



ASSESSING THE ECONOMIC IMPACTS OF MIGRATION AND REMITTANCES ON HOUSEHOLD EXPENDITURE PATTERNS, CREDIT BORROWING, AND AGRICULTURAL INPUT EXPENDITURE : EVIDENCE FROM CAMBODIA

Lamy MONG

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Academic Adviser: Professor Nobuaki MATSUNAGA
Student ID: 096i404i
Student Name: Lamy MONG

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EXECUTIVE SUMMARY

Labour migration has become the focus of attention of international development organisations, policy-makers and academic researchers due to its great magnitude, strong resilience and significant impacts. Despite its significance globally, there is little knowledge about the impacts of it in Cambodia because migration is a new phenomenon recently occurring. Its role is growing importance in the national economy and household livelihoods. A majority of the workforce working in the main sectors of the economy are rural out-migrants, and there are high demands for unskilled workers in host countries. Migrants and remittances are growing and having significant impacts on reducing poverty, increasing household income, smoothing income variation, improving child education, mitigating unexpected risks and improving household livelihoods.

Despite its growing importance, there is limited research assessing empirically the migration and remittance impacts in Cambodia. Recent research has focused on migration in Cambodia as refugee displacement due to political disorder and as a human trafficking issue, but has not studied the economic impacts of labour migration on, for example, household expenditure patterns. Even though remittances have been increasingly recognised to have a role in relaxing credit constraints and mitigating unexpected risks, the direct impact assessment of remittances on credit have remained largely unexplored. Since the impacts of remittances on agriculture are complex and theoretically pre-undetermined, they must be empirically defined through a case-by-case analysis. To the best of the author's knowledge, there are only two studies empirically examining the impacts of migration and remittances in Cambodia where the first is on poverty reduction and the second is on sources of income, income variation and child education. Therefore, it is the motivation for this research to empirically examine the impacts of migration and remittances in Cambodia.

This research conducts an empirical investigation of the impacts of migration and remittances on three areas: (1) the impacts of migration on household expenditure patterns, (2) the impacts of remittances on household credit borrowing, and (3) the impacts of

remittances on household agricultural input expenditure. This research uses nationally representative survey data, Cambodia Socio-Economic Survey 2009 (CSES 2009), to examine these aspects, and the research also addresses the endogeneity problems of migration and remittances in the analyses.

With respect to the first topic of investigation, this research finds that the migration determinants are impacted significantly and differently by these indicators: household characteristics, household assets, educational indicators, village indicators, regional indicators and past migration history. Furthermore, the research finds that migration increases total household expenditure per capita. It indicates that migration improves household livelihoods through the income-effect of remittances. Among food and non-food expenditure, migration is found to have positive impacts on both categories, but, in terms of estimated coefficients, the impacts on non-food categories are found larger. In the non-food expenditure categories, migration has positive impacts on almost all categories of actual expenditure. Moreover, the results indicate that migration appears to change household spending behaviours from food and health consumption to education and communication consumption. Although migration appears to change household spending on food share, the findings indicate that migration increases actual food expenditure. Since the results demonstrate that migration has positive impacts on education and communication and appears to change household spending behaviours toward these spending categories, these results can give an indication that migration has development impacts on households, especially in rural areas.

Regarding the impacts of remittances on household credit borrowing, this research finds that remittances especially from migrants are significantly and negatively associated with credit borrowing. The findings indicate that remittances improve liquidity and financial conditions of recipient households since remittances provide these households with cash income that can improve their household budgets. The findings suggest that remittances reduce indebtedness and financial constraints of the recipient households, and thus support the hypothesis of the New Economics of Labour Migration (NELM) about the lessening of

financial constraints when the credit market is imperfect. It further finds that credit is a household behavioural response to such idiosyncratic risks as health, crime and unemployment but not to aggregate risks. The empirical results also indicate that credit and remittances are significant risk-coping alternatives. Credit is more responsive to risk mitigation except for health, whereas remittances significantly reduce demands for credit in households exposed to health risk. It indicates that remittances reduce household indebtedness and burdens caused by health risk which is identified as a major and severe problem impacting rural Cambodia. In time of health shock, therefore, remittances function as insurance and substitute for credit in coping with the risk. This gives an indication that remittance-recipient households seek assistance from migrant and non-migrant members in time of health shock rather taking credit to cope with the risk. These results may be explained by the major and severe damage caused more by health risk than the others, an insufficient amount of remittances to cover all the entire shocks and the strong attachment of migrants to help their households in time of hardship.

Assessing the impacts of remittances on household agricultural input expenditure reveals that total remittances are negatively associated with crop planting expenses but are positively associated with livestock raising expenses. The findings remain exactly the same when migrant remittances are estimated, but their coefficients are larger than those of total remittances. These results suggest that remittance-recipient households may change their spending behaviours from crop planting into livestock raising activities upon the receipts of remittances. These recipient households appear not to move out from agriculture completely since remittances have no impact on agricultural income but are positively associated with non-agricultural and household income, indicating that these households may adjust their production activities upon the receipts of remittances, and remittances may affect other sources of household income. The results give an indication that remittances enable the recipients to overcome liquidity constraints in livestock raising activity. The shift away from familial subsistence-based but high-risk crop farming into high-value high-risk livestock

raising activities upon the receipts of remittances indicates the insurance role of remittances, and this shift away may be explained by the more liquid, less persistent and high-return characteristics and multifunctional roles of livestock. Similar findings are shown when the analysis is performed using internal and international remittances, and examines only rural poor households. Therefore, these empirical findings support the NELM's hypotheses on the lessening of credit and risk constraints in agriculture.

Because of the significant and positive impacts of migration and remittances on these outcomes, the government should further promote and facilitate migration through reducing migration costs, making migration processes less complicated, circulating job information informatively and connecting migrants with employers directly. Through the promotion of labour migration, the government can reduce demographic pressure by allowing post-civil war baby boomers to have jobs. Since the impacts are found to increase spending on education, communication and livestock husbandry, the government should create policies to reduce unnecessary expenses of sending remittances by migrants, so that migrant households could have more cash to make more investment spending. The government should also encourage migrant households to use remittances for investment in other productive assets. The research emphasises that the government should not restrict the labour movement since remittances enable rural households to overcome credit and risk constraints in livestock activity, or otherwise, they may be unable to escape from agricultural constraints and they will continue to experience poor production.

CHAPTER 1

INTRODUCTION

1.1. Background of the Research

In recent years, labour migration has received great attention from international development organisations, policy-makers, and academic researchers due to its great scale, strong resilience and significant impacts. It was predicted in 2009 that there would be 214 million of international migrants (UNDESA, 2009), and 740 million of internal migrants¹ in 2010 (UNDP, 2009). The amount of internal migrants, however, is widely understood to be underestimated since no single official document has yet been published. In terms of amounts transferred, remittances were estimated globally to be at USD 401 billion in 2012, an increase of more than 5% from 2011 (World Bank, 2013a). As indicated in this report, the remittance flows to developing countries were nearly half of foreign direct investment, and have overtaken the volume of official development assistance and private portfolio investment since the last decade. Particularly in Asia, the flows to South Asia, Southeast Asia and the Pacific were about half of the total flows (ADB, 2012a), of which USD 109 billion each went to East Asia and the Pacific, and the South Asia regions in 2012 (World Bank, 2013a). It should be noted that these are transfers recorded through formal financial institutions and largely from international migrants. However, although transfers through informal channels are not recorded, the unrecorded flows are estimated to be as great as 50% to 250% of the recorded official flows (Aggarwal et al., 2011; and Chowdhury, 2011).

Labour migration and remittances have considerable positive impacts on home countries. They are found to have significant impacts on a number of outcomes: poverty and inequality reduction, income generation, child education and health improvement,

¹ The author has surveyed a large number of studies and finds that the term “internal migrant” is frequently used to represent for “domestic migrant”, and so this research uses the term “internal migrant” throughout.

agricultural production enhancement and other socio-economic indicators (Taylor, 1999; Taylor and Martin, 2001; Rapoport and Docquier, 2006; Adams, 2011; and Mendola, 2012). They also play a significant role as an informal risk coping strategy at individual and household levels (Skoufias, 2003; and IOM, 2013). In the event of negative income shocks or crises, migrant remittances are a steady source of income (Yang, 2011) and more resilient than any other income sources (Sirkeci et al., 2012). For rural households, remittances are informal social protection against the impacts of those hardships (World Bank, 1997). According to Walmsley and Winters (2003), migration is understood to generate returns even as large as trade liberalization has done. Disaggregating the impacts of migration into internal and international, the former's effects have been asserted to be much greater than the latter's effects (Deshingkar, 2006; and IOM, 2013). Since there are a greater number of internal migrants than international migrants, these studies indicate that internal remittances may account for a larger amount than international remittances and reach more families in poor rural areas. As they specify, a majority of internal migrants are from rural poor households, and there is a greater propensity to remit to families left behind. Internal migration is estimated to be growing at an increasing rate greater than that of international migration (Deshingkar, 2006; and IOM, 2013). To address the overall effects of migration, the Global Forum of Migration and Development has been held annually since 2007 to link related agencies to address and discuss the issues, challenges and opportunities of migration, and to exchange information on the experiences, practices, and policies of migration.

Even though the scale of migrants and remittances is globally large, in Cambodia it is relatively low. It is only recently that Cambodia has been involved in this labour migration phenomenon (Maltoni, 2007; Chan, 2009b; and IOM, 2010). In the last four decades, as indicated, Cambodia was engaged in migration but that type of migration was due to the civil war and political instability. Lately, the labour migration phenomenon has emerged due to economic booms in the country's industry and services sectors, and due to high demands for low-skilled workers in neighbouring countries (Maltoni, 2007; Chan, 2009b; and IOM, 2010).

Consequently, labour migration has started to play a key role in economic growth, poverty reduction, and rural livelihood improvement. Its role is becoming important since the amount of migrant remittances is increasing and accounts for a significant proportion of the economy. Between 2003 and 2009, the amount of remittance flows grew substantially from USD 138 million to USD 338 million, and the 2009 amount accounted for about 3.4% of GDP at that time (World Bank, 2011). In terms of economic growth, Cambodia has achieved remarkable growth rates where the growth rate in 1998-2007 was nearly 10% on average (World Bank, 2009). Cambodia obtains its first double digit growth rate in 1999 and then the second in the entire period of 2004-2007 (Figure 3.1). The garment, construction and tourism sectors in addition to agriculture are the factors contributing to this strong growth (World Bank, 2009). For this growth, labour migrants are the main workforce for these sectors (World Bank, 2009); therefore, labour migration from rural Cambodia plays a major role in pushing the economy upward. These migrants “change the employment structure, improve the efficiency of labour utilisation, and expand the scope of rural development” (Zhang and Lin, 2010, pp.203).

In the initial stage of development, rural out-migration is an unavoidable phenomenon for each and every developing country, where rural people depart from their home of origin to look for jobs in urban areas or elsewhere. In Cambodia, this phenomenon is presently occurring where labour migrants account for a great figure in the total population (NIS, 2009), and this phenomenon can be explained by push and pull factors (Godfrey et al., 2001; Maltoni, 2006 and 2007; Yamagata, 2006; CDRI, 2007b; Murshid, 2007; Chan, 2009b; Neth, 2009; and IOM, 2010). This migration, whether migrants move within provinces or between provinces, is more dominant than international migration (NIS, 2009). There are high proportions of migrants moving from one rural to another rural area, and from rural to urban areas (NIS, 2009). In rural Cambodia, labour is abundant and underutilised, and this labour movement is asserted to have no impacts on their local production (CDRI, 2007b; World Bank, 2009; ADB, 2012b; and Theng and Flower, 2014). This means that the loss of labour

due to this movement does not impact the local production since the marginal productivity of labour is nearly or equal to zero. Also, for any types of migration either internal or international, these migrants are mainly involved in unskilled or low-skilled jobs (CDRI, 2007b; Lee, 2007; Maltoni, 2007; and NIS, 2009).

In Cambodia, labour migration has a growing important role in improving livelihoods of households migrants left behind at their home of origin. It is found to be an important mechanism for rural households to cope with risks since a majority of these rural households do not have any protection provided by the government (Yagura, 2005 and 2009; and Maltoni, 2007). In time of shocks, whether they are idiosyncratic or aggregate risks, remittances are empirically found to have a role in mitigating and offsetting the loss impacts in rural migrant households (Luch, 2012). In his empirical findings, remittances are also found to smooth rural household income when these shocks occur. He further finds that remittances sent by garment migrant workers have positive impacts on household income. Moreover, Luch gives an empirical indication that migration and remittances have a net effect to increase child education of those migrant households. In another empirical study, Tong (2011a), remittances are found to reduce poverty, with the impacts of international remittances larger than those of internal remittances. The impacts are larger when remittances are estimated on the depth and the severity of poverty. His findings also indicate that remittances appear to have positive impacts on improving household income but have less effect on reducing inequality. There is another empirical study, Yagura (2012), which does not examine the impact analysis, but examines the determinants of marriage decisions by migrants in Phnom Penh. He finds that migrants with low probability to obtain inherited land from their families at their home of origin are more likely to get married with other migrants from other provinces when they meet in Phnom Penh. In contrast, migrants with a high probability to receive inherited land from their families are more likely to return home and get married with someone there. Besides these studies, a number of descriptive studies assert this growing importance of labour migration in Cambodia. Yamagata (2006) finds that garment workers have important

effects on increasing income, improving livelihoods and reducing poverty of rural households. Similar effects of migration on rural household livelihoods are also found in the studies by CCC (2005) and Dahlberg (2005). Other descriptive studies by World Bank (2006), CDRI (2007b), IOM (2010), Chan (2009b), and Hing et al. (2011b) give findings that migration has impacts on increasing household consumption. In sum, labour migration is found to have an important role in household livelihoods.

In this regard, although labour migration has been a focus of attention since it has recently been found to have significant impacts in Cambodia, to the best of the author's knowledge, there are only two studies empirically examining these impacts. They are Tong (2011a) on poverty reduction, and Luch (2012) on sources of income, income variation and child education. Tong (2011a) uses nationally representative survey data for his analysis, while Luch (2012) uses small sample panel data of garment migrant workers and other nationally representative survey data for his analysis. The other studies use the descriptive approach and use data covering small samples for the analyses. The data in these studies generally concentrate on areas with a larger probability of migration and on migration to Thailand. Therefore, there is a lack of empirical research on the impact analysis of migration and remittances, and there is a need to conduct more empirical research. Also, because migration is recently occurring in the country and it contributes a significant figure to the national economy, it is motivation to thoroughly conduct empirical analyses of the impacts of migration and remittances by using a comprehensive national survey dataset.

1.2. Objectives of the Research

This research empirically assesses three aspects of labour migration and remittances on Cambodia's households. The research firstly examines determinants that have effects on the household decision to send out migrants. It further assesses the impacts of labour migration on total household expenditure, and on a number of expenditure categories. Then, it assesses household spending behaviours by examining the migration impacts on expenditure shares of these expenditure categories. It examines whether the expenditure patterns are consumption

or investment spending associated with migration. The research further examines these impacts in urban and rural households. It should be noted that this first empirical investigation was published as a peer-reviewed journal article in the *Cambodian Economic Review*, issue 6, in December 2013 to partially fulfil the requirements for the doctoral degree of the author.²

In the second aspect, the research examines the direct impacts of remittances on household credit borrowing in rural Cambodia. It examines the hypothesis of the credit constraint lessening of the New Economics of Labour Migration (NELM) in rural Cambodia. It also assesses the impacts of idiosyncratic and aggregate risks on credit borrowing. Moreover, the research assesses the role of remittances toward credit borrowing as risk mitigating tools when these idiosyncratic and aggregate risks hit rural Cambodia's households. It examines how rural households choose between these risk coping tools during these shocks.

In the third aspect, the research examines the impacts of remittances on household agricultural input expenditure in rural Cambodia. It examines the impacts on input purchases in crop planting and livestock raising activities. It investigates whether rural households intensify their subsistence crop activity or shift into high-value livestock activity upon the receipts of remittances. It also examines the impacts of remittances on agricultural, non-agricultural and household income. It further examines these impacts in rural poor households.

1.3. Organisational Structure of the Research

The structure of this research continues with Chapter 2 where a number of theories related to labour migration are reviewed and discussed. This chapter also addresses methodological problems and their solutions in the empirical investigation into the impacts of

² The reference for this published article is as follows: Mong, L. (2013). The Impact of Migration on Household Expenditure Patterns: Evidence from Cambodia. *Cambodian Economic Review*, 6, 37-77

migration and remittances. Before the three empirical chapters, Chapter 3 gives an overview of Cambodia's economic performance and the contributing sectors to the economy. The chapter further reviews national poverty rates and inequality in order to understand whether or not the country's economic growth is pro-poor growth. It also gives an overview of labour migration and remittances in Cambodia. The three empirical studies begin with Chapter 4, which is the slightly modified version of the published article mentioned above, modified to maintain the consistency of dissertation style though the contents are unchanged. Chapter 4 examines the impacts of migration on household expenditure patterns, whereas Chapter 5 and Chapter 6 assess the impacts of remittances on household credit borrowing and on household agricultural input expenditure in rural Cambodia, respectively. The research concludes in Chapter 7 with concluding remarks about the research findings, policy implications, and recommendations for further research. Finally, there are three appendices, Appendices A, B, and C, which provide supplementary estimation tables for Chapter 4, Chapter 5, and Chapter 6, respectively.

CHAPTER 2

THEORETICAL CONCEPTS OF RURAL OUT-MIGRATION, AND METHODOLOGICAL PROBLEMS AND SOLUTIONS

This chapter reviews and discusses theoretical concepts related to rural out-migration in the first section. In the second section, the chapter addresses methodological problems with the impact analysis of migration and remittances before the discussion on solutions to the methodological problems. This chapter provides the very important theoretical and methodological foundations for the impact evaluations of migration and remittances in following chapters.

2.1. Theoretical Concepts of Rural Out-Migration

This section reviews theories that address the concepts of rural out-migration. Theoretically, the two-sector model developed by Lewis (1954) in his ground-breaking study has been the classical model for analysing rural out-migration. In his model, there is a labour movement from the rural traditional sector to urban modern sector, or in other words, from the rural non-capitalist to urban capitalist sector (Taylor and Martin, 2001). Taylor and Martin give a comprehensive review of Lewis's model as follows: The rural traditional sector has low productivity and concentrates on rural areas, known as the agricultural sector. The model assumes that this sector has a labour surplus and does not use workforce or capital so extensively. Besides, the urban modern sector concentrates on the urban economy and employs a large workforce. This sector produces goods and is known as the manufacturing sector. In the model, the rural sector has a lower wage rate than the urban sector, and the labour movement has no impacts on the wage rates of these two sectors. There is an abundant and unexhausted labour supply from the rural sector to the urban sector at any given wage rate and the supply curve is perfectly elastic. This indicates that the marginal productivity of labour in the rural sector is zero, and thus the rural out-migration does not affect the rural production or cause a plunge in the rural outputs. However, they specify that this two-sector

model will no longer hold when this unlimited labour supply and the zero marginal productivity of labour are unbinding and exhausted at one point. At that point, therefore, the marginal productivities of these two sectors are equal, and then labour migration may occur because of the inter-sector wage differences (Taylor and Martin, 2001).

The limitations of this classical two-sector model were pointed out and modified in the work of Todaro and Harris, presented first in Todaro 1969's publication, and in 1970, in a joint study. The significance of their further development of rural out-migration theory has been extensively reviewed by other researchers (Taylor and Martin, 2001; Meier and Rauch, 2005; and Mendola, 2012). Based on the presentation of Todaro and Harris' work in those studies, the model is explained as based on the objective of expected income maximisation. As indicated in those studies, the model assumes that migrants are risk-neutral and they decide to migrate or not depending on the difference in wages between rural and urban areas. The model also accounts for the success probability to acquire jobs in the urban sector, the rural and urban wages, the costs of migration, and the imperfect market conditions. There is a substantial increase in rural out-migration if the difference in wages between rural and urban areas increases. This trend remains the same even though the urban sector is not fully capable of absorbing these migrants and even though there is a high risk of being unemployed. In the long term, the probability of obtaining urban jobs will decline, but this rural out-migration trend appears to remain similar if the wage difference continues to grow. However, the model does not capture other risky components which can influence the migration decision and does not account for its impacts on origin communities (Taylor and Martin, 2001; Meier and Rauch, 2005; and Mendola, 2012).

The theoretical concepts of rural out-migration have been developed into another new perspective, the New Economics of Labour Migration (NELM). This new perspective is greatly discussed by Lucas and Stark (1985), Stark and Bloom (1985) and Stark (1991). In this new perspective, the rural out-migration is no longer the decision by individual migrants themselves, but it is the decision by the families (Lucas and Stark, 1985; Stark and Bloom,

1985; Stark, 1991; Taylor, 1999; Taylor and Martin, 2001; and Mendola, 2012). As indicated in these studies, the migration decision is regarded as an implicit familial contract and as a household strategy to cope with market failures. In the concept, rural households face incomplete credit and insurance markets, and this makes it difficult for households to gain access to capital, credit or insurance. In this regard, they specify that the migration decision is the way to self-finance and self-insure against any unexpected risks. They further indicate that migration can provide these rural households with remittances to relax credit constraints and to mitigate income shocks. The flows of migrant remittances can be explained by a number of motives such as altruism, exchange, insurance and investment (Rapoport and Docquier, 2006). With this capital, these households can adjust their household production from subsistent-based familial activities to commercial agricultural activities (Miluka et al., 2010; and Taylor and Lopez-Feldman, 2010). Therefore, this cooperative decision is not only to lessen credit constraints and to minimise the impacts of unexpected risks, but also to diversify sources of household income (Lucas and Stark, 1985; Stark and Bloom, 1985; Stark, 1991; Taylor, 1999; Taylor and Martin, 2001; and Mendola, 2012). The income positions of these rural households in their origin communities also play a role in the migration decision. These studies also emphasise that migration can have improving impacts on the origin communities through the ease of rural production constraints.

2.2. Methodological Problems and Solutions

This section addresses a number of methodological problems with and solutions to the impact analyses of migration and remittances based on the comprehensive review by Adams (2011) of fifty recent empirical studies.

Adams addresses four methodological concerns over assessing the impacts of migration and remittances. Firstly, he points out that a simultaneous causality can cause concern and generate a potential bias for the analyses. Households may decide to increase consumption, to make more loans or to shift agricultural productions at once when they decide to send out migrants. In this regard, factors which have impacts on these outcomes can also affect the

decisions of sending out migration and the remittance receipts. Secondly, he specifies that an omitted variable bias can also produce misleading analyses of the impacts. This is because of unobservable factors such as motivation or risk-averse behaviour potentially influencing the migration and remittance decisions. More desirous and motivated family members are more likely to migrate and send home remittances. Risk-averse households are more likely to be involved in a number of income diversifications and to send their members as migrants to secure their income shortfalls. Thirdly, Adams shows that a reversal effect can confound these impact investigations as well because the outcomes can cause the migration decision and the remittance receipts. Agricultural failures can encourage the migration decision and then increase the amount of sent remittances. Indebtedness can cause households to be engaged in migration, and an inflow of remittances is then observed. Lastly, he indicates that selection and non-randomness of migration and remittances can also cause a problem. It is necessary to identify that not all sent-out migrants transfer remittances back to their households remaining behind. If they are positively selected, migrants with higher education are more likely to send home more remittances, whereas it is the opposite case if they are negatively selected. Because of these complications, therefore, the causal assessment of the migration and remittance impacts can be a difficult and confounding analysis if these problems are not addressed properly.

To solve these problems, Adams gives a number of solutions by addressing six empirical methods which are used in the empirical literature. He firstly identifies a randomised experiment as the best way to solve the problems above. It is because this method analyses the causal impacts by comparing characteristics between a control group of would-be migrants and a treatment group of actual migrants. These two groups are categorised through a migration lottery that can grant a right for emigration. However, he indicates that this kind of data is really rare and so far there is only one study using this kind of data. It was conducted by McKenzie et al. (2006), examining the income impacts of migration from Tonga to New Zealand. He secondly identifies a natural experiment as another important

method to account for exogenous shocks such as rainfall or exchange rate shocks which can affect the receipts of remittances. Although Yang and Martinez (2006), Yang and Choi (2007), and Yang (2008) use these exogenous shocks for the impact investigations, Adams emphasises that these kinds of shocks rarely occur and are hard to replicate, especially in developing countries. He thirdly indicates that panel data are another good way to solve these problems. As specified in his review, panel data can reduce biasness caused by unobserved time-invariant factors through its first differentiation, but in the migration and remittance analyses these data are hard to obtain, especially in emerging countries.

Furthermore, Adams identifies a counter-factual estimation for out-migrants as another way to deal with the methodological concerns above. He reviews Barham and Boucher (1998) who examine the remittance impacts by estimating migrant counter-factual income—how much they would earn if they did not migrate—and by comparing these results with the actual income. Although this method helps solve the methodological concerns, Adams stresses that it is hard to impute the estimation. He emphasises another possible method to estimate this counter-factual scenario through the propensity score matching. This method estimates propensity scores of migrant characteristics and then matches those scores with non-migrants who have similar characteristics. However, Adams indicates that this method does not deal with endogeneity and selectivity. Additionally, he identifies the Two-Stage Heckman estimation as another important tool to solve the issues. The estimation is similar to the OLS but it includes another indicator to account for selectivity and correction of the selection bias. To employ this method, as indicated in his review, it is necessary to have variables which have impacts on migration or remittances but are exogenously correlated with the outcomes of estimation. In empirical analyses, Adams states that it is difficult to find these exogenous variables. Lastly, Adams indicates that the instrumental estimation is a very common approach to address the methodological problems above. To use this estimation, relevance and validity of instruments must be satisfied. He specifies that it is quite challenging to find instruments which have direct impacts on migration or remittances but

have no impacts on the outcomes unless through migration or remittances. In conclusion, any attempt to examine the impacts of migration and remittances without using one of the methods addressed above may produce confounding results.

2.3. Concluding Remarks

This chapter reviews a number of fundamental theories related to rural out-migration where the NELM is the most recent perspective and is used in the growing empirical literature on migration and remittances. The NELM addresses the shortfalls of preceding perspectives by accounting for factors other than individuals in the migration decisions: family, community and market conditions. Using this new perspective, this research examines the migration and remittance impacts on household expenditure patterns, credit borrowing and agricultural input expenditure in Cambodia. This chapter also reviews methodological problems and their solutions in the empirical analysis of the migration and remittance impacts. By understanding the methodological problems discussed above, in these three empirical studies, this research addresses the issues by using the Two-Stage Least Squares (2SLS) method for the estimations of empirical results. Before assessing the empirical impacts of migration and remittances on Cambodia's households, however, it is necessary to understand a general picture of Cambodia's economy, poverty, inequality, labour migration and remittances. Therefore, Chapter 3 will present an overview of these economic indicators before the empirical analyses begin in Chapter 4.

CHAPTER 3

OVERVIEW OF CAMBODIA'S ECONOMY, POVERTY, INEQUALITY, MIGRATION AND REMITTANCES³

Prior to the empirical impact analyses in the next chapters, it is necessary to understand the general structure and situation in Cambodia as background and rationale for this research. General information about economic growth, poverty and inequality are described in the first section. In it, economic performance, the main contributing sectors to the economy, employment and labour market are discussed primarily. Subsequently, poverty and inequality are discussed in order to understand whether economic growth is pro-poor growth. This chapter also gives overall information about labour migration and remittances in the second section. This second section discusses trends and important characteristics of migration and remittances in Cambodia.

3.1. Overview of Economy, Poverty and Inequality

3.1.1. Economy

After Cambodia attained internal integration, peace and political stability following years of internal unrest, the country has achieved strong economic growth. Prior to the global financial crisis of 2008, Cambodia achieved a very remarkable economic performance and was identified by the World Bank and IMF as one of the fastest growing economies in the world. According to World Bank (2009), between 1998 and 2007, the average annual growth rate of GDP was nearly 10%. Particularly, in Figure 3.1, the country achieves double digits in the growth rate once in 1999 and then in the period of 2004-2007. The average annual growth rate in this period is more than 11% before the growth rate plummets to an all-time low in

³ Beyond the specific citations to Luch (2012), the author has benefited greatly from the general organisation of material and logical development of ideas presented in Luch's 2012 dissertation. His influence is especially clear in this chapter. Luch (2012) has been very useful in this research, which extends his investigations.

2009 (Figure 3.1). This dramatic decline was due to the impacts of the global financial crisis. Following the crisis, the economy has recovered and the growth rate bounced back promptly to pre-crisis levels. The growth rate was 7.3% in 2012 and was projected by IMF to be 7.0% in 2013 (IMF, 2014). Despite this remarkable growth, Cambodia is still regarded as a low income country by the World Bank's definition.⁴ Figure 3.2 shows that the GNI per capita of Cambodia in 2012 is USD 880 which is below the USD 1,036 threshold of lower middle income countries defined by the World Bank. Over these decades, this figure shows that the GNI per capita appears to have a steady increasing trend and has been improving gradually. Between 2004 and 2012, there is more than a twofold increase in the GNI per capita, where it is just about USD 400 in 2004 (Figure 3.2). With this constant growth, Cambodia is projected to move into the group of lower middle income countries by 2015 (World Bank, 2013b).

By sector, services have contributed about 40% to the growth whereas agriculture and industry have contributed about half each of the remaining 60% (Figure 3.3). In the figure, the trend of services is gradually increasing while the trend of agriculture appears to be decreasing. Industry has emerged from the least important sector into one of the main sectors in the economy by overtaking agriculture. However, the trend in the figure fluctuates since it has been vulnerable to external factors such as the global financial crisis. By subsector, manufacturing and construction are the top two sectors contributing to the growth of the industry sector (Figure 3.4). One reason to explain the growth of the manufacturing industry is because Cambodia obtained the Most-Favoured Nation (MFN) status from the United States and the Generalised System of Preferences (GSP) from the European Union of which the duty-free and quota-free privileges of the Everything but Arms (EBA) have been

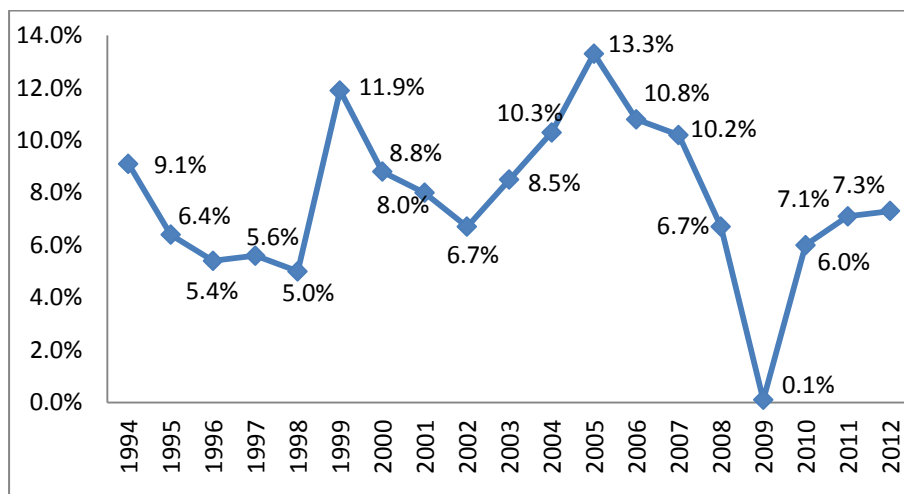
⁴ The World Bank categorises all economies as low income, low middle income, upper middle income, and high income economies according to gross national income (GNI) per capita. In 2012, based on the World Bank Atlas method, the World Bank estimated the threshold of low income economies as lower than USD 1,035. For more detail, it can be found on the website: data.worldbank.org/about/country-classification.

extended for several more years. It is also because Cambodia is a member of the World Trade Organisation (WTO), the Association of South East Asian Nations (ASEAN), and the Greater Mekong Sub-region (GMS). The growth of construction is due to the rapid development and urbanisation in Cambodia.

In terms of employment, these sectors employ very significant shares of workers. Agriculture outstandingly takes a larger share of employment by accounting for nearly 56% in 2007 (Figure 3.5). Industry employs about 15% whereas services employ nearly twice as many as industry in 2007. Despite the greater share of employment that agriculture takes, the figure shows that the trend appears to be decreasing gradually. In contrast, industry and services have increasing trends to absorb more employment (Figure 3.5). In the period of 1998-2007, as shown by World Bank (2009), industry and services annually created about 100,000 jobs in each sector. In the same period, agriculture created just about 80,000 annually (World Bank, 2009). According to Morris (2007), the average annual rate of new job creation in this period grew at 2%. In terms of labour productivity in this period, industry and services have larger labour productivity than agriculture (Figure 3.6). This gives an indication that skills in the latter sector are poorer than the former two sectors. Within the sectors, Figure 3.6 shows that the increase in labour productivity is seen in agriculture and services while it remains at a constant level in industry. Overall, the figure indicates that there is an increase in labour productivity in Cambodia in this period.

