individual height or weight; M is the benchmark obtained from WHO's (2006) Child Growth Standards table; L is the value of Box-Cox power transformation for normal distribution which smooths

centile curves for skew and kurtotic data; and S is a coefficient of variation that is also available in the WHO (2006) guidelines. In addition, I follow their instructions (p. 303) to recompute and make a modest adjustment for those whose initial Z-score is beyond ±3 standard deviation because without such correction the distribution will slightly depart from normality at the extreme tails. The distribution of HFA and WFA of children living in remittances-receiving and non-remittances-receiving households is depicted in figure 4.1. The Two-Sample Kolmogorov–Smirnov equality-of-distributions test is also carried out under the null hypothesis that the samples are drawn from the same distribution. The test result indicates that the distributions of Z-score is not significantly different among children in different types of household.

Figure 4. 1: Distribution of Anthropometric Indicators by Type of Household



Source: Author.
Note: The bandwidth for Kernel estimation is 0.5.

4.3.3. Description of Covariates

Apart from correcting for endogeneity issues, we need to consider that migration and the subsequent inflow of remittances can have both negative and positive impacts on children's nutritional status and growth. Positive effects are a result of remittances that increase household income hence generating better food consumption or health input whereas negative influences are likely to come from the absence of household members who would have carried out the responsibilities for income and non-income generating activities and who would have been potential caregivers. In another words, households have to trade their members for remittances. To earn more remittances, households can simply send more migrant workers elsewhere, but doing so will cause such households to lose other production and income.

To capture the positive impact, I use the total amount of remittances a household received during the previous 12 months (excluding remittances-in-kind). It is worth pointing out that not all migrants send remittances, and remittances can also comprise private transfers from non-migrant workers. Therefore, it is possible that migrant remittances are actually less than the amount of remittances reported by a household. To represent the negative effect, on the other hand, I use variables for the number of migrant workers in the household but distinguish between males and females. Labor migrants are those considered as household members but who have migrated to live and work elsewhere for at least 12 months prior to the survey date. I identify them using information on the purpose of migration. It should be highlighted that the 2009 CSES does not consider those who are absent from the household less

than 12 months as migrants but rather merely “not present during the survey.” The duration is intended to provide a more complete picture of long-term cumulative impact of migration and because migrants may not remit any money in the first few months upon their arrival at the destination.

Households are also asked to report other types of income such as wages, agricultural and business income, etc., which I sum up into total household income excluding remittances. Apart from income, I construct a variable for wealth quintile to control for household amenities, which arguably determine the quality of children’s health (Vyas et al., 2016). The mentioned variable is generated from an asset-based index, and it is the sum of weight of each household asset, facility, and housing condition. To assign weight, I use the Principal Component Analysis method, which scores variables according to their variability and strength of correlation among each other. I also assign a different weight to the same indicators across subgroups (urban/rural). CSES’s questions on household assets are almost identical to those found in the Cambodian Demographic and Health Survey. Due to this similarity, I closely follow the step-by-step guideline to construct a DHS Wealth Index that includes applying household sampling weight.

Besides incorporating a range of conventional control variables for children and household characteristics, I encompass dummy variables for each province to account for regional differences. Moreover, rather than using just a binary variable for urban areas to capture development level, I use the percentage of households in the village that have access to electricity and to piped water, both of which have a wider range of variation because even for the areas classified as urban, the degree of

development can still differ. And if only a small share of total residents in the village have electricity and piped water, this would indicate a location in a poor and remote region. Electricity and piped water also have direct effect on child health. In addition, I include a variable for number of natural disasters faced by a village in the previous five years, which is likely to affect both the amount of remittances and other income households receive as well as their children's health (McKenzie & Sasin, 2007). Finally, distance to the nearest health facility (public hospital or private clinic) variable is used to account for access and availability of healthcare services in the area.

Table 4. 1: Descriptive Statistics of Covariates by Type of Household

VARIABLES	Non-Recipient-Household (N=2049)		Recipient-Household (N=718)		Mean Test
	Mean	SD	Mean	SD	
Height-For-Age	-1.88	1.86	-1.91	1.89	-
Weight-For-Age	-1.28	1.24	-1.23	1.27	-
Remittances (USD)	-	-	123.8	194.9	-
Number of Female Migrant Workers	0.00781	0.103	0.146	0.463	***
Number of Male Migrant Workers	0.00927	0.110	0.181	0.476	***
Household Other Income (USD)	1,822	1,829	2,173	2,219	***
Child is Male	0.504	0.500	0.479	0.500	-
Child's Age	1.988	1.421	1.855	1.397	**
Household Head is Child's Biological Parent	0.851	0.357	0.467	0.499	***
Percentage of Children in the Household (Under 6 Years Old)	31.53	12.63	27.58	12.27	***
Percentage of School-Age Children (6-17 Years Old)	18.19	17.65	16.37	16.72	**

Percentage of Adults (18+ Years Old) (baseline)	0.503	0.136	0.56	0.154	***
Total Number of Household Members	5.301	1.901	5.830	1.981	***
Household Head's Age	35.97	11.11	47.19	15.50	***
Household Head is Male	0.891	0.312	0.748	0.435	***
Household Head Year of Education	4.953	3.707	4.157	3.469	***
Household Head is Married	0.930	0.255	0.762	0.426	***
Number of Natural Disasters in the Last 5 Years	2.266	2.698	2.386	2.783	-
Distance from Village to Nearest Health Facility (km)	2.272	3.155	2.302	3.248	-
% of Household in the Village Has Electricity	20.24	33.03	18.07	31.43	-
% of Household in the Village Has Piped Water	10.91	25.94	12.69	28.81	-
Banteay Meanchey	0.0903	0.287	0.0446	0.206	***
Battambong	0.134	0.341	0.0850	0.279	***
Kampong Cham	0.260	0.439	0.290	0.454	-
Kandal (baseline)	0.140	0.347	0.219	0.414	***
Prey Veng	0.141	0.348	0.143	0.351	-
Siem Reap	0.12	0.325	0.127	0.333	-
Takeo	0.115	0.319	0.092	0.289	*
Instrumental Variable					
% of Out-Migrants	26.54	12.64	26.81	11.24	-
Distance from Village to Nearest MFI (km)	8.44	8.59	8.04	7.4	-

Source: Author.
Note: *** significant at 1%, ** significant at 5%, * significant at 10%. "-" not significant.

Table 4.1 shows the descriptive statistics of independent variables by type of household except for the wealth quintile, which is categorical. I perform the mean-comparison t-test to see if non-remittances and remittances-receiving-households are

significantly different in their socioeconomic characteristics. Results show that these households do differ. Major notable differences between them are characteristics of households per se and of the heads. In comparison, head of remittances-receiving household is more likely to be a much older female and has lower education relative to that from household receiving no such funds. In addition, she is unlikely to be child's biological parent. These findings suggest that many heads of recipient households are grandmother of the child whose parents are probably the migrants. Also, as one should generally expect, households with a greater number of migrant workers tend to receive remittances. The summary data in this section mainly indicates that remittances are not allocated randomly to households, but instead, there is a certain degree of selectivity at household level. For instrumental variables, the mean tests indicate that both types of household are indeed randomly located in the areas where some or many people have migrated, and neither of them is selective in terms of access to MFI, adding evidence to my justification of using them as IVs.

It is worth mentioning that number of female/male migrant workers are the absolute number of household members who were reported to have migrated elsewhere for employment purpose. Therefore, it does not count those who have migrated for other purposes. Non-recipient households might or might not have sent migrant workers elsewhere even though they generally do not. But migrant-sending families are still considered as non-remittances-receiving households in this study, given the condition that they do not receive remittances from their migrating members in the previous 12 months prior to survey. This is why the average number of migrant workers of non-recipient households is extremely small. On the other hand, recipient

households may receive remittances from other household members who appear to have migrated for other purposes, such as for education, rather than migrant workers. Evidently, the migration survey in Cambodia recognizes that more than half of those who have migrated for other reasons but employment, sent remittances home in 2011 (MoP, 2012). Therefore, it explains why the mean of number of migrant workers of recipient households is lower than unity.

4.4. Results and Discussion

4.4.1. The Impacts of Migration, Remittances, and Other Income

To make a comparison, I present both the OLS and 2SLS regression results, but I do not consider outcomes of the former, as it is likely to be biased. Table 4.2 demonstrates the impact of migration and of remittances on the left-behind children's growth indicators.

Table 4. 2: Impact of Migration and of Remittances on Child's Growth

Variables	HFA		WFA	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)
Remittances	0.000100 (0.000483)	0.0163*** (0.00570)	-0.000231 (0.000154)	0.0118*** (0.00430)
Number of Female Migrant Workers	-0.283*** (0.0677)	-1.579*** (0.567)	0.0562 (0.0346)	-0.905* (0.514)
Number of Male Migrant Workers	-0.158 (0.154)	-1.475*** (0.546)	-0.0449 (0.0564)	-1.021*** (0.321)
Household Other Income	0.0000299 (0.0000220)	0.0000174 (0.0000287)	-0.00000413 (0.00000889)	-0.0000134 (0.0000245)

Child is Male	-0.0817	-0.0832	-0.111*	-0.112***
	(0.0579)	(0.0690)	(0.0514)	(0.0389)
Child's Age	-0.234***	-0.231***	-0.232***	-0.230***
	(0.0325)	(0.0335)	(0.0125)	(0.0218)
Household Head is Child's Biological Parent	-0.0910	0.467	-0.192	0.222
	(0.276)	(0.493)	(0.144)	(0.356)
Percentage of Child in the Household	-0.000702	-0.00602	-0.00670***	-0.0106***
	(0.00510)	(0.00520)	(0.00168)	(0.00335)
Percentage of School-Age Child in the Household	0.00146	-0.00720	-0.00161	-0.00803
	(0.00356)	(0.0104)	(0.00213)	(0.00693)
Household Size	-0.00508	0.0518	-0.0277	0.0145
	(0.0258)	(0.0603)	(0.0225)	(0.0440)
Household Head Age	0.0290	0.0399*	0.0227	0.0308*
	(0.0191)	(0.0223)	(0.0132)	(0.0168)
Household Head Age Squared	-0.000184	-0.000407	-0.000246	-0.00041**
	(0.000219)	(0.000262)	(0.000131)	(0.000171)
Household Head is Male	-0.0203	0.0326	0.0119	0.0511
	(0.155)	(0.176)	(0.0758)	(0.153)
Household Head Year of Education	0.0334*	0.0317***	0.0111	0.00991
	(0.0139)	(0.0112)	(0.00949)	(0.00872)
Household Head is Married	0.262	0.259	0.0839	0.0819
	(0.224)	(0.372)	(0.149)	(0.198)
Wealth Quintile (poorest is baseline)				
Poorer	0.0639	0.368	-0.0358	0.190
	(0.167)	(0.362)	(0.0502)	(0.179)
Middle	0.0653	0.331	-0.0852*	0.112
	(0.267)	(0.435)	(0.0400)	(0.185)
Richer	0.0113	0.330	-0.0155	0.221
	(0.175)	(0.329)	(0.0167)	(0.147)
Richest	0.144	0.525	0.0694	0.352*
	(0.177)	(0.338)	(0.112)	(0.209)
Number of Disaster	-0.0123	-0.0334**	0.0166	0.000955
	(0.0184)	(0.0169)	(0.0111)	(0.0197)
Distance Nearest Health Facility	0.00323	0.00641	0.0133	0.0156
	(0.0111)	(0.0126)	(0.0119)	(0.00981)

% of Household Has Electricity	-0.000463 -0.00166	0.000525 (0.00309)	0.00123 (0.000791)	0.00197 (0.00127)
% of Household Has Piped Water	0.000678 (0.00179)	-0.00189 (0.00403)	0.00194* (0.000834)	0.0000342 (0.00252)
Dummy for Each Province	Yes	Yes	Yes	Yes
Constant	-2.382*** (0.433)	-3.498*** (1.120)	-0.906** (0.263)	-1.734** (0.778)
Observations	2767	2767	2767	2767
First Stage Results for IVs				
Percentage of Out-Migrants	-	0.352** (0.174)	-	0.352** (0.174)
Distance to the Nearest MFI	-	-0.705*** (0.275)	-	-0.705*** (0.275)

Note: Cluster-robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In the OLS results in columns 1 and 3, the effect of remittances and of the number of migrant workers on children's health are rather small. In addition to that, the coefficient obtained from regressing WFA on remittances is negative, indicating that the more remittances households receive, the worse their children's health tends to be. But fortunately, the correlation is statistically insignificant. Are these findings counterintuitive? Not necessarily, as I have expected a presence of endogeneity that OLS ignores. We can also simply check whether or not there is an endogeneity by doing a direct comparison between OLS and 2SLS as stated by Wooldridge (2016). After all, both estimators will produce a highly similar outcome if there is no such issue. But to systematically ensure that remittances are really endogenous, I perform Wooldridge's (1995) robust regression-based test, which can accommodate both

heteroskedasticity and autocorrelation. Eventually, I still reject the null hypothesis that remittances are exogenous.

I now discuss 2SLS results. Firstly, remittances in column 2 are highly correlated with HFA. Since the amount of money is in a natural unit (USD), a one-dollar increase in household remittances can be interpreted as raising children's HFA Z-score by 0.0163 standard deviation (SD), holding other independent variables constant. For migration effect, because migration is synonymous with loss of manpower and potential caregivers, it is expected to have a negative effect on children. But my study finds that it is more disadvantageous to select female instead of male household members to migrate. The coefficients suggest that sending off a female will lower children's HFA by 1.58 SD which is 0.1 SD higher relative to sending a male.

We can also calculate how much, on average, each labor migrant needs to remit in order to offset the migration effect for every child in the household. Because a hundred-dollar increase in remittances raises HFA Z-score by 1.63 SD, to balance between the two effects on one child, each female migrant has to remit at least USD 97 (97*0.0163=1.58 which is the effect of migration of one female member) whereas it is only USD 90.8 for a male (or USD 94 regardless of gender). Since each remittances-recipient household in my sample has an average of 1.5 children (based on my tabulation), it needs to receive remittances no lower than USD 141 if it has one migrant worker (USD 94*1.5). But these households only have 0.33 migrants on average, as shown in table 1, so to offset the migration effect, they only need USD 46.5 in remittances, which is apparently much lower than the actual mean of USD

124. In sum, each remittances-receiving household generally has 1.5 children and 0.33 migrant workers. To derive USD 46.5, I simply compute (94*1.5*0.33).

In column 4, the coefficients for migration and remittances have the sign I expected, but their effects on WFA Z-score are relatively smaller than what they are for HFA. A one-dollar grows in remittances will, ceteris paribus, increase the WFA Z-score by 0.012 SD or 1.2 for every hundred dollars. It is also worth noting that having a male migrant worker in this case has a larger effect than does having a female when I use a measurement that takes into consideration both short and long-run aspects of health. Why would this be the case? One explanation is that in Cambodian society as well as in many other Asian countries, males are usually the main breadwinners, so their migration will generally lead to an immediate loss of a portion of household income, which tends to affect short-term consumption and hence nutrition. On the contrary, the roles of females are more likely to involve taking care of household chores and caregiving. As a result, the migration of females will result in children experiencing long-term erosion of a social environment that nurtures the sense of safety and physical growth. This notion is shared by Jampaklay (2006), who found that in Thailand the negative effects of maternal migration start to exceed those created when the father migrates as the duration of the migration increases. For short-term absence, it is paternal migration that has a larger effect on children's educational outcome (ibid).

My second objective is to understand whether or not one form of income is used differently from other forms in terms of investing in children's health. As shown in table 4.2, the responsiveness of both types of anthropometric measurements to

remittances is substantially larger and statistically significant relative to other household sources of income. Both OLS and 2SLS estimators indicate that other income, excluding remittances, does not have any impact on children's health. Thus, different types of income are spent disproportionately on health investment. This outcome adds evidence for maintaining support to the claim made by Cambodian workers in Thailand that a large portion of their remittances goes toward funding household healthcare expenditure. In Mexico, Amuedo-Dorantes & Pozo (2011) also discover that remittances are more likely than other income to be expended on healthcare. Moreover, my finding corroborates Friedman's (1953) Permanent Income Hypothesis and McKenzie & Sasin (2007) who argue that the sources of income matter and that they influence household expenditure differently, particularly if one form of income is stipulated for a specific purpose.

As for other covariates, I find that boys are in a more disadvantageous condition than girls for WFA, but there is no significant difference in long-term nutrition. As my indicator has rolled out the biological aspect of gender, the difference may come from social values such as child preference, which I cannot account for. Antman (2012), Jampaklay (2006), Meng & Yamauchi (2017), and Anton (2010) have all concluded that girls are in a more favorable situation than boys when household members migrate. Antman (2012) attributes the results to an increase women's bargaining power regarding intra-household resource allocation. Because migrant households are more likely to be headed by women due to the fact that male members tend to migrate, decision-making power is shifted to women, resulting in more resources going toward daughters rather than sons. With regard to children's

age, the variable suggests that the deleterious effects on Cambodian children's nutrition tend to be cumulative, worsening as children grow older, which may be due to a lack of caregiving or childrearing practices. The impact of household head's education on long-term investment in health is also noted.

4.4.2. Impact of Internal and International Remittances

I also extend my investigation further to compare between internal and international remittances. My interest in doing so is motivated by studies such as those by Binci & Giannelli (2018), who insist that domestic and international remittances do not have a similar influence on Vietnamese children in term of education. In my study, I distinguish the former from the latter using information on the origin of each type of household income and repeat the regression procedure that produces the results in table 4.2. Nonetheless, I put and instrument both types of remittances in the same equation rather than running a separate model for each one of them. Table 4.3 shows the results of such analysis.