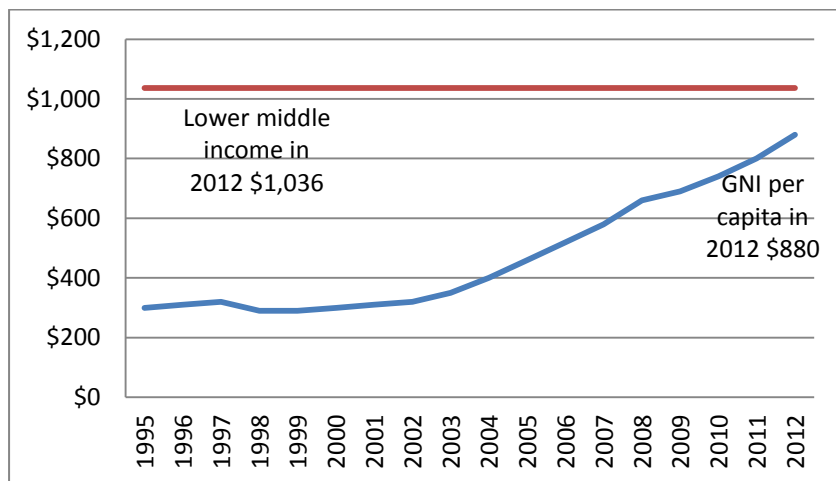
By region, these employment shares constitute differently in Phnom Penh, other urban areas, and rural areas. According to SNEC (2009), these three regions take about 8%, 9% and 82% of the workforce, respectively. By occupation categories, there is an indication of an increase in employment shares of salaried and self-employment jobs in the period of 2004-2011 (Figure 3.7). The salaried employment in Cambodia increases steadily from about 23% in 2004 to 25% in 2008 until it constitutes about 30% of the employment shares in 2011. By region, the figure shows that there is a larger increase in the salaried employment share in urban areas. It jumps from about 37% in 2004 to about 51% in 2011, and it accounts for

Figure 3.1: Cambodia's GDP growth rate



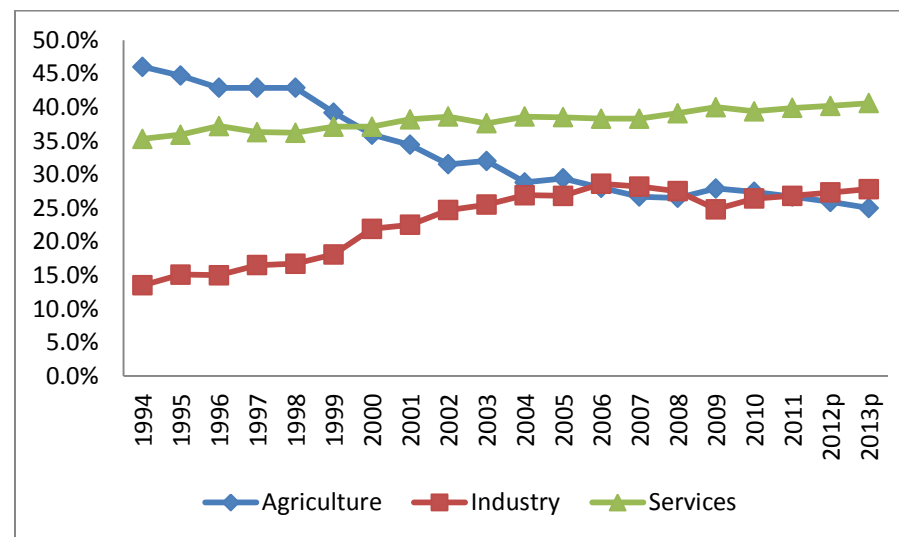
Source: World Bank (2014a)

Figure 3.2: Cambodia's GNI per capita



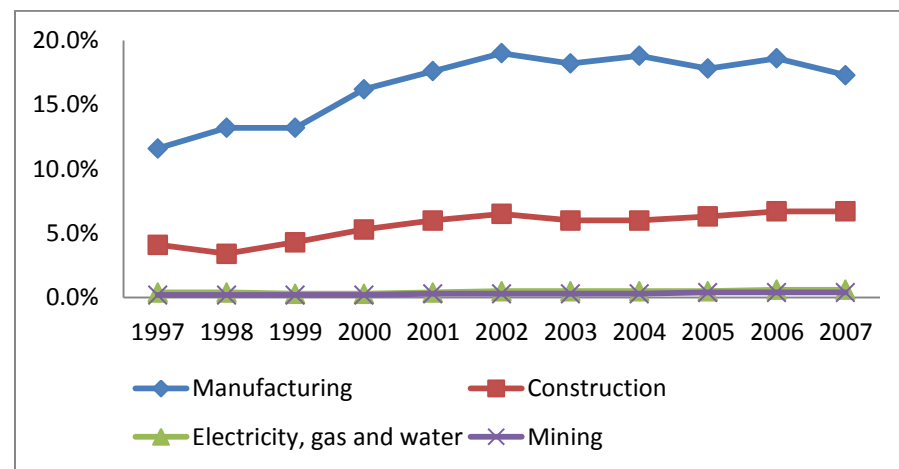
Source: World Bank (2014a)

Figure 3.3: Share of GDP by sector



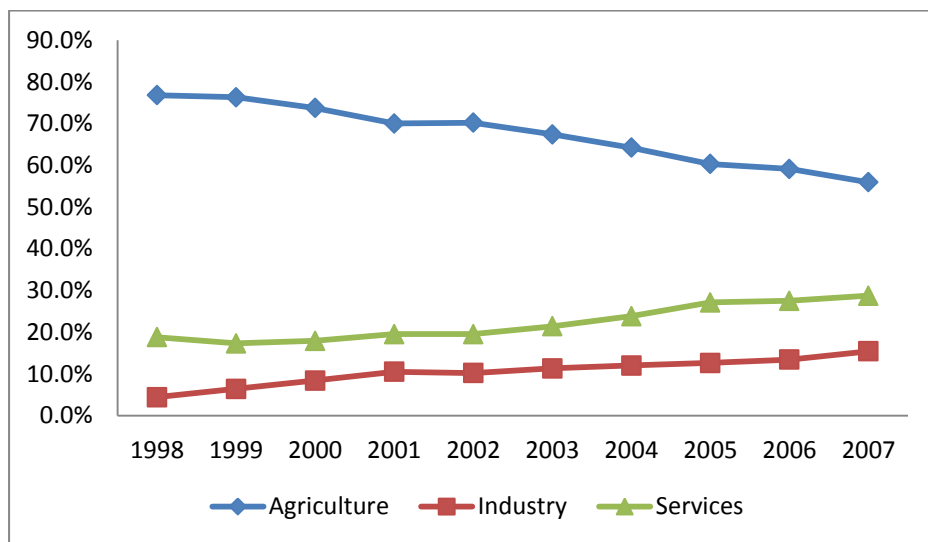
Source: Ministry of Economy and Finance cited in Kem et al. (2011a)

Figure 3.4: GDP share of the industry by subsector



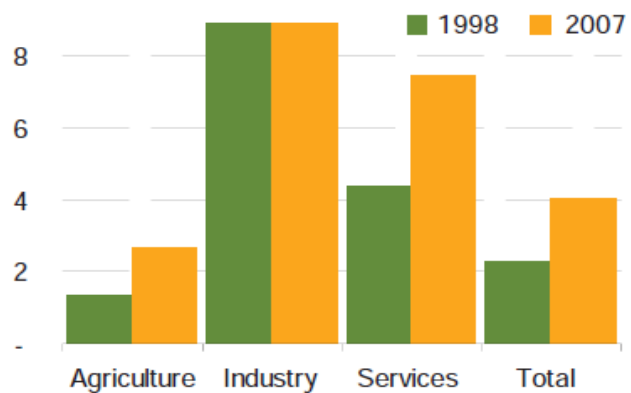
Source: IMF (2004 and 2009)

Figure 3.5: Share of employment by sector



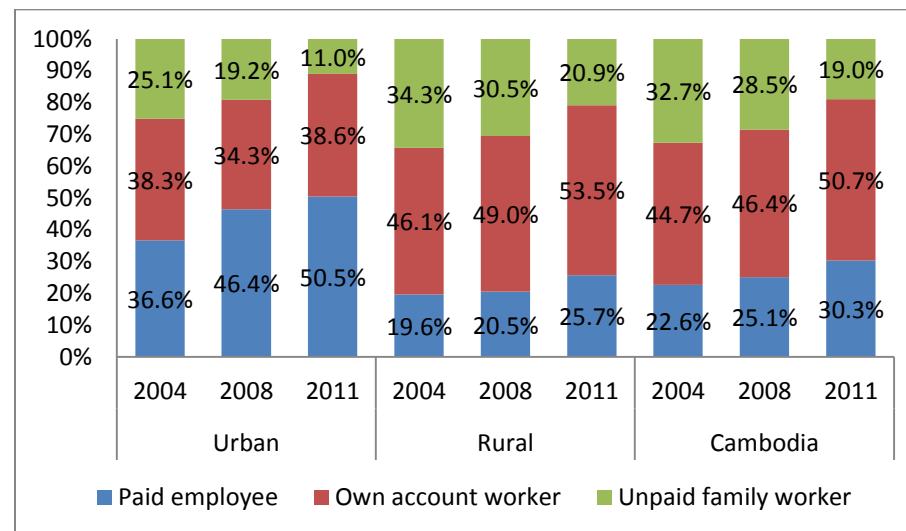
Source: IMF (2004 and 2009)

Figure 3.6: Labour productivity by sector (in 2,000 million riels)



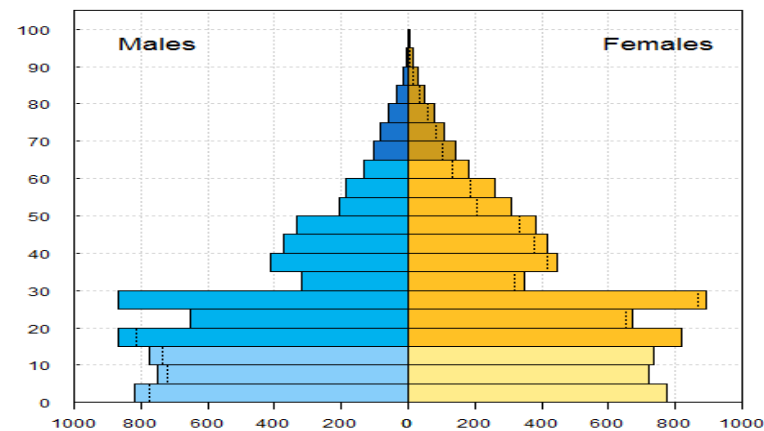
Source: World Bank (2009)

Figure 3.7: Share of employment by occupation categories



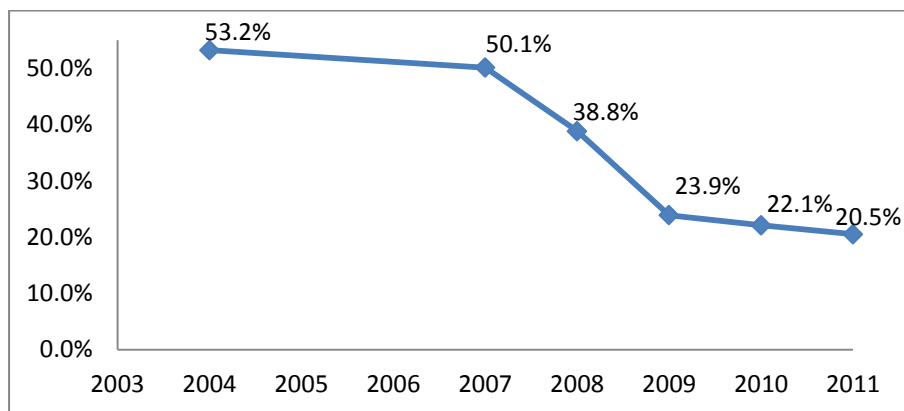
Source: World Bank (2013b)

Figure 3.8: Population pyramid of Cambodia in 2010 (in thousands)



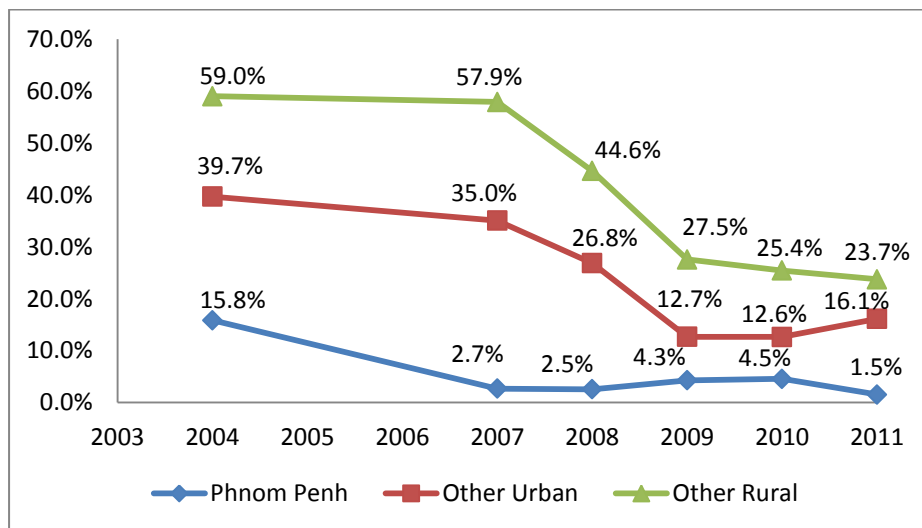
Source: UNDESA (2013)

Figure 3.9: National poverty rate



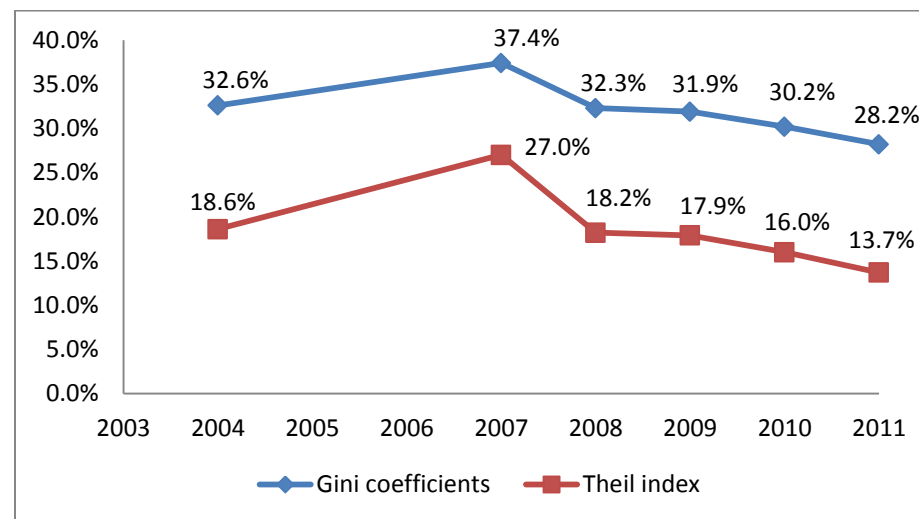
Note: This national poverty rate is the national poverty headcount index. Source: World Bank (2013b)

Figure 3.10: Poverty rate by region



Note: These poverty rates are headcount indexes by regions. Source: World Bank (2013b)

Figure 3.11: Gini coefficient and Theil index



Source: World Bank (2013b)

about half of the employment shares in urban areas. However, the figure shows that there is not a similar case in rural areas though the trend of the salaried employment share is increasing. In rural areas, the figure indicates that this employment accounts for just a quarter of the total employment shares where it increases from 20% in 2004 to 26% in 2011. The employment in these rural areas is mainly constituted by self-employment which accounts for about half of the total employment shares. This self-employment share increases from 46% in 2004 to 49% in 2008 and 54% in 2011. In contrast, the figure also indicates that this type of self-employment appears not to improve in urban areas. The magnitude of this employment remains constant between 2004 and 2011 though it declines in 2008. Overall in Cambodia, the figure shows that self-employment still contributes greatly to employment by accounting for about half of the employment shares. It increases gradually from about 45% in 2008 to 51% in 2011 (Figure 3.7).

Although the economy is significantly and robustly expanding, it appears that the economy is not growing enough to absorb the annual new workforce. Chan (2009b) asserts that there are 250,000 young entrants into the labour market every year but the United Nations Country Team (2010) has revised the annual figure to be 300,000 and has projected it to be 400,000 by 2040. This high number of young workforce entrants can be explained by demographic features shown in Figure 3.8 where there is huge working-age population. This population pyramid figure shows the great number of the population below 30 years old in both genders in 2010. This great number of working-age population can be explained by the fact that Cambodia experienced baby booms in 1980s and 1990s after the civil war was finished in 1979. Currently, this post-civil war generation is actively engaged in economic activities. Therefore, this can indicate that the labour supply in the country is abundant and can respond to any demands, but a large proportion of the labour is unskilled or low-skilled (CDRI, 2007a; World Bank, 2009; ADB, 2012b; and Theng and Flower, 2014).

3.1.2. Poverty and Inequality

This robust economic growth raises the question of whether this is pro-poor growth or inclusive growth. Figure 3.9 gives a very important indication that the poverty rate is reduced significantly and this reduction in the poverty rate is more than half in just under a decade. Along the national poverty line, in the figure, the poverty rate reduces slightly between 2004 and 2007 from 53% in 2004 to 50% in 2007. Poverty declines dramatically just in three years between 2007 and 2009, declining from 50% in 2007 to just nearly 24% in 2009. It continues to decrease and is just slightly above 20% in 2011 (Figure 3.9). This impressive performance indicates that Cambodia can achieve the Millennium Development Goals (MGDs) of reducing half of the poverty by 2015. By region, poverty appears to decline in all areas of Phnom Penh, other urban, and rural (Figure 3.10). Among these regions, rural areas have the highest poverty rates but Phnom Penh has the lowest poverty rate whereas the poverty rates of other urban areas are in between these two. Although the poverty rates in rural areas have been reduced significantly, the figure shows that poverty in this region is higher than other areas and remains severe. It has a trend similar to the national poverty rate though it is slightly greater. In Phnom Penh, the poverty rate reduces more than 10 points in the period of 2004-2007, declining from 16% in 2004 to 3% in 2007. However, the poverty rate slightly increases until 2010 before it declines again in 2011. The figure also shows that the trend of poverty reduction happens in other urban areas where it gradually declines from 40% in 2004 to 35% in 2007. Poverty drops dramatically to just about 13% in 2010 before it increases in 2011 (Figure 3.10). This dramatic decline in poverty is because of an increase in farming production, price of agricultural products, farm wage, non-farm self-employment, and urban wage and salaried jobs (World Bank, 2013b).

Regarding inequality, Figure 3.11 gives an indication that inequality is declining whether it is measured by Gini coefficient or Theil index though the latter generates nearly half the level as the former. Although inequality rises from 33% in 2004 to 37% in 2007, it drops to a similar level a year later to just about 32% in 2008. It continues to drop gradually,

where it is about 32% in 2009 and about 28% in 2011 (Figure 3.11). Since economic growth significantly reduces poverty and inequality, therefore, this can indicate that it is pro-poor growth (World Bank, 2013b). Although this growth enables a large number of households to escape from poverty, these households are still very vulnerable to exogenous risks, and a small shock can turn these households back into poverty since they have limited access to any social protection (World Bank, 2013b).

3.2. Overview of Migration and Remittances

Actually, migration is not a new phenomenon for Cambodia, but previously it was a kind of migration mainly due to the internal political turmoil. It took place in the 1970s while Cambodia was in the period of civil war and political instability. It was a form of forced migration resulting in refugee resettlement, diaspora, and displacement. Just lately, after Cambodia attained peace completely, the country has started exporting labour (Maltoni, 2007; Chan, 2009b; and IOM, 2010). As indicated in these studies, migration has transformed itself from refuge seeking to voluntary migration in search of jobs. They specify that these workers do not migrate only from provinces which used to be recipient destinations of refugee resettlement and displacement from refugee camps in Thailand, but also from other rural and remote areas. They also indicate that an internal movement of workforce across provinces is recently happening and there is a large influx of rural out-migration to urban areas or elsewhere to find jobs.

During the civil war, the migration occurrence was truly due to the political disorder. However, the current labour migration is mainly pushed out by poverty (Godfrey et al., 2001; Maltoni, 2006 and 2007; CDRI, 2007b; Murshid, 2007; Chan, 2009b; Neth, 2009; and IOM, 2010). These studies indicate that the migration decision is made by the family and is because of unfavourable living conditions such as financial hardship, unexpected shocks at village level (natural disasters), shocks at household level (sickness), landlessness, unemployment, or debts. The other push factors are the shortage of income generating activities in local communities, the difficulty in market accessibility, the high demographic growth rate, the

depletion of common village resources and materialism. A study by CDRI (2007a) reveals that these push factors play a very important role in the migration decision in Cambodia since these migrants are mostly influenced by the present situations happening in their local communities rather than their favourable choices for migration. Migrant households would not send members and those migrants “prefer to stay and work in their village if they could earn enough to support their family and if there was enough development in the village” (CDRI, 2007a, pp.155).

These studies also indicate that pull factors are another prominent aspect of migration motivation. Employment opportunities at destinations due to economic booms, a shortage of and high demand for unskilled or low-skilled labour due to skill improvement of host destinations, and a high wage expectation encourage rural workers to undertake the migration decision (Godfrey et al., 2001; Maltoni, 2006 and 2007; CDRI, 2007b; Murshid, 2007; Chan, 2009b; Neth, 2009; and IOM, 2010). In the garment sector alone, this industry attracts a large number of rural migrant workers since it has contributed about three-fourths to Cambodia’s total exports (Yamagata, 2006; and Chan, 2009b). This sector is mainly dominated by rural female migrant workers, and the sector is found to have a significant impact on reducing poverty, where wages of these migrant workers greatly exceed the poverty line (Yamagata, 2006).

In this regard, it is necessary to note that this labour migration is a very important tool for rural Cambodian households because they are facing incomplete or missing credit and insurance markets. It is found to be a significant household strategy to mitigate unexpected risks such as sickness or crop failures due to drought or floods (Yagura, 2005 and 2009; and Maltoni, 2007). In rural Cambodia, these studies show that rural livelihoods of these households are very vulnerable since there are no formal insurance protections or social safety nets provided by the government. Actually, as indicated in these studies, there are a number of informal mechanisms such as funeral funds or farmer organisations. However, they are organised just in a small number of villages, and the coverage of these protections is

very limited and insufficient to offset the entire impacts of any unexpected risks. The studies indicate that seasonal migration for survival is a common approach to tackle the impacts if there are any risks happening in their villages. Asset liquidation may not be an appropriate way since there may be a drop in prices of their assets, and other villagers who are similarly affected may not be capable of purchasing these assets. These studies also identify that long-term migration is the best alternative to mitigate the impacts if there are any risks (i.e. sickness) happening in their households. By nature, these risks need immediate engagement and a large amount of funds in a short time. To cope with these risks, as indicated in the studies, these households generally take credit and then sell their assets to pay back these debts. However, these authors find that these sold amounts are insufficient to cover the extent of these severities, and the migration decision is the best solution and can help minimise the impacts.

3.2.1. Internal Migration and Remittances

3.2.1.1. *Internal Migration*

The 2008 population census indicates that the population of the country in 2008 was 13.4 million, of which 26.5% of the total population was migrants (NIS, 2009). In Table 3.1 by categorising migrants into urban and rural areas, it shows interesting figures that migrants in rural areas outnumber those in urban areas by 57% to 43%, respectively. By gender, the table shows that the number of male migrants is similar to that of female migrants since male migrants and female migrants account for 50.46% and 49.54% of the total number of migrants, respectively. Another interesting point is that there is a larger proportion of female migrants moving to urban areas, but in the opposite pattern, fewer men are moving to urban areas, migrating instead to other rural areas for work.

There is another noticeable distribution of migration in the 2008 census. There was a remarkable increase in a cross-province migration over the decade. In Table 3.2, it shows that within-province migration is the leading migration figure, whereas the migration between provinces constitutes nearly half of the remaining migration. By gender, the table shows that

there is a greater percentage of male migrants to migrate within the province. In contrast, female migrants appear to move between provinces relatively higher than male migrants.

Table 3.1: Percentage of migrants by gender, and urban and rural areas

	Both sex			Male			Female		
	Total Population	No. Migrants	%	Total Male	No. Migrants	%	Total Female	No. Migrants	%
Total	13,395,682	3,552,345	26.52	6,516,054	1,792,625	27.51	6,879,628	1,759,720	25.58
Urban	2,614,027	1,514,247	42.63	1,255,570	717,780	40.04	1,358,457	796,467	45.26
Rural	10,781,655	2,038,098	57.37	5,260,484	1,074,845	59.96	5,521,171	963,253	54.74

Source: NIS (2009)

Table 3.2: Percentage of migrants within provinces, between provinces and abroad

	Both sex	Male	Female
Within province	51.34	52.26	50.41
Between provinces	45.99	45.04	46.95
Abroad	2.67	2.7	2.64

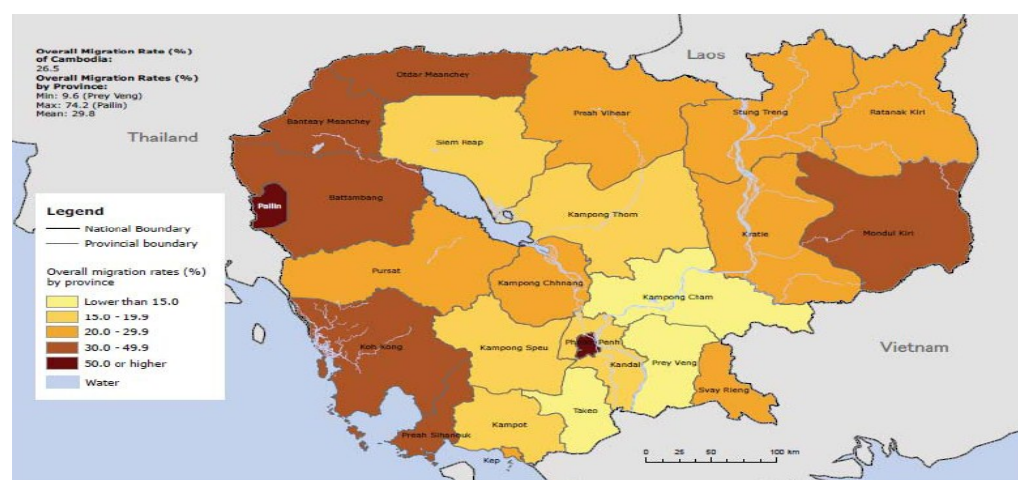
Source: NIS (2009)

Table 3.3: Percentage of internal migrants in each migration stream

	Both sex	Male	Female
Rural to Rural	50.88	53.26	48.45
Rural to Urban	27.53	25.56	29.54
Urban to Rural	6.48	6.79	6.16
Urban to Urban	15.11	14.39	15.85

Source: NIS (2009)

Figure 3.12: Map of overall migration rates by provinces



Source: NIS (2009)

Regarding migration streams, the census shows another interesting feature of the internal migration. Table 3.3 shows that the top two streams of internal migration are rural-to-rural and rural-to-urban areas. The other two smaller patterns of internal migration are urban-to-urban and urban-to-rural areas. For instance, the rural-to-rural migration and rural-to-urban migration account for about 51% and 28%, respectively. The urban-to-urban and urban-to-rural movements constitute about 15% and 6%, respectively. By gender, there is an indication that female migrants are more likely to move to urban areas because they have relatively higher proportions of rural-to-urban (30%) and urban-to-urban (16%) migration streams. However, the table shows the opposite situation for male migrants that are more likely to move to rural areas. This appears to be consistent with the findings by Lee (2007) where this author finds that adult female migrants are more likely to migrate to the capital city and male workers mainly migrate to border regions. Female workers have a higher propensity to migrate to Phnom Penh and to work in the manufacturing and services sectors (Lee, 2007).

Since the table shows a great distribution of the rural-to-rural migration, it is necessary to understand this migration stream in more detail. The study by CDRI (2007a) finds this migration stream as an increasing dominant phenomenon in rural Cambodia. This study demonstrates that there is a great movement from villages with fewer assets of land or resources to villages that are rich in agricultural cultivated land or other common property resources, or where there is a greater chance to obtain non-agricultural jobs. By geographic region, the study also indicates that this kind of migration stream is more intense in the Tonle Sap areas and Thai-Cambodian borders. Furthermore, Figure 3.12 demonstrates that there are high densities of migration rates in provinces nearby Thailand and Tonle Sap Lake in addition to Phnom Penh. The top three out-migrant provinces are Kampong Cham, Prey Veng and Takeo.

By industrial categories, the population census indicates that more than half of internal migrants are engaged in the agriculture, forestry and fishing activities, whereas the wholesale and retail trade accounts for 13% and the manufacturing is about 10% (NIS, 2009). By

occupation categories, NIS (2009) shows that the agricultural, forestry and fishery works are the most concentrated jobs, whereas the service and sale works, and the craft and other related works are the other two most dominant jobs. In the manufacturing sector, in particular, migrant workers are mainly engaged in the garment and construction works (Lee, 2007). In the service sector, migrants work as clerks, waitresses, beer promoters, domestic workers, hairdressers, shop assistants, and other similar types of informal employment (Lee, 2007). These kinds of occupations are low-skilled or unskilled jobs where migrant workers are not required to go through any training before working, and no significant skill improvement is found in return migrants (CDRI, 2007b).

Another perspective on migration was studied by Maltoni (2007), which groups internal migrant jobs in Cambodia into three groups: short-term, medium to long-term, and long-term. Examples of jobs in these groups are (a) motor-taxi drivers and construction workers; (b) garment workers; and (c) scavengers and beer promotion girls for short-term, medium to long-term, and long-term, respectively. An explanation for the short-term nature of motor-taxi drivers is that they often migrate only in the dry season when their farm work is finished. Construction works, on the other hand, take on temporary work when unexpected shocks, such as floods or drought, force them to seek cash (Maltoni, 2007). From CDRI (2007b), it is also true that motor-taxi drivers are unable to secure any permanent or year-round jobs in their home villages, and construction work is project-based, so migrants go to another job or return home to wait to be contacted by former construction supervisors or colleagues after a construction project finishes. Maltoni (2007) classifies garment workers as medium to long-term because it is a household strategy to diversify sources of income. Yagura (2012) points out that migrant garment workers are likely to return home if there is expectation to obtain household assets. Maltoni (2007) explains that scavengers are long-term because they may have lost land or other related properties and therefore cannot return home, where beer promotion girls may face harassment, forced marriage or rape, and thus do not return home.

3.2.1.2. *Internal Remittances*

Although Cambodia has been involved in this migration since the economy was liberalised, there is no any official report documenting internal remittances. Internal remittances may have a larger impact than international ones on poverty reduction and livelihood improvement because of a larger scale of internal migrants (Deshingkar, 2006). Despite the non-existence of such reports, a number of studies on migrants working either in the garment or in other sectors have identified a significant amount of remittances. A study by CCC (2005) conducts a survey on garment workers from Prey Veng Province and examines its impact on rural livelihoods of households left behind. The study finds that these workers send home about USD 17 per month and this amount of remittances accounts for about 27% of their earnings. In another research by Dahlberg (2005) which studies garment workers in Phnom Penh, she finds a slightly greater amount of remittances sent home by these workers. She finds that they send home an average amount of USD 20-40 per month. This amount of remittances is similarly found by another study of CDRI (2007b), though this study does not examine garment workers alone. The study finds that the average annual remittances sent home by workers in different kinds of occupations are about USD 250. Casino workers are found to lead the figure greatly whereas cart pullers, construction workers and garment workers follow suit. Car washers, motor-taxi drivers, petty traders and waiters/waitresses are those who send smaller remittances. The study indicates that this amount of sent remittances is about 27% of these workers' annual earnings. In terms of sent remittance ratio to total earnings, car washers, waiters/waitresses and casino workers are the top three senders of their income. The study also finds that they send remittances every 2.32 months and the average amount of each transfer is about USD 36. However, another recent study by Yagura (2012) finds greater amount of transferred remittances. In his survey, migrant workers send home about 40% of their total earnings, and the annual sent remittances from female and male migrants are about USD 430 and USD 551, respectively.

Table 3.4: Internal remittances by provinces and gender

Provinces	Both sex		Male		Female	
	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)
Banteay Meanchey	72	191	42	190	30	194
Battambang	77	187	47	205	30	158
Kampong Cham	72	62	35	64	37	60
Kampong Chhnang	15	307	10	251	5	420
Kampong Speu	70	43	35	52	35	33
Kampong Thom	21	240	12	417	9	6
Kampot	39	77	23	113	16	24
Kandal	93	222	45	227	48	216
Koh Kong	19	176	14	89	5	420
Kratie	25	179	15	134	10	247
Mondolkiri	9	600	3	150	6	825
Phnom Penh	795	414	325	302	470	492
Preah Vihear	14	398	10	485	4	180
Prey Veng	52	138	30	222	22	25
Pursat	14	47	10	24	4	105
Rattankiri	20	146	11	118	9	180
Siem Reap	81	300	50	276	31	339
Sihanoukville	34	167	17	154	17	179
Stueng Treng	7	141	7	141	0	0
Svay Rieng	16	73	12	30	4	200
Takeo	52	103	34	115	18	80
Oddar Meanchey	21	85	10	61	11	107
Krong Keb	2	10	2	10	0	0
Krong Pailin	14	160	7	157	7	163
Moved within the province	1,969		1,026		943	
Total	3,603	194	1,832	148	1,771	241

Source: Author's calculation from CSES 2009.⁵

In this research, the Cambodia Socio-Economic Survey 2009 (CSES 2009) gives an overall view of internal remittances. Table 3.4 gives an indication that Phnom Penh, its surrounding areas and Siem Reap are major hosting destinations for these internal migrants.⁶ The average amount of remittances per migrant is about 194,000 riels (nearly USD 50) while remittances sent by female migrants are higher than male migrants. Migrants residing in Phnom Penh send a greater amount of remittances, but it is still less than those in Mondolkiri

⁵ Luch (2012) uses the same data and descriptive summary represented by this table format, though the calculations are the author's.

⁶ The research defines migrants in this descriptive statistics as those who have departed since 2004 and are in the age group of 15-64. More detailed explanations are discussed in the next chapters.

Province, though there are a small number of migrants. By educational attainment, the research shows that there is a link to educational levels. Larger remittances are seen to be sent by those with a master's degree, but the number of migrants with that educational attainment is small (Table 3.5). It appears from this descriptive table that a very large number of internal migrants have low educational attainment. This may indicate that internal migrants are low-skilled or unskilled, which supports the views above. The table also shows that the greatest proportion of remittances is sent by these low educated migrants since they make up the majority.

Table 3.5: Internal remittances by education levels

Levels of Education	Both sex		Male		Female	
	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)
No education	6	38	3	2	3	73
Grade 1	50	63	23	27	27	94
Grade 2	152	87	66	54	86	112
Grade 3	293	100	133	69	160	126
Grade 4	363	127	156	84	207	160
Grade 5	403	172	191	135	212	205
Grade 6	414	231	191	152	223	299
Grade 7	383	322	202	184	181	476
Grade 8	321	160	176	104	145	227
Grade 9	299	184	173	170	126	202
Grade 10	106	158	64	154	42	165
Grade 11	91	288	58	337	33	202
Grade 12	178	270	122	213	56	393
Lower secondary	42	393	23	369	19	423
Upper secondary	63	212	45	220	18	190
Technical pre-secondary	15	128	13	92	2	365
Technical post-secondary	19	668	11	875	8	383
University undergradate	45	8	27	6	18	11
Bachelor degree	49	572	33	456	16	811
Master degree	8	2,628	6	304	2	9,600
PhD	2	100	1	0	1	200
Other	5	10	5	10	0	0
No class completed	256	96	95	32	161	134
Total	3,603	194	1,832	148	1,771	241

Source: Author's calculation from CSES 2009.⁷

⁷ Luch (2012) uses the same data and descriptive summary represented by this table format, though the calculations are the author's.

In terms of channels used by these migrants to send remittances home, the most common way revealed in the studies above is through an informal and unrecorded channel. Garment workers are found to transfer remittances through friends or relatives visiting home, or when they visit home during public holidays or when some of their relatives visit them at destinations (CCC, 2005). CDRI (2007b) also identifies this channel as a very common method for migrants working in other kinds of employment. In addition to the means just described, these migrant workers are also found to send remittances through taxi men or phone shop services where remittances can be delivered quickly. Remittances are found to be sent through micro-finance institutions as well but it is much less common (CDRI, 2007b). In Table 3.6, the summary data from CSES 2009 also indicates that the main channel recipient households receive internal remittances through is an informal method. There are a great number of migrants sending remittances through other persons they know or they take it with them when they visit home. However, the average amount of remittances sent through this informal channel is lower than the average amount sent through financial institutions. Despite this great figure, there is a very small number of internal migrants using this latter method.

Table 3.6: Two main transfer means of internal and international remittances

	Transfer Mean 1				Transfer Mean 2			
	Internal		International		Internal		International	
	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)
Western Union	10	317	16	1,551	1	1,200	1	10,000
Bank transfer	29	1,834	86	2,578	12	1,269	9	3,478
Through the persons or other persons	2,240	283	128	1,607	6	1,172	9	1,592
Other	15	471	18	3,141	94	445	7	1,886
Total	2,294	304	248	2,052	113	578	26	2,647

Source: Author's calculation from CSES 2009.⁸

⁸ Luch (2012) uses the same data and descriptive summary represented by this table format, though the calculations are the author's.

3.2.2. International Migration and Remittances

3.2.2.1. *International Migration*

As noted above, Cambodia is in an early stage of involvement in cross-country labour migration. Therefore, in this research, the author considers it is necessary to understand why Cambodian migrants decide to move through this migration stream instead of internal migration. Various studies have shown that one reason that encourages these migrants to cross borders is due to very limited information about employment in the local markets. In provinces near the borders, migrant workers find it easier to obtain job information in neighbouring countries through their networks than to attain that information from other local urban areas (Chan, 2009b; and IOM, 2010). Another reason for this movement is due to the insufficient amount of local job creation to absorb new labour workforce (Chan, 2009b). The garment sector has employed about 350,000 workers, mostly females, and this amount is insufficient to mitigate the annual entrants of 250,000 labourers into the market (Dahlberg, 2005; Yamagata, 2006; CDRI, 2007b; and Chan, 2009b). In construction, although the sector has actively progressed, it is mostly concentrated in urban areas such as Phnom Penh and Siem Reap, and absorbs mostly male workers (Murshid, 2007; and CDRI, 2007b).

Another possible reason to explain why these migrants decide to move to another country is due to their high expectation of higher wages in destination countries (Chan, 2009b). In terms of wage rate, Chan (2009b) finds that the average local wage rate per day is USD 1.5-2, while it is USD 3-6 in Thailand and USD 4-9 in Malaysia. However, in agricultural work in Thailand, he finds that migrant workers can earn monthly wages of about USD 70 which is in a similar magnitude to garment workers in Cambodia. He finds that these migrants generally work in low-skilled jobs such as in construction, fishing, manufacturing, plantations, and domestic works. In particular, these jobs consist of raising pigs, transplanting rice, tree planting, sugar cane planting, rubber plantation, restaurant services, and housemaid. Such kinds of works are categorised as dirty, dangerous and difficult (3Ds) jobs (IOM, 2006 and 2010; Maltoni, 2007; Chan, 2009b; and Hing et al., 2011a and 2011b).

A last reason that can explain this significant flow of Cambodian migrants especially to work in these 3D jobs is due to a shortage of workers in these unskilled/low-skilled jobs in the host countries (Chan, 2009b). Due to the continuous growth of these host economies, their labour skills have improved and transformed from low-skilled to high-skilled workforces (Chan, 2009b). As indicated in his study, these workers are no longer interested in working for these low-paid 3D jobs. To keep up with the pace of the growth, these countries need to bring migrants to replace these workers because they still have great demands for unskilled/low-skilled labour in certain industries (Chan, 2009b).