Table 4. 3: Impact of Internal and International Remittances

VARIABLES	HFA	WFA
International Remittances	0.0349*	0.0328**
	(0.0216)	(0.0157)
Internal Remittances	0.00353	-0.00264
	(0.0135)	(0.00882)
Number of Female Migrant Workers	-0.740	0.0414
	(0.762)	(0.467)
Number of Male Migrant Workers	-2.309*	-1.962**

	(1.207)	(0.853)
Observations	2767	2767
Instrumental Variables	*International Remittances*	*Internal Remittances*
Percentage of Out-Migrants	0.02	0.332**
	(0.156)	(0.152)
Distance to the Nearest MFI	-0.413**	-0.292**
	(0.189)	(0.137)

Note: - All regressions in this table also control for other household, its head, and village characteristics, and provincial dummies listed in Table 4.1.

- Cluster-robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

It appears that internal remittances do not have any impact on children's growth while funds from international sources have a very large effect – two-fold larger than overall remittances. Likewise, the effect of having male migrant workers is substantially larger than that found in table 4.2 whereas the variable for the number of female migrants is not statistically significant. One possible reason is that the influence of domestic remittances tends to cancel out the effect of migration of females, who are also more likely to be internal labor migrants (Ministry of Planning, 2012) – or simply that only international remittances are more likely to be channeled toward health expenditure. A more concrete explanation is that the estimation is not precise since the percentage of out-migrants is not strongly correlated with international remittances. Future research is possible with better instruments to understand differences in responsiveness of children's health outcome to different types of remittances and migration.

4.5. Conclusion

Using the 2009 Cambodia Socio-Economic Survey, this chapter examine the impacts of migration and of remittances on children's quality of health as measured by WHO's Child Growth Standards indicators. In the attempt to mitigate potential reverse causality and omitted variable bias, I employ a Two Stage Least Squares estimator with two instruments, both of which are strongly correlated with the endogenous variable. A few main findings emerge. Remittances significantly improve children's health outcome, and they do so more positively for girls than boys. Holding other variables fixed, a hundred-dollar rise in remittances increases height-for-age and weight-for-age Z-score by a 1.6 and 1.2 standard deviation, respectively. It is also found that the migration of female household members is more harmful to children's long-term nutrition than is the migration of males. The opposite is true in the short term. To offset migration's effects, households need to receive remittances of approximately no less than USD 94 from each migrant for every child in the household. While this may be relatively good news for remittances-recipient households in Cambodia, which on average receive more than that, and hence experience a more positive net impact, it is detrimental to children who live in migrant-households that receive no remittances. Additionally, I found that remittances are not fungible. In another words, remittances are not spent proportionately like other income on health expenditure. This finding provides evidence not only to support the Permanent Income Hypothesis but also to indicate that remittances are indeed directed toward buying healthcare, just as the Cambodian migrant workers have claimed. It

can be, therefore, of significant interest to policymakers who attempt to promote health.

CHAPTER 5

IMPACT OF REMITTANCES ON CONSUMPTION AND POVERTY

5.1. Introduction

The objective of this chapter is to evaluate the impact of remittances on per capita household consumption and poverty. I attempt to understand to what extend migration has played a role in increasing general welfare of members of the recipient households. To do so, I use the Cambodia Socio-Economic Survey in 2014, which allows me to distinguish between internal and international remittances, so that in turn I can delve deeper to learn the impact of remittances on a sub-sample of households instead of only on the national level. Cambodia represents a good case study here on account of a factor that following the end of a civil war, three quarters of the Cambodian population lived without basic consumption, yet since then extreme poverty has dramatically decreased, and in 2014, only 13 percent are still impoverished (World Bank, 2019).

In addition, I recognize two challenges in my estimation. First, remittances are the substitute for migrants' pre-migration income, in which case a hypothetical counterfactual scenario of no migration and no remittances needs to be imputed and compared with the actual scenario. Second, there can be a self-selection problem that has to be addressed in my empirical model. To do so, I use a Heckman Two-Step

estimation and compute inverse Mill's ratio which will correct for such bias. There are a number of reasons to believe why there may be a bias arising from selection into migration. First, the probability of receiving remittances can be biased toward richer families or households with better-educated members, as they have more possibilities to afford migration costs compared to their poorer counterparts as I have mentioned in the literature review section. In addition, as the human capital model in migration suggests, those who have higher education and skills and therefore expect to earn higher income at the destination, tend to be selected as the ones to migrate (De Vreyer et al., 2009; Kaestner & Malamud, 2013; Todaro, 1969). Consequently, remittances may increase exiting inequality rather than reducing it as we would have expected.

This chapter is divided into 6 sections. In section 2, I will show how poverty is measured in Cambodia using per capita household consumption on a series of food and non-food items which are deemed essentially necessary to maintain human life, growth, and development. Then, data and sample will be put into discussion in section 3 followed by a thorough looking at the approach that I use to construct a counterfactual scenario of no migration and no remittances in section 4. In the same section, I will also talk about the Heckman Two-Step estimation and how to calculate inverse Mill's ratio to correct for selection bias. Results of my estimation will be demonstrated in section 5 while section 6 is the conclusion of this chapter.

5.2. Poverty Measurement in Cambodia

Before going further into a description of the data and the econometric method used in this paper, it is necessary to understand how poverty is defined and computed in Cambodia because this indicator and its measurement are also used in my empirical analysis. But it is worth noting that although the poverty headcount ratio in Cambodia was first estimated in 1997, it was not until 2004 that a more reliable and standardized methodology was employed. The civil war and Pol Pot's genocidal regime (1975-79), which left millions of people dead and the country's socioeconomic infrastructure completely in ruins, are the main reasons why the poverty level had never been measured.

"Extreme poverty" is officially measured as a lack of enough money to spend per day on food that provides 2,200 kilocalories (defined by the Reference Food Basket) and non-food items in order to attain basic necessities regardless of age and gender. The latest method to calculate the poverty line was updated in 2011 and was used by the Ministry of Planning to carry out work in parallel with the World Bank in order to compare results. The outcomes from both studies are very similar, so this paper will use the latest 2011 World Bank poverty line for Cambodia (World Bank, 2014). Cambodia's poverty line is not, however, internationally comparable, as it is not measured at Purchasing Power Parity values. Table 5.1 shows the national poverty line and poverty rate for three different areas in Cambodia in 2009 and 2011. As will be seen, Phnom Penh had a different poverty line and a much smaller poverty headcount in 2011 than did other urban regions in the country, which justifies its exclusion from the data analysis discussed in section 5.4.

Table 5. 1: National Poverty Line and the Poverty Rate in 2009 and 2011

Region	Poverty Line (KHR)		Food Poverty Rate (%)		Total Poverty Rate (%)	
	2009	2011	2009	2011	2009	2011
Phnom Penh (capital)	6,347	6,014	0.3	0	12.8	1.53
Other Urban Areas	4,352	4,828	2.0	3.75	19.3	16.1
Rural Areas	3,503	4,422	5.1	4.38	24.6	23.72

Source: Ministry of Planning, 2013; World Bank, 2014.

It should be emphasized that rather than employing per capita income to determine who is living below the poverty line, which is generally done by other research studies, the Cambodian government (and my thesis) use monthly per capita household expenditure for certain types of goods and services that are considered as basic consumption items. Thus, some expenditures, particularly those for purchasing durable goods, are for the most part not taken into account when calculating poverty headcount because they are deemed not "basic." But there are reasons why using expenditure is better than using income. First, income fluctuates frequently especially in developing countries, where many people still earn a living through agriculture and small family businesses, hence the variance in income is often quite larger than that of expenditure. Second, income is more difficult to measure due to challenges in calculating some types of income deriving from agriculture and self-employment. Third, people are more likely to use saving to smooth their consumption over time when they face financial problems. Therefore, expenditure is more accurate in providing a picture of household welfare. Fourth, expenditure is less susceptible to classic measurement error and bias because people tend to underreport their income for various reasons.

To calculate household expenditure per capita, I follow official procedure by summing up the value of three different types of basic household consumption and dividing it by the number of household members. Basic consumption comprises food expenditure (22 food groupings) and non-food expenditure (medical care, education, transportation, communication, personal care products, clothing, recreation, gambling…but excluding durable goods) as well as housing expenditure (water, sanitation, garbage disposal, energy, house rent if an actual expense incurred, and house maintenance and minor repairs, excluding major construction). For those who own a house, imputed depreciation values of consumer durables are not taken into account, as the method was deemed unsuitable for Cambodia, where there is a large non-monetized sector, and many items are not fungible (Ministry of Planning, 2013).

All types of consumption, of goods both purchased and self-produced, are represented in Khmer Riel (KHR), the local currency. However, some types of expenditure are reported for different time periods, namely, the previous 7 days (food and beverage), the previous month (transport, communication, health, etc.), or the previous 12 months (recreation, education, gambling, etc.). Therefore, I need to convert the data into one-month units by considering that a month has 30.4375 days, which is the Cambodian standard. In addition, I assume that, on average, households spend the same amount of money on food over time. In other words, to calculate food expenditure in a month, I divide the amount of food consumption in the last 7 days by 7 and multiply by 30.4375. For expenses that are recorded for the previous 12 months, I simply divide the result by 12 to get monthly average consumption. Housing expense is reported for the previous month, so a simple addition is sufficient.

5.3. Data and Sample Description

Data used in this study derives from the nationally representative Cambodia Socio-Economic Survey (CSES) 2014 conducted by the National Institute of Statistics. The original 2014 CSES dataset comprises a sample of roughly 12,000 households in both rural and urban regions across all 25 provinces of Cambodia, including the capital, but some households do not provide the complete information that I need while others are extreme outliers in terms of consumption or receiving remittances. As a result, I have to remove them from the analysis. As mentioned before, I also exclude samples from the capital city of Phnom Penh since it is not a receiving point for migrant remittances but rather a destination for rural-urban sojourners. In addition, the standard of living in Phnom Penh is very different from the rest of Cambodia, so incorporating it would unnecessarily influence my estimation. Ultimately, my study uses sample of 9,791 households, of which 3,611 or 36.9 percent received some kind of remittances in the previous 12 months (2,961 received internal remittances, 486 received international remittances, and 164 received remittances from both sources).

Table 5. 2: Summary Data on Non-Recipient and Recipient Households

VARIABLES	Non-Recipient Household (N=6,180)		Recipient Household (N=3,611)		Mean Test
	Mean	SD	Mean	SD	
Total Household Expenditure (USD)	310.7	192.7	280.6	181.2	***
Expenditure Per capita (USD)	72.59	43.42	71.70	41.93	-
Domestic Remittances (USD)	-	-	230.3	435.5	-
International Remittances (USD)	-	-	1,276	2,063	-
Household Head Age	43.64	12.72	53.96	13.86	***

Household Head is Male	0.833	0.373	0.685	0.465	***
Household Head is Married	0.847	0.360	0.666	0.472	***
Household Head Education	5.106	3.926	4.006	3.565	***
# of Children Under 6 Years Old	0.553	0.710	0.416	0.647	***
# of Adolescent (6-14 Years Old)	0.912	0.993	0.673	0.895	***
# of Adult without Education	0.597	0.886	0.731	0.883	***
# of Adult with Primary Education	1.195	1.094	1.278	1.104	***
# of Adult with Secondary Education	1.182	1.218	1.052	1.192	***
# of Adult with Tertiary Education	0.128	0.455	0.107	0.417	**
Distance to District Headquarter (km)	12.08	13.39	12.25	14.52	-
Distance to Provincial Headquarter (km)	36.14	29.83	34.57	26.92	***
Village Agricultural Land (ha)	384.2	658.9	381.1	623.4	-
Urban	0.192	0.394	0.181	0.385	-
% of Out-Migrants	25.66	12.04	27.57	12.47	***

Source: Author.
Note: *** significant at 1%.; ** significant at 5% ; "-" not significant.

Table 5.2 presents in more detail summary data on non-remittance-recipient and remittance-recipient households from the 2014 CSES. I also perform the mean-comparison t-test, which offers an interesting insight. It statistically reveals that recipient and non-recipient households systematically differ in terms of their socioeconomic characteristics, indicating that remittances are not allocated randomly to households. But a substantial degree of selectivity may be observable and accounted for if the assumptions of the NELM and the human capital theory hold, in which case controlling for education will significantly capture selection bias. This supposition is my main motivation to include several variables for educational level of household members and household heads.

As for the comparison between recipient and non-recipient households, heads of the former tend to be non-married older females and to be less educated than their peers from non-recipient households. In addition, the latter have more members with

higher education and have a greater number of children or adolescents in the family compared to recipient households, who have more less-educated members. These statistics are consistent with the literature on Cambodian migration showing that most migrants are low-skilled, as they mainly come from poor households in rural areas (Jampaklay & Kittisuksathit, 2009; Ministry of Planning, 2012). Borjas (1987) calls this negative selection into migration, but the phenomenon contradicts human capital theory, which asserts that well-educated people are more likely to migrate since they expect higher return to their education at the destination. Nevertheless, migration among the lower skilled supports the NELM assumption that migrants do not necessarily migrate due to expectations of higher income and that highly educated people are unlikely to migrate, for they have more ability to access capital or insurance, unlike those in non-elite groups. It is worth noting that there can also be a case in which recipient households have more low-educated members because their well-educated members have all left, but this is rare due to homogeneity among household members, who tend to have similar socioeconomic characteristics. For example, education levels of husbands and wives and their children are positively correlated since highly educated parents tend to earn a lot and most likely want their children to receive better education.

As for the amounts of expenditure and remittances, generally expenditures per capita of recipient and non-recipient households are not significantly different, and neither is the standard deviation. The smaller total expenditure of remittance-receiving households compared to that of their non-receiving counterparts is more likely a result of bigger average household size of the latter (4.6 vs. 4.3). Nonetheless,

if I compare only the amounts from remittances among recipient households, international remittances are 5.5 times larger than those from internal sources, which can be attributed to the relatively much higher salaries earned by Cambodian migrants who go to countries such as Japan and South Korea. Nevertheless, only 650 households actually received such money, compared to 3,125 households that received internal remittances.

5.4. Empirical Method

There are a few challenges in estimating the impact of remittances on poverty and inequality since a migration decision and subsequent inflow of remittances can have both direct and indirect effects on household income. A direct effect can be a result of a loss of a certain number of household members who would have contributed some positive income and expenditure to the family had they stayed while indirect effects are the influence of migrants' absence on other remaining household members' income generating activities and earnings, as suggested by NELM. As a result, remittances cannot be simply treated as exogenous transfers, and we will entirely disregard their substantial influence. Thus, I will consider remittances as a substitute rather than a completely extra income of a recipient household, which would cause us to overestimate their effect since it is possible that total household income excluding remittances and consumption would be lower relative to that of the pre-migration situation.

To remove both direct and indirect effects of remittances, I will adopt the counterfactual method in the scenario of no migration and no remittances that was initially developed by Adams (1989) in his paper on the impact of remittances in rural Egypt. To determine recipient household expenditure, I can use a simple linear regression based on information of non-recipient households that share similar characteristics. But employing such a method requires some necessary assumptions (Acosta et al., 2007; Rodriguez, 1998). First, in the absence of information on characteristics of migrants, I will suppose that remittances were sent by an adult member whether a household received remittances from either an internal or international source, but I will assume remittances were sent by two adults if a household received such money from both sources. I also need to approximate a migrant's level of education. Based on the conventional assumption made by other studies such as those by Acosta et al. (2008) and Barham & Boucher (1998), I will assume that migrants generally have years of education equal to the average of that observed by their adult household members. A shortcoming of this assumption is that a counterfactual additional adult member will linearly increase expenditure regardless of the initial household size. Second, it is assumed that labor market conditions remain unaffected with or without migration. But in reality, local wages or income may be influenced by the outflow of migrants and the inflow of remittances (Brown & Jimenez, 2008). For example, employers may increase local wages to attract labors because it is harder to find employees due to out-migration.

The counterfactual method will, however, suffer from selection bias if recipient and non-recipient households significantly differ. Empirically, table 2 also

provides evidence that there is a certain degree of selection between non-remittance-receiving and remittance-receiving households. Reviewing recent literature, Adams (2011) suggests that self-selection into migration can be driven by education, ability, or determination of individuals or households, which explain most of the differences in both migration decisions and the earning of remittances. As a result, I will make every attempt to take into account these effects. But a simple comparison between these two types of households still leads to an inconsistent estimation if unobservable characteristics that drive migration and remittances are statistically significant, meaning that a substantial bias cannot be reduced or captured by observed variables. To make sure OLS is effective in predicting counterfactual consumption, first I need to resort to an auxiliary regression to test for self-selection, which will also allow us to correct for bias in the process if there is any.