Regarding destinations, there are a number of host countries receiving international migrants from Cambodia, and they are Thailand, Malaysia and South Korea (Hing et al., 2011a). Hing et al. (2011a) indicate that Cambodia so far has signed labour agreements with several countries. The government signed a labour agreement with Malaysia in 1997, a memorandum of understanding on Cooperation in the Employment of Workers with Thailand in 2003, the Act of Foreign Worker Employment with South Korea in 2003, and an agreement of manpower exchange with Kuwait in 2009. They also states that the government is discussing legal agreements to export workers with Japan and Singapore.

In terms of migrant numbers to these receiving countries, the Ministry of Labour and Vocational Training (MLVT) reports that the total registered number of international migrants between 1998 and 2009 were 45,656 (Hing et al., 2011a). By destination, about 52% migrated to Malaysia, 34% to Thailand, and 14% to South Korea. By gender, migrants were dominated by females which were recorded as 59%, and this may be due to a large contribution of female migrants to Malaysia (Hing et al., 2011a).

In this period, Hing et al. (2011a) categorise this registered international migration into two stages. The first stage was between 1998 and 2002, and there was a limited list of receiving countries. The only host country to receive Cambodian migrants in the first stage was Malaysia (Hing et al., 2011a). The labour agreement allows private recruitment agencies to recruit and send workers, and these agencies are obligated to give migrant workers training

in language, culture and skills before departure (Maltoni, 2007). As a result, 2,603 migrants were sent, of which 65% were females and worked in domestic work, and the other 35% were males engaged in construction and manufacturing activities (Hing et al., 2011a). A large numbers of migrants to Malaysia are Muslim ethnic minorities (Maltoni, 2007). The second stage was from 2003, and the list of destinations included several other countries (Hing et al., 2011a). Up to 2009, Hing et al. (2011a) report that 43,053 workers were sent to Malaysia, Thailand and South Korea. To South Korea alone, they indicate that 7,791 migrant workers were recorded and mainly worked in manufacturing factories. Since 2003, they specify that Cambodia has sent workers to South Korea through a system called Industrial Trainee System, and then called Employment Permit System. The system allows Cambodian migrants to work there for a number of years to attain new skills that can be used upon returning home (Maltoni, 2007).

After Cambodia and Thailand signed a memorandum of understanding on Cooperation in the Employment of Workers in 2003, it is important to note that there was a significant result taking place. More than 110,000 Cambodian workers gained legal employment permits from the Thai government (MLVT/ILO, 2010). Although the memorandum was signed in 2003, the official sending of migrants under the new arrangement was done in 2006 (Chan, 2009b), and so far 15,496 migrants have been officially sent to work in Thailand (Hing et al., 2011a). However, it is estimated that about 180,000 Cambodian workers are believed to have worked there, both in terms of irregular labourers and legally registered workers (Chan, 2009a). Cambodian migrants then became the second ranking group of foreign workers following Burmese in 2004 (MLVT/ILO, 2010). According to the legal employment registration of Cambodian workers with the Ministry of Labour of Thailand in 2008, about 41% were identified as females and 59% as males, and they mainly worked in 3D jobs. Those female workers were engaged in occupations mainly in domestic work and brick making, whereas male migrants were involved mostly in fishing, agriculture, and construction activities (MLVT/ILO, 2010).

Although a considerable number of migrants have legally been sent to Thailand after the memorandum of understanding was signed, illegal migration is still a challenging issue. Relatively high costs to register as legal migrants are the main obstacle to removing this illegal migration (Chan, 2009b; and Hing et al., 2011a and 2011b). Chan (2009b) finds that it costs migrants about USD 700 on average to undertake this legal movement to Thailand, while it costs just about USD 70-100 and USD 38 to carry out an illegal movement into the deep interior of Thailand and Malaysia, respectively. It is also convenient for migrant workers to take on this irregular channel because the waiting time for migration is short, and there are no required documents or recruitment procedures (Hing et al., 2011b). Travel arrangement and occupation placement are facilitated and organised by existing networks either by former household migrants, current migrants at destinations, or middlemen (Chan, 2009b; and Hing et al., 2011a and 2011b). These studies also indicate that this illegal migration is due to the loosened law enforcement in Cambodia and Thailand. Unofficial paid fees for migration at Cambodia's border checkpoints are commonly practiced, and there is nonexistence of prosecution against employers in Thailand who employ illegal Cambodian migrants (Hing et al., 2011b). Close geographical proximity between Cambodia and Thailand is another factor which limits the restriction and control of illegal migration (Hing et al., 2011b).

3.2.2.2. *International Remittances*

Recently, international remittances have been observed to have an increasing trend and account for a significant amount of Cambodia's GDP. Between 2003 and 2009, international remittances substantially increased more than double from USD 138 million to USD 338 million (World Bank, 2011). From migrants in Thailand alone, according to MLVT/ILO (2010), the average amount of sent remittances in 2008 was about 833 Baht per migrant per month or USD 45 million in total for the whole year of 2008.

A similar figure of remittances sent by migrants in Thailand is also found in a study by Chan (2009b), which studies migration in six villages of four provinces where there is a high

Table 3.7: International remittances by education levels

Levels of Education	Both sex		Male		Female	
	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)	Migrants	Remittances (000 riels)
No education	1	0	0	0	1	0
Grade 1	3	333	0	0	3	333
Grade 2	18	422	10	190	8	713
Grade 3	31	549	17	784	14	264
Grade 4	37	779	19	1,123	18	416
Grade 5	58	807	34	571	24	1,142
Grade 6	43	1,155	28	793	15	1,830
Grade 7	34	1,069	19	867	15	1,325
Grade 8	17	1,264	10	970	7	1,684
Grade 9	27	1,306	16	931	11	1,850
Grade 10	17	4,921	12	1,763	5	12,500
Grade 11	3	1,333	2	0	1	4,000
Grade 12	14	1,007	5	1,880	9	522
Lower secondary	4	7,940	4	7,940	0	0
Upper secondary	12	8,604	7	11,400	5	4,730
Technical pre-secondary	1	0	0	0	1	0
Technical post-secondary	1	0	1	0	0	0
University undergradate	5	1,160	3	333	2	2,400
Bachelor degree	0	0	0	0	0	0
Master degree	0	0	0	0	0	0
PhD	0	0	0	0	0	0
Other	0	0	0	0	0	0
No class completed	24	662	12	754	12	569
Total	362	1,406	207	1,322	155	1,517

Source: Author's calculation from CSES 2009.⁹

incidence of migration to Thailand and also to Malaysia. Chan finds that seasonal migrants working along Thailand's borders brought remittances back of about USD 30-84 at the time of their most recent trip home, whereas those who worked deep inside Thailand brought home about USD 150-180. The study indicates that households in those villages received about USD 173 on average in the previous year from migrants in Thailand, whereas the amount was quite similar to that of migrants in Malaysia. By occupation categories, Chan

⁹ Luch (2012) uses the same data and descriptive summary represented by this table format, though the calculations are the author's.

finds that migrants working along the borders send smaller remittances than those working deep inside Thailand. Migrants working in housework and construction activities lead the sent figure. The study also finds that the remittance magnitudes of migrants in Malaysia are similar to those of migrants working deep inside Thailand. By gender, female migrants working in Thailand send larger remittances than the counterparts, but it is the opposite result for migrants working along the borders. Chan does not find any difference of remittances across gender sent by migrants in Malaysia. Another recent study by IOM (2010) conducted a survey on migrants working in two provinces of Thailand nearby Cambodia's borders. It finds that a great proportion of these migrant workers send remittances of about USD 100 each time, and send it once in every 4 months. However, these two studies above do not report on the differences of remittances by educational levels. From the CSES 2009, however, Table 3.7 indicates that international remittances are primarily sent by migrants with low educational attainment. As with internal migrants, this may indicate that international migrants are mainly low-skilled or unskilled workers. The table also shows that the average amount of international remittances per migrant is 1,406,000 riels (proximately USD 350), which is so greatly larger than the amount of internal remittances. By gender, female migrants also appear to send remittances larger than the male counterparts.

The study by Chan (2009b) also identifies how migrants send remittances from Thailand and Malaysia. He finds that a majority of migrants use the informal channel to transfer remittances to households at home villages. In particular, he finds that migrants working in Malaysia are more likely to send remittances through middlemen directly travelling to Cambodia, whereas those working along the borders with Thailand send remittances through other migrant workers and those working deep inside Thailand send remittances through middlemen using phone shop services. IOM (2010) also finds that the phone shop services are a common tool for migrants working in Thailand to send home remittances. More importantly, the study finds that there is an increase in using financial institutions such as ACLEDA Bank to transfer remittances. Likewise, the summary of

statistics from CSES 2009 in Table 3.6 reveals that the informal method of transfer is still the most common tool for these international migrants. Interestingly, there is an indication that the transfer through financial institutions has emerged as a player in this international migration phenomenon. This is because of a greater number of migrants using this method, and a greater amount of transferred remittances.

3.3. Concluding Remarks

This chapter gives an overall overview of Cambodia's economy, poverty, inequality, migration and remittances in order to understand the background and rationale for conducting this research. Cambodia has achieved remarkable growth rates after it liberalised its economy in the 1990s. The economy was disrupted during the global financial crisis, but it shortly bounded back to pre-crisis growth rates. The main contributors to this growth are garment, construction, tourism and agriculture. By employment, the industry and services sectors create jobs at a rate larger than that generated by the agriculture sector, though the latter sector employs a larger proportion of total workforce. Because of the great proportion of workforce employed in the latter sector, rural areas take a larger share of employment than urban areas and Phnom Penh. Even though the industry, services and agriculture sectors create a significant amount of employment annually, it is insufficient to absorb the amount of annual new entrants to the labour market. These high annual new entrants are due to the post-civil war baby booms. Therefore, labour in Cambodia is abundant and underutilised, and there is great demographic pressure on the government to generate more jobs.

Because of the great economic performance, World Bank (2013b) identifies this economic growth as pro-poor growth because poverty and inequality are found to reduce significantly. Cambodia is expected to achieve the Millennium Development Goals (MDGs) of reducing half of the poverty by 2015. By regions, poverty is found to be declining in all regions: Phnom Penh, urban areas and rural areas. Interestingly, among these regions, the poverty rate in rural areas is found to reduce greater than the others. However, in terms of actual number of the poverty rates, rural areas have larger poverty rates than the others. Even

though a great number of people are found to move out from poverty, this World Bank's study indicates that they are still vulnerable and a small single risk can make them fall back into poverty.

Furthermore, this chapter gives an overview of trends and characteristics of labour migration and remittances in Cambodia. Although migration has occurred in Cambodia since the 1970s, it was mainly due to the internal conflict until only recently, when Cambodia has emerged as a labour exporter. In terms of migration streams, internal migration overwhelmingly dominates the migration phenomenon while international migration shares a small proportion. For internal migration, a majority of internal migrants move from rural areas to other rural areas and from rural areas to urban areas. Women are found to migrate mainly to urban areas for work whereas men are found to move from rural to rural areas, mainly to the Tonle Sap region and borders between Cambodia and Thailand for work. For international migration, there are three host countries: Thailand, Malaysia and South Korea. In terms of education and skills, both internal and international migrants are found to possess low education attainment, and to have no skills or low skills. In both migration patterns, they are involved in low-skilled or unskilled jobs. Regarding the means of transferring remittances, a majority of both internal and international remittances are found to be sent through informal channels, though the latter ones are found to be increasingly sent through formal channels. Remittances appear to keep growing and account for a significant proportion of GDP. It is because of the economic booms in a number of sectors in the country and also in those host countries. A majority of migrant workforce are working in the main sectors which are the backbone of the national economy. More interestingly, migration and remittances are found to have important roles in rural household strategies and livelihood improvement.

Because of this existing background of the economy, poverty, inequality, and migration and remittances, therefore, the motivation for this research to conduct an empirical assessment of the migration and remittance impacts on three aspects of the situation in Cambodia can be understood. The research examines the impacts of migration on household

expenditure patterns in the next chapter, Chapter 4; the impacts of remittances on household credit borrowing in Chapter 5; and the impacts of remittances on household agricultural input expenditure in Chapter 6.

CHAPTER 4

MIGRATION AND HOUSEHOLD EXPENDITURE PATTERNS IN CAMBODIA¹⁰

4.1. Introduction

4.1.1. Problem Statement

In the world context, labour migration is not truly a new theme since a great influx of migration occurred during difficult times such as the colonial era, World Wars I and II, and other civil conflicts. During such times, labour migration was a movement phenomenon from developing countries to developed nations to find better ways of living. Only in recent decades, labour migration has emerged as a new important focus for researchers and policy-makers since migration has started moving from one developing country to another developing country in addition to the earlier phenomenon to find jobs. Recent research finds that this labour movement has significant impacts on accelerating economic growth and improving the social development of sending countries through the income-effects of remittances. At the microeconomic level, recent research identifies this labour migration as having significant impacts on household consumption and investment, and identifies migration as a growing important source for household income and livelihoods.

According to Karamba et al. (2011) and Mendola (2012), migration can have effects on households for either consumption or investment through direct and indirect ways. These

¹⁰ This chapter heavily depends on a journal article published in the *Cambodian Economic Review*, issue 6, in December 2013, and it is slightly modified from the published article to ensure the consistency of this dissertation, but the contents are exactly the same. The publication is for partial fulfilment of the requirements for the doctoral degree of the author. For full citation, the reference is the following: Mong, L. (2013). The Impact of Migration on Household Expenditure Patterns: Evidence from Cambodia. *Cambodian Economic Review*, 6, 37-77.

studies indicate that migration can give knowledge, which migrants acquire at their host destinations, about how to plan and how to spend on either consumption or investment categories to households at their home of origin. As also indicated, migrants can provide their households with remittances to make spending on either consumption or investment. These studies also specify that migration can indirectly have effects on increasing household income for consumption or investment spending since migration is regarded as an increasingly important method for households to diversify sources of income and to reduce risks of losing income. Remittances sent by migrants, according to Adams and Cuecuecha (2010), can be categorised as and spent like other sources of income. These researchers also identify these remittances as income that can be spent either on consumption or investment categories. Remittances are generally seen to be consumption spending due to natural household behaviours when their income is increased (through migration). In contrast, the study also indicates that remittances are investment spending when households regard migration as a temporary income strategy. Therefore, their results give an ambiguous indication of the migration impacts on both spending categories.

From the theoretical perspective, the impacts of migration on either consumption or investment spending are not explicitly indicated. According to the New Economics of Labour Migration (NELM), migration is a result of households' and migrants' decisions in order to improve household liquidity by diversifying household income through migrant remittances, and to reduce the extent of household economic hardships (Lucas and Stark, 1985; Stark and Bloom, 1985; Stark, 1991; Taylor, 1999; Taylor and Martin, 2001; Azam and Gubert, 2006; and Mendola, 2012). In this way, migration provides households with an income flow to ensure their livelihood improvement, and, thus, migration enables these households to make consumption spending. As these studies also indicate, because of missing insurance and credit markets, the NELM identifies migration as having an insurance role in mitigating risk exposures and protecting households against household investment failures. The NELM also specifies that migration can allow households to overcome credit constraints binding

investment activities. In this respect, migration induces households to be involved in investment spending.

Due to this theoretically indeterminate indication, there are a growing number of empirical studies examining these migration impacts. Likewise, the empirical literature shows that migration and remittances have impacts on consumption spending and also on investment spending, and these diverse impacts are because data and research methods are used differently from one study to another. For the impacts on consumption spending, Taylor et al. (1996) find that remittances have significant impacts on increasing consumption spending but have fewer effects on investment spending. In Turkey, Koc and Onan (2004) find that remittances have impacts on improving household daily spending, and on increasing household welfare and livelihoods.

For the impacts on investment spending, on the other hand, Zarate-Hoyos (2004) finds that remittances have strong impacts on productive investment in Mexico's urban areas, but have fewer effects on daily spending, and medical and education spending. Also in Mexico, Taylor and Mora (2006) find that remittances have positive impacts on increasing investment spending. In their findings, migrant households are found to possess a greater marginal propensity to make investment upon the receipts of remittances. Furthermore, Woodruff and Zenteno (2007) find that migration enables entrepreneurs to overcome capital constraints and promotes self-employment in Mexico. With migration, in their findings, micro-entrepreneurs are found to attain greater profits and performances. Also on investment spending, in China, Taylor et al. (2003) find that migration has positive impacts on increasing household production investment, saving, income and non-farm self-employment. In El Salvador, Edwards and Ureta (2003) find that remittances increase household schooling and attendance. Likewise, Adams and Cuecuecha (2010) find similar results in Guatemala. In their findings, remittances have positive impacts on education and housing spending. In conclusion, because of these theoretically and empirically indefinite impacts of migration on expenditure patterns, this gives an indication that the migration impacts on household expenditure deserve further

study, especially in a context where migration has lately emerged as having growing importance in the households and economy. This is the situation in Cambodia; therefore, this is motivation to investigate the migration impacts in this country.

4.1.2. Objectives and Research Questions

This empirical study firstly examines the determinants of migration in Cambodia in order to understand what affects the household decision to send out household members as migrants. Secondly, the study assesses the migration impacts on total household expenditure, and further on a number of spending categories—food and non-food. Thirdly, the study investigates the migration impacts on expenditure shares of those spending categories. This is to understand household behaviours toward consumption patterns in response to the migration decision. The study also examines the migration impacts on households in urban and rural areas. With these objectives, therefore, the study investigates the following research questions:

- What determines the decision made by households about whether or not their members will migrate?
- What is the relationship between migration and household expenditure, and how does household expenditure break down?
- How do households behave in the expenditure patterns of various expenditure categories associated with migration? Which kinds of spending—consumption or investment—are the expenditure patterns associated with migration?

4.1.3. Significance and Contributions

There is a good case for empirically examining the migration impacts on household expenditure patterns in Cambodia for a number of reasons. As described in the preceding chapter, labour migration in Cambodia has only recently emerged as growing importance for household livelihood improvement even though migration occurred several decades ago due to the internal chaos of the Khmer Rouge regime period. As also indicated, rural out-migration to find jobs at either internal or international locations is lately growing due to

economic booms in Cambodia and the destinations so that there are great demands for Cambodian low-skilled or unskilled workers. Even though this labour movement is asserted above to have impacts on households at their home of origin, the migration impacts especially on household expenditure patterns are less emphasised in the literature and remain largely unexplored. Therefore, further study to thoroughly understand the impacts in the Cambodian context is well-deserved.

Furthermore, this empirical study contributes to the existing works examining the migration impacts in Cambodia by assessing expenditure categories more deeply and thoroughly. The existing research on expenditure in Cambodia includes World Bank (2006), CDRI (2007b), Chan (2009b), IOM (2010), and Hing et al. (2011b). These studies assess few expenditure categories and are done through the descriptive approach. To the best of the author's knowledge, in Cambodia only Tong (2011a) and Luch (2012) empirically assess the impacts of migration and remittances but on poverty, and income sources, income variation and child education, respectively. There are several other empirical studies and they are Yagura (2012) on migrants' marriage decision, and Filmer and Schady (2008 and 2011) on school enrolment and attendance. The latter two studies investigate the impacts of transfers other than remittances, that is, conditional cash transfers by the World Bank and JICA. Actually, there are a number of other studies analysing migration in Cambodia but those studies are qualitative and descriptive analyses. Those studies analyse the effects of migrant workers on household living at their home of origin (CCC, 2005; Dahlberg, 2005; and Yamagata, 2006); the characteristics and structure of migration (Haapala, 2003; Maltoni, 2006 and 2007; CDRI, 2007a; and Murshid, 2007); and the legal frameworks, cost and benefits of migration (Chan, 2009a and 2009b; and Hing et al., 2011a and 2011b). Therefore, to the best of the author's knowledge, this study is the first study which deeply and empirically investigates the migration impacts by categorising expenditure and consumption shares into more details i.e. food, education, health, consumer goods, communication, recreation and other spending.

Another contribution and motivation of this study is to assess the migration impacts on expenditure patterns from a comprehensive survey dataset covering all regions of the country. The existing research on the expenditure effects of migration in Cambodia is conducted through an analysis of small samples that were interviewed from provinces with a great probability to migrate and especially to Thailand. Also, this empirical study examines the impacts by addressing the endogeneity problem of migration so that the migration impacts on expenditure patterns in Cambodia can be understood more clearly.

4.2. Data Description

This study uses a comprehensive survey dataset to examine the objectives above. It is the Cambodia Socio-Economic Survey 2009 (CSES 2009), and the samples of the survey were 12,000 households from 720 villages across the country. This survey was conducted by the National Institute of Statistics, Ministry of Planning with the assistance of the Swedish International Development Cooperation Agency (SIDA) to interview 1,000 households from 60 villages every month, and the 2008 Population Census is the sampling frame for this survey.¹¹ Because of incomplete questionnaires or other technical reasons concerning 29 households, this survey has total 11,971 observations. In this study, because of missing values on a number of variables key to this study, the study assesses the expenditure impacts of migration on 11,773 households. Out of these total households for this analysis, 2,422 (20.57%) households are migrant households and 9,351 (79.43%) households are non-migrant households.

Table 4.1 shows descriptive statistics for all variables used in this migration impact analysis.¹² The table shows that there is a higher percentage of non-migrant households to be male headed. From the table, there is an indication that migrant household heads are more likely to be older but non-migrant household heads tend to be younger. For instance, there are

¹¹ The CSES 2009 was sampled to have numbers of observations similar to the CSES 2004.

¹² List of variables and descriptions are indicated in Table A.1 in Appendix A.

greater proportions of migrant household heads older than 45 years than non-migrant households. It is the opposite case for non-migrant households where there are greater proportions of their heads younger than 45 years. The table also gives an interesting indication that migrant household heads tend to have lower education than non-migrant household heads. In particular, the table shows that there are greater proportions of migrant household heads having primary education or no education at all than in the case of non-migrant household heads. In contrast, the table shows that there are higher proportions of non-migrant household heads to complete lower secondary, upper secondary, vocational, and college education. Furthermore, the table shows that migrant households have a greater size of land, value of livestock, and proportion of migration history. The table also shows greater proportions of non-migrant households to reside in villages having enterprises and electricity, and to reside in Phnom Penh and urban areas than migrant households.

Table 4.2 shows the descriptive statistics of expenditure and expenditure shares for all types of expenditure categories, where total household expenditure per capita is not significantly different between non-migrant and migrant households. For food expenditure, the table shows that non-migrant households have a greater proportion of that expenditure category than migrant households. For non-food expenditure, however, it does not show a significant difference between expenditure of these two groups of households. For specific expenditure categories of non-food type, the table shows that non-migrant households have higher proportions of consumer goods and recreation expenditure than migrant households. Also, the table indicates that there are no significant differences between expenditure of education, health and communication of these two groups of households. In terms of expenditure shares between food and non-food expenditure, the table indicates that about two thirds of total expenditure are spent on the former category where about one third of total expenditure is spent on the latter category. By types of households, non-migrant households have a greater proportion of food expenditure share than migrant households, but it is the reverse case for non-food expenditure share. In each category of non-food type, non-migrant

households have a greater expenditure share on consumer goods than migrant households, but migrant households have greater expenditure shares on health and other goods categories than non-migrant households.

Table 4.1: Descriptive statistics

<i>Variables</i>	<i>All Households</i>	<i>Non-migrant HH</i>	<i>Migrant HH</i>	<i>t-scores</i>
Male head	0.785	0.798	0.733	6.91***
Head $\leq$ 24	0.040	0.048	0.007	9.31***
Head 25_34	0.203	0.250	0.022	25.56***
Head 35_44	0.257	0.289	0.134	15.71***
Head 45_54	0.236	0.204	0.359	-16.19***
Head 55_64	0.158	0.116	0.318	-24.89***
Head > 64	0.106	0.092	0.160	-9.68***
HH size	4.774	4.769	4.793	-0.55
Head zero	0.005	0.004	0.007	-1.57
Head primary	0.442	0.427	0.498	-6.23***
Head lower	0.216	0.227	0.175	5.53***
Head upper	0.075	0.080	0.055	4.23***
Head vocational	0.006	0.007	0.005	0.75
Head college	0.013	0.015	0.003	4.68***
Landless	0.051	0.053	0.043	2.09**
Land 0-0.5 ha	0.154	0.156	0.147	1.14
Land 0.5-1 ha	0.161	0.159	0.168	-1.002
Land 1-2 ha	0.182	0.174	0.214	-4.57***
Land 2-4 ha	0.110	0.104	0.131	-3.70***
Land 4-8 ha	0.040	0.039	0.044	-1.06
Land over 8 ha	0.011	0.009	0.019	-3.87***
Livestock	1,864,291	1,754,861	2,286,784	-6.37***
Durable	4,408,734	4,569,493	3,788,063	2.02**
Enterprise	0.475	0.478	0.459	1.66*
Electricity (%)	26.79	28.072	21.838	7.03***
NGO project	0.358	0.359	0.356	0.22
Bus stop	4.035	4.072	3.895	0.98
Plain	0.418	0.406	0.463	-5.03***
Tonle Sap	0.299	0.299	0.296	0.26
Coastal	0.070	0.069	0.071	-0.33
Plateau	0.122	0.124	0.114	1.24
Phnom Penh	0.092	0.101	0.055	7.06***
Urban	0.197	0.212	0.141	7.83***
Past migration	0.619	0.596	0.711	-10.40***
<i>Number of observations</i>	<i>11773</i>	<i>9351</i>	<i>2422</i>	

Source: Author's calculation from CSES 2009. Note: * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table 4.2: Descriptive statistics of expenditure and expenditure share

<i>Variables</i>	<i>All Households</i>	<i>Non-migrant HH</i>	<i>Migrant HH</i>	<i>t-scores</i>
<i>Expenditure levels</i>				
Expenditure per capita	2,497,008	2,510,740	2,443,991	1.36
Food expenditure	1,565,871	1,581,720	1,504,682	3.27***
Non-food expenditure	931,137.2	929,020.6	939,309	-0.30
Consumer goods expenditure	187,122.2	190,779.1	173,003.3	2.28**
Education expenditure	68,307.29	69,129.45	65,133.03	0.61
Health expenditure	238,618	234,861.2	253,122.3	-0.87
Recreation expenditure	36,941.02	38,690.38	30,187.02	1.69*
Communication expenditure	56,921.17	57,808.3	53,496.07	1.03
Other goods expenditure	343,227.6	337,752.2	364,367.3	-1.79*
<i>Expenditure shares</i>				
Food share	0.683	0.687	0.667	5.74***
Non-food share	0.317	0.313	0.333	-5.74***
Consumer goods share	0.0734	0.073	0.071	1.82*
Education share	0.020	0.020	0.01998	0.08
Health share	0.075	0.073	0.082	-3.22***
Recreation share	0.010	0.010	0.0098	0.058
Communication share	0.018	0.018	0.0186	-1.46
Other goods share	0.122	0.119	0.132	-6.25***
<i>Number of observations</i>	<i>11773</i>	<i>9351</i>	<i>2422</i>	

Source: Author's calculation from CSES 2009. Note: * is significant at 10%; ** is significant at 5%; *** is significant at 1%. Annual average exchange rate for 2009 is USD 1 = KHR 4,154 (NBC's annual report 2009).

4.3. Empirical Models

As indicated in the objectives above, this study firstly examines the migration determinants of households who send out their members as migrants. To examine this first objective, the study uses the Probit model to assess the determinants of the migration decision. In the regression, the probability to migrate is regressed on household characteristics, household assets, household education indicators, village indicators, regional indicators and past migration history. The empirical model is the following:

$$y_i^* = \alpha + \mathbf{X}_i\beta + \tau_i \quad (4.1)$$

$$y_i = \begin{cases} 1, & y_i^* \geq 0 \\ 0, & y_i^* < 0 \end{cases}$$

where y^* is a latent or unobserved continuous variable and y is a observed variable. In this specification, the observed variable y is a binary variable and is the observed migration

decision. The unobserved variable y^* is the potential gains for households i for being engaged in migration. X_i is a vector of the control variables i.e. household characteristics, household assets, household education indicators, village indicators, regional indicators and past migration history of household i . τ_i is the error term and, according to Wooldridge (2009), its distribution is standard normal distributed with zero mean and variance $\sigma^2 = 1$ [$\tau \sim N(0,1)$]. α is the constant term.¹³

For the second objective, the study assesses the migration impacts on total household expenditure and expenditure categories—food and non-food. Non-food expenditure categories include consumer goods, education, health, recreation, communication and other goods. In the analysis, those expenditure categories are expenditure per capita in the past 12 months in riel. The empirical model is the following:

$$\ln EXP_i = \gamma + \delta M_i + X_i \varphi + \varepsilon_i \quad (4.2)$$

where M_i is the migration dummy for household i ; X_i is a vector of the control variables i.e. household characteristics, household assets, household education indicators, village indicators, and regional indicators of household i ; and γ and ε_i are the constant term and the error term, respectively. The main dependent variable in the investigation is $\ln EXP_i$. It is a natural logarithm of total household expenditure per capita, and the natural logarithm of expenditure per capita on the spending categories of food, consumer goods, education, health, recreation, communication and other spending for household i , respectively.

In the investigation of the expenditure patterns, it is argued that how households spend depends on how much households earn, and, thus, household income has impacts on household consumption. However, in the estimation of the model above, the study does not control household income in the estimation for several reasons as follows. According to Sadoulet and de Janvry (1995), in the household model when the market functions poorly or imperfectly, households cannot separate their consumption from their income. “When a

¹³ List of variables and descriptions are indicated in Table A.1 in Appendix A.

household needs to decide what to produce and how to earn income in different activities in a situation where some markets fail, then there is no longer ‘separability’ between production and consumption decisions. The household’s production/income problem must be determined simultaneously with its consumption decisions.” (Sadoulet and de Janvry, 1995, pp.150). It indicates that the separability does not hold in households when the market is weakly functioning, and it is the situation in Cambodia. Therefore, the study assumes the non-separability in the investigation. In this respect, investigating the impacts of migration on household expenditure similarly demonstrates the impact analysis of migration on the income. Furthermore, according to Deaton (1997), it is difficult to identify and measure income in a developing country such as Cambodia where it is very complicated to calculate income of self-produced goods and self-employment. He indicates that there may be a measurement error in the calculation of the income. Another reason that the study does not control the income in the estimation is due to the endogeneity concern. If it is controlled, it will generate a correlation with the error term because the income is the function of other control variables in the model: household education, household composition, household assets, and village socio-economic indicators. The endogeneity concern can be minimised if the estimation controls variables accounting for household and village socio-economic indicators i.e. household characteristics, household assets, household education, and village characteristics. Since this study is a cross-section data analysis, it is necessary to categorise household expenditure into clusters, as indicated by Sadoulet and de Janvry (1995), in order to deal with differences of the changing prices. Therefore, this study uses several geographical dummies for regions in the analysis in order to control variations of relative prices and other regional fixed effects. Those dummies are characterised into four regions i.e. the Tonle Sap region, the plain region, the plateau region, and the coastal region. Phnom Penh, whose geographical plate is in the plain region, is excluded from the plain region and treated as the base group. An urban regional dummy is also included as another control variable.

In this study, migration instead of remittances is used for the analysis because, according to McKenzie (2006), migration could have impacts other than those occurring as a result of remittances and migration could capture the entire impacts of both migration and remittances on expenditure patterns. To minimise omitted variable bias, McKenzie (2006) suggests that migration should be used for the analysis. Also, according to Karamba et al. (2011), the entire impacts of having a migrant in the household could be captured by using the migration dummy and its sign is important for causal inferences. Therefore, this study uses the migration dummy to analyse the impacts on household expenditure patterns.

This study defines migration following Luch (2012) who uses the same dataset for his analyses. The binary variable of migration equals one if households have any members who are currently migrating, and zero otherwise. Current migrants are persons who are aged over 15 years and below 64 years, and who have previously been members of households but now are living away from home. In this definition of migration, this study analyses migration that has occurred since 2004 to avoid any impacts of migration which Cambodia experienced during the internal turmoil. This is also because of the study's objectives in investigating the economic impacts of current migration on household livelihoods. In this regard, these migrants are in frequent contact with families and are still being treated as household members. Also, these migrant members are still another main stream of household income and a main household coping strategy to diversify sources of income. It is more likely that they would return home. It is arguable that migrants departing before 2004 are more likely to remain at the destinations. Luch (2012) argues that migrants moving before 2004 may have their own families there, and he suggests this definition "in order to avoid duplicating and misreporting" (pp.62) in the analysis. In this way, these migrants may no longer be a part of household members and income channels. Although they may provide transfers or gifts to households, it is rare and so may have negligible effect on households.

For the third objective, as indicated, this study examines the migration impacts on expenditure shares of spending categories i.e. food, consumer goods, education, health,

recreation, communication and other goods in order to understand household spending behaviours in response to the migration decision. For this objective, the study follows Karamba et al. (2011) by modelling dependent variables as ratios of those spending categories to total household expenditure. The empirical model for this analysis is the following:

$$EXPSH_i = \sigma + \omega M_i + \rho \ln EXP_i + X_i \theta + v_i \quad (4.3)$$

where M_i is the binary variable of migration of household i ; $\ln EXP_i$ is a natural logarithm of total expenditure per capita for household i ; X_i is a vector the control variables i.e. household characteristics, household assets, household education indicators, village indicators, and regional indicators of household i ; and σ and v_i are the constant term and the error term, respectively. The dependent variable is $EXPSH_i$ where it is a ratio of expenditure per capita of each spending category (food, non-food, consumer goods, education, health, recreation, communication, and other spending) to total household expenditure per capita. It is the expenditure share of each spending for household i .

In this empirical model, in addition to the binary variable of migration and other control variables, the analysis includes the logarithm of total household expenditure per capita as another independent variable because, according to the consumer theory, average budget shares of each type of goods are positively associated with total income. As indicated by Karamba et al. (2011), if this variable is not controlled in the regression, it would generate results inversely in capturing the actual migration impacts on expenditure patterns. However, this study uses household expenditure instead of household income because the objectives of this study are to assess the migration impacts on expenditure patterns. As already specified above, it is also due to the complication of income measurement in developing countries e.g. Cambodia, especially in self-employed farming activities as indicated by Deaton (1997). It is also because, in the household theory, households decide to produce (or earn income) and spend simultaneously (Sadoulet and de Janvry, 1995).

Before empirically estimating models (4.2) and (4.3), it is necessary to indicate that migration may be endogenous and may generate confounding results if it is not properly addressed. A growing number of studies in the literature indicate that unobserved factors in households may affect the household decision to send migrants and may also affect household expenditure patterns because migration is the joint decision between households and migrants (Karamba et al., 2011). These researchers address the fact that the unobserved factors may generate omitted variable bias and the estimation done through the Ordinary Least Squares (OLS) could not solve the problem. They suggest that the estimation should be done through the Two Stage Least Squares (2SLS) where migration is estimated in the first stage before the estimations of models (4.2) and (4.3). The empirical model for the first regression of migration is the following:

$$M_i = \eta + \zeta Z_i + \mathbf{X}_i \lambda + \mu_i \quad (4.4)$$

where M_i is the binary variable of migration for household i ; Z_i is the instrumental variable for household i ; $\mathbf{X}_i$ is a vector of the control variables i.e. household characteristics, household assets, household education indicators, village indicators, and regional indicators of household i ; and η and μ_i are the constant term and the error term, respectively.

To estimate model (4.4), it is necessary to find instrumental variables which have impacts on migration but have no impacts on expenditure categories in models (4.2) and (4.3) unless through migration. According to Taylor et al. (1996) and McKenzie (2006), the NELM identifies migration network as an important indicator of encouraging migration and reducing migration costs. These studies point out that the network i.e. relatives, friends and household neighbours helps circulate job information and other socio-economic indicators of the destinations to families and villages at their home of origin. They specify that the network provides occupation referrals and temporary housing for subsequent migrants. The studies point out that subsequent migration is generally seen in families or villages with migration history. Empirically, this migration network is used as an instrumental variable in the studies of Rozelle et al. (1999), McKenzie and Rapoport (2007), Adams and Cuecuecha (2010),

Amuedo-Dorantes and Pozo (2010), Damon (2010), de Brauw (2010), Karamba et al. (2011), and Hu (2012). Following the literature, Luch (2012) uses past migration as an instrumental variable to represent the migration network in his analysis of the impacts of migration and remittances on child education in rural Cambodia.