The supplementary approach is called Heckman's (1979) Two-Step Estimator, in which the first step (1) is to estimate the probability of not receiving remittances using all samples and obtain an inverse Mill's ratio (conventional notation is λ). The second step (2) is a linear model conditional on households that do not receive remittances, but I also include a variable, (λ_i), in the regression to allow the error term to be independent and identically distributed; hence the estimation will be consistent. The null hypothesis for λ is that non-recipient households are randomly drawn from a population, and if I fail to reject it, I do not need to correct for selection bias, as such bias will be small and therefore negligible. Thus, imputing expenditure for remittance-receiving households under the condition that migration had not occurred can be done using just OLS. Otherwise, controlling for λ is indispensable. Heckman's

Two-Step method can be best understood using the econometric specifications as follows:

$$Prob(NoRem) = \delta_0 + \gamma_1 X_i + \gamma_2 H_i + \gamma_3 C_i + \gamma_3 Z + u_i\,,\ \ u \sim N(0,1) \qquad (5.1)$$

$$Y = \alpha_0 + \beta_1 X_i + \beta_2 H_i + \beta_3 C_i + \beta_\lambda \lambda_i + \varepsilon_i,\ \ \varepsilon \sim N(0,\sigma^2) \qquad (5.2)$$

Where subscript i indexes individual household; Y is monthly per capita household expenditure excluding remittances; X is a vector of household head general characteristics such as age, gender, marital status, and education; H is a set of household characteristics, namely, household asset-based wealth quintile that is calculated using Principal Component Analysis, number of children under 6 years old, number of adolescent (6-14 years old) and number of adults (15+ years old) with primary, secondary, tertiary, and no education, the rationales for including which lie in the NELM; C is a vector of village characteristics including distance to district and provincial capital, a dummy variable for urban region, a dummy for each province, and a log amount of agricultural land in village. These variables capture the structure of the village economy. For example, if a village has large amount of agricultural land in use, its economy depends mainly on cultivation, signifying that it is a poor area. Distance to the district and provincial capital also indicates the remoteness of a village and its development level, which are associated with income, consumption, and migration. λ is the selection inverse Mill's ratio that I obtain from estimating equation (5.1) using formula $\lambda_i = \frac{\phi(\delta_0+\gamma_1 X_i+\gamma_2 H_i+\gamma_3 C_i+\gamma_3 Z_c)}{1-\Phi(\delta_0+\gamma_1 X_i+\gamma_2 H_i+\gamma_3 C_i+\gamma_3 Z_c)}$; u and ε are error terms and may be correlated with one another.

Identification of equation (5.1) requires imposing an exclusion restriction (Cameron & Trivedi, 2005), denoted by Z. That is to say, I need to have at least a variable that will only appear in equation (5.1) and that is strongly correlated with remittances but that has no significant direct relationship with consumption of non-receiving households in equation (5.2). My choice of variable is the percentage of out-migrants to the total population of the district in 2008. It is computed using information from the 2008 Cambodia census, which was also collected by the National Institute of Statistics. In the literature, the percentage of out-migrants generally represents a migration network that plays a crucial role in the likelihood of future migration and of receiving remittances. This variable has also been used by many other studies on impacts of remittances (Acosta et al., 2007; Hanson & Woodruff, 2003; McKenzie & Rapoport, 2011). My assumption is that it does not have any significant direct effect on expenditure of non-remittance-receiving households. The percentage of out-migrants in my data varies a lot, ranging from 3.7 percent to as high as 73 percent, indicating a wide range of variation.

Table 5.3 below demonstrates results from the Heckman Two-Step estimation of per capita consumption of non-remittance-recipient households. I also provide a regression outcome deriving from OLS without correction for bias in model (3). Apparently, most coefficients in model (3) are not largely different from those in model (2), in which I control for self-selection into migration and receiving remittances (λ). The lambda coefficient itself is not statistically significant either, indicating that selection bias is small and not substantial, probably because I manage to include several educational variables that tend to capture the effects of selectivity.

This is not, however, surprising. Some other studies such as Adams (2006) in Guatemala and Barham & Boucher (1998) in Nicaragua have also reached a similar conclusion, namely, that education can be an important factor explaining self-selection. In addition, because most employment populated by Cambodian migrant workers in Phnom Penh and in Thailand are low-skilled jobs (Ministry of Planning, 2012), they are not attractive to members of wealthy families and those who have a high education. Therefore, migration and education are strongly associated. Adams (2006) also finds that including remittances from all kinds of migrants (domestic or international and legal or undocumented), like in my case, will reduce the likelihood that migration is selective with respect to consumption, education, or skills. Consequently, including lambda in the regression is unnecessary since estimated coefficients are still consistent without such correction.

I will now begin to discuss regression outcome by first paying close attention to probit model (1). In practice, we can only observe the direction of a relationship between dependent and independent variables, as the coefficients estimated by probit are not directly interpretable without calculating marginal effect. Most variables have the sign I anticipated, including the percentage of out-migrants to total population in the district, which as the literature has suggested, is strongly correlated with the probability of (not) receiving remittances.

Table 5. 3: Heckman Two-Step Estimation of Non-Remittances-Recipient Household Per Capita Expenditure

Variables	Heckman Selection Model (1)		(2)		OLS (3)	
Household Head is Male	0.0545	(0.0596)	2.590	(2.150)	2.043	(2.048)
Household Head Age	-0.0408***	(0.00711)	0.747***	(0.290)	0.934***	(0.250)
Household Head Age Squared	0.0000859	(0.0000685)	-0.0108***	(0.00281)	-0.00934***	(0.00254)
Household Head is Married	0.233***	(0.0609)	3.158	(2.950)	0.515	(2.192)
Household Head Year of Education	-0.000417	(0.00530)	0.865***	(0.177)	0.875***	(0.171)
Number of Children Under 6 Years Old	-0.0140	(0.0217)	-11.80***	(0.738)	-11.65***	(0.705)
Number of Adolescent (6-14 Years Old)	0.0608***	(0.0152)	-8.693***	(0.646)	-9.252***	(0.487)
Number of Adults without Education	0.0112	(0.0209)	-7.007***	(0.751)	-7.156***	(0.720)
Number of Adults with Primary Education	0.0224	(0.0148)	-6.862***	(0.570)	-7.125***	(0.522)
Number of Adults with Secondary Education	0.0700***	(0.0139)	-6.966***	(0.725)	-7.697***	(0.482)
Number of Adults with Tertiary Education	0.0954***	(0.0343)	3.784***	(1.377)	2.779**	(1.133)
Household Wealth: Poorest is baseline						
Poorer	-0.000445	(0.0421)	8.503***	(1.457)	8.614***	(1.408)
Middle	0.0233	(0.0439)	13.96***	(1.525)	13.84***	(1.474)
Richer	0.0234	(0.0476)	26.64***	(1.660)	26.50***	(1.605)
Richest	0.203***	(0.0655)	54.65***	(2.497)	52.93***	(2.089)
Distance to District Headquarter	-0.00292**	(0.00114)	0.0185	(0.0447)	0.0441	(0.0395)
Distance to Provincial Headquarter	0.00191***	(0.000604)	0.0828***	(0.0244)	0.0633***	(0.0192)
Dummy for Urban	-0.0119	(0.0499)	0.792	(1.714)	0.977	(1.653)
Log Village Land	-0.00663	(0.00922)	-0.652**	(0.310)	-0.612**	(0.298)
Dummy for Each Province	Yes		Yes		Yes	
% of Out-Migrants	-0.00326**	(0.00141)	-		-	
Constant	1.572***	(0.205)	48.57***	(7.874)	54.05***	(6.617)
Lambda	-		18.73	(13.47)	-	
N	9,791		6,180		6,180	

Note: Dependent variable in model (1) is the probability of not receiving remittances while it is the monthly per capita household expenditure excluding remittances in model (2) and (3). Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01. Rho=0.494 and Sigma=37.93

An examination of the ages of household heads indicates that households with older heads are more likely to earn remittances. A simple reason is that these households tend to have more members of working age, such as children of the head, who can possibly migrate, compared to households that have younger household heads. Also, contrary to the notion hypothesized by human capital theory, education tends to be negatively correlated with migration and thereby receipt of remittances. The number of household members with secondary or tertiary education variable directly suggests that households with additional highly educated members have a higher propensity not to receive remittances. This relationship can simply be attributed to the fact that those with high education tend to earn high income and also come from wealthy households or have advantageous backgrounds. And as mentioned before, most employment taken up by migrant workers is for unskilled positions. My finding is also similar to that found in many Latin American countries, as documented by Adams (2006) and Acosta et al. (2007).

Similar to what have been expected under the New Economics of Labor Migration, migration is more likely to be experienced by poorer households rather than by the elite. The coefficient for the richest group indicates that they are less likely to receive remittances compared to the baseline, which is entirely understandable, as the former have no need to migrate and earn remittances in order to diversify sources of income, minimize agricultural risks, or provide a risk-sharing approach. The propensity of not receiving remittances for other groups is not significantly different from zero, revealing that there is no substantially different tendency to migrate between them and the poorest group. This finding is, however,

inconsistent with general views that migration is a costly journey and thus only those from relatively well-off families can afford it. A possible explanation for the inconsistency is that migration in Cambodia is mainly a rural-urban phenomenon, as only a small number of households did receive international remittances (as indicated in the previous section). Therefore, generally, the cost of migration is unlikely to be a major constraint for most households, even for those at the bottom of Cambodian economic pyramid. McKenzie & Rapoport (2007) also assert that when migration is incipient, the journey cost is likely to be high, so migrants are likely to come from richer families. But over time, this cost will diminish due to migration networks, and migration itself becomes more affordable even by those who are relatively worse off.

Moving onto model (2) and (3) concurrently, we see that most of the coefficients have the sign we would normally expect, but some points are also worth mentioning. Different from the result is model (1), the age of household head is positively correlated with expenditure. There are two reasons for this. First, older people tend to spend a lot on healthcare routinely, and second, they tend to have more work experience and thus are in a higher position, all of which stimulate earnings and thereby expenditure. Having a greater number of children and adolescents, on the other hand, reduces per capita expenditure, which is totally understandable since they do not consume as much as the average adult.

Households having a head or members with high education are more likely to have high consumption, particularly so if such members have a tertiary education, which is not surprising given the current body of literature, thus requiring no further explanation. But with respect to other human capital variables, the direction of the

relationship is negative, signifying that the average per capita consumption is much lower than it is for households with university-educated members, probably due to return to education, and those with a university degree may actually earn very much more than those with only a high school diploma. Adams (2006) has also documented this unusual finding and attributed the result to return to education. Regardless of that, combing results from model (1) and (2) suggests that households with better-educated members have a lower probability of receiving remittances but are more likely to have higher consumption due to higher earning power, which in turn curtails the desire to migrate. This could be why the educational factor predominantly explains the differences between recipient and non-recipient households, making lambda insignificant.

5.5. Impact of Remittances on Poverty and Inequality

Now that I have performed the auxiliary Heckman regression, I am in a position to estimate the impact of remittances on poverty in Cambodia. To impute expenditure for recipient households in the scenario of no migration and no remittances, the estimated coefficients from model (3) are used under the assumptions stated in the previous section. Then, I can proceed to calculate the poverty rate and show what would have prevailed if these households had not had migrating members. Would the poverty level have been higher or lower relative to the actual situation now that they receive remittances? Three basic scenarios are considered. In the first scenario, I treat remittances as a completely exogenous transfer to households. That is

to say, I use both observed total expenditure and actual household size (observed number of residents in the household) to calculate the poverty headcount. In the second scenario, I still use observe household size, but I will exclude the amount of remittances from household expenditure. The third scenario is the counterfactual poverty situation in which migrants stayed at home, making household size increase, but households would not receive remittances. In each scenario, sampling weight from the survey is taken into account. In addition, Acosta et al. (2007) suggest extending the analysis by estimating the impact of remittances on poverty using only a sub-sample of recipient households. His point is that the effect prevailing among such families could be largely different from that on the national level. Their recommendation is also considered.

Table 5. 4: Impact of Remittances on Poverty Indicators in Three Different Scenarios

Type of Household	Poverty Headcount (%)			Poverty Gap (%)		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
All Households	8.6	12.4	9.2	16.8	40.4	23.6
Only Recipient Households	8.4	18.9	10.1	16.1	58.4	32.9
Only Recipient Household of Internal Remittances	8.2	15.4	7.7	15.4	35.7	31.8
Only Recipient Household of International Remittances	10.6	40.2	21.5	18.1	98.5	36.5

Source: Author.

Note: Scenario 1 is the actual current situation of households; Scenario 2 is also the actual scenario, but total amount of remittances is excluded from household expenditure; scenario 3 is the counterfactual scenario of no migration and no remittances.

Table 5.4 reports analysis results of the impact of remittances on the poverty headcount and poverty gap in three different scenarios. On the poverty headcount, if I consider remittances as purely exogenous, then remittances would reduce poverty from 12.4 to 8.6 percent, which means there is a poverty reduction of 3.8 percent. However, if I regard them as substitute income, they only lower the poverty headcount from 9.2 percent (a 0.6 percent reduction) – a small decrease. If I only consider recipient households that receive only some types of remittances, the drop is 1.7 percent, but the impact is particularly large for households receiving international remittances, the poverty headcount for which drops almost 11 percent. On the other hand, remittances slightly increase the poverty rate of internal-remittance-recipient families. But a study conducted in Cambodia by Roth & Tiberti (2017), using Propensity Score Matching, found that internal and international remittances in 2009 reduced the poverty rate of recipient households by 3-7 percent. This reduction is a bit larger than what I found, but this is reasonable because the pace of poverty reduction and impact of remittances itself can possibly become smaller over time, as Cambodian economy grew 7 percent annually between 2009 and 2014.

In an empirical study, Adams (2006) shows that the poverty rate decreased by 1 percent on account of domestic remittances, but international remittances increased the poverty of recipient households by 1.6 percent. Lokshin et al. (2010) additionally assert that remittances reduced poverty in Nepal by 20 percent over a period of 10 years. In another very convincing study using natural experiment, Yang & Martínez (2006) found a 10-percent increase in international remittances would lead to a 2.8 percent decrease in the probability that households would live in poverty. Even

though they do not attempt to control for selection bias, Brown & Jimenez (2008) and Jimenez-Soto & Brown (2012) estimate that 9 percent and 30 percent poverty reduction in Fiji and Tonga, respectively, can be attributed to the impact of remittances. The much higher effect in the latter is due to the fact that the Tongan economy relies very much on remittances. However, Acosta et al. (2008) empirically argue that remittances actually increase poverty in Mexico, the Dominican Republic, and Nicaragua. Reviewing empirical studies, however, Adams (2011) finds remittances to have generally decreased poverty by 3-5 percent in the developing world.

In my study, remittances are also found to help reduce the poverty gap, which measures the depth of poverty, or simply how far, on average, the poor are from the poverty line. I find evidence that on the national level, both types of remittances reduce the poverty gap by 6.8 percent (from 23.6 to 16.8). Therefore, the poverty rate has not only decreased, but the poor are also living in a better condition relative to the scenario in which they had not received remittances. The effect is also much higher (roughly 17 percent) if I consider only a sub-sample of recipient households. This number is much larger than that found in Roth & Tiberti (2017), who observe a poverty reduction of only 2 percent on the national level. In Fiji and Tonga, Brown & Jimenez (2008) reveal that the poverty gap declines by 3 and 16 percent, respectively. In Guatemala, the poverty gap is found to drop by 3.6-12.6 percent (Adams, 2006). While most previous studies seem to reach a consensus that remittances reduce the poverty rate and the poverty gap in developing countries, the impact of such money on inequality is less agreed upon.

Table 5. 5: Impact of Remittances on GINI Coefficient for Three Different Scenarios

Type of Household	GINI Coefficient (%)		
	Scenario 1	**Scenario 2**	**Scenario 3**
All Households	27.9 (27.1–28.8)	29 (28.2–30)	25.8 (25–26.6)
Only Recipient Household	27.3 (26.1–28.6)	29.9 (28.7–31.3)	20.2 (19.3–21.1)
Only Recipient Household of Internal Remittances	27 (25.8–28.2)	29 (27.6–30.4)	18.9 (18–19.8)
Only Recipient Household of International Remittances	29.1 (26.9–32)	36 (33.2–39.1)	24.7 (22.8–26.9)

Source: Author.

Note: Bias-Corrected Confidence Interval in parenthesis.
Scenario 1 is the actual current situation of households; Scenario 2 is also the actual scenario, but total amount of remittances is excluded from household expenditure; scenario 3 is the counterfactual scenario of no migration and no remittances.

Table 5.5 shows the impact of remittances on the GINI coefficient for different scenarios. I also present a bias-corrected confidence interval (at 95 percent) that is computed using a bootstrap procedure that replicates the estimation 1,000 times. In all sample groups, the GINI coefficient indicates that remittances actually worsen inequality. On the national level, inequality increased from 25.8 to 27.9 percent. It is worth noting that the latter number, which is computed using observed consumption figures, is also very close to the World Bank's 2011 estimation of 28.2 percent (World Bank, 2014). But even though there is only a 2 percent rise, among recipient households, the situation is actually worse, as the increase is 7 percent. The finding reinforces the idea that remittances may exacerbate inequality between households from different social groups in the long run if such a circumstance prevails.

However, as observed by Barham & Boucher (1998) and Rodriguez (1998), an increase in inequality may also be caused by artificially reduced variance of expected expenditure of remittance-receiving households, which is based on only observed characteristics of the non-recipient households. In other words, the predicted values are conditional and hence disregard other unobserved attributes that explain the variation in consumption. Therefore, observed expenditure of non-recipient households is more likely to have higher variability whereas that of the receiving households has lower variability, which may influence my indicators. Nevertheless, some research papers (Adams & Cuecuecha, 2010a; Barham & Boucher, 1998; Brown & Jimenez, 2008; Rodriguez, 1998) have reported a similar finding, namely, that remittances severely aggravate inequality. But there are also studies that challenge this conclusion. For example, Adams (2006) finds that remittances have almost no impact while Acosta et al. (2008) discover that remittances reduce inequality.

5.6. Conclusion

This chapter investigates the impact of remittances on consumption, poverty, and inequality in Cambodia using monthly per capita consumption to measure household welfare and a counterfactual method to impute it in a scenario of no migration, no remittances. I also test for selection bias, and the result shows that non-remittance-recipient households are randomly drawn from the population, thus, such bias is not substantial and negligible. However, with respect to human capital, I reveal

that the education of household members and household head is a power variable which explains both propensities not to migrate and not to receive remittances and better consumption of other members. Therefore, education is the predominant characteristic that mainly accounts for selection into migration, but contradictory to human capital theory of migration, education in Cambodia in negatively correlated with migration.