In the context of Cambodia, the network plays an important role in promoting labour migration and linking migrant workers with employers. According to CDRI (2007b), the network helps facilitate the migration process, and reduce social and financial costs. The study specifies that more than 50% of job opportunities are circulated by relatives, and the remaining are disseminated by family members, friends, neighbours or villagers. The study points out that parents and other family members at home are less worried if migrants work with any workers from the same villages. The study also indicates that with the migration network a great expectation of secured jobs is achieved; risks associated with migration are minimised; and the likelihood of job exploitation is lessened. Particularly, in the garment industry, Lee (2007) finds that the network provides migrants with job information and temporary housing at the destinations before these migrants find jobs. As this researcher specifies, these migrants can obtain mental and emotional assurance from the network to help incorporate their lives into life at the destinations since most of them “are travelling and living out of their homes for the first time in their lives” (Lee, 2007, pp.13). If rural households have any connection with someone working in the garment industry in Phnom Penh, they are more likely to send their household members to work in the sector (CCC, 2005; and Dahlberg, 2005). Likewise, in the construction sector, the network is found to provide free accommodation and food to migrants until they start their work (Murshid, 2007). Furthermore, in the case of migration to Thailand, the network also works in the similar way by circulating job information to origin communities (IOM, 2010). According to Maltoni (2007), this migration to Thailand is generally facilitated by two sorts of middlemen. The first kind is return migrants using their experiences in migration and their well-established

network to help relatives, friends or villagers migrate for work in Thailand, and the second kind is professional brokers who facilitate the migration process (Maltoni, 2007).

Following Luch (2012), this study uses migration history as an identification of the migration network and as the only instrumental variable for the analysis.¹⁴ It is a binary variable if households have any return migrant members in the past five years before 2004, and zero otherwise. This migration history is expected to have an impact on the current household migration since it helps facilitate the current migration, but have no direct effect on the outcomes of the analysis. It is because the network is the past migration history incurred at least five years before the survey was conducted in 2009, and those past migrants have already returned home. The network could have effects on the past consumption or investment, but have no effects at all on the current levels of consumption or investment. Although the migration history may provide households with knowledge on how to consume, it is hard to measure the magnitude. As noted above, Cambodian migrants are engaged in unskilled or low-skilled jobs so there is no evidence to emphasise significant skill improvement upon returning home. Therefore, this verifies that this network instrument has no effects on the current household consumption or investment other than through current migration.

4.4. Results and Discussions

This section gives detailed results estimated through the models described in the preceding part, and discusses these results and their implications. The results of migration determinants through the Probit model will firstly be discussed. In the second part, the results of the migration impacts on expenditure patterns will be estimated through the OLS and 2SLS, and will be discussed thoroughly.

¹⁴ A wide range of possible instrumental variables i.e. village and individual shocks are executed and tested as well. However, the attempts do not successfully satisfy the econometric tests of 2SLS.

4.4.1. Migration Determinants

The first objective of this study is to examine the determinants of the migration decision to send out household members as migrants by using the Probit regression of migration probability on household characteristics, household assets, household education indicators, village indicators, regional indicators and past migration history. The estimation gives significant findings of these indicators influencing the household decision to be involved in migration.

Table 4.3: Migration determinants by the Probit model

<i>Variables</i>	<i>Coefficients</i>	<i>S.E.</i>	<i>Marginal Effect</i>	<i>S.E.</i>
Male head	-0.028	(0.037)	-0.007	(0.009)
Head 25_34	-0.227*	(0.124)	-0.050**	(0.025)
Head 35_44	0.567***	(0.115)	0.152***	(0.034)
Head 45_54	1.338***	(0.114)	0.4091***	(0.039)
Head 55_64	1.615***	(0.115)	0.531***	(0.039)
Head>64	1.321***	(0.117)	0.440***	(0.043)
HH size	-0.041***	(0.008)	-0.010***	(0.0018)
Head primary	0.156***	(0.037)	0.037***	(0.0088)
Head lower	0.011	(0.047)	0.003	(0.011)
Head upper	0.057	(0.068)	0.014	(0.017)
Head vocational	0.108	(0.196)	0.027	(0.051)
Head college	-0.323*	(0.195)	-0.064**	(0.032)
Land 0-0.5 ha	-0.133***	(0.051)	-0.030***	(0.011)
Land 0.5-1 ha	-0.105**	(0.051)	-0.024**	(0.011)
Land 1-2 ha	-0.037	(0.050)	-0.009	(0.011)
Land 2-4 ha	-0.019	(0.057)	-0.004	(0.013)
Land 4-8 ha	-0.095	(0.080)	-0.021	(0.017)
Land over 8 ha	0.148	(0.127)	0.037	(0.034)
Livestock	0.014***	(0.003)	0.003***	(0.0007)
Durable	0.014**	(0.006)	0.003**	(0.0014)
Enterprise	0.043	(0.033)	0.010	(0.0078)
Electricity (%)	-0.001**	(0.001)	-0.0003**	(0.0001)
NGO project	-0.006	(0.031)	-0.0015	(0.0072)
Bus stop	-0.003*	(0.002)	-0.0008*	(0.0005)
Plain	0.286***	(0.073)	0.069***	(0.018)
Tonle Sap	0.242***	(0.073)	0.060***	(0.019)
Coastal	0.283***	(0.087)	0.075***	(0.026)
Plateau	0.230***	(0.082)	0.059**	(0.023)
Urban	-0.189***	(0.061)	-0.042***	(0.013)
Past migration	0.094***	(0.032)	0.022***	(0.007)
Constant	-2.191***	(0.151)		
<i>Pseudo R²</i>	<i>0.167</i>			
<i>LR Chi2</i>	<i>2002.96</i>			
<i>Prob>Chi2</i>	<i>0.000</i>			
<i>Number of observations</i>	<i>11773</i>			

Note: Standard errors in parentheses, * is significant at 10%; ** is significant at 5%; *** is significant at 1%

Table 4.3 gives estimation results that all age groups of heads with the exception of the 25-34 age group have positive effects on the migration decision of household members. It shows that older heads are more likely to send out migration since the results point out that an increase in the ages of heads increases the migration probability. This finding is consistent with that of Lipton (1980) and Adams (1993) who conclude that the older heads are more capable of having household members ready to participate in migration because of being in the productive age range. The table also shows that household size has a negative impact on the migration probability. It can indicate that having more members reduces the probability of households to send their members as migrants. By having more members, households may keep their members to carry out household activities. Interestingly, the table provides significant results of household education indicators. The table shows opposite results between primary and higher education on the migration decision. It shows that heads with higher education appear less likely to send out their members as migrants, but heads with lower education are more likely to send out their household members as migrants. It gives an indication that highly educated household heads can look for jobs and earn reasonable income to maintain household livelihoods so that they are less likely to allow their members to participate in migration. Also, because there are risk concerns of members being physically and mentally exploited at the destinations (Marshall, 2001; Neth, 2009; and UNIAP, 2010), household heads with higher education can avoid that risk by putting more effort into their work for the betterment of household livelihoods. In Cambodia, education is found to have high returns (Ridao-Cano, 2003), and workers with higher education are found to receive higher hourly wage rates (Sakellariou, 2008).

The results further show that landless households are more likely to be involved in migration. In the table, households possessing land holding less than one hectare are found to be less involved in migration than those possessing no land holding. As indicated in the preceding chapter, landlessness is one of the main reasons that induce households to participate in migration, and land is regarded as the important asset for livelihoods in

Cambodia. Without it, their livelihoods will be in danger. Even so, Maltoni (2007) indicates that their livelihoods can be protected if these households participate in migration. This researcher specifies that migration is the alternative strategy for household survival. Also, this finding is consistent with Deshingkar (2006) and Chan (2009b) where they find that landless households are more likely to send out their household members to find jobs in urban areas, and these households depend heavily on migrants for living. Furthermore, the table shows that livestock and durable assets have positive impacts on the migration decision, indicating that these assets could be used to afford migration costs.

Table 4.3 also shows that village indicators, regional indicators and past migration history are important factors to induce migration. For the village indicators, the results indicate that migration is more likely to occur in villages with poor economic infrastructure. It is because of the negative finding of the percentage of households having access to electricity on the migration probability. The negative finding of the distance to bus stop from household villages on the migration decision shows that greater distance induces a disturbance and discourages households from participating in migration. For the regional indicators, the results show that all regions except the urban regions have positive impacts on the migration decision. It is obvious that migration is less likely to occur in the urban regions than the rural regions because economic activities and employment opportunities are highly concentrated on the urban regions. With Phnom Penh as the reference group, the great probability of migration in the plain region is because of its close vicinity to the capital city and good infrastructure. The high probability of migration in the Plateau region is because of the shortage of economic activities and job opportunities there. The great likelihood of migration in the coastal region is because of the daily cross-border migration to Thailand for farming and fishing activities, while that in the Tonle Sap region is also because of a high incidence of seasonal fishing and farming activities, and more importantly, because of construction and garment work in Siem Reap and Phnom Penh. Furthermore, in the results, migration history is found to have positive impacts on the migration decision, indicating that

households with migration history are more likely to send their members as migrants. It gives an indication that information about job opportunities and other socio-economic characteristics are circulated by this migration network. Therefore, it identifies the past migration history as the indicator to promote and facilitate further migration in households.

4.4.2. Migration and Expenditure Patterns

This section discusses results of the migration impacts on household expenditure patterns. Before discussing the results in details, it is necessary to indicate econometric tests done in this analysis. The study has tested heteroskedasticity, and the testing suggests that the analysis should be done with the robust standard error OLS and 2SLS. Because of the methodological problem concerning migration, as indicated above, the analysis has performed another econometric test, Wu-Hausman statistics, to check the endogeneity of migration and to ensure a more efficient analysis between the OLS and 2SLS. To carry out the 2SLS in the analysis, the study has also tested F statistics of the first regressions for all estimations to ensure the relevant and strong instrumental variable. After testing these econometric tests, the estimation results indicate that the analysis should be done with the 2SLS.¹⁵ However, several regressions are found not to satisfy the Wu-Hausman statistics—health expenditure, and the expenditure shares of food, recreation, communication and other goods—where their Wu-Hausman statistics are too small to reject the null hypothesis of exogenous regressions. For the regressions of these variables, it shows that the OLS should be done since it is less biased and more efficient; therefore, the discussions of these variables only are based on the OLS throughout the study.¹⁶

¹⁵ All details are shown in Table A.2, A.3, A.4, A.5, A.6, A.7, and A.8 in Appendix A.

¹⁶ There is a possible concern about the left-censored problem since the variables of recreation, education, communication, and health expenditures contain zero values about 57%, 43%, 43%, and 22%, respectively. Therefore, Tobit and IV Tobit regressions are estimated for all dependent variables. The results show that estimated signs and significant levels are similar and comparable, but the magnitudes of migration by the Tobit

Table 4.4: Summary of the regressions of migration on expenditure

<i>Dependent Variables</i>	<i>Total Observations</i>		<i>Rural</i>		<i>Urban</i>
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>
<i>Expenditures</i>					
Total expenditure	0.0002 (0.011)	1.787** (0.753)	0.001 (0.013)	1.784*** (0.659)	0.006 (0.026)
Food expenditure	-0.023** (0.010)	1.490** (0.653)	-0.027** (0.012)	1.570*** (0.594)	-0.002 (0.023)
Non-food expenditure	0.055*** (0.019)	3.316** (1.337)	0.062*** (0.021)	2.943*** (1.086)	0.039 (0.042)
Consumer good expenditure	-0.025 (0.022)	3.459** (1.445)	-0.030 (0.024)	3.349*** (1.243)	0.006 (0.055)
Education expenditure	0.225** (0.113)	31.095*** (11.193)	0.336*** (0.120)	22.982*** (7.637)	-0.270 (0.318)
Health expenditure	0.130 (0.117)	7.139 (5.112)	0.015 (0.127)	3.319 (3.972)	0.743** (0.308)
Recreation expenditure	0.257** (0.123)	8.280 (5.341)	0.324** (0.133)	5.533 (4.240)	0.036 (0.313)
Communication expenditure	0.492*** (0.116)	21.923** (8.517)	0.557*** (0.132)	19.715*** (7.009)	0.159 (0.208)
Other goods expenditure	0.090*** (0.028)	4.790** (1.896)	0.104*** (0.031)	4.295*** (1.545)	0.048 (0.066)
<i>Expenditure shares</i>					
Food share	-0.016*** (0.003)	-0.059 (0.127)	-0.0176*** (0.0036)	0.0139 (0.1105)	-0.0072 (0.0075)
Consumer goods share	-0.004** (0.001)	0.110* (0.067)	-0.0039** (0.0015)	0.1128* (0.0583)	-0.0025 (0.0035)
Education share	-0.001 (0.001)	0.131** (0.058)	-0.0004 (0.0011)	0.0696** (0.0341)	-0.0033 (0.0042)
Health share	0.0067** (0.0027)	-0.3170** (0.1544)	0.0071** (0.0031)	-0.3080** (0.1357)	0.0030 (0.0055)
Recreation share	0.0007 (0.0005)	-0.0029 (0.0202)	0.0008* (0.0005)	0.0049 (0.0148)	0.0003 (0.0019)
Communication share	0.0020*** (0.0007)	0.0390 (0.0271)	0.0021*** (0.0007)	0.0438* (0.0231)	0.0015 (0.0022)
Other goods share	0.0109*** (0.0021)	0.0981 (0.0860)	0.0118*** (0.0023)	0.0630 (0.0708)	0.0082 (0.0057)
<i>Number of observations</i>	11,773	11,773	9,453	9,453	2,320

Notes: Instrumental variable is the past migration. Heteroskedasticity robust standard errors are in parentheses.

** is significant at 10%; ** is significant at 5%; *** is significant at 1%. It should be noted that the discussions of the results are based on the 2SLS for all regressions, except the regressions of health expenditure, and the expenditure shares of food, recreation, communication and other goods. The discussions for these regressions are based on the OLS because the Wu-Hausman statistics are too small to reject the exogeneity.*

and IV Tobit estimations appear slightly greater than the OLS and 2SLS estimations, respectively. Therefore, the explanation of the results is kept as is in the narrative above.

Table 4.4 provides significant findings of the migration impacts on expenditure and expenditure shares of various spending categories. In the table, migration is found to have significant and positive impacts on total household expenditure per capita. This finding indicates that the overall impact of migration provides households with net returns through the income-effects of remittances as specified by Karamba et al. (2011). From this finding, there is an indication of livelihood improvement when households participate in migration. In other words, as Karamba et al. (2011) identify that migration can cause concern about a reduction in household production or village economies due to the workforce movement, this finding may suggest that the migration decision has no impact on household production or village economies. It may indicate that the marginal productivity of labour is near to or equal to zero where the rural out-migration has no impact on the rural sector. In Cambodia, several studies find that the labour workforce is abundant and these labourers are underutilised (CDRI, 2007b; World Bank, 2009; ADB, 2012b; and Theng and Flower, 2014). These studies describe the workforce as poorly skilled and specify that their movement for work does not affect production of households they leave behind at their home of origin. As specified by CDRI (2007b), Maltoni (2007), and IOM (2010), during the peak farming season, migrants return home to help farming. These studies also point out that labour is not constrained even in households with permanent migrants. As indicated, if there is a labour shortage in households, hiring labour is an option to solve this issue. Since a majority of migrant parents are too old to do farm work, Kang et al. (2009) find that there is hired labour in migrant households and this hiring is financed through remittances. Due to the abundance and underutilisation of labour, therefore, this finding in this study indicates that migration would rather generate income for these households to increase their livelihoods or make household investment.

When the analysis categorises expenditure into food and non-food, the study finds that migration still has significant and positive impacts on both spending categories. The impacts of migration on the latter category are larger than the former category. Regarding the former

spending category, this research finding gives an indication that migration enables households to increase food consumption through the income-effect of remittances. It may indicate that food consumption in these migrant households are not constrained but rather improved upon their migration decision. It can also indicate that there may be nutrition improvement in these migrant households. There is another possible explanation for this finding. According to Turunen et al. (2010), male seasonal migrants bring food along with them in addition to savings on their home visits. Therefore, this research finding demonstrates that food consumption is strengthened and improved when households participate in migration. Regarding the latter spending category, the study categorised the non-food spending into deeper categories: consumer goods, education, health, recreation, communication and other spending. Table 4.4 provides findings that migration has significant and positive impacts on these spending categories, except health and recreation spending where the coefficients are insignificant. Among all of these spending categories, at the margin, the two largest spending categories migration has impacts on are education and communication categories.

When the study further analyses the impacts of migration on expenditure shares, the analysis gives interesting results, as also provided in Table 4.4. Migration is found to have significant and negative impacts on food and health expenditure shares. In contrast, migration is found to have significant and positive impacts on the other categories of expenditure shares, except the expenditure share of recreation where the coefficient is insignificant. According to Karamba et al. (2011), these findings give an indication that migration changes household spending behaviours. Migrant households appear to shift their expenditure categories away from food and health toward consumer goods, education, communication and other spending. These results indicate that there is a change in household spending behaviours upon the migration decision away from such basic goods as food and health to such more durable and investment goods as education, consumer goods and communication.

As already indicated, migration has a positive and significant impact on food expenditure, and also has a positive but insignificant impact on health expenditure. For the expenditure shares of these two categories, as also shown above, migration has negative and significant impacts on these expenditure shares. According to Nguyen and Winters (2011), these results give an indication that expenditure levels on food and health items are growing less as a proportion of total expenditure. These findings can also indicate that food and health are basic goods for which consumption demand initially increases upon the receipts of remittances but later declines.

As migration is found to have no impact on health expenditure but has a negative impact on the expenditure share, several reasons to explain these findings can be offered. The first reason is due to the positive impact of migration on food expenditure. As indicated above, migration is found to increase food consumption. Migration appears to improve food nutrition, and, thus, household health conditions can also be improved. According to the NELM, migration enables households to lessen credit constraints; therefore, concerns about financial constraints could be addressed by having migrants, resulting in the improvement of household health conditions. Another possible reason to explain these findings are due to the accessibility of rural households to several social programs jointly assisted by the government and development agencies. Kem et al. (2011b) shows that more than half of 76 programs operated in Cambodia are about health care related issues. Those programs include health equity funds, community-based health insurance, and voucher schemes (Net, 2011). As indicated by Kem et al. (2011b), the health equity fund targets people under the poverty line and is operating in 51 referral hospitals and 120 medical centres across the country, whereas the community-based health insurance program is operating in Phnom Penh and in other seven provinces, consisting of 81 medical centres and insuring 73,828 policyholders.

Furthermore, another explanation is that factors other than migration have impacts on health spending. Ambrosius and Cuenca (2013) indicate that it might not be a deliberate decision to increase health expenditure when households receive cash income from

remittances, but the increase in the expenditure is seen when unexpected shocks occur. When households face unexpected shocks such as illness or injury, a prominent coping strategy for those households is to take credit from relatives, friends or other informal or formal institutions (Fafchamps and Lund, 2003). Due to the large amounts of money needed for medical treatment, it is understandable that rural households in Cambodia are not able to afford the expenses through wage labour, farming, or other additional income sources (Yagura, 2005; Ngo and Chan, 2010; Turunen et al., 2010, and Kem et al., 2011a). These studies indicate that adequate income cannot be accumulated in a short period of time to compensate for excessive health treatment fees. To deal with this hardship, as they specify, it is a common approach for households in Cambodia to borrow credit from neighbouring households, moneylenders, brokers, or microfinance institutions. These studies describe another strategy for those households to handle their difficulties through liquidating household assets. Through this means, they can pay not only for household medical expenses, but also repay borrowed principal and interest. As also indicated in these studies, another approach is for migrant remittances to be used to repay those loans. Therefore, migration indirectly influences health spending.

More importantly, in these empirical results, the study finds that migration has positive impacts on education expenditure and its expenditure share. It gives a very important finding of the migration impacts in Cambodia. This finding provides evidence that migration has lessened financial constraints of migrant households, and, thus, has enabled them to send their members to school. In rural Cambodia, rural households are generally liquidity constrained, and the high drop-out rate is mainly due to household financial hardships. Therefore, the lessening of these constraints will increase household capacity to keep school retention of their children and other members. In this regard, through migration, migrant households are able to overcome liquidity constraints in education so that household members could be kept in school. As found by Kang et al. (2009), migrants are sent out temporarily by households to earn income when they are free from school or on vacation. It

can indicate that income migrants earn can improve household liquidity and can also be used for their education spending. In Luch (2012) which uses the same dataset as this study but examines the impacts on child school attendance and attainment, similar results are detailed by finding that migration and remittances have positive net effects on those outcomes. In sum, migration in Cambodia has positive impacts on improving household education.

Furthermore, the results in this study give a second important finding of the migration impacts in Cambodia. Migration is found to have positive impacts on communication expenditure and its expenditure share. The communication spending signifies an important role of the social network and social capital in information exchange on the business environment and labour markets. In Cambodia's farming activities, according to Roberts and Kernick (2006), the mobile phone is one of the chief tools for market information sharing, especially for agricultural price information, between farmers, dealers, retailers, wholesalers and exporters. Similarly, Houghton (2009) also specifies this role of the communication network in Cambodia. Because of the convenient accessibility to information related to market prices, climate change, and best practices, the mobile phone is confirmed to be satisfactorily associated with productivity improvement in raising poultry (Houghton, 2009). The phone is also one of the most common and economical channels for transferring remittances from migrants to home families (Chan, 2009b; IOM, 2010; Hing et al., 2011a). In construction work, the mobile phone is used by construction foremen to contact other villagers when more construction workers are needed (CDRI, 2007b). Therefore, the impacts of migration on communication spending not only build up social capital but also improve household businesses.

Additionally, in the above findings, the results show the migration impacts on expenditure and expenditure shares without distinguishing the impacts in different locations. There is a possibility that migration could have impacts differently in rural and urban areas. Therefore, this study further examines the migration impacts by disaggregating the samples into rural and urban areas. Significantly, the migration impacts on rural subsamples are found

similarly like the results of total samples above (Table 4.4). In contrast, the results in urban areas show that migration has no impact on those outcomes.¹⁷ Therefore, the results indicate that migration has significant development impacts in rural Cambodia predominantly.

As indicated above by Adams and Cuecuecha (2010), remittances can be spent like other sources of income if migration is a household permanent income strategy, and can also be used for investment spending if migration is a temporary income strategy. From the empirical findings in this study, these can give an indication that migration in Cambodia is used as the permanent income strategy since migration is found to have positive impacts on household expenditure, including food and non-food spending categories. Moreover, since migration is found to increase household spending in education and communication and appears to change their spending behaviours toward these spending categories, migration in Cambodia can also be categorised as the temporary income strategy for household investment. More importantly, migration demonstrates these roles very significantly in rural Cambodia.

4.5. Concluding Remarks

This study (1) firstly examines the determinants of the decision to send out household members as migrants; (2) secondly investigates the migration impacts on total household expenditure and several other expenditure categories; and (3) thirdly assesses the migration impacts on expenditure shares of those spending categories in order to examine household spending behaviours in response to the migration decision.

Through the Probit model to estimate the first objective, this study finds that older household heads are more likely to send out their members as migrants, but households with a greater number of members are not. Poorly educated household heads are more likely to

¹⁷ In the 2SLS estimations of urban subsamples, the results show that Wu-Hausman statistics and F statistics are too small to reject the null hypotheses of exogeneity and weak instrument. Therefore, the discussions on these urban subsamples are heavily depending on the OLS estimations. In the OLS estimation in urban households, migration is found to have a significant and positive impact on health expenditure.

send out their members as migrants. In contrast, highly educated household heads are less likely to participate in migration, but more likely to find jobs locally and put more effort into their work for livelihood improvement of their households. Landless households appear to be more likely to participate in migration. Households with greater values of livestock and durable goods, in all geographic regions and in rural areas are more likely to participate in migration. The accessibility and economic conditions of villages are also important determinants of the migration decision. Also, migration history is shown to promote and facilitate further migration.

Through the OLS and 2SLS to examine the second and third objectives, the study finds that migration has a positive impact on increasing total household expenditure. It gives an indication that migration provides households with net returns through the income-effect of remittances for the livelihood improvement. When this study categorises expenditure into food and non-food, the study finds that migration still has positive impacts on both spending categories, but the impacts on the latter category are larger. When this non-food spending category is classified as several other detailed spending categories, this study finds that migration has positive impacts on almost all those spending categories. Furthermore, when the analysis is done with expenditure shares of those spending categories, this study finds that migration appears to change household spending behaviours away from the consumption of such basic goods as food and health toward the consumption of such durable and investment goods as education and communication.

As already discussed above, migrants are mainly from rural regions heavily depending on subsistence-farming activities and having abundance of labour, and these migrants have low skills or no skills at all. Therefore, sending out migrants has no impact on harming household economies, but it will improve household economies. More specifically, in the results, this study finds that migration has a positive impact on increasing food consumption even though migration appears to change its expenditure share. More importantly, this study finds that migration has positive impacts on increasing education and communication

expenditure and their expenditure shares. These results indicate that migration has positive development impacts on Cambodia's households and, especially, on the households in rural areas as the migration impacts are found to remain highly significant in these regions. Therefore, it indicates that migration in Cambodia has positive impacts on household investment spending, showing the improvement of household livelihoods upon the migration decision.

In the next chapter, the research examines the second main focus, the impacts of remittances on household credit borrowing in rural Cambodia.

CHAPTER 5

REMITTANCES AND HOUSEHOLD CREDIT BORROWING IN RURAL CAMBODIA

5.1. Introduction

5.1.1. Problem Statement

In developing countries, credit and insurance markets are generally underdeveloped, incomplete or poorly functioning. Households, especially in rural areas, are restricted by capital constraints due to the limited access to those markets, and are highly vulnerable to any exogenous shocks (Townsend, 1994; Jalan and Ravallion, 1999; and Dercon and Krishman, 2000b). To insure consumption against those shocks, rather than using formal mechanisms which are missing in developing countries, these studies indicate that households use informal risk-coping or self-insured strategies such as asset accumulation and dis-accumulation, off-farm labour participation, income earning from village common property resources and child labour. As reported in the studies, credit is also identified as another significant mechanism for informal risk-coping even though it may create certain burdens for households when they are unable to settle debts. Among those mechanisms, as indicated in these studies, migration and remittances have been recently emphasised as playing a significant role to insure against the adverse risks by providing households with capital to improve liquidity, to minimise the impacts of shocks and to lessen credit constraints.

Despite migration and remittances having a role in relaxing credit constraints and coping with unexpected risks, there is little research assessing the direct impacts on credit borrowing, or the direct substitution between remittances and credit borrowing. A number of studies have examined the impacts of migration and remittances on financial development at macroeconomic and household levels, but the credit effects of remittances are unclear. Furthermore, several other studies have emphasised the indirect substitution between remittances and credit borrowing when households or home countries are credit constrained

and have difficulty gaining access to credit. Removing credit constraints by receiving remittances allows households to carry out investment in human capital in Ecuador (Calero et al., 2009) and to improve farm income and production in Mexico and China (Taylor and Wyatt, 1996; and Taylor et al., 2003); allows entrepreneurs who are credit constrained to make more investment and profits in Mexico (Woodruff and Zenteno, 2007); and allows recipient countries, especially countries with underdeveloped financial systems, to accelerate economic growth (Giuliano and Ruiz-Arranz, 2009).

To the best of the author's knowledge, only a study in Mexico by Ambrosius and Cuecuecha (2013) investigates whether remittances directly substitute for credit in the event when households face health-related shocks by using migration ties as an indicator. Their results support this hypothesis and show that households have recourse to migrants in the time of health shocks. With access to remittances, the study indicates that households are less at risk and less reliant on credit to cope with adverse shocks. It may suggest that households tend not to take credit, to liquidate assets, or to employ child work but rather undertake migration, which may provide remittances sufficient to compensate the loss, when they experience adverse shocks. Therefore, it indicates that migration works as a mitigation instrument better than other informal mechanisms.

5.1.2. Objectives

In this chapter, the primary objective is to empirically examine the New Economics of Labour Migration's (NELM) hypothesis about the lessening of credit constraints by assessing the direct effects of remittances on household debt burdens in Cambodia. Secondly, it estimates the effects of idiosyncratic and aggregate shocks on household credit borrowing. Thirdly, it further analyses the role of remittances as a coping mechanism for households to deal with shocks at household and village levels. It examines whether remittances substitute for credit when households experience those shocks.

5.1.3. Contributions

This study makes several significant contributions to the existing literature. Firstly, it fills a gap in the risk coping literature between credit and remittances by analysing Cambodia as a case study. In Cambodia, credit borrowing has been studied as a prominent tool for households in dealing with shocks, especially health-related risk (Murshid, 1998; Chan and Acharya, 2002; Damme et al., 2004; Yagura, 2005; Murshid and Phim, 2007; and Lun, 2013). Recently, remittances have been found to be another significant tool for households smoothing income variations when they experience transitory shocks at household and village levels (Luch, 2012). However, to the best of the author's knowledge, this study is the first study to assess this role of remittances in Cambodia as to the present ambiguity about whether remittances substitute for credit to cope with adverse shocks or whether they complement each other.

Secondly, this study extends the analysis of Ambrosius and Cuecuecha (2013), who examine the health-related shocks on credit demands in households with and without migrants, by investigating the effects and role of remittances rather than migration on household credit borrowing. This study extends the analysis by not only covering idiosyncratic risks with unemployment and crime shocks in addition to acute health-related shock, but also by including aggregate risks such as shocks to rainfall, harvest, and crops damaged by flood or too much rain.

Thirdly, this study provides a deeper analysis by examining the impacts of migrant remittances and internal remittances in addition to the impacts of total remittances on credit borrowing. From the literature, the existing empirical studies mainly examine the impacts of international remittances on financial sector development at the macroeconomic level, or on the access to deposit savings accounts or loans at the household level. It appears that these studies place more emphasis on international remittances and neglect to capture the potential effects of internal remittances since internal migration may generate even larger impacts on the lessening of liquidity constraints as indicated by Deshingkar (2006). For that reason, this

study extends the analysis to cover the disaggregated effects of internal remittances, and most importantly those of migrant remittances.

5.1.4. Significance

It makes a good case to empirically test the impacts of remittances on credit demands in rural Cambodia for a number of reasons. Firstly, the credit market in Cambodia is imperfect and constrainedly functioning though the sector has been significantly expanded in the recent decade. In 2009, only 9% out of the total population obtained loans from financial institutions and the six month weighted interest rate was about at 17% (NBC, 2010). In rural areas, the interest rate is estimated to be about 10% per month in a study by Yagura (2005) but it is found to be as high as 15% per month in a study by Damme et al. (2004). Murshid (1998) also finds that the interest rate was in the range of 10%-20% in rural Cambodia. This constrained credit market is also attributable to credit rationing and harsh debt collection by lenders (Yagura, 2005).

Secondly, rural households in Cambodia are at risk and vulnerable to many kinds of shocks at household and village levels because formal social protection programs provided by the government do not exist (Damme et al., 2004; Yagura, 2005 and 2009; Maltoni, 2007; and Luch, 2012). Although some protection programs such as health equity funds, community-based health insurance, voucher schemes, and Sangkaha¹⁸ have been implemented in a number of communities and arranged by several non-governmental organisations and village councils, these studies indicate that the programs are limited in scope of coverage, benefits received, and numbers of participants and villages. To insure against adverse shocks, as these studies specify, these rural households have to depend on

¹⁸ Sangkaha is a kind of community informal risk sharing mechanisms where people in the community help each other in terms of money when somebody gets severely sick or passes away (Yagura, 2005). It is also a kind of fund for funerals (Yagura, 2005). It has been implemented in a number of communities across the country (Yagura, 2005).

self-insured or informal coping strategies such as income transfers or taking loans, though credit borrowing may generate future costs and unfavourable consequences which could lead households into severe poverty. Migration and remittances, as a result, have been described as a worthwhile approach to cope with the severities.

Thirdly, the migration phenomenon in Cambodia is not new since it experienced refugee displacement or political diaspora because of the civil war and political instability in the past (Hing et al., 2011a). It is just recently, however, that labour migration in Cambodia has become a new approach and a source of income for household livelihoods (Maltoni, 2007; Chan, 2009b; and IOM, 2010) after Cambodia experienced growth at the average rate of 9.8% in 1998-2007 (World Bank, 2009). Since then, an increase in numbers of migrants moving for work either locally or overseas has been reported (i.e. NIS, 2009; Chan, 2009a). Between 2003 and 2009, the official statistics of remittances grew from USD 138 million to USD 338 million, which was about 3.4% of GDP (World Bank, 2011). In Thailand alone, the transfers to households in Cambodia were estimated to be at USD 45 million in 2008 (MLVT/ILO, 2010). However, there are no documented records of the internal remittance flows. Labour migrant workers are mainly from rural subsistence agricultural households and are engaged in unskilled or low-skilled jobs such as in motor-taxi, construction, garment or other low-skilled handicraft and service works (CDRI, 2007b; Lee, 2007; Maltoni, 2007; and NIS, 2009). By understanding this situation, therefore, it is very instructive to examine the remittance impacts on households remaining behind.

Lastly, it is significant to extend the existing research on the economic impacts of migration and remittances on household livelihoods in Cambodia. To the best of the author's knowledge, only the studies below empirically analyse the causal impacts of migration and remittances on poverty reduction (Tong, 2011a), and on household income variation smoothing (Luch, 2012). A number of other empirical studies include the marriage decisions of migrants in Phnom Penh (Yagura, 2012) and the effects of transfers other than remittances (conditional cash transfers) from the World Bank and JICA on school enrolment and

attendance (Filmer and Schady; 2008 and 2011). The remaining studies, using qualitative and descriptive methods, examine a few sets of household expenditures (World Bank, 2006; CDRI, 2007b; IOM, 2010; Chan, 2009b; and Hing et al., 2011b), the structure and root causes of migration in general and in the Tonle Sap region in particular (Haapala, 2003; Maltoni, 2006 and 2007; CDRI, 2007a; and Murshid, 2007), the characteristics, legal frameworks and policies of regular and irregular migration (Chan, 2009a; and Hing et al., 2011a and 2011b), the cost and benefits of cross border migration (Chan, 2009b), and the impact of migration in the garment sector on rural livelihoods (CCC, 2005; Dahlberg, 2005; and Yamagata, 2006). Therefore, due to the lack of empirical analyses of the remittance impacts on households, it is very significant for this study to assess the impacts of remittances on rural households in Cambodia.

5.2. Literature Review

5.2.1. Remittances, Credit and Financial Development

5.2.1.1. *Theoretical Concepts*

This subsection discusses the theoretical concepts underlying the impacts of remittances on credit and insurance markets. The New Economics of Labour Migration (NELM) defines migration as a collective decision in families by accounting for household income positions in communities, and identifies migration as a tool to overcome missing credit and insurance markets (Lucas and Stark, 1985; Stark and Bloom, 1985; Stark, 1991; Taylor, 1999; Taylor and Martin, 2001; Azam and Gubert, 2006; Damon, 2010; and Mendola, 2012). Due to the market imperfection in credit, these studies indicate that it is hard for rural households to gain access to credit, and credit constraints are binding. By sending out family members as migrants, as found in these studies, migration provides these households with capital to relax the constraints and to improve the liquidity positions. In the context of incomplete credit market where borrowing costs and required collateral are high, entrepreneurs with access to remittances are more able to overcome the credit constraints and to make further investment (Woodruff and Zenteno, 2007; and Giuliano and Ruiz-Arranz, 2009). Remittances become

important capital to substitute for credit when these households are lacking funds from formal financial institutions (Orozco and Fedewa, 2006). Since remittances can lessen the liquidity constraints of households, remittances may have a negative relationship with credit demand, and they may substitute for each other (Aggarwal et al., 2011; Anzoategui et al., 2011; Demirguc-Kunt et al., 2011; and Ambrosius, 2012). As indicated in these studies, an increase in remittances may have no impacts on the credit demand if lenders do not take remittances as collateral for loans, or recipient households lack trust in financial institutions and have other forms of savings. As they specify, this condition holds if recipient households use remittances instantly for consumption or remittances are used to finance the government spending. This indicates that remittances reduce the credit demand.