Then, I simply proceed to predict per capita expenditure of remittance-receiving households using OLS without controlling for lambda. Comparing between households that do or do not receive remittances, I find strong evidence that in 2014 remittances reduced poverty by about 0.6 percent on the national level, but the impact is quite larger (1.6 percent) if I only consider recipient households instead of all households, and it is very large for international remittance-receiving households. But the implication is that these households rely very much on international funds and thus will fall back below the poverty line almost immediately if such money is transferred irregularly. In addition, I discovered that the poverty rate has not only decreased but that the poor are also living in a better condition compared to a scenario in which they received no remittances. Both types of remittances generally decrease the poverty gap by 6.8 or 17 percent for a sub-sample of recipient households. However, they also increase inequality by 2 percent, as measured by the GINI coefficient. This situation may be exacerbated in the long term due to increasing amount of remittances flowing into Cambodia, especially to households that can afford to have migrant workers in South Korea and Japan, as such funds tend to flow toward the middle-income families rather than the poor.

CHAPTER 6

CONCLUSION

6.1. Synopsis and Discussion

This section will first summarize the main findings of the entire dissertation chapter by chapter. Then, I will go on discussing implication of the findings at the end of the section. In section 6.2, policy recommendations are suggested based on the findings while directions for future research are presented in section 6.3.

This dissertation contributes to the growing interest in understanding the mechanism through which remittances spur development. The entire thesis presents new evidence to the controversial debate on the impact of remittances on children human capital development by looking at the timing of receiving remittances, origin of remittances, and their impacts on different sub-group of population. I apply different two stage modeling methodologies to data from the Cambodia Socio-Economic Survey of 2009 and 2014.

On the impact of remittances on household educational investment in chapter 3, I find that even for a particular context, differences in the time of receiving various income including remittances can significantly lead to different expenditure patterns. Cambodian households indeed changed their spending behavior after the economic crisis in 2009, but there is still not enough evidence suggesting that remittances in

general increase household scholastic expenses. But other irregular earnings have a substantially large effect on it, larger than regular income from agricultural and business activities. As a result, I conclude that Cambodian households do not think of remittances as transitory income or that remittances are fungible when they are used to spend on education. In another word, individuals use remittances just like any other permanent income when it comes to educational spending. When I separate between internal and international remittances, results show that the latter lowers household expenses on education. A one-dollar increases in international remittances will decrease educational investment by USD 0.25, but such effect is only statistically significant for households that receive more than USD 50 of remittances in the past 12 months and for families whose income is below average of that of Cambodian households. Therefore, it is possible that the impact and fungibility of remittances lie not only in how a household intends to use them but also in how their importance is perceived.

Based on the findings from chapters 3 and 5, “poorer” households -- that is, those who earn less than average Cambodian household income, and household with generally low-educated members -- are more likely to send migrants and receive international remittances. This demonstrates that migrant households in Cambodia are negatively selected. Yet, one of my key concerns is that migration and remittances may not be a viable avenue for long-term development because they do not essentially contribute to increasing education of children from low-income households. Accordingly, more evidence is required to leverage understanding of what kind of investments remittances are being put towards vs. what the Cambodian households

have claimed. Certainly, it is not education. However, it is worth noting that, by saying so, I do not refer to migrant children -- that is, those who migrate with the adults to Phnom Penh. Moreover, many Cambodian migrant workers in Thailand move with their families, and many young children also accompany their parents. Some is then sent to attend education at the destination, and hence they do not appear in the survey. Regardless of that, as educational expense is not a main expenditure on which remittances are being spent, I take yet another step to further explore the impact of remittances on another indicator of human capital which is health.

In chapter 4 which investigates the effect of migration and remittances on children's health, I have developed another picture for the conclusion. It is discovered that the net impact between migration and remittances is positive and significant for improving children's quality of health. The effect is also larger for girls than boys if we take both short- and long-term growth into consideration. For the ceteris-paribus effect, a hundred dollar increase in remittances will raise height-for-age and weight-for-age z-score by 1.6 and 1.2 SD, respectively. Moreover, one needs to receive at least USD 94 of remittances from each migrant for every child in the household to offset migration effect. I also argue that selecting female member into migration is more detrimental to children in long-term than sending a male off, but the opposite is true for short-term. In addition, after testing Friedman's (1953) Permanent Income Hypothesis, remittances are found not to be fungible since they are used disproportionately compared to other types of household income when purchasing healthcare. That is, when it comes to health expenditure, households tend to invest a lot using the remittances they receive. On the other hand, other income may have been

used to smooth other consumption. My findings in chapter 4 additionally provide evidence to support a statement that remittances are directed toward health expenditure as the Cambodian migrant workers in Thailand have claimed.

In chapter 5, I use only Cambodia Socio-Economic Survey in 2014 to investigate the impact of remittances on consumption and poverty. Unlike other studies that use income to measure poverty, I employ monthly per capita household consumption. I also consider remittances as a substitute income rather than an exogenous transfer. Therefore, imputing counterfactual expenditure in a scenario of no migration no remittances is necessary. The findings in this chapter are as follows: with respect to human capital variables, their association with migration is negative, indicating that households with highly educated members tend not to have migrants and not to receive remittances. My findings, thus, add evidence against the human capital theory of migration, which claims that educated people are more likely to migrate because they expect a higher rate of return to their education at the destination. However, my results are consistent with the NELM. Moreover, households with better-educated members have a higher thriving consumption, probably because they have higher earning power, which in turn curtails the desire to migrate. It must be why the educational factor predominantly explains the differences between recipient and non-recipient households. To elaborate other results, I also find a strong evidence that remittances reduce the poverty rate by 0.6 on the national level or 1.6 percent for recipient households. In addition, remittances decrease the poverty gap by 6.8 percent or 17 percent for a sub-sample of recipient households, but they also increase inequality by 2 percent, as measured by the GINI coefficient.

For the first discussion about the findings, one may ask why remittances have a positive influence on children's health outcome but negative effect on their education? Such question can be best answered by Behrman (1987) who actually emphasizes that in some poorer countries in which education is limited and the rate of return to schooling is low (as most employments do not require high skills), non-schooling investment such as health is considered by most as a much better option. Evidently, many studies concerning return to education in Cambodia suggest that earning of wage-worker has limited association with their education and skills, and those who have university degree earn just twice as much as those without any formal education (Hang, 2016; Lall & Sakellariou, 2010). The return to one additional year of education between 2004 and 2015 is only between 6-7% whereas return to tenure is likely to be higher (ibid). In addition, a lower quality of education and nepotism are other reasons that contribute to lower return to education (Peou, 2017). Given the wages earned by low-educated and highly-educated people are not largely different, there is a lack of motivation for young adults to pursue high schooling, which then becomes very unattractive itself.

Consequently, it is explicable that a household is likely to invest more in healthcare so that its members remain healthy and enjoy longer return to labor force participation (or return to tenure). As a result, even if household income increases through inflow of remittances, it will have little or no significant effects on educational dimension in general because most expenses are directed toward improving health conditions. In fact, most empirical studies on the relationship between remittances and the left-behind household members' health outcome or

knowledge tend to concur and indicate a significantly positive influence while those that concentrate on the impact of internal or international migration and remittances on education is much more debated (Adams, 2011; Antman, 2013; Brown & Jimenez-Soto, 2015). The Permanent Income Hypothesis also describes household preference in using certain types of income for certain types of expenditure based on their perception regarding of the nature of income and spending itself–whether the income is "permanent" or "transitory" and whether the expenditure is considered as consumption or investment.

For an observation, it should be emphasized that most empirical papers on the relationship between remittances and children's health tend to indicate a positive association, particularly those concentrate on other regions but Southeast and East Asia. Studies such as Hildebrandt & McKenzie (2005) and Lopez-Cordova (2005) claim that remittances do improve infant survival in Mexico. Amuedo-Dorantes & Pozo (2011) also agree that remittances increase household expenditure on health there. In countries that rely heavily on remittances like Tajikistan and Tonga, children living in recipient household tend to be better off relative to those whose household does not receive such money (Azzarri & Zezza, 2011; Stillman et al., 2012). The study about Tongan children is particularly very convincing, for the authors use randomized experiment. However, as mentioned before, negative effect on children' health or physical growth is documented in China (Gao et al., 2010; Li et al., 2015; Meng & Yamauchi, 2017) and in Thailand (Jampaklay et al., 2018). In another research which includes Indonesia and Thailand, Graham & Jordan (2011) show a negative consequence of migration on left-behind children's psychological well-being

while in Vietnam and the Philippines, Graham & Jordan (2013) find no significant impact of remittances on nutrition. An additional study in Vietnam, however, claims that migration does reduce children's health outcome and cognitive ability measured by test scores (Nguyen, 2016). In comparison between our study and those conducted particularly in Southeast Asia, the influence of migration and remittances seems rather mixed whereas research in other countries outside of the region appears to concur. However, based on quantitative data, it is difficult to explain thoroughly the mechanisms through which remittances positively or negatively affect children's health in these countries. Better understanding of country's specific context may help elucidate the mixed conclusion.

For a final remark, it is worth highlighted that although remittances may not have a direct positive effect on household educational investment, it may also do so on other indicators which are not under my study such as agricultural or business investment. 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-off relative to that of the pre-migration situation. This is substantiated by my findings in chapter 5. 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 in a field to earn their livelihood. Such indicators, however, are not captured by the Cambodia Socio-Economic Survey.

6.2. Policy Implications

As for policy implications, what the Cambodian government should do first to make a policy targeting vulnerable groups is to conduct a national migration survey (or at best a social experiment by cooperating with Thai government and financial institutions) and include questions asking in detail about migration experience, remittances, the educational progression and performance of left-behind children and those who follow their parents to the destination. It is crucial that policymakers should be aware of what migrants' children are doing so that migration can be an advantage in improving children's schooling results. Grade or school enrollment cannot tell much in this sense; therefore, a valuable insight cannot be drawn, and evidence-based policies cannot be formed properly. Conducting a comprehensive migration survey will also allow government to estimate how many children are moving with their parents or left behind at the area of origin. Neither number of the former nor the latter has ever been estimated.

A national campaign to provide financial literacy for rural households is essential for them to better manage their financial situation. This is, especially for those in migration prevalent areas. Moreover, the government should encourage migrant households to not only save and invest in non-education enterprises but to also invest more in the schooling of their younger generations. It can be better understood by examining in more detail migrant's purposes of sending remittances, what remittances are used or intended for by households, and whether or not households are saving a portion of remittances. In addition, they should promote awareness of the pros and cons of international migration. This is particularly the

notion that migration is not the sole solution to increase household income quickly nor easily. Once again, this is why it is fundamentally important to distinguish households based on the types of remittances they receive, including those that only receive private transfers. Otherwise policies cannot be drafted and used to target specific vulnerable groups and will be less effective because they too neutral.

A short-term policy recommendation for domestic migrants would be for the government to lower the cost of sending remittances, thus inducing migrants to remit more money. But this does not necessarily mean to suggest that Cambodia should continue to allow a huge migration influx into Phnom Penh, for there is a larger tradeoff effect. However, while migration itself cannot be simply stopped, difficulties associated with travel or unnecessary separations between households and migrants can be minimized to increase interaction frequency among household members and lessen the negative impacts of separation. Thus, merely raising remittances is not enough. The development of infrastructure and communication facilities should be given priority in migrant-sending provinces so that migrants can go home more frequently. One may think that this will instead promote internal migration, but if the transportation system is good enough, people from surrounding provinces of Phnom Penh could become daily commuters rather than permanent internal migrants, which means they can spend more time with family.

Government policies should also be directed to help children to better get accustomed to being the left-behind (live independently). During the initial period of adult migration, there might be a short-lived effect that briefly disrupts children's engagement in schooling because they still have not gotten used to it, but as time goes

by, they might also start to lose interest in going to school. As a result, even though this phenomenon may be temporary, it has the potential to drag children away from school entirely. The effect will gradually fade away, but before that, it is a critical period during which they do not benefit from such migration of adults.

Finally, it should be highlighted that in the long-term, remittances may continue to exacerbate social inequality between households that receive them and those who do not if they do not gradually flow toward the poorest as the theory has suggested. My concern here is that international migration of Cambodians to highly developed regions such as Japan and South Korea is strictly regulated by both government of sending and receiving countries from submission of application to job placement. Furthermore, the cost of regular migration is largely determined, and the procedure is time-consuming whereas undocumented migration is not practical. Thus, I doubt that "migration network" will have a potential role to play in facilitating movement by reducing the cost. The theory itself is from a perspective of Latin American mobility to the United States, the context in which irregular migration is quite possible at least until recently. In Cambodia, it is generally believed that migrant-sending households are those who are relatively well-off, for migration journey is so expensive especially the international one. Therefore, only richer families in Cambodia can actually afford it, and thereby they may be in an even more favorable situation since they have better access to international remittances particularly those that stem from migrant workers in countries such as South Korea. As a result, the government may consider taxing Cambodian migrants who are

working in high income countries to redistribute national wealth and increase national budget for the country's development.

6.3. Suggestions for Future Research

Based on the general findings and limitations of the dissertation, I would like to outline some suggestions for future research as follows.

First, apart from children's education and health, household may also invest in agricultural and non-agricultural activities such as small-scale business which will more or less positively influence their income in long-term too. On the other hand, household may mainly direct their remittances toward different types of consumption such as food, durable goods, or housing if they start from a very low level of consumption. Economically speaking, spending remittances on housing is also fruitful and better than on food or durable goods after the basic consumption to maintain life and growth is already attained, as excessive food consumption is not a productive way to improve household situation (Adams, 2006). However, this study does not go further to investigate what household remittances are spent on in detail if not investment in children. Therefore, future research can attempt to understand their other preferences in using remittances. It is also knowledgeable to see if remittances increase other types of investment.

Second, from literature review, cross country study using nationally-representative data is meager while most research is conducted using only a specific

country data. Based on my own perspective, the most remarkable paper is Acosta et al. (2007) which tries to compare the impact of remittances on children's human capital across eleven Latin American countries. Some other studies such as Graham & Jordan (2013) either rely on small sample size collected within a restricted geographical region and/or do not address potential endogeneity problem which can lead to substantial bias. As a result, future research can start by comparing across countries especially those in Asia using national survey since literature talking about this region is more limited compared to that in Latin American context. And because Eastern Asia has experienced the highest rates of growth in remittances inflow in the world (Acosta et al., 2008).

Third, as implicitly notified in the main body of my dissertation, South-North and South-South migration are clearly distinct types of movement signifying the need of independent and more concrete empirical evidence for the latter. In many South-South context, remittances tend to have negative impact on children's education but positive effect on their health. In contrast, remittances are more likely to be found to have beneficial or no impacts on children in the South-North perspective. The differences may be attributed to characteristics and labor markets of both countries of origins and destinations and type of migrant workers in each type of movement. For developed immigrant-receiving countries like USA and Europe, return to education for labor migrants is much higher than their country of origin, and their skills are better matched in the north than what the market and firms are demanding in their home country (Chiquiar & Hanson, 2005). In contrast, south-south migration largely happens between countries with contiguous border such as from Cambodia to

Thailand where vast number of migrants are unskilled and undocumented and entitled to no labor law or social protections. In addition, migrant workers in the North such as those in the U.S often seek permanent residence or citizenship, and this decision alone is likely to influence the amount and regularity of the flow of remittances hence the impacts.

Fourth, as I have mentioned in the literature review section, the impact of migration and remittances on early childhood development is relatively a new sub-field of research, and previous studies tend to use indicators that are not internationally accepted. Therefore, future research is largely possible in this area, and one potential indicator to measure early childhood development is that of the UNICEF. Recognizing the lack of universal appraisal, UNICEF has initiated a first international systematic assessment to monitor the developmental status in early childhood for low and middle-income countries called Early Childhood Development Index. It was first introduced in 2009 during the 4th round of Multiple Indicator Cluster Survey and has been available since then.

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ABBREVIATION

2SLS	Two Stage Least Square
ASEAN	Association of South-East Asian Nations
CSES	Cambodia Socio-Economic Survey
DHS	Demographic and Health Survey
GDP	Gross Domestic Product
GLM	Generalized Linear Model
HFA	Height-For-Age
ILO	International Labor Organization
IV	Instrumental Variable
KHR	Khmer Riel (Cambodian currency)
KR	Khmer Rouge
MFI	Micro-Finance Institute
MoP	Ministry of Planning, Cambodia
NELM	New Economics of Labor Migration (theory)
NIS	National Institute of Statistics, Cambodia
OLS	Ordinary Least Square
PIH	Permanent Income Hypothesis (theory)
PRK	People's Republic of Kampuchea
PSM	Propensity Score Matching
SD	Standard Deviation
UN	United Nations
U.S.	United States of America
USD	United States Dollar
WFA	Weight-For-Age
WHO	World Health Organization

APPENDIX

Table 3A: 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 (0.0630)	-0.0288 (0.101)	0.437*** (0.0704)	0.145 (0.128)
Siem Reap	0.246*** (0.0690)	-0.447*** (0.110)	0.267*** (0.0756)	-0.0943 (0.144)
Takeo	-0.204** (0.0678)	0.0486 (0.116)	0.283*** (0.0719)	0.270* (0.131)
Constant	-1.963*** (0.249)	3.126*** (0.369)	-1.181*** (0.249)	3.413*** (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

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