Alternatively, remittances are empirically asserted to have a complement role in increasing the credit demand (Giuliano and Ruiz-Arranz, 2009; Aggarwal et al., 2011; Anzoategui et al., 2011; Demirguc-Kunt et al., 2011; Ambrosius, 2012; and Ambrosius and Cuecuecha, 2013). Because recipient households can secure an income source from migrants, these studies indicate that remittances may be used as collateral for loans. They specify that lenders may have knowledge about income records and credit history of these households. As indicated in these studies, this kind of information allows lenders to better assess these households' creditworthiness and the default risk may be low. If the credit market is perfect and complete, this market condition may facilitate the use of remittances to demand credit and may promote productive investment because the costs of credit and transfer fees are lower, and the terms of repayment are less restricted. If remittances are transferred through formal financial institutions, recipient households albeit with no bank accounts may gain access to other kinds of financial products such as deposit savings and can obtain benefits from those services. In this way, the studies emphasise that remittances may have positive impacts on the outreach expansion of those financial institutions since they could attain profits from the transfer fees. With these two conceptual insights, it is clear that further study

to empirically examine the credit impacts of remittances especially in a least developing country like Cambodia is well deserved.

5.2.1.2. *Empirical Studies*

Regarding the empirical evidence assessing the impacts of migration and remittances on financial development, there are a growing number of studies examining these impacts at both macroeconomic and household levels, but the results of the effects on credit borrowing are still indefinite. In Sub-Saharan Africa, Gupta et al. (2009) find that remittances reduce poverty significantly and promote the levels of access to finance (deposit and M2) in the formal financial institutions in the region. Aggarwal et al. (2011) examine the remittance effects on the financial development in more than 100 countries and find that remittances are associated with greater bank deposits and credit. Extending this study, Demirguc-Kunt et al. (2011) assess the effects of remittances on the breadth and depth of the Mexican banking sector at the municipality level. Their research offers similar findings that remittances positively affect the expansion of bank branches, deposit accounts and deposit ratio. In another country-specific analysis of Bangladesh, Chowdhury (2011) asserts an analogous finding of the positive remittance effects on financial development in Bangladesh.

In household level analyses, Quisumbing and McNiven (2010) assess the effects of both migration and remittances on credit constraints in the Philippines, and do not find any significant impact of either migration or remittances on the Filipino households to release liquidity constraints. Anzoategui et al. (2011) investigate the remittance effects on financial inclusion in El Salvador, and Ambrosius (2012) analyses the impacts on financial access to both banking and microfinance institutions in Mexico. In El Salvador, Anzoategui et al. (2011) find a strong and robust effect of remittances on the use of saving deposit accounts, but do not find any effects on the demands for and the use of bank loans. In Mexico, Ambrosius (2012) finds a strong effect of remittances on the use of savings accounts as well, but finds a mild impact of remittances on borrowing from both institutions. In a subsection of the study by Ambrosius and Cuecuecha (2013) in Mexico, in contrast, they find that

migration is positively associated with credit borrowing possibly because loans may be used to finance migration and remittances may be a source of collateral.

5.2.2. Remittances, Insurance and Risk-coping Mechanisms

5.2.2.1. *Theoretical Concepts*

In NELM, migration is also defined as a strategy to overcome the missing insurance market and to mitigate households' vulnerability to adverse risks (Lucas and Stark, 1985; Stark and Bloom, 1985; Stark, 1991; Taylor, 1999; Taylor and Martin, 2001; Azam and Gubert, 2006; Damon, 2010; and Mendola, 2012). As these studies indicate, this strategy is an important financial instrument for rural households not only to cope with economic hardships, but also to diversify income sources and to lessen risks. They specify that this market imperfection makes it harder for these households to get insured against unexpected risks, but migration may help these households self-insure against and minimise the risks associated with income or other unexpected shocks. As indicated in the studies, this imperfection encourages migrants to send home remittances because of altruistic and insurance motives when the households remaining behind face a decrease in income, and remittances are regarded as "informal social arrangement within extended families and communities" (Rapoport and Docquier, 2006, pp.1,138). The remittance motives of altruism and insurance are empirically supported by the studies of Lucas and Stark (1985), Agarwal and Horowitz (2002), de la Briere et al. (2002), Gubert (2002), Park (2003), Brown and Poirine (2005), Osili (2007), and Brown and Jimenez (2011) when households are challenged by adverse shocks.

5.2.2.2. *Empirical Studies*

Using these theoretical insights, there are a number of empirical studies examining this risk-coping role and confirming this result. Rosenzweig (1988), comparing income transfers with credit borrowing in coping with adverse risks, finds in India that income transfers are much more preferred to credit borrowing and are an important ex-post instrument for consumption smoothing. Studying the causal relationship between consumption smoothing

and migration through female marriage, Rosenzweig and Stark (1989) find that migration reduces household consumption fluctuation caused by income risks. In their findings, households use migration distance to diminish the correlation of exposed harmful shocks between destinations and home households. In China, Jalan and Ravallion (2001) investigate how households respond to risks which threaten their income, and reveal that households adopt migration as a behavioural response to the income risks. In El Salvador, Halliday (2006) examines how households respond to common economic shocks through an ex-post risk coping strategy of migration. He finds that shocks associated with the loss of harvest and livestock induce households to undertake migration as an instrument to solve the loss and there is a great increase of remittance flows to households facing those shocks. In the Philippines, in a response to unexpected shocks, gifts in kind and in cash are exchanged and transferred among villagers and networks partners (Fafchamps and Gubert, 2007). Yang and Choi (2007) show that remittances play a role as insurance and migrant households are fairly well insured against income shocks whereas consumption in non-migrant households is severely affected by those shocks. In a similar finding, Yang (2008) finds that the shocks of exchange rate increase the remittance flows to Filipino households and there are positive impacts of remittances on productive investment. In Thailand, Miller and Paulson (2007) find that there is a strong response of remittances if home households experience negative rainfall shocks. Khandker et al. (2011) find in Bangladesh that migration is an important means to cope with seasonal income variation, and consumption in migrant households fluctuates much less. In Northern Nigeria, in addition, Dillon et al. (2011) assess the household migratory responses to aggregate weather shocks and confirm that households use migration as a coping strategy to buffer both ex-ante and ex-post shocks. In Cambodia, Luch (2012) indicates that remittances have a role in smoothing household income variation against the idiosyncratic and common village shocks.

In the literature on risk-coping strategies, a number of other informal self-insured mechanisms have been discussed. Among others, credit is regarded as an important tool of

informal coping mechanisms against shocks. Through theoretical models, Eswaran and Kotwal (1990) find that access to credit enables individuals to smooth consumption over time during adverse income shocks. In Northern Nigeria, Udry (1994) finds that credit functions as an insurance and risk-sharing between borrowers and lenders in a state contingent contract where borrowers pay back less or lenders receive more repayments when either one faces negative shocks. In India, Kochar (1995) finds that illness shocks induce households to take loans during peak but not slack periods of farming seasons. Credit is also found to be an important tool to deal with the impacts of shocks caused by bus accident injuries in a quasi-experimental study of Mohanan (2011). In Bangladesh, Morduch (1998) finds that access to microcredit reduces household consumption variation over time. Another study by Islam and Maitra (2012) asserts analogous findings and further reveals that access to microcredit enables households to keep livestock rather than selling it off to cope with health shocks. In the Philippines, Fafchamps and Lund (2003) confirm that households are more insured against downside shocks when they obtain loans from relatives and friends. In a cross-country analysis, Dehejia and Gatti (2005) emphasise that child labour is a less preferable option in the events of negative shocks if households could access credit. Gertler et al. (2009) conclude in Indonesia that households who live in a close distance to micro-finance institutions are much more able to insure against idiosyncratic shocks. In Cambodia, credit is also asserted to be a remarkable response tool for risk mitigation especially for health-related shocks (Murshid, 1998; Chan and Acharya, 2002; Damme et al., 2004; Yagura, 2005; Murshid and Phim, 2007; and Lun, 2013). However, these studies also specify that it may generate severe impacts, long-term costs and undesirable consequences such as falling into extreme debt burdens and poverty as a result when the condition of credit markets is harsh and households experiencing shocks could not resolve their debts.

Although remittances and credit play roles in mitigating adverse risks, there is limited research assessing whether remittances and credit substitute for each other when rural households face the risks. To the best of the author's knowledge, only Ambrosius and

Cuecuecha (2013) examine whether remittances are a substitute for credit when health risk occurs in households. They find that remittance-recipient households appear to turn to migrants for help rather than to take credit when health shocks happen in the households, and they conclude that remittances substitute for credit to some extent. However, their study uses migration as the indicator for the investigation and examines only the effect of health shock. Therefore, this study contributes to the literature by investigating the substitute impacts of remittances on credit when households are challenged by idiosyncratic and aggregate risks in Cambodia.

Furthermore, the risk-coping literature also describes other informal strategies. Households can insure themselves from the negative shocks by accumulating savings, assets and livestock in good times, but liquidating them in times of adverse shocks (Rosenzweig and Wolpin, 1993; Alderman, 1996; Kurosaki, 1995; Dercon and Krishman, 2000a; Jalan and Ravallion, 2001; Beegle et al., 2006; and Islam and Maitra, 2012). Households can also deal with the shocks by working longer hours, participating in off-farm or self-employed activities, or generating income from common property resources in villages (Kochar, 1995 and 1999; Rose, 2001; Takasaki et al., 2004; Yagura, 2005; Kijima et al., 2006; and Ito and Kurosaki, 2009). In other cases, with arguably harmful consequences, households are found to withdraw their children from school and to adopt child labour as household strategies to mitigate the negative shocks (Jacoby and Skoufias, 1997; Dehejia and Gatti, 2005; Beegle et al., 2006; Calero et al., 2009; and Guarcello et al., 2010).

5.3. Data Description and Empirical Models

5.3.1. Data Description

This section describes data which are used in this study for the impact and role analysis of remittances on household credit borrowing. This study uses Cambodia's nationally representative survey data in 2009 entitled Cambodia Socio-Economic Survey 2009 (CSES 2009). It was conducted by the National Institute of Statistics (NIS), Ministry of Planning under the auspices of the Swedish International Development Cooperation Agency (SIDA).

The sampling frame of the survey was based on the 2008 Cambodian Population Census. This survey data was intended to cover samples of 12,000 households from 720 villages. It was designed to interview 1,000 households from 60 villages every month in the calendar year of 2009. The survey data include total samples of 11,971 households whereas 29 households are excluded because of incomplete questionnaires, the absence of households during the survey or other technical reasons.

Since this study examines the economic impacts and risk-coping role of remittances in rural Cambodia, it uses samples of rural households only, and excludes the samples residing in the capital city of Phnom Penh and other urban areas. Therefore, the samples in this study are 9,296 households, 2,919 and 6,377 of which are remittance-recipient households and non-recipient households, respectively. It is also important to note that the survey provides significant and comprehensive data on socio-economic conditions and characteristics of households and villages across different regions in Cambodia.

Table 5.1 shows a summary of statistics for a number of variables which are used in this empirical study: credit borrowing, remittances, exogenous shocks, household heads' characteristics (gender, age, education and occupation), household compositions, housing and assets, village characteristics and geographic regions. The table shows that about 42% of total households in the study have current outstanding credit which accounts for more than 910,000 riels.¹⁹ Classifying households as remittance recipients and non-recipients, the statistics present greater values both in the percentage of households and in monetary volumes for non-recipient households. It appears that remittances are associated with lower credit borrowing.

¹⁹ The annual average exchange rate in 2009 was USD 1= KHR 4,154 (NBC's annual report 2009).

Table 5.1: Descriptive statistics

<i>Variables</i>	<i>All Households</i>		<i>Non-Recipient Households</i>		<i>Recipient Households</i>		<i>t-scores</i>
	<i>Mean</i>	<i>(S.E)</i>	<i>Mean</i>	<i>(S.E)</i>	<i>Mean</i>	<i>(S.E)</i>	
Total credit (riels)	911,290.9	41,032.94	965,856.4	54,323.56	792,084.2	54,643.65	1.966**
Total credit (dummy)	0.4224	0.0051	0.4367	0.0062	0.3912	0.0090	4.125***
Share of total credit in total monthly HH expenditure	1.1315	0.0440	1.1994	0.0593	0.9831	0.0529	2.283**
Household income	9,471,403	2,016,722	8,901,070	2,399,959	10,700,000	3,709,881	-0.418
Total remittances (riels)	207,148.5	13,549.1	0	0	659,695.9	41,952.09	-23.244***
Total remittances (dummy)	0.3140	0.0048	0	0	1	0	0
Share of total remittances in income	0.0543	0.0141	0	0	0.1729	0.0447	-5.715***
Migrant remittances (riels)	92,008.44	7,233.57	0	0	293,014.9	22,596.81	-19.167***
Migrant remittances (dummy)	0.1522	0.0037	0	0	0.4847	0.0092	-77.449***
Share of migrant remittances in income	0.0320	0.0133	0	0	0.1018	0.0423	-3.557***
Health shock (dummy)	0.3760	0.0050	0.3568	0.0060	0.4180	0.0091	-5.663***
Crime shock (dummy)	0.0263	0.0017	0.0234	0.0019	0.0325	0.0033	-2.570**
Unemployed shock (dummy)	0.0695	0.0026	0.0714	0.0032	0.0654	0.0046	1.041
Village shocks (dummy)	0.7541	0.0045	0.7477	0.0054	0.7681	0.0078	-2.119**
Village remit norm (dummy)	0.0354	0.0004	0.0267	0.0004	0.0546	0.0009	-32.609***
Past migration history (number)	1.1124	0.0128	1.0566	0.0156	1.2343	0.0222	-6.442***
<i>Head gender and age characteristics (dummy)</i>							
Male head	0.7903	0.0042	0.8225	0.0048	0.7201	0.0083	11.331***
Head age under 24	0.0428	0.0021	0.0532	0.0028	0.0202	0.0026	7.303***
Head age 25_34	0.2153	0.0043	0.2725	0.0056	0.0901	0.0053	20.297***
Head age 35_44	0.2569	0.0045	0.3027	0.0058	0.1569	0.0067	15.108***
Head age 45_54	0.2286	0.0044	0.2013	0.0050	0.2881	0.0084	-9.288***
Head age 55_64	0.1498	0.0037	0.1004	0.0038	0.2580	0.0081	-20.185***
Head age over 65	0.1066	0.0032	0.0699	0.0032	0.1867	0.0072	-17.197***
<i>Head education characteristics (dummy)</i>							
Head no education	0.0055	0.0008	0.0061	0.0010	0.0041	0.0011	1.214
Head primary	0.4649	0.0052	0.4580	0.0062	0.4799	0.0092	-1.965**
Head lower secondary	0.1989	0.0041	0.2072	0.0051	0.1809	0.0071	2.946***
Head upper secondary	0.0510	0.0023	0.0536	0.0028	0.0452	0.0038	1.711*
Head vocational training	0.0030	0.0006	0.0027	0.0006	0.0038	0.0011	-0.900

Head college	0.0017	0.0004	0.0022	0.0006	0.0007	0.0005	1.630
<i>Head occupation characteristics (dummy)</i>							
Head unemployed	0.0923	0.0030	0.0734	0.0033	0.1336	0.0063	-9.352***
Head wage labour	0.1395	0.0036	0.1463	0.0044	0.1247	0.0061	2.791***
Head self-employed	0.7673	0.0044	0.7795	0.0052	0.7407	0.0081	4.118***
<i>Numbers of Household members by age</i>							
Members younger than 5 years old	0.5908	0.0078	0.6743	0.0098	0.4083	0.0123	15.959***
Members age 6-14	0.9933	0.0110	1.0790	0.0137	0.8061	0.0181	11.552***
Members age 15-64	2.9418	0.0153	2.8872	0.0175	3.0610	0.0302	-5.264***
Members age over 65	0.2175	0.0051	0.1634	0.0054	0.3357	0.0109	15.755***
<i>Housing characteristics and assets</i>							
Landless (dummy)	0.0469	0.0022	0.0453	0.0026	0.0504	0.0040	-1.067
Land less than 0.5 ha (dummy)	0.1814	0.0040	0.1806	0.0048	0.1829	0.0071	-0.266
Land 0.5-1 ha (dummy)	0.1898	0.0041	0.1874	0.0048	0.1949	0.0073	-0.860
Land 1-2 ha (dummy)	0.2168	0.0043	0.2162	0.0051	0.2179	0.0076	-0.178
Land 2-4 ha (dummy)	0.1312	0.0035	0.1334	0.0043	0.1264	0.0062	0.932
Land 4-8 ha (dummy)	0.0460	0.0022	0.0513	0.0028	0.0346	0.0034	3.563***
Land over 8 ha (dummy)	0.0128	0.0012	0.0127	0.0014	0.0130	0.0021	-0.126
Room (number)	1.3037	0.0067	1.2739	0.0080	1.3686	0.0124	-6.521***
Floor (dummy)	0.0816	0.0028	0.0911	0.0036	0.0610	0.0044	4.929***
Durable goods (riels)	2,533,282	97,735.94	2,475,305	109,084.4	2,659,942	200,228.5	-0.877
Poor (dummy)	0.2393	0.0044	0.2532	0.0054	0.2090	0.0075	4.648***
<i>Village characteristics</i>							
Bus stop (km)	4.8252	0.0897	5.2124	0.1145	3.9792	0.1364	6.396***
Electricity (%)	11.9608	0.2603	11.5868	0.3087	12.7780	0.4818	-2.124**
Water (%)	6.4106	0.2086	6.0763	0.2409	7.1408	0.4051	-2.369
Credit units (dummy)	0.1150	0.0033	0.1220	0.0041	0.0997	0.0055	3.131***
NGO projects (dummy)	0.3932	0.0051	0.3925	0.0061	0.3947	0.0091	-0.197
Enterprise (dummy)	0.3654	0.0050	0.3600	0.0060	0.3772	0.0090	-1.593
Health facility (dummy)	0.3576	0.0049	0.3536	0.0059	0.3662	0.0089	-1.177
<i>Village access to common resources (dummy)</i>							
Cultivated land	0.5700	0.0051	0.5620	0.0062	0.5875	0.0091	-2.306**
Firewood to collect	0.6149	0.0050	0.6258	0.0061	0.5910	0.0091	3.209***
Timber to take	0.2272	0.0043	0.2590	0.0055	0.1576	0.0067	10.904***
Fish to catch	0.7832	0.0043	0.7704	0.0053	0.8112	0.0072	-4.437***

Bamboo to take	0.1934	0.0041	0.2062	0.0051	0.1655	0.0069	4.621***
Open land	0.3291	0.0049	0.3307	0.0059	0.3254	0.0087	0.501
Fruit to pick	0.1381	0.0036	0.1403	0.0043	0.1333	0.0063	0.919
Wild animals to hunt	0.1659	0.0038	0.1827	0.0048	0.1291	0.0062	6.454***
<i>Regional zones (dummy)</i>							
Plateau	0.1276	0.0035	0.1385	0.0043	0.1038	0.0056	4.654***
Plain	0.4899	0.0052	0.4612	0.0062	0.5526	0.0092	-8.210***
Tonle Sap	0.3122	0.0048	0.3251	0.0059	0.2840	0.0083	3.969***
Coastal	0.0704	0.0027	0.0753	0.0033	0.0596	0.0044	2.741***
<i>N</i>	9296	-	6377	-	2919	-	

*Source: Author's calculation from CSES2009. Note: * is significant at 10%; ** is significant at 5%; *** is significant at 1%.*

In the table, it also shows that the annual disposable income²⁰ of households that received remittances in 2009 was 10,700,000 riels on average. Total remittances received from migrants²¹ and non-migrants were about 660,000 riels. Remittance-recipient households represent about 31% out of the 9,296 sampled households and total remittances account for 17% of household income. In particular, the table reveals that nearly half of those recipient samples are households that received remittances from household migrant members and those migrant remittances constitute about 10% of family income on average.

It is important to note that this study includes both idiosyncratic and aggregate exogenous shocks occurring at household and village levels. Idiosyncratic shocks consist of health, crime and unemployed shocks. Health-related shock in this study is measured as a dummy for whether any household members were acutely sick or injured any time in the last 30 days before the survey was conducted, and needed medical treatment. Crime shock is a binary variable to indicate if any members were exposed to theft, burglary or robbery in the past 12 months. Unemployed shock is also a dichotomous variable to denote if any members experienced the shock during the past 12 months, which means they were unemployed during the time they were interviewed but were employed any time before. Aggregate shock is measured as a binary variable if villages of households experienced rainfall shock worse than normal, too late or too early, crop damage by floods or too much rain, and bad harvest in the past season. Households in the same villages are exposed similarly to the extents of impacts.²²

²⁰ Disposable income is a summation of net revenues from salary, agricultural and non-agricultural income, property income and all other transfer incomes.

²¹ Migrants in this study are defined as family members whose ages are between 15-64 years old, who have migrated since 2004 and are currently living at destinations. It is explained in detail in the next section.

²² Details of descriptions and a list of variables are defined in Table B.1 in Appendix B.

For idiosyncratic shocks, the descriptive statistics show that there is a higher incidence of health and crime shocks happening in remittance-recipient households. It does not indicate any differences in unemployed shock of the two groups of households. For aggregate shocks, the table expresses a greater percentage for recipient households residing in villages that experienced aggregate shocks. Therefore, this may suggest that remittances tend to be sent back home and are used to mitigate household economic hardships.

The table continues to show differences in variables of those two groups of households. For remittance-recipient households, it shows larger figures in the past migrant numbers and the village-remit norm, representing a ratio of recipient households to total households in the village. It implies that these determine the flows of remittances to family members left behind. As compared with households that did not receive remittances, it appears that the heads of recipient households are more often headed by females, are likely to be older, have lower education, and seem not to be engaged in wage or self-employed jobs. Furthermore, recipient households tend to have greater working-age adult members. It is more likely that recipient households own smaller sizes of land and own houses that have a larger number of rooms and have floor less likely to be earth clay. It seems that those recipient households are non-poor. The summary results further reveal that remittance-recipient households more likely reside in areas that are closer to bus stops and have a greater access to electricity but have less access to credit units and income-generating common-resources. Those households tend to reside in the plain region.

5.3.2. Empirical Models

To examine the impacts of remittances on household credit, this study models household credit borrowing as a function of remittances, household characteristics, household socio-economic statuses, village characteristics and common property resources, and regional zones. This study specifies the model by including idiosyncratic and aggregate shocks which households experienced in the estimation in order to assess household risk coping strategies. To investigate the substitution role of remittances for households in coping with shocks, the

study estimates the remittance effects in the equation of credit borrowing by a different subgroup of shocks. The estimation equation for this analysis is as follows:

$$C_i = \alpha + \beta R_i + S_i\gamma + X_i\delta + \varepsilon_i \quad (5.1)$$

where C_i is household credit borrowing and the main dependent variable for household i ; R_i is the average monthly amount of remittances households received in cash and kind in the past 12 months in 10,000 riels; S_i is a vector of dummies for idiosyncratic shocks i.e. acute health shock, crime shock and unemployed shock, and aggregate shocks in villages (rainfall shock, crop damages and bad harvest); X_i is a vector of household heads' characteristics (gender, age, education and occupation), household compositions, housing and assets, village characteristics and common property resources, and geographic regions; α is the constant term and ε_i is the error term.

In this study, credit borrowing is the total amount borrowed which is defined as total household outstanding debts to other households or institutions in riels. Rather than taking this value for estimation, this study uses the ratio of total amount of household outstanding debts to total monthly household expenditure, following a study by Ambrosius and Cuecuecha (2013). As these researchers indicate, this method enables the study to capture household debt status relative to income and household capabilities to pay back since the same amount of loans may have different burden effects on poor households than well-off households. In this way, as indicated in the study, it weights household composition and average price variation, and is also convenient for result interpretation.

It is necessary for this study to control characteristics of households and villages, and regional zones in the estimation. If the estimation includes household income or expenditure as regressors, it would generate the endogeneity issue. It can be eliminated by using the household socio-economic variables of household composition, gender and age of household heads, education attainment, kinds of occupation, and characteristics of housing and assets. Village characteristics and common resources, and regional dummies are included to account

for geographic differences in economic environment, income sources, physical infrastructure, relative price variation, and other regional fixed effects.

To capture the impacts and role of remittances, this study uses monetary values of monthly remittances which households received in cash and kind in 2009 in 10,000 riels. These remittances are in total values from both migrants and non-migrants, and internal and international destinations. The regressions of household credit borrowing are done separately on total remittances, migrant remittances and internal remittances, respectively, to see the different impacts of those kinds of remittances. Remittances from migrants, in particular, were those from household members, as defined in Chapter 4, who are currently living away from home and have undertaken migration since 2004, and whose ages are between 15 and 64 years old. This study defines migration following Luch (2012) where he uses the same dataset for his analyses. It is to see the economic impacts of remittances and avoids any effects of migration which Cambodia experienced during the civil war. These migrants are still regarded as household members, more likely to return home, in frequent contact with families, a significant source of household incomes, and serve as an important strategy for households in coping with risks. Migrants departing before 2004 are highly likely to remain at destinations. Luch (2012) argues that migrants moving before 2004 may have their own families there, and he suggests this limitation “in order to avoid duplicating and misreporting” (pp.62) in the analysis. In this respect, they may no longer be a part of household members and income channels. Although they may provide transfers or gifts to households, it is rare and so may have negligible effect on households.

In examining the impacts and role of remittances on household credit borrowing in equation (5.1), there are a few econometric issues needing to be addressed, the issues of measurement error, omitted variable bias and reversal causality (Calero et al., 2009; Aggarwal et al., 2011; Demirguc-Kunt et al., 2011; Anzoategui et al., 2011; and Phan, 2012). For the measurement error, these studies indicate that the analyses of international remittances are studied on transfers through formal financial institutions such as banks, which

are recorded in published documents, and not on those sent through channels other than banks. For the omitted variable bias, they specify that it is due to unobserved characteristics of household decisions to both obtain remittances and take credit borrowing. As they indicate, it can also be caused by unobserved simultaneous behaviours when households are affected by negative shocks and use remittances as a response. They emphasise that unobserved factors influence household decisions to use remittances as a coping instrument for responding to income risks when the adverse shocks have impacts on household credit positions. As specified in these studies, reversal causality also gives a cause for concern for this impact analysis. They indicate that liquidity constraint might be a reason to induce households to undertake migration and consequently obtain remittances. They also indicate that migration might be a result of a greater borrowing and remittances may be sent to reduce debt burdens of households.

To deal with the measurement error, this study captures remittances sent through informal channels to families back home in addition to formal means from Cambodia's nationally representative survey data. By including both channels of remittances, it can minimise the measurement error in the estimation. To solve endogeneity problems caused by omitted variable bias and reversal causality, the estimations are not done through the Ordinary Least Squares (OLS) since it may generate a correlation between the control variable of remittances and the error term. Instead, the Two-Stage Least Squares (2SLS) is used to deal with these endogeneity issues through a model specification of remittances as follows:

$$R_i = \varphi + Z_i\rho + S_i\sigma + X_i\omega + \tau_i \quad (5.2)$$

where R_i is the average monthly amount of remittances households received in cash and kind in the past 12 months in 10,000 riels for household i ; S_i is a vector of dummies for idiosyncratic shocks i.e. acute health shock, crime shock and unemployed shock, and aggregate shocks in villages (rainfall shock, crop damages and bad harvest); X_i is a vector of household heads' characteristics (gender, age, education and occupation), household

compositions, housing and assets, village characteristics and common property resources, and geographic regions; φ is the constant term; τ_i is the error term; and Z_i is a set of instrumental variables which are village remit norm and past migration history.

Following the studies of Rozelle et al. (1999), Taylor et al. (2003), Atamanov and Van Den Berg (2012) and Hu (2012), this study uses village remit norm as an instrumental variable of remittances to capture uncorrelated components of remittances from the error term. It is the ratio of numbers of remittance recipient households to total households in the village. As indicated in these studies, the rationale is that behaviours of other migrants to remit to source communities may have impacts on the extent to which remittances can be sent back home by migrants. When some send remittances back home but others fail to remit to families, as they indicate, it shows that those migrants do not express their good deeds and obligation toward families back home and their social status in the local communities can become inferior. As they identify, the village remit norm can be set as a benchmark for migrants to follow and social punishment can be exercised when migrants fail to comply. In Cambodia, it is found that migrants have strong attachments to families back home (Derks, 2008; and Yagura, 2012). As children or siblings in households, these studies indicate that they have a strong sense of duty to support families, and it is obligatory for them to satisfy this duty. As the studies indicate, they are obliged to pay respect and return generosity to households left behind, especially to elderly parents, by offering remittances. In this respect, this norm determines remittances sent back home by migrants. Since it is a norm in villages and a kind of motive to send remittances back home, it is expected not to affect the credit borrowing of households. It is also because the indicator captures the average levels of remittances at village levels and hence has minor impacts on or is less correlated with choices of individual households.

Furthermore, it is important to identify and define another instrumental variable. A number of empirical studies have used historical migration patterns as an instrument for migration and remittance analyses (Taylor et al., 1996; Rozelle et al., 1999; Acosta, 2006;

McKenzie, 2006; McKenzie and Rapoport, 2007; Calero et al., 2009; Adams and Cuecuecha, 2010; Amuedo-Dorantes and Pozo, 2010; Damon, 2010; de Brauw, 2010; Karamba et al., 2011; Hu, 2012; and Luch, 2012). In this context, as used in Chapter 4, the migration history is used as a proxy for migration network which help migration of other household members and stimulate remittance receipts. As explained in the preceding chapter, these studies offer the justification that the network provides information about migration process, employment opportunities, economic activities and other socio-economic activities at the destinations. As indicated, the network assists migrants in the process of migration, serves as migrants' occupation references, provides them with living places, and helps them incorporate into destinations upon arrival. Moreover, as is also indicated, the network is an instrument to minimise migration costs. As the studies indicate, the migration network also provides them with knowledge about and the practice of how to make remittance transfers effective and not costly. In that sense, as the studies specify, the migration tie determines remittance receipts of households and encourage the increment of remittance transfers. Regardless of distance, therefore, these studies indicate that the migration network between migrants and households can be sustained through remittance receipts. In this study, the author uses household past migrants before 2004 as another instrument for this assessment. This migration history is expected to facilitate current household migration and remittance receipts, but not to have any effect on the outcomes of this estimation. It is because it is past migration history and occurred at least five years before the survey was conducted in 2009, and those past migrants have already returned home. The historical migration patterns may be the past strategy of households to diversify income risks, but do not have effects at all on the current levels of household credit borrowing. Although it might provide households with knowledge on credit management, it is hard to measure the magnitude. As noted above, Cambodian migrants are engaged in unskilled or low-skilled jobs so there is no evidence of significant skill improvement upon returning home.

5.4. Results and Discussions

In this section, this study estimates the empirical models described in the previous part to examine the credit impacts of remittances and its role in the time of various exogenous shocks in rural Cambodia. It should be noted that the study estimations are carried out by the robust OLS and 2SLS regressions for all specifications. To address the method of estimations, they are econometrically tested for endogeneity to ensure more efficient evaluations between OLS and 2SLS. Across different specifications, the study provides statistics of endogeneity testing such as the robust score Chi square and the robust regression F statistics. The results show p-values significantly large enough to reject the hypothesis that all regressors are exogenous and suggest that the estimations should be done through 2SLS rather than OLS since it generates more efficient results.

To execute instrumental estimations, the study continues to address the econometric issues of instruments' relevance and validity. For the relevance of instruments, the results show F statistics significant enough to reject the hypothesis of weak instruments and indicate that the instruments have strong predictive powers. For the validity of instruments, the study also performs score Chi square's over-identified restriction tests and provides results that the validity of instruments are not rejected. It suggests that the instruments perform satisfactorily to capture uncorrelated parts of remittances from the error term, indicating that there is no correlation between the instruments and the error term. Therefore, it is pursued through the instrumental estimations, which can minimise estimation biasness triggered by endogeneity problems.

The estimation results of remittances on credit borrowing are presented in Table 5.2, and are estimated by excluding and including the group of exogenous shocks. The estimations are further done by separating migrant remittances from total remittances since those two forms of remittances may differ in their impacts. The table also shows the estimated coefficients of remittances in both OLS and 2SLS, where these two coefficients are shown with opposite results. The estimated coefficients of remittances from OLS are close to

zero, reflecting that endogeneity caused by measurement error, attenuation bias or reversal causality may generate concerns for the estimation. In contrast, the 2SLS coefficients of remittances reveal the causality effects of remittances on credit borrowing. Therefore, the interpretation in the study is carried on by the latter method of estimation since it satisfies the econometric criteria.

5.4.1. Credit Impacts of Remittances

The study provides a significant insight into the effects of remittances on credit borrowing in rural Cambodia. The results in Table 5.2 show that remittances and credit have a negative relationship. There is a robust significant and negative association between total remittances and credit even it is estimated by either including or not the exogenous shocks in the estimations. When the study differentiates the impact of migrant remittances from total remittances, the estimated coefficients of migrant remittances are even larger than those of total remittances on credit borrowing, whether the estimations include shocks or not. The coefficients are nearly twice as large as those of total remittances. These results give an indication that remittances are a source of income that can provide recipient households with cash income to improve their liquidity and financial conditions. When their liquidity and financial conditions are improved through the income-effect of remittances, it enables these households to increase their household budgets and to ease their debt burdens. In that sense, this allows these recipients to reduce their indebtedness and their demands for credit. Interestingly, the impacts are greater when households received remittances from migrant members, indicating that this kind of remittances plays a more significant role in household financial improvement.

It is arguable that remittances may instead increase their demands for credit when remittances are sent to improve liquidity of recipient households and when these households are financially constrained. According to the theoretical concepts reviewed above, this condition will be the case when the credit market is functioning perfectly or completely. However, according to Orozco and Fedewa (2006), remittances will substitute for credit

Table 5.2: The effects of remittances and shocks on credit borrowing

<i>Variables</i>	<i>Total Remittances</i>		<i>Migrant Remittances</i>		<i>Total Remittances</i>		<i>Migrant Remittances</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Remittances	0.001 (0.003)	-0.132* (0.080)	0.011 (0.009)	-0.253* (0.153)	0.001 (0.003)	-0.140* (0.079)	0.012 (0.009)	-0.270* (0.152)
Health shock (dummy)					0.181** (0.089)	0.155 (0.097)	0.181** (0.089)	0.169* (0.096)
Crime shock (dummy)					0.355* (0.202)	0.339* (0.207)	0.355* (0.202)	0.337* (0.208)
Unemployed shock (dummy)					0.423** (0.174)	0.336* (0.191)	0.426** (0.174)	0.331* (0.201)
Village shocks (dummy)					0.077 (0.095)	0.029 (0.101)	0.079 (0.096)	0.011 (0.104)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village access-resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.241 (0.265)	0.327 (0.289)	0.230 (0.265)	0.502 (0.327)	-0.005 (0.294)	0.160 (0.324)	-0.020 (0.294)	0.362 (0.380)
<i>Endogeneity</i>								
Robust score chi2 (p-value)		2.924 (0.087)		3.289 (0.069)		3.463 (0.063)		3.849 (0.049)
Robust regression F (p-value)		2.952 (0.086)		3.325 (0.068)		3.496 (0.061)		3.891 (0.048)
<i>Weak Instruments</i>								
F statistics (p-value)		23.182 (0.000)		14.882 (0.000)		23.615 (0.000)		14.616 (0.000)
<i>Over-identified</i>								
Score chi2 (p-value)		0.042 (0.838)		0.00072 (0.979)		0.0271 (0.869)		0.0002 (0.988)
<i>N</i>	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%. Please be noted that the levels of significance of crime shocks in columns (6) and (8) are significant at 10.2% and 10.5%, respectively, so they are in the bound of significance at 10%.

when recipient households have limited access to or are lacking funds from financial institutions. This limited access to credit exists when the credit market is poorly functioning and where remittances are the only way to improve liquidity and financial positions of rural households. When the credit market does not work perfectly, Giuliano and Ruiz-Arranz (2009) indicate that there are high borrowing costs and high collateral requirements for households to obtain loans from financial institutions. Therefore, it indicates that “remittances might become a substitute for inefficient or non-existent credit markets” (Giuliano and Ruiz-Arranz, 2009, pp.144). When there is an increase in remittances to households at their home of origin, it does not necessarily indicate that there is an increase in the credit demands if lenders do not take remittances as collateral for loans, or if these households lack trust in financial institutions and have other forms of savings (Aggarwal et al., 2011).

These conditions are found to be in the context of Cambodia where it appears that there is low access to financial institutions; the credit market does not function perfectly or completely; and there are high costs of borrowing. According to a report of the World Bank, in Cambodia it shows a low percentage of the total population gaining access to financial institutions (World Bank, 2014b). World Bank (2014b) shows that only 3.7% of the population had access to financial institutions in 2011 where less than 1% had active saving accounts. According to NBC (2010), it shows a figure slightly greater than the World Bank’s report, but it remains a very low amount. About 9% of the total population obtained loans from financial institutions in 2009 (NBC, 2010). Wilwohl (2013, November 12) explains this low access to financial institutions in Cambodia by indicating that a majority of people do not have trust in and knowledge about the financial institutions.

According to Yagura (2005), households in rural Cambodia have very limited access to credit from financial institutions, or even if they are able to gain access to credit, the amount is not enough for their emergency. Since the majority obtain loans from informal lenders, he indicates that those lenders charge borrowers high interest rates, making it difficult for

borrowers to pay back their borrowings. Other studies by Damme et al. (2004) and Murshid (1998) also demonstrate these high interest rates in rural Cambodia. The last point Yagura (2005) identifies the constrained credit market in rural Cambodia is due to the severe characteristics of debt collection where lenders do not consider extending periods of repayment if borrowers fail to comply. If borrowers do not repay the loans on time as promised, lenders will force borrowers to sell their properties for the repayment of the loans, or lenders will confiscate their properties (Yagura, 2005). As indicated, in some cases, lenders have ill intention of not making borrowers repay on time by not strongly pushing “borrowers to repay their debts so they can obtain the borrower’s lands” (Yagura, 2005, pp.777). Because of these severe characteristics of the credit market in Cambodia, a small amount of loans can cause catastrophic consequences if households are incapable of repaying the loans on time (Murshid, 1998; Chan and Acharya, 2002; Damme et al., 2004; Yagura, 2005; Murshid and Phim, 2007; and Lun, 2013).²³ As also indicated in these studies, it appears that lenders in Cambodia accept only household assets such as land and house as collateral for credit borrowing, and there is no indication that they take an income source of remittances as collateral for borrowing. Therefore, these above conditions make credit high costs and make it hard for rural households to gain access, or by having access to credit, they are more constrained and become poorer.

In the context where it is difficult for rural households to gain access to credit, or they can have access to credit but the borrowing costs are high and it can cause them severe unfavourable consequences, rural households would prefer not to be involved in credit borrowing when they have a source of cash income such as remittances. In Cambodia, it is observed that rural households will not take credit unless it is truly necessary and unavoidable when emergency occurs and there is no available source of income for them in households.

²³ The undesirable consequences of credit borrowing will be discussed in more detail in the following subsections.

When they have a source of cash income e.g. remittances, these conditions can induce them to impede their decision to take credit since remittances can improve their liquidity and financial positions. In this way, these households can avoid burdens and undesirable consequences caused by taking credit. From the findings in this study, it gives an indication that remittances can enable the recipient households to improve their cash income and to be financially sound enough to overcome their financial shortages caused by the constrained market. Therefore, remittances reduce their demands for credit, giving evidence in support of the NELM's hypothesis about the lessening of the financial constraints.

5.4.2. Credit and Risks

Table 5.2 further shows the regression estimations of household credit borrowing on the exogenous shocks of health, crime, unemployed and common village shocks. The estimated coefficients, signs and significant levels of those shocks remain similar whether they are assessed with either total or migrant remittances. The estimation results find that households who were exposed to health, crime and unemployed risks are positively associated to take credit at about 17%, 34% and 33%, respectively, more than households who were not exposed to those shocks. It indicates that credit has a coping role to insure against those idiosyncratic adverse shocks in rural Cambodian households. These findings are consistent with the above empirical literature reviews on the risk coping role of credit, especially on health-related risk. In Cambodia in particular, these results by and large support the studies of Murshid (1998), Chan and Acharya (2002), Damme et al. (2004), Yagura (2005) and Murshid and Phim (2007) where credit is found to be a prominent tool which households undertake to respond to health shocks. Using household survey data, which covers a small number of samples in several provinces, Lun (2013) finds that households exposed to risks caused by health problems, crime issues and unemployment increase their demands for credit borrowing to mitigate these shocks, and his results are analogous to this study. In short, households are capable of dealing with risks at individual household levels by taking credit as a coping tool.

However, the results in the table show that the common village shocks have a positive effect on credit demands but are not statistically significant. One possible reason to explain this result is because it is hard for those households to obtain loans when their villages are hit by any negative common shocks. Once their villages are threatened by any common shocks, families in the villages are exposed to similar levels of damage and household incomes and consumption are very vulnerable to the impacts. In that sense, it is difficult for them to seek for any credit from other villagers whose risks are equally high. This may also suggest that the results can be explained by other alternative risk coping mechanisms such as income transfers from migrants and non-migrants (Halliday, 2006; Fafchamps and Gubert, 2007; Yang and Choi, 2007; Miller and Paulson, 2007; and Dillon et al., 2011), the supply of labour force, earning extra income by working longer or participation in non-farm activities (Kochar, 1995 and 1999; Rose, 2001; and Ito and Kurosaki, 2009), or earning income from common property resources in communities (Takasaki et al., 2004). In rural Cambodia, remittances are found to have a role in income smoothing when rural households are hit by idiosyncratic and common risks (Luch, 2012). Another further possible explanatory reason is that households exposed to the aggregate risks in Cambodia may have well-prepared behavioural responses to these common shocks (Yagura, 2005). In the time of aggregate risks, as this researcher specifies, those families respond by fishing and extracting revenues from other common village property resources. It is found that in places where those households reside, the failure of farming output is frequently triggered by flooding which is a very common phenomenon and those places are equipped with common community resources i.e. fishing assets (Yagura, 2005). Although those families are threatened by the aggregate risks, the common properties could protect their livelihoods and the repeated frequency of the risk could build those households experiences and well-managed risk mitigation strategies (Yagura, 2005).

5.4.3. Credit, Remittances and Risks

As another objective of the study is to assess the coping role of remittances to mitigate adverse risks, it further examines the effects of remittances on credit borrowing in households

that were exposed or not to different sub-groups of risks. The estimation results shown in Table 5.3 indicate that estimated coefficient of remittances in households exposed to all but health risk has a significant negative impact on household debts. It appears that remittances do not have any effects at all on demands for credit when families were exposed to crime, unemployment and village shocks. For risks other than health, it gives the impression that remittances do not play any role but credit appears to be very sensitive and responsive to those negative shocks.

Table 5.3: The effects of remittances on credit borrowing by shock categories

<i>Dependent Variable:</i> <i>Credit Borrowing</i>	<i>Total Remittances</i>		<i>Migrant Remittances</i>		<i>N</i>
	<i>OLS</i> (1)	<i>2SLS</i> (2)	<i>OLS</i> (3)	<i>2SLS</i> (4)	
No Health Shock	0.003 (0.004)	-0.125 (0.082)	0.019 (0.012)	-0.233 (0.150)	5,801
Health Shock	-0.005 (0.004)	-0.241* (0.138)	0.001 (0.006)	-0.540 (0.338)	3,495
No Crime Shock	0.001 (0.003)	-0.124 (0.085)	0.012 (0.009)	-0.228 (0.152)	9,052
Crime Shock	-0.020 (0.030)	-0.217 (0.181)	-0.035 (0.047)	-1.085 (0.777)	244
No Unemployed Shock	0.001 (0.003)	-0.132 (0.087)	0.009 (0.009)	-0.253 (0.167)	8,650
Unemployed Shock	0.007 (0.026)	-0.061 (0.154)	0.068 (0.084)	-0.083 (0.274)	646
No Village Shocks	-0.006** (0.003)	-0.047 (0.120)	-0.001 (0.006)	-0.034 (0.270)	2,286
Village Shocks	0.003 (0.004)	-0.129 (0.112)	0.015 (0.012)	-0.257 (0.227)	7,010

*Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.*

Please be noted that in the 2SLS estimation in column (2) only the estimation of remittances on credit borrowing in time of health shock satisfies all econometric tests of 2SLS, while the others cannot rule out the exogeneity of remittances. In the 2SLS estimation in column (4), almost all of estimations of remittances on credit borrowing satisfy all econometric tests of 2SLS, except those in time of unemployed, village and no village shocks. Please be also noted that the level of significance of the estimated coefficient of remittances in column (4) in time of health shock is significant at 11%.

These results point out that in households exposed to health shock remittances are negatively associated with the household decision to take credit. In other words, households who received remittances especially from migrant members reduce their demands for loans when they faced health-related risk occurring at the household level, which is consistent with the findings of Ambrosius and Cuecuecha (2013). These results can suggest that those households are less at risk and less likely to undertake loans to mitigate the health shock, but rather to seek assistance from migrants and non-migrants in the case of the shock.

It also indicates that remittances can reduce household debt burdens and undesirable aftermaths triggered by acute illnesses and damaging accidents. Based on several studies in Cambodia, health is a severe issue for households to deal with where there is a noticeable record of out-pocket fees for medical services in the region and where an overwhelming majority of households do not have any insurance or protection from the government (Murshid, 1998; Damme et al., 2004; Yagura, 2005 and 2009; Maltoni, 2007 and Net, 2011). As indicated in these studies, other informal community risk-sharing mechanisms such as funds for Sangkaha are found to be poor, inadequate and limited in scope of coverage. They specify that the consequences of a health shock include medical expenses and a loss of earning income due to absences from work, and, more importantly, other unfavourable severities resulting from credit, explained below, even though it is found to be a prominent instrument to mitigate the risks. When households are hit by health risk, as indicated, they need a large sum to finance medical treatments in a short period of time and anything else but credit borrowing is a common response to these shortfall effects. These studies identify that credit can tackle these hazards but at the expense of a future downturn in household consumption and earnings. They also specify that excessive interest rates and the oppressive environments in Cambodia's credit markets could further make those households end up liquidating assets, bearing catastrophic debt burdens, imposing bankruptcy on household economies and being even further impoverished. From the results, it suggests that to some extent remittances can address these destructive impacts and enable recipient households to

lessen indebtedness and other burdens caused by health-related risk. Therefore, remittances can function as an insurance against their vulnerability to adverse health shock and can substitute for credit when those families face the negative health shock. In brief, individual and common shocks generate demands for capital to finance the damages, and credit acts a coping role to deal with risks other than health, whereas remittances are more responsive to reduce credit demands to cope with health-related risk.

It is necessary to explain why remittances appear to be more responsive to reduction in credit demands when households did not face shocks other than health in rural Cambodia. The degree of differences of severity caused by health and other risks could be a possible reason to explain these results. As stated, in rural Cambodia health is a common and severe problem which greatly harms household livelihoods more than other idiosyncratic and aggregate risks do. As argued by Yagura (2005), shocks other than health do not cause dangers as severe as health risk does. It reflects that these excessive severities may hinder household capabilities to mitigate the impacts and households are hence vulnerable to health risk. Without remittances, it is a heavy burden to cope with these difficulties even if loans are obtained which do help to offset the impacts of the burdens. Although remittances are found to smooth income variation caused by individual and common shocks in rural Cambodia (Luch, 2012), remittances in his findings are estimated to cover just about a quarter of losses caused by those shocks. As indicated above, migrants are resiliently attached to families back home and they are strongly responsive to exercising their familial duties when livelihoods of family members left behind are threatened or at risk. Due to these strong senses of attachment and familial obligations to show gratitude, migrants are more likely to send their families remittances to lessen hardships. These reasons above could indicate that migrants choose to prioritise and emphasise the need to help families by using remittances as a quick coping tool when their families are hit by health risk. For these reasons, remittance-recipient households who are exposed to health risk may need fewer loans or no longer demand for credit. It is also

possible for these households to make a credit decision initially to cope with the impacts and pay back their indebtedness through remittances.

5.4.4. Internal Remittances and Robustness

The study further analyses the impacts and role of remittances on credit borrowing and carries out all the above estimations in a similar pattern just by accounting for internal remittances.²⁴ The estimation results shown in Tables B.2 and B.3 in Appendix B confirm the findings analogous to the above results even when internal remittances are classified as remittances from migrants and regressed with or without shocks. These findings emphasise that internal remittances especially from migrants play a significant role to diversify household income and loosen household credit constraints, and can be cash income for households to overcome their vulnerability to shocks, especially health-related risk, and to substitute for credit in time of health shock.

Since Cambodia is in the primary stage of exporting labour as explained above, the destination countries are so far limited to these three countries: Thailand, Malaysia and South Korea. This could be a reason to explain why internal remittances have more significant impacts on families back home (CDRI, 2007a and 2007b; Maltoni, 2007; Chan, 2009b; MLVT/ILO, 2010; and Hing et al., 2011a and 2011b). Although labourers to South Korea are expected to earn larger income than those in the other two countries, these studies show fewer figures of sent migrants to South Korea. Also, these studies show that earnings in certain jobs in Thailand and Malaysia are roughly equal to those in Cambodia despite wages in these countries being generally greater than in the local market. In some other cases, as they specify, these migrants are found to lose contacts with family members left behind, implying

²⁴ The research did attempt to investigate the impacts and role of international remittances on credit borrowing but it appears that all estimated coefficients of international remittances for all specifications are not significant at all. The instrumental variables seem not to work very well in these estimations but perform well in the specifications of internal remittances.

that remittances are less likely to be sent to households back home. The 2008 population census also shows that less than 3% of the population is engaged in international migration. In contrast, it is observed that there is a great flow of migration locally within and between provinces, in which the 2008 population census reveals that 26.5% were involved in internal migration. These great amounts were the result of the economic boom since 1998, which has generated abundant employment in the industry, farming, tourism, construction and other service sectors. Due to these reasons, in sum, this study finds that internal remittances have more significant impacts on reduction of household credit constraints and have a role for households in coping with adverse risks, which are consistent with the assertions of the greater internal migration-generated impacts by Deshingkar (2006) and IOM (2013).

The study, furthermore, checks robustness through measuring remittances as remittance per capita in 10,000 riels.²⁵ As found similarly to the above specifications, the findings show that remittances especially from migrants relax capital constraints and substitute for credit in cases of adverse health risk. More importantly, it is observed that these estimations create even larger estimated coefficients of remittances.²⁶

5.5. Concluding Remarks

This study examines (1) the impacts of remittances on household debt burdens to assess whether remittances reduce credit constraints; (2) the effects of idiosyncratic and aggregate shocks on credit borrowing; and (3) the role of remittances in mitigating risks by investigating whether or not remittances substitute for credit in the time of those shocks.

²⁵ Estimation results are shown in Tables B.4, B.5 and B.6 in Appendix B.

²⁶ The research also examines the estimations with Tobit and IV Tobit models. The results indicate that most of estimated coefficients of remittances are relatively greater than the estimations with OLS and 2SLS, and the coefficients remain negative even though some become insignificant. It also appears that remittances have negative impacts on credit when households face the health risk.

The empirical findings indicate that remittances have negative effects on credit borrowing. The effects are even larger when credit borrowing is assessed on migrant remittances. It reflects the significant improvement in liquidity and financial conditions of remittance-recipient households since remittances provide them with cash income that can improve their household budgets. This indicates the lessening of indebtedness and financial constraints of the recipient households. It supports the NELM by finding that households with access to remittances are financially capable of overcoming financial constraints, and this can impact their decisions not to take loans due to the constrained credit market. The findings further show that remittances and credit play key alternative roles in mitigating different idiosyncratic and aggregate shocks which create household demands for capital to finance the impacts. The results show that households exposed to such idiosyncratic risks as health, crime and unemployment appear to respond to those risks by taking credit borrowing. However, those exposed to common village shocks seem not to take credit as a response tool to mitigate the impacts.

The findings further show that remittances do not have any impacts on credit demands in households exposed to such risks as crime, unemployment and common village shocks but health risk. For health risk, remittances have negative impacts on credit borrowing, where remittances from migrants have even larger negative effects on credit demands. It indicates that recipient households decrease their demands for loans in the time of health risk, inferring that they seek liquidity assistance from migrants and non-migrants rather than obtain credit to cope with the shock. To some extent, remittances can reduce household indebtedness and burdens caused by health risk which is identified as a major and severe issue impacting rural Cambodian livelihoods. Remittances, therefore, can function as insurance against health risk and can substitute for credit to mitigate the impacts of the shock. The results remain unchanged when the analyses are conducted using internal remittances, internal remittances from migrants, and remittances per capita for all specifications.

These results, where remittances have significant effects to reduce credit demands of households exposed to health risk, can be explained by the major and severe damage caused more by health risk than by the others, an insufficient sum of remittances to cover all the entire shocks and the strong attachment of migrants to help households in time of hardship. It shows how migrants emphasise the importance of their responses to families' needs of necessary help especially when their livelihoods are threatened by health shock. It may suggest that remittances enable those exposed households to demand fewer loans or no longer demand credit, or to undertake a credit decision initially to mitigate the health risk impacts and then repay their indebtedness through remittances.

In the following chapter, a third impact of remittances on Cambodian rural households will be examined. Chapter 6 analyses the impacts of remittances on agricultural input expenditure in rural Cambodia.

CHAPTER 6

REMITTANCES AND HOUSEHOLD AGRICULTURAL INPUT EXPENDITURE IN RURAL CAMBODIA

6.1. Introduction

6.1.1. Problem Statement

In the economic development process, migration from subsistence-farming rural areas is an inevitable and ubiquitous phenomenon which every developing country has to encounter. Recently, it has attained much attention because of its significant magnitude and impacts through remittances on source communities. The significant impacts have been identified as affecting a number of outcomes such as poverty, inequality, income, education and other socio-economic indicators of migrants' home communities (Taylor, 1999; Taylor and Martin, 2001; Rapoport and Docquier, 2006; Adams, 2011; and Mendola, 2012). Obviously, agricultural outcomes are also impacted by these migration and remittance flows, but the effects are complex. According to the New Economics of Labour Migration (NELM), these impacts on agriculture can be in two ways: migration can cause concern and can deteriorate the farming sector, or it can improve rural welfare through the income-effect of remittances.

Theoretically, the impacts of migration and remittances on agricultural outcomes are ambiguous and undetermined a priori. The theoretical perspective does not give very clear evidence of the magnitude or sign of the impacts (Taylor and Lopez-Feldman, 2010). If local markets are well-functioning, migration is expected to have a small or no effect on the agricultural outcomes (Wouterse and Taylor, 2008; Damon, 2010; de Brauw, 2010; Miluka et al., 2010; Taylor and Lopez-Feldman, 2010; and Atamanov and van den Berg, 2012). As indicated, this is because migrant households can manage to substitute for out-migrant workers through hired labour in the markets. If the markets are poorly functioning, these studies specify that migration can have a reducing effect on the agricultural outcomes. This is because migrant households cannot find any substitute for the loss of workforce due to

migration in these incomplete markets. However, as specified in these studies, the impacts can be minimised if these households shift into labour-extensive or high-return activities. They find that the income-effect of remittances can offset this reducing impact, but the extent to which this effect can be compensated is debatable. If remittances are transferred to overcome credit and risk constraints in production, these studies identify that migrant households are more likely to be involved and have more spending in high-value and risky production activities such as livestock.

Because these impacts are theoretically unclear, they must be examined empirically. The impacts depend on the nature of local market conditions, household behavioural responses, and an identification of unobservable and non-random factors of migration (de Brauw, 2010; and Atamanov and van den Berg, 2012). These settings give an indication that the migration and remittance effects on agriculture should be further analysed empirically in a context in which labour migration is a new and growing phenomenon happening in the country, remittances are significantly increasing and account for a significant amount of GDP, and a majority of people depend on the agricultural sector for living. This is exactly the situation in Cambodia, and therefore it will be very instructive to examine these impacts in this country.

6.1.2. Objectives

This study examines the NELM by investigating the causal relationship between remittances and agricultural input expenditure in rural Cambodia. In particular, it examines the impacts of remittances on rural households' agricultural input purchases in crop planting and livestock raising activities in Cambodia. This is to assess whether rural households at source communities intensify their crop activity or transform their spending behaviours into a high-value activity such as livestock husbandry upon the receipts of remittances. The study also examines the remittance impacts on agricultural, non-agricultural and household income. The study assesses further these impacts on the agricultural input expenditure in rural poor households.

6.1.3. Contributions

This study makes two significant contributions to the existing literature. The primary contribution of this study is to provide a different and more comprehensive analysis by categorising remittances into total, migrant, internal, and international remittances, respectively. This is to see how differences in these categories have impacts on the agricultural input spending. The majority of empirical literature investigate mainly the impacts of international migration and remittances on agriculture, except the studies on internal migration by Rozelle et al. (1999) and Taylor et al. (2003) in China and de Brauw (2010) in Vietnam. The larger group of studies seem to put more emphasis on the important impacts of international migration on the agricultural outcomes, but neglect the other significant impacts of internal migration which could generate even larger effects as indicated by Deshingkar (2006). More importantly, those studies do not differentiate the impacts of migrant remittances from total remittances. These two streams of remittances are important sources of household income, but they may impact differently on household spending behaviours since they may function differently in household spending and risk-coping strategies. For this reason, it is interesting to investigate these disaggregated impacts of remittances especially in the Cambodian context.

The other significant contribution of this study is that this is the first empirical analysis of the remittance impacts on agricultural input expenditure in the Cambodian context. To the best of the author's knowledge, the existing empirical studies in Cambodia are the assessment of the impacts of migration and remittances on poverty reduction (Tong, 2011a), the analysis of the impacts of migration and remittances on household sources of income, income variation and education attainments (Luch, 2012), and the analysis of marriage decisions among migrants (Yagura, 2012). The other two empirical studies are the examination of the impacts of transfers, which are not transferred remittances but are conditional cash transfers from World Bank and JICA, on school enrolment and attendance (Filmer and Schady, 2008 and 2011). There are a number of other studies examining migration and remittances in

Cambodia, but those studies use descriptive and qualitative methods (Haapala, 2003; CCC, 2005; Dahlberg, 2005; World Bank, 2006; Yamagata, 2006; CDRI, 2007a and 2007b; Maltoni, 2006 and 2007; Murshid, 2007; Chan, 2009a and 2009b; Hing et al., 2011a and 2011b; and IOM, 2010). These studies address the migration characteristics, policies, legal frameworks and rural livelihoods at migrants' source communities. Therefore, this lack of research on the specific question has motivated this study in order to shed light on the impacts of remittances on the household agricultural input spending in Cambodia.

6.1.4. Significance

The present situation in Cambodia offers a good case for empirically examining the impacts of remittances on the agricultural input expenditure in Cambodia for three significant reasons. The primary reason to investigate these impacts on agriculture is because of the great importance of both migration and agriculture to livelihood improvement and income generation of rural households in Cambodia. Agriculture has contributed about 30% to the GDP growth, and the sector is an important source of income for rural households (Figure 6.2). This is because about 80% of the population lives in rural areas and depends primarily on agriculture for livelihoods (Figure 6.4). About one third of the population is actively engaged in agriculture and this sector employs more than half of the total workforce (Figure 6.3 and 6.4). Recently, migration has been defined as being an important source of household income, having an important role in smoothing income variation, and providing important capital to improve child education of rural households (Luch, 2012). It also has impacts to reduce poverty (Yamagata, 2006; and Tong, 2011a) and to improve livelihoods of rural households (Chan, 2009a and 2009b; IOM, 2010; Hing et al., 2011a and 2011b; and Chapter 4 and 5). Since migration and the agricultural sector are both important sources for rural income and livelihoods, therefore, this may indicate that these two components can have a causal relationship, and this has not yet been studied.

Another reason to examine these impacts in Cambodia is because of major constraints binding agricultural production. A number of studies find that Cambodian farmers have

severely limited access to credit to purchase agricultural inputs or to modernise their production (Yagura, 2009; Ros et al., 2011; Yu and Diao, 2011; ADB, 2012b; Theng and Flower, 2014; and Theng and Khiev, 2014). They also specify that the household production is very vulnerable to any exogenous risks since there is not adequate protection provided by the government. Despite the significant contributions of the agricultural sector to the GDP growth and employment, its trends in both areas are reducing (Figure 6.2 and 6.3). According to the NELM, when the credit and insurance markets are constrained, this indicates that migration may have a role in relaxing these constraints and in increasing the agricultural spending. Therefore, it is significant to assess these impacts thoroughly.

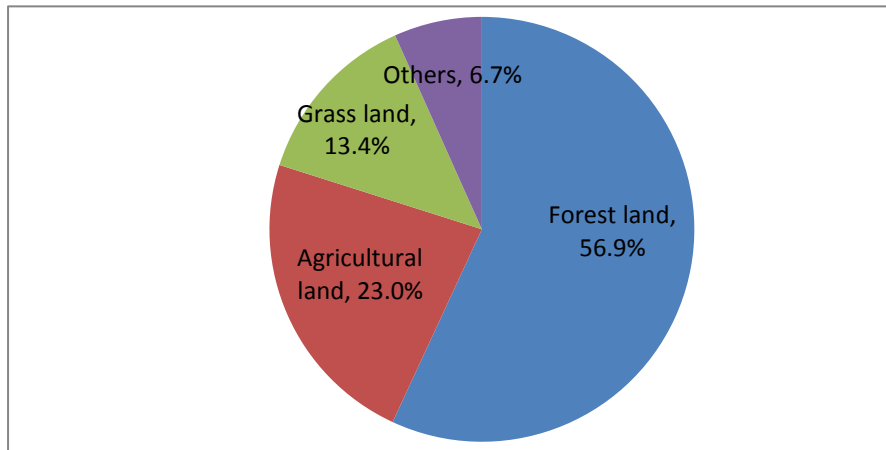
The final reason to examine these impacts in Cambodia is because labour migration is a new expanding phenomenon, and remittances are significantly growing and accounting for a significant figure in GDP. The contributing factor is due to the economic booms in the industry and services sectors in urban areas. This has attracted rural migrants from subsistence agricultural households to work in low-skilled or unskilled jobs such as garment, construction, transportation, handicraft or other service works (CDRI, 2007b; Lee, 2007; Maltoni, 2007; and NIS, 2009). The economic booms in Thailand, Malaysia and South Korea also play another important part to attract these migrant workers to work in low-skilled or unskilled sectors in these countries. This gives an indication that migration may have impacts on the rural economy of households remaining behind at source communities.

6.2. Overview of Cambodia's Agriculture

In order to fully assess the migration impacts on agriculture in Cambodia, it is helpful to have an overview of the sector. Because of favourable features in abundant arable land and environmental conditions, agriculture is the predominant activity in Cambodia. Out of the total land area of the country, agricultural land accounts for 23% whereas forest and grass areas are about 57% and 13%, respectively (Figure 6.1). The tropical monsoon climate sets the country's weather into a six-month rainy season and a six-month dry season. The rainy season is from May to October while the dry season is from November to April, and there is a

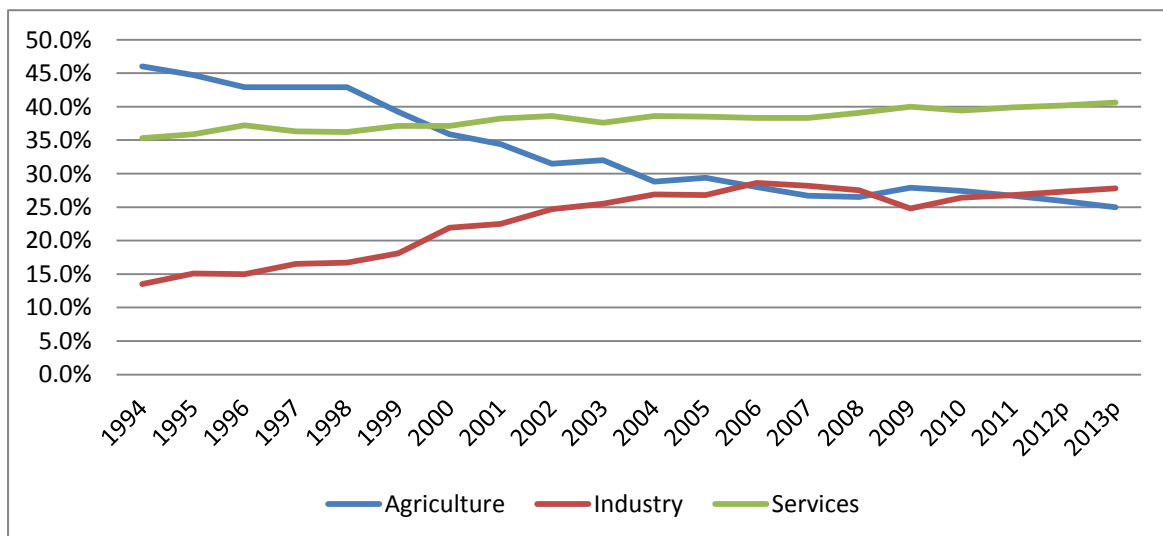
short drought in mid-July. Although the irrigation system is recently being improved and further developed, farming is mainly still a rainfall-dependent activity (Ros et al., 2011).

Figure 6.1: Distribution of land in 2010



Source: Aum (2012)

Figure 6.2: Share of GDP by sectors



Source: Ministry of Economy and Finance cited in Kem et al. (2011a)

The economic indicators are another factor to indicate the importance of agriculture. Cambodia has achieved remarkable rates of economic growth after the economy was liberalised in 1993. It was 9.8% on average during the period of 1998-2007 (World Bank, 2009). According to ADB's Asian Development Outlook 2014, the growth rate was nearly 7% on average during the last four years after the downturn of the global financial crisis in

2009 (ADB, 2014). By sectors, the agriculture has significantly contributed to GDP growth, accounting for about 30% on average, but the trend appears to be declining (Figure 6.2). By employment, agriculture absorbs a significantly larger share of the workforce if it is compared with industry and services, but the trend of the employment share is decreasing (Figure 6.3). For instance, the figure shows that the share of the labour workforce in agriculture is about 77% in 1998 but 56% in 2007.

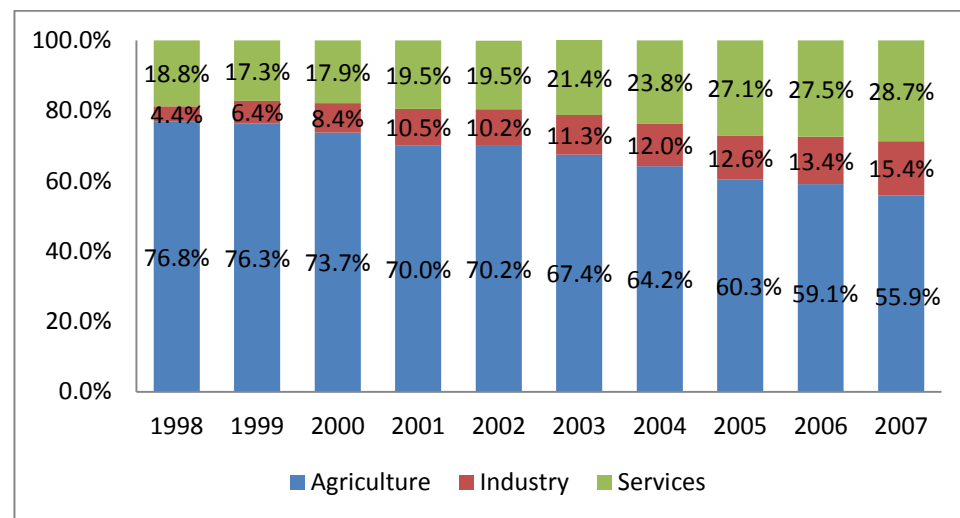
Despite these declining trends, agriculture remains an important sector for economic growth, rural income generation and poverty eradication (CDRI, 2013). Agriculture may still play an important role in promoting growth and income of rural people because about 80% of the population stays in rural areas and more than one third of the population is actively engaging in agricultural activities (Figure 6.4). Crop production is the main driver contributing more than half to the total agricultural production, whereas fisheries, livestock and forestry are contributing the remaining amount (Figure 6.5). In the latter group, the contribution share of livestock production is quite steady while the other two are declining. In the livestock production, cattle and buffalos have increasing trends while the trend of pig is gradually decreasing and the trend of poultry is fluctuating (Figure 6.6).

In terms of agricultural policies, the Royal Government of Cambodia (RGC) has generated a number of development policies and reforms. In the government's Rectangular Strategy which has been recently extended to Phase III, the National Strategic Development Plan and the Strategy for Agriculture and Water are the two major policies to reform the sector. The objectives are to increase agricultural production, to commercialise and to diversify the sector. As a result, agricultural production is seen to be noticeably improved (Kem et al., 2011a; Theng and Koy, 2011; Tong, 2011b; and ADB, 2012b).

Despite these efforts, this improvement is mainly due to an expansion of cultivation land and insignificantly due to an increase of agricultural productivity (Kem et al., 2011a; Theng and Koy, 2011; Tong, 2011b; and ADB, 2012b). This is because a number of constraints are binding on agricultural investment and growth. Several studies identify such

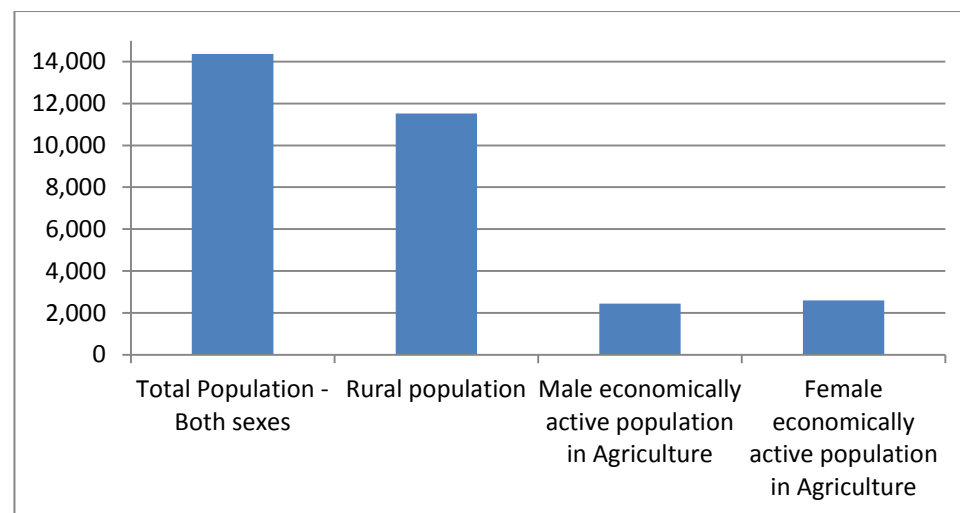
constraints as weak public institutions to support the production, weak governance in land-use management, poor public and agricultural infrastructure, high costs of transportation, electricity and other inputs for agricultural production, and limited knowledge among farmers about market information of their agricultural products (Hangchuon and Suzuki, 2005; RGC, 2010; Ros et al., 2011; Yu and Diao, 2011; ADB, 2012b; Seng, 2013; Theng and Flower, 2014; and Theng and Khiev, 2014). In contrast to neighbouring countries, as specified in these studies, farmers in Cambodia are exposed severely to weather risks potentially harming their production since there is no public protection or insurance against those risks. More importantly, these studies indicate that credit constraint is the main binding factor for the purchases of agricultural inputs and for the production improvement. In 2008, for instance, only 5% of the national loan portfolio was invested in the agricultural sector (Ros et al., 2011). As also specified in this study, a major number of farmers have very limited access to credit to purchase agricultural inputs such as planting seeds, chemical fertiliser and livestock feed, and, thus, this makes it hard for them to improve the agricultural productivity. This limited access to credit of rural farming households is because of high interest rates whether from moneylenders or micro-finance institutions (Theng and Flower, 2014; and Theng and Khiev, 2014). These studies find that the average monthly interest rates charged by moneylenders and micro-finance institutions are 5% and 2.5-3%, respectively, which are high enough for these rural farmers not to be able to purchase agricultural inputs. As indicated by these studies, this inaccessibility makes these farmers incapable of transforming their agricultural production, but just keeps them engaging in subsistent farming activities. However, agriculture appears not to have a labour constraint since the labour supply is abundant and underutilised (CDRI, 2007b; World Bank, 2009; ADB, 2012b; and Theng and Flower, 2014).

Figure 6.3: Share of employment and numbers of employment (in thousands) by sectors



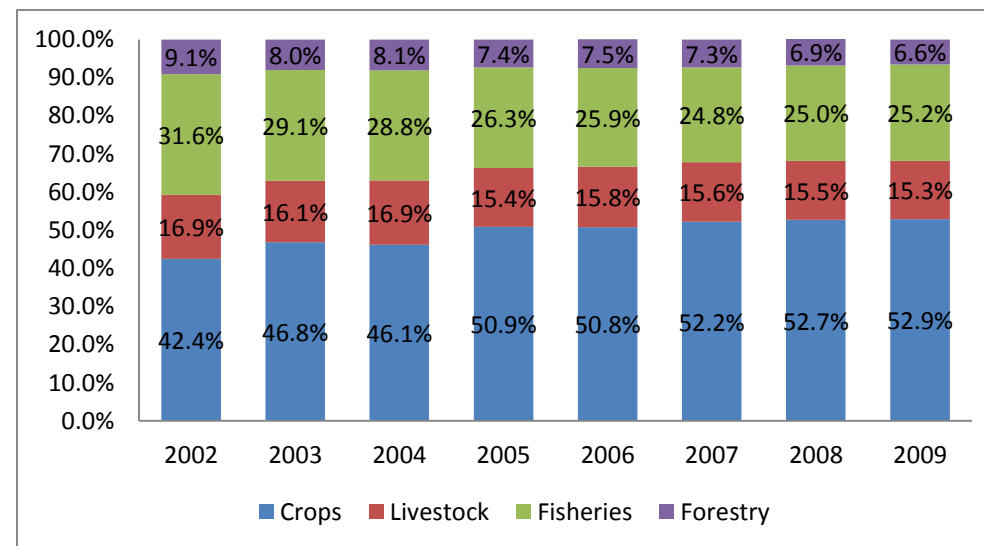
Sources: IMF (2004 and 2009)

Figure 6.4: Population composition (in thousands) in 2010



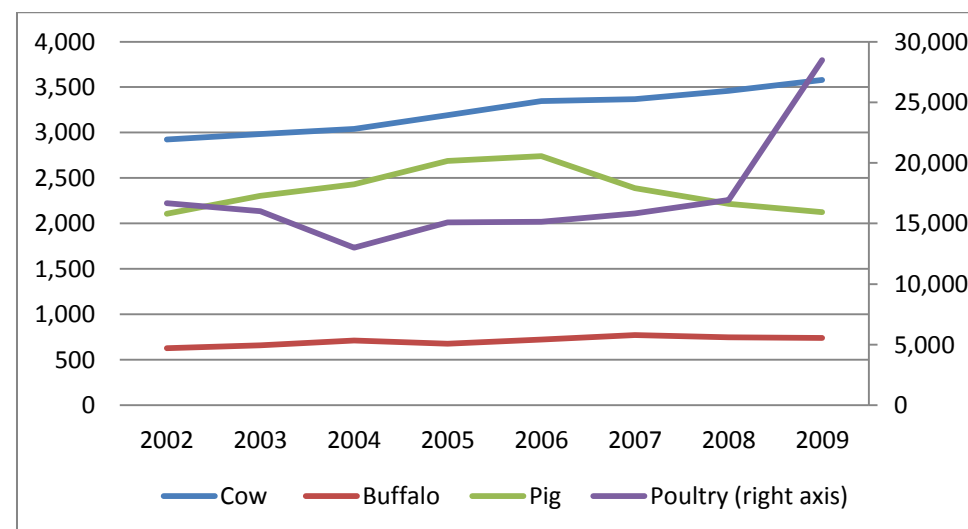
Source: FAO (2014)

Figure 6.5: Share of agricultural production



Sources: IMF (2009) and Saing et al. (2012)

Figure 6.6: Livestock production (in thousand heads)



Source: Saing et al. (2012)

This decreasing trend in agriculture is occurring while the GDP contribution shares of the industry and services are increasing (Figure 6.2). These two sectors employ a workforce of 44% in 2007 (Figure 6.3). This indicates that these two sectors extract labour from the rural sector. In the garment industry in particular, this industry absorbs more than 350,000 jobs (Chan, 2009b) and has contributed about three quarters to the country's total exports (Yamagata, 2006). This rural out-migration in this industry is found to have significant impacts on livelihoods of rural households at home communities (Chan, 2009b; and Yamagata, 2006). This decreasing trend in employment in agriculture may also indicate the contribution of the economic growth in Thailand, Malaysia and South Korea, where there are high demands for low-skilled or unskilled labour (Maltoni, 2007; Chan, 2009b; and IOM, 2010). In 2009, for instance, the amount of international remittances sent to Cambodia was recorded as USD 338 million or 3.4% of GDP (World Bank, 2011). In particular, remittances sent from Thailand alone were about USD 45 million in 2008 (MLVT/ILO, 2010). These remittance flows are indicated to have significant impacts on a number of outcomes of rural households in Cambodia such as poverty, education, income and risk mitigation (Tong, 2011a; and Luch, 2012).

Therefore, these settings and constraints in agriculture in Cambodia may indicate that migration and remittances have a role in rural households' agricultural spending behaviours. The NELM suggests that migration and remittances can have impacts on agriculture when the credit and insurance markets are missing. For that reason, it may be an interesting analysis to examine these impacts in the context of Cambodia.

6.3. Literature Review: Theoretical Concepts and Empirical Studies

6.3.1. Theoretical Concepts

This subsection discusses theoretical conceptual frameworks and presents how various scholars have shown that causal relationship can exist among migration, remittances and agriculture. They show how migration and remittances can overcome incomplete markets of labour, credit and insurance in rural agricultural households.

In the migration phenomenon, migrant households risk incurring a cost of losing family labour to earn income at home in addition to the initial cost to send out those migrants (Damon, 2010; and Taylor and Lopez-Feldman, 2010). If the labour market is complete, these studies indicate that labour is abundant and can be substituted for these out-migrants without any effect on household production. As indicated, this condition enables these households to substitute for the loss of these family members by hiring labour, and therefore the levels of household production could be retained. In a perfect agricultural household model, as these studies specify, this unbinding labour market should not impose any constraint on the household production, but this increases these migrant households' demands for leisure. Because migration can provide households with such capital as remittances, they identify that this can push budget lines of these households upward. In this way, they emphasise that remittances have a positive impact on household consumption. However, there is a possibility that migration could have pressure on production through an increase in wages of the local labour market, which could constrain labour in farming (Gonzalez-Velosa, 2011). Even so, she emphasises that in the condition of unconstrained market the labour supply is abundant and elastic and wages become constant. Therefore, this threat does not hold and there is no effect on production (Gonzalez-Velosa, 2011). Even in the separable agricultural household model, remittances could have an impact on the production only if remittances positively affect household spending behaviour toward productive assets (Taylor and Wyatt, 1996).

If the labour market is incomplete, however, migration may create a labour constraint or a labour shortage in these migrant households (Damon, 2010; and Gonzalez-Velosa, 2011). In this case, as these studies indicate, these households may not attain the same levels of production as before those workers migrated. In other words, according to these studies, this incompleteness makes it difficult for these migrant households to find a substitute for the loss of family labour due to migration, and this generates a non-zero impact on the production. As indicated by Atamanov and van den Berg (2012), the magnitude of this non-zero impact due

to migration depends on local market conditions, the extent to which migrant households can substitute for these migrant workers, main job activities of family members remaining behind, and migrants' prior-to-migration jobs. However, recent research finds that this non-zero impact on the production can be offset by remittance-generated income-effect (Rozelle et al., 1999; Taylor et al., 2003; and Atamanov and van den Berg, 2012). As these studies indicate, the extent to which remittances can compensate for the loss effect is still an empirical question to test in different contexts and settings.

According to the New Economics of Labour Migration (NELM), migration has been defined as a strategic collective action in the migrant families to overcome an incomplete credit market (Lucas and Stark, 1985; Stark and Bloom, 1985; Stark, 1991; Taylor, 1999; Taylor and Martin, 2001; Damon, 2010; and Mendola, 2012). As indicated, this is to maximise these migrant households' utility and to increase their welfare. In these studies, the NELM accounts for the imperfectness or non-existence of the credit market, resulting in rural farming households facing liquidity constraints in production. Although these migrant households have options to be engaged in either high-value or low-value production, they end up being involved in the low-value activities because of the binding capital constraints (Atamanov and van den Berg, 2012). This condition makes the agricultural household model no longer be separable, and the migration and remittance decisions have impacts on the household production (Damon, 2010; and Taylor and Lopez-Feldman, 2010). When these households are liquidity constrained, as these authors describe, remittances are empirically observed to be sent to these households to ease the constraints in production. Therefore, remittances can spur these constrained households to make more spending in the production or to transform from low-value traditional subsistence-farming to high-value non-crop activities such as livestock husbandry (Wouterse and Taylor, 2008; Damon, 2010; de Brauw, 2010; and Taylor and Lopez-Feldman, 2010).

The NELM also describes migration as an important strategy for agricultural households to overcome a missing insurance market, and as a main informal risk-mitigation

tool to cope with any unexpected risks threatening on their production (Lucas and Stark, 1985; Stark and Bloom, 1985; Stark, 1991; Taylor, 1999; Taylor and Martin, 2001; Damon, 2010; and Mendola, 2012). These studies indicate that this missing market makes these households very vulnerable to any shocks, and migration can help these households lessen the impacts by providing them with capital when the risks happen. In this setting, it is difficult for these households to gain access to any protection, and only migration is an essential tool to self-insure and self-mitigate the effects. According to these studies, this is not only to minimise the risk impacts, but also to diversify their sources of income. When they can secure their sources of income and insure against any income shocks or farming failures through remittances, these households are more likely to endure risk-taking behaviour and to have productive spending (Miluka et al., 2010; and Taylor and Lopez-Feldman, 2010). This kind of assurance helps migrant households be involved in high-value and risky activities (Wouterse and Taylor, 2008; and Damon, 2010).

In brief, the causal relationship between migration, remittances and agricultural outcomes is theoretically complicated and pre-undetermined. The impacts depend on how imperfect the local market conditions are. Therefore, it is significant to examine the effects carefully and thoroughly with comprehensive representative survey data in a different local context of incomplete markets like in Cambodia where the effects are expected to be non-zero.

6.3.2. Empirical Studies

This subsection reviews empirical studies on the effects of migration and remittances on household agricultural outcomes. Firstly, studies showing impacts on high-value livestock activity will be discussed, and secondly, studies on production and income will be considered.

By assessing the impacts of migration on rural economy of the sending community in Mexico, Mines and de Janvry (1982) find that migration has an impact on rural households to shift their production from staple to livestock. In South Africa, Lucas (1987) examines the impacts of international migration on crop production and cattle investments in migrants'

home countries. These workers migrated from Botswana, Lesotho, Malawi and Mozambique to work in South Africa's mine industry. He finds that migration has a reducing impact on crop production, but this impact takes place in the short term. In the long term, migration turns out to increase crop productivity and cattle investment through the investment of remittances. In his findings, migration appears to put pressure on local wages in crop plantation in those countries. In Burkina Faso, Wouterse and Taylor (2008) analyse the impacts of migration on activity choices and income of rural households. They classify migration as continental and inter-continental migration, and categorise activity choices as staple, cash crop, livestock and nonfarm activities. They find that continental migration has no impacts on these activity choices and income sources, except a negative impact on nonfarm income. Interestingly, they find that inter-continental migration is positively associated with livestock activity, and this migration has a strong increasing impact on livestock income. In their findings, inter-continental migration appears to be a pathway out of staple production to livestock activity. In another case study in Albania, McCarthy et al. (2006) assert a similar finding that international migration has positive impacts on livestock production and pasture land dedicated for raising livestock. Extending this study, Miluka et al. (2010) assess the impacts of migration on household spending on livestock and other input purchases. Their empirical results show that migration has an increasing impact on livestock expenses, but negative effects on the expenses for chemical fertiliser and rental equipment. Their findings further show an insignificant effect on agricultural income but a significant positive impact on household income. Their study indicates a movement out of crop activity to high-return livestock husbandry. In another recent study in Central America, Davis and Lopez-Carr (2014) examine the impacts of migration and remittances on household investment in Costa Rica, El-Salvador, Guatemala and Nicaragua. They provide analogous findings that migration and remittances have positive impacts on livestock activity, and appear not to have any effects on the use of land for crop cultivation, fertiliser, mechanised

equipment and labour input. Therefore, these studies give an indication that households shift away from traditional crop activity to livestock activity.

There is another strand of studies finding weak or insignificant impacts of migration and remittances on livestock activity, but strong impacts on other types of agricultural investment. Assessing the impacts of international migration and remittances on agricultural outcomes in El Salvador, Damon (2010) finds that migration and remittances have impacts on livestock production, but the impacts are weak and not robust across different specifications. She also finds weak impacts of migration and remittances on asset accumulation in land and the farming input use. Her findings show positive impacts of migration and remittances on the land use for subsistence crop cultivation, but negative impacts on the land use for commercial crop cultivation. In the Philippines, Gonzalez-Velosa (2011) does not find any significant impacts of migration and remittances on livestock production, but finds that remittances enable farming households to make productive investment in high-return crop cultivation and modern cultivation equipment. In Mexico, Bohme (2013) finds that migration is positively associated with asset accumulation but negatively associated with livestock activity. However, the findings cannot reject the risk buffer function of livestock.

In addition to the preceding studies on livestock husbandry, a number of studies examine the impacts of migration and remittances on household farming income and production. In China, Rozelle et al. (1999) investigate the impacts of internal migration and remittances on maize production. They find that migration has a reducing effect whereas remittances have a compensating impact, but the net effect is negative. Taylor et al. (2003) extend this study by examining these impacts on income sources in crop, self-employment, wage and other activities. Their empirical results indicate that although remittances have a compensation effect for the loss-labour effect of migration on crop income, the net impact is still negative. They also find that rural migrant households are more likely to shift into high-value self-employment activity. Their results further indicate a positive association between the net effect and household income per capita. In another study with a different dataset, Li et

al. (2013) also provide analogous findings in the case of China. With a similar estimation methodology but by categorising migration into seasonal and permanent, Atamanov and van den Berg (2012) find that migration, especially permanent migration, has a negative impact on crop income, but seasonal migration appears to have no effect on the income in the Kyrgyz Republic. They find that remittances compensate for the loss effect of migration but decrease with land size. In Mexico, Taylor and Wyatt (1996) find that remittances have a positive impact on household income through the asset-effect investment, and the marginal effect of remittances on income is positive. In another separate study, Taylor and Lopez-Feldman (2010) also find that migration is positively associated with an increase in income and land productivity. In Bangladesh, Mendola (2008) finds that international migration has stronger impacts on household adoption of rice varieties than internal migration, either temporary or permanent. In Vietnam, de Brauw (2010) finds that seasonal migration appears to shift away from rice production to other high-return crop production. In his findings, migration has no impact on farming revenue but has a positive impact on revenue from crops other than rice.

In sum, there is an indication that migration and remittances appear to generate significant impacts on these agricultural outcomes. The literature gives an indication that migrant households shift their activities from traditional subsistence-farming into high-value agricultural activities. In Cambodia, however, there is no a single study examining these impacts. Therefore, to the best of the author's knowledge, this study is the first study to assess these impacts empirically on the household agricultural input spending in the context of Cambodia.

6.4. Data Description and Empirical Models

6.4.1. Data Description

This subsection describes the data used in this study to assess the impacts of remittances on agricultural input expenditure in Cambodia. This study uses the Cambodia Socio-Economic Survey 2009 (CSES 2009) which samples 12,000 households in this nationally

representative survey. These data were surveyed by the National Institute of Statistics (NIS) of the Ministry of Planning under the auspices of the Swedish International Development Cooperation Agency (SIDA), and the 2008 Cambodian Population Census was the sampling frame of this survey. The total samples of the survey were 12,000 households from 720 villages, in which 1,000 households from 60 villages were surveyed every month in 2009. Because of missing data or other technical reasons concerning 29 households, the final samples of the survey are 11,971 households.

It is very important to analyse the impacts of remittances on the agricultural input expenditure by using this survey. This is because this survey gives very comprehensive data on socio-economic indicators, conditions and characteristics of households and villages across different regions in the country. Because the objective of this study is to examine the remittance impacts on rural households' agricultural input spending, the study uses only the samples of rural households for the analysis. This analysis excludes households living in the capital city of Phnom Penh and other urban areas. In particular, this study analyses the impacts on rural households who are involved in both crop planting and livestock raising activities. Therefore, the samples for this analysis are 6,575 households, 2,018 and 4,557 of which are remittance-recipient and non-recipient households, respectively (Table 6.1).²⁷

²⁷ Out of the total 11,971 observations in the CSES 2009, 7,237 households are reported to be involved in crop planting activity and 7,717 households are involved in livestock raising activity. The CSES 2009 consists of a number of separate modules where each and every sampled household was interviewed in accordance with each and every activity described in the survey. If households are engaged in both crop planting and livestock raising activities, they are reported to be involved in these two activities in the questionnaire. If they are involved in either one, they are reported to be involved in only one of them in the survey, and then they move to other questions in other parts of the survey. Since the objective of this study is to examine the remittance impacts on household behavioural responses to agricultural expenditure, the study analyses the impacts on 6,575

Table 6.1 shows a summary of statistics for the variables used in the analysis: crop planting expenses, livestock raising expenses, remittance-related variables, household characteristics, household assets, village characteristics and common property resources, and geographic regions.²⁸ The table shows that crop households on average have expenses for chemical fertiliser nearly twice that of planting seeds. However, these two expenses are insignificantly different between remittance-recipient and non-recipient households. The summary table further shows that the expenses to purchase livestock feed are the major spending of total livestock expenditure. These kinds of expenditure, however, are not significantly different between remittance-recipient and non-recipient households. The table also shows that total expenditure of crop planting, agricultural capital purchases and livestock purchases insignificantly differ between these two groups of households.

In this table, the remittance-recipient households are about 31% of the total observations where more than half of these recipient households received remittances from migrant members. Categorising these recipient households into internal and international remittance-recipients, the former is overwhelmingly higher than the latter. In terms of income contribution, total remittances constitute about 10.50% of household income, of which migrant remittances account for about half of these income contributions. Among the income contributions of total remittances, internal and international remittances constitute about two third and one third, respectively. This may indicate that different kinds of remittances have different impacts on income among these two groups of households.

households that are engaged in both crop planting and livestock raising activities. This analysis is to see how these households respond to the activities upon the receipts of remittances.

²⁸ Detailed descriptions of each variable are shown in Table C.1 in Appendix C.

Table 6.1: Descriptive statistics

Variables	All Households (<i>N</i> =6,575) (1)	Non- Recipient (<i>N</i> =4,557) (2)	Recipient HHs (<i>N</i> =2,018) (3)	t-scores (4)
Planting seed expenses (riels)	175,533 (4,723)	176,620 (5,964)	173,077 (7,447)	0.346
Chemical fertilizer expenses (riels)	312,457 (10,553)	318,380 (13,410)	299,082 (16,284)	0.843
Feed livestock expenses (riels)	301,458 (12,166)	291,511 (15,753)	323,922 (17,484)	-1.229
Total livestock expenses (riels)	318,736 (12,324)	309,874 (15,976)	338,748 (17,631)	-1.081
Total remittances (dummy)	0.307 (0.006)	0 -	1 -	-
Total remittances (riels)	180,986 (16,386)	0 0	589,684 (52,267)	-16.955***
Total remittances in income (%)	3.239 (1.115)	0 0	10.554 (3.627)	-4.373***
Migrants' remittances (dummy)	0.163 (0.005)	0 0	0.531 (0.011)	-71.850***
Migrants' remittances (riels)	85,782 (8,400)	0 0	279,494 (26,877)	-15.628***
Migrants' remittances in income (%)	1.763 (9.351)	0 0	5.743 (3.045)	-2.834***
Internal remittances (dummy)	0.282 (0.006)	0 0	0.918 (0.006)	-230***
Internal remittances (riels)	108,008 (8,125)	0 0	351,910 (25,662)	-20.609***
Internal remittances in income (%)	2.188 (1.046)	0 0	7.130 (3.405)	-3.147***
International remittances (dummy)	0.035 (0.002)	0 0	0.113 (0.007)	-24.088***
International remittances (riels)	72,978 (14,256)	0 0	237,774 (46,246)	-7.727***
International remittances income (%)	1.051 (0.370)	0 0	3.425 (1.205)	-4.272***
Total crop expenses (riels)	972,589 (21,628)	972,475 (27,029)	972,846 (35,230)	-0.008
Agricultural capital purchase (riels)	193,000 (23,669)	177,848 (17,084)	227,214 (66,781)	-0.962
Livestock (animal) purchase (riels)	232,978 (14,232)	239,006 (14,032)	219,368 (33,858)	0.636
Village remit norm (%)	2.852 (0.041)	2.163 (0.040)	4.408 (0.089)	-26.618***
Health shock (dummy)	0.387 (0.006)	0.369 (0.007)	0.428 (0.011)	-4.574***
Head gender and age (dummy)				
Male head	0.818 (0.005)	0.838 (0.005)	0.771 (0.009)	6.553***
Head age under 24	0.040 (0.002)	0.050 (0.003)	0.018 (0.003)	5.981***

Head age 25_34	0.207 (0.005)	0.261 (0.007)	0.085 (0.006)	16.532***
Head age 35_44	0.264 (0.005)	0.311 (0.007)	0.157 (0.008)	13.275***
Head age 45_54	0.236 (0.005)	0.206 (0.006)	0.302 (0.010)	-8.439***
Head age 55_64	0.157 (0.004)	0.106 (0.005)	0.272 (0.010)	-17.508***
Head age over 65	0.097 (0.004)	0.066 (0.004)	0.166 (0.008)	-12.707***
<i>Head education (dummy)</i>				
Head no education	0.006 (0.001)	0.007 (0.001)	0.004 (0.001)	1.392
Head primary	0.487 (0.006)	0.477 (0.007)	0.510 (0.011)	-2.511**
Head lower secondary	0.196 (0.005)	0.202 (0.006)	0.183 (0.009)	1.853*
Head upper secondary	0.045 (0.003)	0.046 (0.003)	0.042 (0.004)	0.883
Head vocational training	0.003 (0.001)	0.002 (0.001)	0.003 (0.001)	-0.938
Head college	0.0005 (0.0003)	0.0004 (0.0003)	0.0005 (0.0005)	-0.099
<i>Head occupation (dummy)</i>				
Head unemployed	0.067 (0.003)	0.057 (0.003)	0.088 (0.006)	-4.641***
Head wage labour	0.059 (0.003)	0.059 (0.003)	0.059 (0.005)	0.001
Head self-employed	0.873 (0.004)	0.882 (0.005)	0.852 (0.008)	3.433***
<i>Household members by age</i>				
Members younger than 5 years old	0.593 (0.009)	0.674 (0.011)	0.409 (0.015)	13.316***
Members age 6 to 14	1.029 (0.013)	1.124 (0.016)	0.815 (0.021)	10.963***
Members age 15 to 64	3.090 (0.018)	2.988 (0.021)	3.320 (0.034)	-8.630***
Members age over 65	0.212 (0.006)	0.165 (0.006)	0.316 (0.013)	-11.653***
<i>Household assets</i>				
Landless (dummy)	0.038 (0.002)	0.038 (0.003)	0.037 (0.004)	0.156
Land less than 0.5 ha (dummy)	0.202 (0.005)	0.201 (0.006)	0.205 (0.009)	-0.339
Land 0.5-1 ha (dummy)	0.239 (0.005)	0.237 (0.006)	0.244 (0.010)	-0.616
Land 1-2 ha (dummy)	0.278 (0.005)	0.276 (0.007)	0.281 (0.010)	-0.451
Land 2-4 ha (dummy)	0.169 (0.005)	0.168 (0.005)	0.171 (0.008)	-0.313
Land 4-8 ha (dummy)	0.059 (0.003)	0.065 (0.004)	0.046 (0.005)	2.961***
Land over 8 ha (dummy)	0.0152 (0.0015)	0.0151 (0.0018)	0.0154 (0.0027)	-0.067
Room (number)	1.304	1.271	1.381	-6.498***

	(0.008)	(0.009)	(0.014)	
Floor (dummy)	0.068	0.077	0.048	4.246***
	(0.003)	(0.004)	(0.005)	
Durable goods (riels)	2,230,915	2,086,499	2,557,031	-2.123**
	(102,219)	(91,285)	(261,492)	
<i>Village characteristics</i>				
Irrigated agricultural land (%)	23.441	21.749	27.264	-6.333***
	(0.403)	(0.468)	(0.771)	
Manure/agro-chemical (dummy)	0.149	0.146	0.156	-1.020
	(0.004)	(0.005)	(0.008)	
Technical support (dummy)	0.722	0.708	0.754	-3.868***
	(0.005)	(0.007)	(0.010)	
Bus stop (km)	4.952	5.340	4.077	5.514***
	(0.106)	(0.134)	(0.163)	
Electricity (%)	6.974	6.436	8.189	-3.472***
	(0.233)	(0.268)	(0.457)	
NGO projects (dummy)	0.399	0.396	0.405	-0.741
	(0.006)	(0.007)	(0.011)	
Enterprise (dummy)	0.324	0.315	0.344	-2.337**
	(0.006)	(0.007)	(0.011)	
<i>Village common resources (dummy)</i>				
Cultivated land	0.557	0.554	0.565	-0.885
	(0.006)	(0.007)	(0.011)	
Firewood to collect	0.626	0.641	0.594	3.645***
	(0.006)	(0.007)	(0.011)	
Timber to take	0.248	0.281	0.173	9.412***
	(0.005)	(0.007)	(0.008)	
Fish to catch	0.795	0.782	0.825	-3.921***
	(0.005)	(0.006)	(0.008)	
Bamboo to take	0.216	0.226	0.193	3.025***
	(0.005)	(0.006)	(0.009)	
Open land	0.340	0.348	0.325	1.816*
	(0.006)	(0.007)	(0.010)	
Fruit to pick	0.142	0.147	0.133	1.475
	(0.004)	(0.005)	(0.007)	
Wild animals to hunt	0.159	0.179	0.113	6.751***
	(0.004)	(0.006)	(0.007)	
<i>Regional zones (dummy)</i>				
Plateau	0.143	0.149	0.128	2.209**
	(0.004)	(0.005)	(0.007)	
Plain	0.482	0.452	0.550	-7.326***
	(0.006)	(0.007)	(0.011)	
Tonle Sap	0.290	0.306	0.254	4.342***
	(0.006)	(0.007)	(0.010)	
Coastal	0.0852	0.093	0.068	3.247***
	(0.003)	(0.004)	(0.006)	
<i>No. observations</i>	<i>6,575</i>	<i>4,557</i>	<i>2,018</i>	

Source: Author's calculation from CSES 2009. Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%. The average annual exchange rate in 2009 was USD 1=4,154 riels (NBC's annual report 2009).

The summary of statistics shows that remittance-recipient households have higher proportions of village remit norm²⁹ and health shock than non-recipient households. They are significantly different from each other in these two groups of households. This indicates that these factors encourage the remittance flows to and determine the remittance receipts of households left behind.

The table also reveals that the heads of remittance-recipient households appear to be more female headed, to be older, and to have lower education compared with non-recipient households. These heads of remittance-recipient households are more likely to be unemployed while those of the counterparts are more likely to engage in self-employment activity. The remittance-recipient households are more likely to have a larger percentage of working-age adult members. This may indicate that the recipient households are less likely to be labour constrained. Regarding the household assets, the recipient households appear to own smaller sizes of land and to own houses with a larger number of rooms and floor less likely to be of earth clay. These recipient households are more likely to possess durable goods slightly higher than the counterparts. This may indicate that remittances are used to improve living standards of the recipient households.

The descriptive statistics further show that remittance-recipient households are more likely to be in villages which have a larger proportion of irrigated agricultural land, receive more agricultural technical support, have a greater access to electricity, have a larger proportion of commercial enterprises, and are closer to bus stops. The villages of these recipient households are less likely to have common property resources, except fish resources. These recipient households are more likely to be in the plain region.

In sum, these descriptive statistics appear to show that remittances are not associated with agricultural input spending since the remittance-recipient and non-recipient households

²⁹ Village remit norm is a ratio of remittance-recipient households to total households in the village and is explained in more details in the following subsection.

are insignificantly different from each other in terms of crop planting and livestock raising expenses. However, these descriptive statistics may have confounding effects since they do not control other covariates and they do not account for a potential endogeneity problem of remittances, which the literature intensively emphasises as a concern. Therefore, an empirical investigation which especially accounts for the endogeneity problem must be conducted to determine the causal impacts of remittances on the agricultural expenditure in Cambodia.

6.4.2. Empirical Models

Since the objective of the analysis is to empirically assess the impacts of remittances on agricultural input expenditure, this study models the agricultural expenditure as a function of remittances, household characteristics, household socio-economic indicators, village characteristics and common property resources, and geographic regions. This analysis uses two kinds of agricultural input expenditures: household expenses on crop planting and livestock husbandry. For the crop expenses, in particular, this study examines the impacts on planting seed and chemical fertiliser purchases. For the livestock expenses, this study uses the expenses on raising livestock categorised into feed purchase as one variable and all of the expenditures as the second variable. The empirical model of the analysis is:

$$\ln AgrInv_i = \alpha + \beta \ln R_i + X_i \theta + \varepsilon_i \quad (6.1)$$

where $\ln AgrInv_i$ is a natural logarithm of agricultural input expenditure in the purchases of planting seeds, chemical fertiliser and livestock feed, and in raising livestock (total expenses) for households i in riels; $\ln R_i$ is a natural logarithm of internal and international remittances households received both in cash and in kind from migrants, relatives and others in the past 12 months in riels; X_i is a vector of the characteristics of household heads, household composition, household assets, village characteristics and common property resources, and geographic regions; α is the constant term; and ε_i is the error term.³⁰

³⁰ Descriptions and definitions of each variable are shown in Table C.1 in Appendix C.

Regarding the main variable in this analysis, this study defines remittances as monetary transfers, including both internal and international remittances, received by households in cash and in kind in riels in 2009. Households received these remittances from both migrants and non-migrants such as relatives and others. In the analysis, this study estimates the impacts of different categories of remittances on the agricultural input expenditure. Specifically, the study firstly estimates the total effects of remittances households received from both migrants and non-migrants, and that they received from both domestic and international destinations. The study further analyses the impacts of remittances households received only from migrant members, and then from internal and international destinations, respectively. The estimations of these disaggregated impacts of remittances are to understand the differences in the impacts remittances may generate on agricultural expenditure.

In particular, this study defines migrant remittances as transferred remittances households received from members, as defined in Chapter 4 and 5, who are currently living elsewhere, away from home, either domestic or abroad and have undertaken migration since 2004, and whose ages are between 15 and 64 years old. This study defines migration following Luch (2012) where he uses the same dataset for his analyses. As explained in the preceding chapters, it analyses only the economic impacts of remittances and avoids any effects of migration which Cambodia experienced during the civil war. In this regard, these migrants are still household members, more likely to return home, in frequent contact with families, an important source of household income, and an important strategy for households in coping with risks. Migrants departing before 2004 are more likely to reside at the destinations. Luch (2012) argues that migrants moving before 2004 may have their own families there, and he suggests this limitation “in order to avoid duplicating and misreporting” (pp.62) in the analysis. In this respect, they may no longer be a part of household members and income channels. Although they may provide transfers or gifts to households, it is rare and so may have negligible effect on households.

To estimate the empirical model (6.1), the literature demonstrates that the estimation would be biased if it is done through with the Ordinary Least Squares (OLS) because remittances may be an endogenous variable and potentially have an endogeneity problem (Rozelle et al., 1999; Taylor et al., 2003; Damon, 2010; de Brauw, 2010; Miluka et al., 2010; Taylor and Lopez-Feldman, 2010; Gonzalez-Velosa, 2011; and Atamanov and van den Berg, 2012). As these studies identify, this happens due to the omitted variable bias since there may be unobserved factors influencing the remittance decision and also affecting the household spending behaviours toward agricultural input purchases. This can also be caused by unobserved simultaneous decisions on remittances and the adjustment of agricultural input spending when migration is a household decision. As also indicated by these studies, the reversal causality may also matter since agricultural failures may reduce the remittance decision. They also specify that the non-randomness of migration and remittances may also cause this endogeneity problem since not all migrants send remittances. To deal with this endogeneity problem, the estimation of the empirical model (6.1) is suggested to be done through the Two-Stage Least Squares (2SLS), in which the first stage regression of the endogenous variable of remittances is as follows:

$$\ln R_i = \sigma + \mathbf{Z}_i \varphi + \mathbf{X}_i \rho + \tau_i \quad (6.2)$$

where $\ln R_i$ is a natural logarithm of internal and international remittances households received both in cash and in kind from migrants, relatives and others in the past 12 months in riels for households i ; $\mathbf{Z}_i$ is a set of instrumental variables (village remit norm and health shock); $\mathbf{X}_i$ is a vector of the characteristics of household heads, household composition, household assets, village characteristics and common property resources, and geographic regions; σ is the constant term; and τ_i is the error term.

To estimate the first stage regression of model (6.2), it is important to find valid and strong instruments to capture uncorrelated components of remittances from the error term of the empirical model (6.1). This study follows the studies of Rozelle et al. (1999), Taylor et al. (2003), Atamanov and Van Den Berg (2012) and Hu (2012), and uses village remit norm as

an instrumental variable. As Chapter 5, it is the ratio of numbers of remittance recipient households to total households in the village. As specified in these studies, the reason to use this village remit norm as an instrument is that behaviours of other migrants to remit to source communities may have impacts on the extent to which remittances can be sent back home by migrants. When some send remittances back home but others fail to remit to families, as specified, this shows that those migrants do not express their good deeds and obligation toward families back home. Their social status in the local communities can become inferior. As the studies indicate, this norm can be set as a benchmark for migrants to follow and social punishment can be exercised when migrants fail to comply. In Cambodia, migrants are found to have strong attachments to families back home (Derks, 2008; and Yagura, 2012). As children or siblings in households, these studies specify that they have a strong sense of duty to support families, and, thus it is obligatory for them to satisfy this duty. As also indicated in these studies, they are obliged to pay respect and return generosity to households left behind, especially to elderly parents, by giving remittances. In this regard, this norm determines remittances sent back home by migrants. Therefore, this norm is expected to have no effect on the agricultural input spending because it is a norm in villages and a kind of motive to send remittances back home. It is also because this indicator captures the average levels of remittances at village levels, and hence has minor impacts on or is less correlated with the household decision on agricultural input spending.

The other instrumental variable used in the analysis is a dummy of health shock if households experienced any acute illness or injuries that needed medical treatment. The justification for using this variable is reliant on the theoretical perspectives of NELM above which describe remittances as an insurance function and a risk mitigation strategy. When households are at risk or vulnerable to any unexpected risks, remittances are seen to be sent home to mitigate or reduce the extent of losses because remittances are found to have an insurance motive. This can determine the remittance receipts and encourage the amount of remittance transfers since it influences the motivation of migrants and other members to send

remittances. Empirically, remittances are asserted to play a major insurance role in a context of an incomplete insurance market (de la Briere et al., 2002; Gubert, 2002; Rapoport and Docquier, 2006; Halliday, 2006; Yang and Choi, 2007; and Dillon et al., 2011). In Cambodia, recent research finds that remittances have a role in smoothing income variation of rural households against exogenous risks (Luch, 2012). Therefore, this insurance motive is expected to have an effect on the remittance receipt but no effect on the agricultural input spending.

To estimate the empirical models above, furthermore, it is important for this research to control other variables, which are household characteristics, household assets, village characteristics and common property resources, and geographic regions. This is to control socio-economic conditions of households and to reduce another potential endogeneity problem if household income is included as an independent variable in the estimation. The analysis also accounts for geographic differences in economic environment, income sources, physical infrastructure, relative price variation, and other regional fixed effects and socio-economic conditions by controlling the variables of village characteristics and common property resources, and geographic regions.

6.5. Results and Discussions

6.5.1. Estimation Results

This section discusses empirical results estimated from the empirical models above to assess the impacts of remittances on the agricultural input expenditure in Cambodia. The study estimates the models through the robust OLS and 2SLS estimations in all specifications to compare differences of the estimated results. Because of an endogeneity concern if the estimations are done with the OLS, the analysis conducts an econometric test on endogeneity to ensure more efficient results. To test this endogeneity, the study provides robust statistics of score chi2 and regression F for all 2SLS estimations at the bottom of each table. The results show that values of the statistics in all specifications are large enough to reject the null

hypothesis that all independent variables are exogenous. This indicates that the empirical estimations should be done with 2SLS to attain more efficient results.

The study further examines issues related to the 2SLS method by addressing the relevance and validity of the instruments. The results provide large values of the F statistics in all specifications to significantly reject the hypothesis of weak instruments.³¹ This indicates that the instruments have strong predictive powers for the estimations. To see the causal relationship between the instruments and remittances, the first stage regressions are provided in Table C.2 (in Appendix C), and show that the village remit norm and health shock are significantly and positively associated with the remittance receipts.³² This shows that the instruments determine the remittance flows. The study also examines the validity of instruments by testing the over-identification restriction. The results give the statistics of score chi2 that cannot reject the hypothesis of valid instruments. This specifies that the instruments can capture the uncorrelated parts of remittances from the error term, and the instruments do not have any correlation with the error term. In the estimation results below, the estimated coefficients of remittances by the OLS are smaller than those by the 2SLS. This may indicate that the OLS results are downward biased and the endogeneity problem could be a concern for this analysis. Therefore, the 2SLS estimations must be done in all specifications so that biasness caused by the endogeneity concern can be minimised and the interpretation of results is based on the 2SLS estimations.

³¹ The values of F statistics in all specifications are bigger than the rule of thumb (value of 10) except in the estimations of international remittances. However, the p-values of the F statistics in the estimations of international remittances are statistically significant to reject the hypothesis of weak instruments. Therefore, this indicates that the instruments are strong for the endogenous estimations.

³² Although the estimated coefficients of health shock in the regressions of international remittances are insignificant, they are positively associated with the receipts of international remittances.

Table 6.2: Regressions of total remittances on crop and livestock expenses (Ln riels)

Variables	Planting Seeds		Chemical Fertiliser		Feed Expense		Livestock Expense	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Remittances (total)	-0.013*** (0.005)	-0.062*** (0.016)	-0.008 (0.012)	-0.128*** (0.047)	0.035*** (0.007)	0.151*** (0.022)	0.022*** (0.006)	0.119*** (0.019)
Head gender and age								
Male head	0.254*** (0.071)	0.248*** (0.071)	0.326* (0.176)	0.312* (0.177)	-0.156 (0.103)	-0.143 (0.105)	-0.110 (0.094)	-0.099 (0.095)
<i>Head age under 24 (base group)</i>								
Head age 25_34	0.089 (0.124)	0.077 (0.125)	0.417 (0.343)	0.387 (0.343)	0.026 (0.223)	0.054 (0.226)	-0.016 (0.196)	0.008 (0.198)
Head age 35_44	0.131 (0.131)	0.154 (0.133)	0.437 (0.354)	0.495 (0.355)	0.174 (0.226)	0.119 (0.228)	0.059 (0.199)	0.013 (0.201)
Head age 45_54	0.117 (0.137)	0.255* (0.147)	0.037 (0.366)	0.376 (0.389)	0.013 (0.228)	-0.312 (0.236)	-0.037 (0.200)	-0.309 (0.208)
Head age 55_64	0.158 (0.141)	0.370** (0.159)	0.135 (0.377)	0.656 (0.427)	-0.068 (0.238)	-0.568** (0.253)	-0.013 (0.206)	-0.431* (0.222)
Head age over 65	-0.215 (0.175)	-0.057 (0.181)	-0.522 (0.447)	-0.133 (0.470)	-0.036 (0.266)	-0.408 (0.277)	-0.075 (0.240)	-0.387 (0.251)
Head education								
<i>Head no education (base group)</i>								
Head primary	0.066 (0.055)	0.097* (0.057)	0.574*** (0.161)	0.650*** (0.164)	0.273*** (0.091)	0.200** (0.092)	0.279*** (0.083)	0.218*** (0.083)
Head lower secondary	0.139** (0.070)	0.158** (0.071)	1.206*** (0.193)	1.252*** (0.194)	0.282** (0.118)	0.237** (0.119)	0.305*** (0.105)	0.268** (0.105)
Head upper secondary	-0.058 (0.156)	-0.042 (0.156)	1.181*** (0.316)	1.223*** (0.317)	0.097 (0.209)	0.057 (0.214)	0.130 (0.188)	0.097 (0.192)
Head vocational training	0.605 (0.710)	0.685 (0.729)	1.071 (1.440)	1.265 (1.385)	-0.305 (0.916)	-0.492 (0.918)	-0.379 (0.926)	-0.535 (0.921)
Head college	1.594*** (0.291)	1.628*** (0.278)	-0.294 (4.419)	-0.210 (4.218)	1.596* (0.941)	1.515 (1.109)	1.591* (0.862)	1.524 (0.991)
Head occupation								

<i>Head unemployed (base group)</i>								
Head wage labour	-0.975*** (0.190)	-0.986*** (0.190)	-2.400*** (0.372)	-2.428*** (0.374)	-0.101 (0.240)	-0.075 (0.242)	-0.049 (0.225)	-0.027 (0.227)
Head self-employed	-0.070 (0.106)	-0.086 (0.105)	-0.989*** (0.264)	-1.029*** (0.263)	0.228 (0.167)	0.267 (0.171)	0.283* (0.161)	0.315* (0.164)
<i>Household members by age</i>								
Members younger 5 years	0.073** (0.031)	0.055* (0.031)	-0.276*** (0.090)	-0.319*** (0.092)	0.042 (0.053)	0.084 (0.054)	-0.016 (0.050)	0.019 (0.050)
Members age 6 to 14	0.028 (0.025)	0.013 (0.026)	-0.288*** (0.065)	-0.327*** (0.067)	0.052 (0.038)	0.089** (0.039)	0.045 (0.034)	0.076** (0.035)
Members age 15 to 64	0.065*** (0.022)	0.061*** (0.022)	-0.063 (0.054)	-0.072 (0.054)	0.113*** (0.030)	0.122*** (0.031)	0.089*** (0.028)	0.096*** (0.029)
Members age over 65	0.120* (0.068)	0.152** (0.069)	0.013 (0.184)	0.091 (0.189)	0.218** (0.102)	0.143 (0.106)	0.127 (0.096)	0.065 (0.099)
<i>Household assets</i>								
<i>Landless (base group)</i>								
Land less than 0.5 ha	-0.097 (0.223)	-0.122 (0.222)	-0.441 (0.383)	-0.501 (0.382)	0.206 (0.266)	0.264 (0.268)	0.269 (0.250)	0.317 (0.251)
Land 0.5-1 ha	0.780*** (0.215)	0.758*** (0.214)	1.023*** (0.376)	0.969*** (0.375)	0.798*** (0.259)	0.850*** (0.261)	0.851*** (0.243)	0.894*** (0.243)
Land 1-2 ha	1.228*** (0.215)	1.201*** (0.214)	1.376*** (0.373)	1.310*** (0.372)	1.114*** (0.258)	1.177*** (0.260)	1.080*** (0.242)	1.133*** (0.243)
Land 2-4 ha	1.696*** (0.218)	1.674*** (0.217)	2.097*** (0.387)	2.043*** (0.386)	1.232*** (0.265)	1.284*** (0.267)	1.165*** (0.248)	1.209*** (0.249)
Land 4-8 ha	2.121*** (0.230)	2.057*** (0.230)	3.007*** (0.446)	2.851*** (0.449)	1.295*** (0.293)	1.444*** (0.296)	1.168*** (0.275)	1.292*** (0.277)
Land over 8 ha	2.845*** (0.249)	2.806*** (0.252)	3.933*** (0.610)	3.838*** (0.607)	1.463*** (0.369)	1.554*** (0.371)	1.320*** (0.363)	1.397*** (0.363)
Room	0.047 (0.041)	0.058 (0.041)	-0.203* (0.110)	-0.177 (0.114)	0.058 (0.057)	0.033 (0.060)	0.055 (0.053)	0.034 (0.055)
Floor	-0.139 (0.097)	-0.169* (0.097)	0.636*** (0.229)	0.563** (0.230)	-0.090 (0.152)	-0.020 (0.154)	-0.125 (0.138)	-0.066 (0.140)
Durable goods (ln)	0.007 (0.008)	0.009 (0.008)	0.185*** (0.027)	0.190*** (0.027)	0.113*** (0.019)	0.108*** (0.018)	0.122*** (0.018)	0.118*** (0.018)
<i>Village characteristics</i>								

Irrigated land (%)	0.892*** (0.073)	0.911*** (0.074)	1.110*** (0.196)	1.155*** (0.199)	-0.600*** (0.137)	-0.643*** (0.138)	-0.467*** (0.123)	-0.503*** (0.125)
Agro-chemical	-0.319*** (0.076)	-0.329*** (0.076)	0.383** (0.163)	0.358** (0.165)	0.197** (0.096)	0.221** (0.100)	0.097 (0.091)	0.117 (0.094)
Technical support	-0.054 (0.048)	-0.026 (0.050)	0.752*** (0.144)	0.820*** (0.148)	0.333*** (0.088)	0.268*** (0.090)	0.293*** (0.079)	0.239*** (0.081)
Bus stop (km)	0.003 (0.003)	0.002 (0.003)	-0.008 (0.007)	-0.011 (0.007)	0.012*** (0.005)	0.015*** (0.005)	0.007 (0.004)	0.009** (0.004)
Electricity (%)	-0.001 (0.002)	-0.000 (0.002)	-0.005 (0.004)	-0.004 (0.003)	-0.006*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.008*** (0.002)
NGO projects	-0.132*** (0.047)	-0.120** (0.048)	-0.389*** (0.133)	-0.359*** (0.134)	0.342*** (0.076)	0.314*** (0.077)	0.185*** (0.067)	0.161** (0.068)
Enterprise	-0.156*** (0.054)	-0.164*** (0.054)	0.336** (0.138)	0.316** (0.140)	0.086 (0.081)	0.106 (0.082)	-0.063 (0.072)	-0.046 (0.073)
<i>Village common resources</i>								
Cultivated land	-0.113** (0.056)	-0.093 (0.057)	-0.499*** (0.149)	-0.450*** (0.151)	-0.199** (0.096)	-0.246** (0.098)	-0.149* (0.086)	-0.189** (0.088)
Firewood to collect	0.085 (0.067)	0.076 (0.067)	-1.127*** (0.160)	-1.148*** (0.162)	0.331*** (0.105)	0.351*** (0.107)	0.259*** (0.093)	0.276*** (0.095)
Timber to take	-0.127* (0.066)	-0.194*** (0.071)	-1.400*** (0.228)	-1.564*** (0.235)	-0.586*** (0.138)	-0.428*** (0.142)	-0.453*** (0.113)	-0.321*** (0.120)
Fish to catch	-0.064 (0.057)	-0.023 (0.059)	0.122 (0.155)	0.224 (0.159)	0.265** (0.109)	0.169 (0.111)	0.262*** (0.098)	0.181* (0.100)
Bamboo to take	0.209** (0.086)	0.224*** (0.086)	0.331 (0.208)	0.367* (0.210)	-0.088 (0.117)	-0.122 (0.119)	-0.074 (0.105)	-0.102 (0.106)
Open land	-0.019 (0.060)	-0.031 (0.060)	0.148 (0.159)	0.119 (0.160)	0.403*** (0.093)	0.431*** (0.094)	0.462*** (0.084)	0.486*** (0.085)
Fruit to pick	-0.255** (0.101)	-0.218** (0.101)	-0.604** (0.250)	-0.515** (0.256)	-0.364*** (0.133)	-0.449*** (0.136)	-0.104 (0.119)	-0.176 (0.122)
Wild animals to hunt	0.046 (0.084)	0.015 (0.086)	-1.296*** (0.231)	-1.372*** (0.235)	-0.624*** (0.135)	-0.552*** (0.138)	-0.524*** (0.124)	-0.463*** (0.125)
<i>Regional zones</i>								
<i>Plateau (base group)</i>								
Plain	0.324*** (0.078)	0.322*** (0.079)	3.377*** (0.241)	3.372*** (0.242)	0.690*** (0.137)	0.694*** (0.138)	0.643*** (0.120)	0.647*** (0.121)

Tonle Sap	0.403*** (0.076)	0.369*** (0.078)	2.173*** (0.243)	2.091*** (0.245)	-0.390*** (0.143)	-0.311** (0.147)	-0.383*** (0.131)	-0.317** (0.133)
Coastal	0.037 (0.092)	0.007 (0.095)	4.433*** (0.270)	4.358*** (0.276)	1.249*** (0.149)	1.320*** (0.153)	1.012*** (0.135)	1.072*** (0.139)
Constant	9.279*** (0.284)	9.364*** (0.286)	4.205*** (0.677)	4.413*** (0.685)	6.921*** (0.443)	6.722*** (0.453)	7.303*** (0.410)	7.136*** (0.418)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		10.833 (0.001)		7.052 (0.008)		34.109 (0.000)		30.096 (0.000)
Robust regression F (p-value)		10.799 (0.001)		8.041 (0.005)		33.631 (0.000)		29.634 (0.000)
<i>Weak instrument test</i>								
F statistics (p-value)		170.71 (0.000)		170.71 (0.000)		170.71 (0.000)		170.71 (0.000)
<i>Over-identified test</i>								
Score chi2 (p-value)		0.112 (0.738)		1.336 (0.248)		0.842 (0.359)		1.125 (0.289)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table 6.3: Regressions of migrant remittances on crop and livestock expenses (Ln riels)

Variables	Planting Seeds		Chemical Fertiliser		Feed Expense		Livestock Expense	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Remittances (migrant)	-0.009 (0.006)	-0.161*** (0.042)	0.001 (0.015)	-0.311*** (0.120)	0.034*** (0.007)	0.391*** (0.062)	0.024*** (0.007)	0.310*** (0.054)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.260*** (0.284)	9.325*** (0.291)	4.192*** (0.677)	4.326*** (0.691)	6.968*** (0.443)	6.814*** (0.485)	7.331*** (0.410)	7.208*** (0.440)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		14.460 (0.000)		6.998 (0.008)		45.024 (0.000)		35.734 (0.000)
Robust regression F (p-value)		14.506 (0.000)		7.789 (0.005)		44.321 (0.000)		35.151 (0.000)
<i>Weak instrument test</i>								
F statistics (p-value)		53.117 (0.000)		53.117 (0.000)		53.117 (0.000)		53.117 (0.000)
<i>Over-identified test</i>								
Score chi2 (p-value)		0.038 (0.845)		2.215 (0.136)		0.009 (0.923)		0.092 (0.762)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table 6.4: Regressions of internal remittances on crop and livestock expenses (Ln riels)

Variables	Planting Seeds		Chemical Fertiliser		Feed Expense		Livestock Expense	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Remittances (internal)	-0.008 (0.005)	-0.063*** (0.016)	-0.008 (0.012)	-0.130*** (0.048)	0.039*** (0.007)	0.153*** (0.022)	0.026*** (0.006)	0.121*** (0.019)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.271*** (0.284)	9.373*** (0.287)	4.206*** (0.677)	4.434*** (0.687)	6.911*** (0.443)	6.699*** (0.453)	7.293*** (0.410)	7.118*** (0.418)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		13.214 (0.000)		7.070 (0.008)		32.961 (0.000)		28.382 (0.000)
Robust regression F (p-value)		13.154 (0.000)		8.069 (0.004)		32.541 (0.000)		28.005 (0.000)
<i>Weak instrument test</i>								
F statistics (p-value)		174.9 (0.000)		174.9 (0.000)		174.9 (0.000)		174.9 (0.000)
<i>Over-identified test</i>								
Score chi2 (p-value)		0.125 (0.723)		1.304 (0.253)		0.902 (0.342)		1.189 (0.275)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table 6.5: Regressions of international remittances on crop and livestock expenses (Ln riels)

Variables	Planting Seeds		Chemical Fertiliser		Feed Expense		Livestock Expense	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Remittances (international)	-0.035** (0.014)	-1.262** (0.553)	-0.001 (0.025)	-2.333* (1.302)	0.010 (0.013)	3.092** (1.276)	0.001 (0.012)	2.460** (1.030)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.246*** (0.284)	8.886*** (0.504)	4.192*** (0.677)	3.508*** (1.057)	6.985*** (0.443)	7.889*** (1.109)	7.342*** (0.410)	8.062*** (0.903)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		14.674 (0.000)		6.243 (0.012)		51.439 (0.000)		41.036 (0.000)
Robust regression F (p-value)		14.797 (0.000)		6.822 (0.009)		51.037 (0.000)		40.636 (0.000)
<i>Weak instrument test</i>								
F statistics (p-value)		3.175 (0.042)		3.175 (0.042)		3.175 (0.042)		3.175 (0.042)
<i>Over-identified test</i>								
Score chi2 (p-value)		0.105 (0.746)		1.425 (0.232)		0.037 (0.847)		0.009 (0.923)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

The estimations draw an interesting assessment of the impacts of remittances on the agricultural input expenditure in Cambodia. The empirical results in Table 6.2 demonstrate that total remittances are significantly and negatively associated with the household purchase of planting seeds. To examine the robustness of this result, the study estimates the remittance effects on another kind of spending: the purchase of chemical fertiliser. The findings also show that total remittances are still significantly and negatively associated with the fertiliser purchase, but the coefficient is about twice larger. In contrast, when the study analyses the impacts on livestock raising expenses, the empirical findings demonstrate a significant and positive result of remittances on the household feed expenses. The result of remittances remains significantly positive even though the magnitude is slightly lower when it is estimated with total household expenses to raise livestock. When the study differentiates migrant remittances from total remittances in the estimations, the results demonstrate a very significant insight into the impacts of migrant remittances on the expenditure (Table 6.3). The estimation results find that migrant remittances have analogous significant impacts on the expenditure as total remittances do, but the coefficients are more than double those of total remittances. This indicates that remittances households received from migrant members play a more significant role in the household agricultural input spending.

For the other control variables, Table 6.2 also shows that male heads and heads in the age group of 45-64 spend more in the purchases of crop inputs, and heads with low education spend more in the purchases of both crop and livestock inputs. Compared with unemployed heads, those engaging in wage labour spend less on the input purchases of these activities, and those engaging in self-employment spend more on the purchases of livestock inputs but less on fertiliser. Households with higher working-age adult members are more likely to engage in these two activities. In terms of household assets, it appears that richer households are more capable of purchasing these crop and livestock inputs, which is consistent with the findings of Yagura (2009). It appears that villages with a greater proportion of irrigated land have higher expenses on crop planting but fewer expenses on livestock. This can indicate that

irrigation enables households to be more involved in crop planting activity. Villages with agro-chemical business are positively associated with livestock raising activity and the purchases of chemical fertiliser. It appears that the agricultural technical support helps households to spend more on the input purchases of these two activities. Development projects of NGOs appear to intensify livestock activity but to reduce crop input purchases. Households using more chemical fertiliser appear to reside in villages having commercial enterprises, whereas households with more livestock input expenses are more likely to reside in villages having low access to electricity and being far from bus stops. Households engaged in these two activities appear to be in villages with low access to village common property resources. Lastly, these activities are significantly more intensified in regions other than the Plateau, except in the Tonle Sap region where households in the region spend less on livestock than those in the Plateau.

6.5.2. Result Discussions

These empirical results can have a number of implications for the agricultural spending behaviours of rural Cambodian households. The findings demonstrate that remittances have causal impacts to reduce the expenditure of crop planting but increase the expenses of livestock husbandry. These results can indicate that remittance-recipient households pull out their input spending from crop planting to put into livestock raising activities, and the response is stronger if they received remittances from migrants. Since remittances appear to impose pressure on the crop planting activity, this can raise the question whether remittances have an impact on agricultural income of these households. As argued by de Brauw (2010), migrant households have a number of behavioural responses to agricultural activities when they are engaged in migration, and one major response is to the agricultural income impact upon the migration decision. He specifies that migrant households may pull out from the agricultural activities entirely if their agricultural income decreases in response to the migration decision, but they may adjust their production mix if the agricultural income is insignificantly impacted or increases upon the decision.

The analysis further analyses the impacts of remittances on agricultural income, non-agricultural and household income.³³ The findings in Table C.3 demonstrate that remittances have insignificant impacts on agricultural income.³⁴ This result is consistent with another study, Luch (2012), where he finds that remittances from garment workers have no impact on agricultural income. Interestingly, the empirical results of this study provide significant findings that remittances have significantly positive impacts on non-agricultural and total household income.³⁵ These results give an indication that these recipient households do not move out from the agricultural activities completely, but they adjust their production activities. This may suggest that these households shift into a high-value agricultural activity of livestock husbandry which can provide them with high returns upon the receipts of remittances. The positive impacts of remittances on non-agricultural and household income

³³ In this study, agricultural income is defined as total household revenue from crop planting, livestock raising, fishing and forestry activities in the past 12 months in riels. Non-agricultural income is total household revenue in the past 12 months from salary income, wage income, property income and income from small businesses operated by households in riels. Total household income is the sum of agricultural income and non-agricultural income in riels. Remittances and other transfers (e.g. NGO transfers, scholarship transfers, or gifts) are not included in the calculation of non-agricultural income and total household income since this study aims to examine the impacts of remittances on the incomes.

³⁴ In the OLS estimation, Table C.3 shows a positive result of remittances on the agricultural income, reflecting that recipient households do not shift away from agriculture entirely. The result remains the same when the research specifies the income as agricultural income per capita.

³⁵ In the 2SLS estimation of the non-agricultural income regression, Table C.3 shows that the over-identification statistics are significant to reject the hypothesis of valid instruments. Even so, the OLS result also shows its significant and positive impacts of remittances on non-agricultural income. The estimation results of remittances on non-agricultural income and total household income remain the same when these types of incomes are specified as incomes per capita.

may indicate that remittances affect other sources of income, and this is consistent with the findings of Miluka et al. (2010). In Cambodia, the finding of this study is also consistent with Luch (2012), finding that migrant remittances from the garment industry increase the income of rural households.

These results give an indication that remittances reduce the credit constraint to be involved in a high-value livestock activity because of the positive results of remittances on the livestock expenses. De Brauw (2010) specifies that the reduction of the liquidity constraint can be seen through an increase in the input purchases associated with the remittance receipts when the credit market is incomplete. As reviewed above, Cambodian farmers face a serious credit constraint and are very inaccessible to capital for the purchases of agricultural inputs and for the agricultural modernisation especially in high-value activities (Hangchuon and Suzuki, 2005; RGC, 2010; Ros et al., 2011; Yu and Diao, 2011; ADB, 2012b; Seng, 2013; Theng and Flower, 2014; and Theng and Khiev, 2014). With capital through remittances, this can help remittance-recipient households overcome the liquidity constraint that makes these households incapable of being involved in this high-value activity. Therefore, these results can suggest that remittances enable these recipient households to overcome the constraint in this activity, which are in support of the NELM's hypotheses about the lessening of credit constraint in agricultural activities.

Since remittances appear to facilitate a shift away from crop planting activity, there are a number of possible explanations for these results. This shift away from crop planting to livestock raising activities may be because the constraints of the former are more persistent than the latter in remittance-recipient households. Because farming in Cambodia is a predominantly rainfall-dependent activity and the weather condition is a main factor for the production (Ros et al., 2011), this condition makes the farming activity more risky and has a higher chance of farming failures. This high uncertainty is also because a large amount of farmland in Cambodia is not irrigated and thus very vulnerable to drought (Yagura, 2009). In this analysis, the descriptive statistics shows that just only about 23% of village farmland is

irrigated on average. In Table 6.2, this study finds that farmers are more likely to be involved in crop planting activity when there is a greater proportion of village irrigated land. This high risk of farming failures is not only due to the weather dependency, but also depending on the nature of grain storage after cultivation (McCown et al., 1979). Likewise, livestock husbandry also bears substantial uncertainties since it is very vulnerable to epidemic disease and weather shocks (Wouterse and Taylor, 2008). However, the extent of these risks can be limited since livestock is a liquid asset and can be easily reversible when any unexpected risks happen (Dercon, 1998). More importantly, Dercon (1998) stresses that the impacts can be minimised since livestock husbandry is a high-value activity and can provide these remittance-recipient households with more favourable returns. He also emphasises that these recipient households can cope with these uncertainties simply by adjusting their distance to find feed and grass for livestock when drought occurs.

In terms of risk preferences, rural farmers are emphatically risk-averse, but their risk-aversion is decreasing with wealth and income (McCown et al., 1979; Binswanger et al., 1980; Hamal and Anderson, 1982; Binswanger and Sillers, 1983; Grisley and Kellog, 1987; and Menapace et al., 2013). This means that these farmers are more likely to be involved in a risky activity when they receive an income flow. When farmers attain an income flow, McCown et al. (1979) demonstrate that crop farming becomes less attractive than livestock husbandry. It is because livestock husbandry can provide these farmers with greater returns and other benefits even though it requires greater capital investment than crop farming (McCown et al., 1979). Therefore, these risky but more liquid, less persistent and high-return characteristics of livestock enable these recipient households to be more engaged in this livestock activity when they can secure an income source from remittances. According to Wouterse and Taylor (2008), when remittances function as insurance against this activity failure, remittances enable recipient households to shift from traditional crop activity to such a high return and high risk new activity as livestock. In this regard, the findings of this study are in support of the NELM about the insurance role of migration and remittances in a

context of the missing insurance market, and about the movement out from familial into high risk commercial activities when the income assurance from remittances is sure.

Another possible reason to explain these positive results of remittances on livestock expenses may be due to the important multifunctional roles of livestock in rural livelihoods. Livestock is found to be an important saving asset when the financial market is incomplete and an important tool to generate household income from their rural activities and also from selling livestock (Rosenzweig and Wolpin, 1993). It is also an important risk-coping strategy to buffer risks and to smooth income and consumption when any unexpected risks occur (Kurosaki, 1995; Dercon, 1996 and 2002; Fafchamps et al., 1998; Takasaki et al., 2004; Kazianga and Udry, 2006; and Mogues, 2011). It also helps contribute to the farming activity through draught power and manure, maintain food security, increase social status and reduce poverty (Upton, 2004; Kristjanson et al., 2007; Randolph et al., 2007; FAO, 2009 and 2012; Moyo and Swanepoel, 2010; Pica-Ciamarra et al., 2011; and Bashir et al., 2012).

Moreover, there is another possible reason to explain why remittances can facilitate a shift away from crop planting activity to livestock raising activity. A characteristic difference in the utilisation of labour between these two activities can explain the results. Generally, crop planting activity needs more labourers than livestock raising activity. When rural households send out their members as migrants, these households may be less involved in farming activity since they have fewer labourers. They may be more involved in an activity e.g. livestock raising activity that needs fewer labourers. Therefore, migration of household members has strong negative impacts on farming activity, where it is supported by the findings in this study that remittances sent by migrants have greater impacts than total remittances on rural households to move out from crop planting into livestock raising activities. Even though migrant households may have fewer labourers to be involved in farming activity and change their behaviours to be engaged in livestock raising activity that needs fewer labourers, it does not necessarily indicate that the labour market in Cambodia, especially in agriculture, is generally constrained. It appears that the labour market is not

constrained in the Cambodian context. A number of studies have identified the labour market in Cambodia as abundant and have demonstrated that the labour workforce is not yet drained (CDRI, 2007b; World Bank, 2009; ADB, 2012b; and Theng and Flower, 2014). These studies show that there are substantial quantities of the labour workforce in Cambodia and there is underutilisation of the workforce. They identify the workforce as possessing low skills, and describe this abundant labour similarly as disguised unemployment where the marginal productivity of labour from the farming sector is zero. They find that there are very limited income-earning activities in local source communities, and the movement of this labour out from the rural sector has no impact on household production. In this study, the descriptive statistics shows that remittance-recipient households significantly have a larger proportion of working-age adult members, indicating that these households are less likely to have a labour constraint. Therefore, these reasons would enable this research to argue that these negative results of remittances on crop expenses may be due to a change in the spending behaviour of the recipient households. Upon the receipts of remittances, these recipient households may change their farming spending behaviour from low-value cropping to high-value livestock activities, and commercialise their activities through the investment of remittances in livestock assets. This can give an indication which is consistent with Taylor and Wyatt (1996) that remittances can have impacts on the agricultural production in an unconstrained labour market setting only when remittances positively influence the household spending decision on productive assets. This decision on productive spending can indicate a very important role of migration and remittances in long-term household strategies to build household productive capacity (de Brauw and Rozelle, 2008).

In addition, these results may raise the question of whether migration would impose pressure on food consumption in these households due to the negative impacts of remittances on the crop planting expenses. By using the same dataset, the study in Chapter 4, as already shown, gives no indication that food consumption is reducing with migration, but instead, migration significantly increases the expenses on food consumption in these migrant

households. The study further finds an increase in non-food consumption associated with migration. The other existing studies about Cambodia reviewed above also assert analogous findings that migration and remittances improve rural livelihoods.

6.5.3. Additional Analysis and Robustness Tests

This study continues to examine the impacts of remittances on these agricultural expenses by classifying remittances as internal and international. The estimation results in Table 6.4 and Table 6.5 offer a very significant insight into the effects of internal and international remittances on the agricultural spending by giving findings analogous to the results in the previous section in terms of signs and levels of significance. An interesting finding is that the magnitudes of internal remittances are similar to those of total remittances, but the magnitudes of international remittances are larger. They remain larger even when they are compared with those of internal remittances. These results indicate that both internal and international remittances are significant capital for recipient households to overcome missing credit and insurance markets to move away from low-value subsistent farming to high-value commercial agricultural activities. The results particularly emphasise a more important role of international remittances in the productive spending because of the larger magnitudes.

The study further examines the impacts of remittances on the agricultural expenditure in the samples of poor households only.³⁶ The results in Table C.4 give findings which are similar to the results above and indicate that remittances are still playing an important role in

³⁶ In this analysis, the research defines households as poor when their monthly expenditure per capita is lower than that of the national poverty lines. MoP (2013) calculates the national poverty lines based on monthly expenditure per capita from the CSES 2009 and categorises it into three areas: Phnom Penh, other urban areas, and rural areas. The poverty lines of monthly expenditure per capita are 193,052 riels in Phnom Penh, 132,386 riels in other urban areas, and 106,560 riels in rural areas. The average annual exchange rate in 2009 was USD 1 = 4,154 riels (NBC's annual report 2009).

the agricultural productive spending in rural poor households. In this regard, therefore, remittances can improve livelihoods of these rural poor households.

It should be noted that this study checks the estimation robustness by using the instrumental Tobit estimation. The estimation results in Table C.5 remain similar to the 2SLS findings, but the magnitudes of remittances are slightly larger than those of 2SLS. Furthermore, the analysis also checks its robustness in several other ways. The study combines household expenditure in the purchases of planting seeds and chemical fertiliser as one dependent variable, and the estimation results in Table C.6 show that all categories of remittances have significant and negative impacts on the expenses. When the study uses total expenses of all kinds of materials in crop cultivation as the dependent variable, the results of all types of remittances also remain significant and negative (Table C.7). The analysis further uses total expenses in the purchases and payment for services of agricultural equipment as the dependent variable in the analysis. The results demonstrate that remittances still have significant and negative impacts on the agricultural capital purchases (Table C.8). For the livestock raising activity, the study uses total purchases in all kinds of livestock as the dependent variable, and the estimation results in Table C.9 show that remittances have positive impacts on the livestock purchases.³⁷ Therefore, the implications of the remittance impacts remain exactly the same as above.

6.6. Concluding Remarks

This chapter empirically assesses the impacts of remittances on agricultural expenses in crop planting and livestock raising activities, and on agricultural income, non-agricultural and household income in rural Cambodia. The instrumented findings show that total remittances

³⁷ In the analysis, it appears that statistics for testing over-identification are significant to reject the hypothesis of valid instruments in the estimations of migrant remittances on total crop expenses and agricultural capital purchases, and in the estimations of total, migrant and internal remittances on livestock purchases. The instruments seem not to work well in these specifications.

are negatively associated with crop planting expenses either with seed or fertiliser purchases, but are positively associated with livestock raising expenses either with feed purchases or total livestock expenditure. When the analysis is conducted on migrant remittances, the results remain exactly the same but the coefficients of migrant remittances are larger than those of total remittances. These findings give an indication that recipient households may change from cropping activity into livestock activity, and the effects are stronger if they received remittances from migrants. This pull-out effect of remittances may raise a concern whether it is a complete move-out from agriculture. This can be seen through its effect on agricultural income since de Brauw (2010) specifies that migrant households respond immediately to the income upon the migration decision. The empirical results show that remittances have no impact on the agricultural income, but have positive impacts on non-agricultural and total household income. These findings indicate that recipient households do not move out from agriculture completely, but adjust their production activities through the engagement in high-return livestock activity. These results also give an indication that remittances may influence other sources of household income (Miluka et al., 2010). When the analysis is performed using internal and international remittances, the findings are similar to the above in terms of sign and level of significance, but the magnitudes of international remittances are larger. The findings remain the same when the analysis examines only rural poor households.

The analysis provides evidence in support of the NELM's hypotheses about the relaxing credit constraint in agriculture because of the positive findings of remittances on livestock expenditure. This indicates that remittances provide these rural recipient households with capital to overcome the constraints in this high-return livestock activity. The findings also give evidence in support of the NELM hypotheses about the insurance role of remittances when the insurance market is missing. It is because these rural recipient households appear to move out from familial subsistence-based but high-risk crop farming into high-value high-risk but more liquid and less persistent livestock activities. When remittances provide these

households with assurance in this activity failure, they are more likely to be involved and have more spending in this high-return and high-risk activity. The multifunctional roles of livestock can also help explain these findings. Another possible explanation is because of the characteristic difference in the utilisation of labour between crop planting and livestock raising activities where the former needs more labourers than the latter. When migrants are sent out, migrant households may be less likely to be involved in the former but more likely to be involved in the latter. That is why remittances sent by migrants are found to have greater impacts on the recipient households to move out from crop planting into livestock raising activities. However, it does not necessarily indicate that the labour market in Cambodia, especially in agriculture, is generally constrained. It is not yet found to have reached the point where the supply is drained, but instead there is abundance and underutilisation of labour (CDRI, 2007b; World Bank, 2009; ADB, 2012b; and Theng and Flower, 2014). Therefore, these findings may suggest that recipient households would rather change their productive spending behaviour when they receive remittances, where in the unconstrained labour market remittances can affect agriculture through the remittance investment in productive assets (Taylor and Wyatt, 1996).

CHAPTER 7

CONCLUSIONS AND POLICY IMPLICATIONS

Labour migration has recently been a focus of attention due to (1) its great magnitude, both in terms of migrants and remittances, (2) its resilience in coping with crises and important role in household risk-coping strategies, and (3) its significant impacts on macroeconomic and microeconomic indicators. Despite its significance in scale and impacts globally, there is little knowledge about it in Cambodia because Cambodia has only recently become involved in the labour migration phenomenon. However, the roles of labour migration and remittances in the economy and households are becoming important because of the following reasons: (1) the amount of remittances keeps growing; (2) a large migrant workforce is working in the sectors that are the main keys to the country's economic growth; (3) there are high demands for low-skilled workers in Thailand, Malaysia and South Korea; (4) migration is found to be an important source and strategy for rural household income and risk-coping mechanism; and (5) remittances are found to reduce poverty, to increase household income, to smooth income variation in time of shocks, to increase child education, and to improve household livelihoods.

Even though the growing importance of the roles of migration and remittances has been recently confirmed, there is a lack of empirical research examining the migration and remittances impacts. To the best of the author's knowledge, only two studies have empirically assessed the impacts, while other studies are descriptive analyses. This gives an indication that there is an urgent need to conduct more empirical analyses to thoroughly understand the growing importance of migration and remittances in the Cambodian context. Therefore, this research empirically examines three aspects of labour migration and remittances in Cambodia: (1) the impacts of migration on household expenditure patterns, (2) the impacts of remittances on household credit borrowing, and (3) the impacts of remittances on household agricultural input expenditure.

7.1. Research Findings

This section summarises the research findings of the three empirical aspects above.

Chapter 4: The first issue examined, the impacts of migration on household expenditure patterns, finds that households with older heads and with heads having lower education are more likely to be involved in migration. Landless households and households with greater values of livestock and durable goods are more likely to be engaged in migration. Households living in rural areas, in all regions, in poor villages and living near bus stop are greatly found to send out migrants. Households with past migration history are more likely to be involved in migration.

Furthermore, this study finds that migration has significant and positive impacts on total household expenditure. This indicates that migration improves household livelihoods through the income-effect of remittances. Significant and positive impacts of migration on food expenditure and non-food expenditure are also found. At the margin, the impacts are found to be larger than on the latter categories of expenditure. In the non-food expenditure categories, migration is found to have positive impacts on almost all spending categories. The study further finds that migrant households appear to change their spending behaviours from food and health spending toward education and communication spending. Even though migration appears to change household behaviour regarding food consumption share, the findings indicate that there is an increase in food spending associated with migration. Because migration is found to have positive impacts on education and communication and migrant households appear to change their spending behaviours toward these spending categories, this indicates that migration has development impacts on households in Cambodia, especially in rural areas, to make investment in these activities.

Chapter 5: Examining the impacts of remittances on household credit borrowing shows that total remittances have negative impacts on credit borrowing, and the impacts are larger when remittances from migrants are estimated. It gives an indication that remittances improve liquidity and financial conditions of recipient households since remittances provide

them with cash income to improve their household budgets, and thus reduce their indebtedness and financial constraints. The results give evidence in support of the NELM's hypothesis about the lessening of financial constraints in the context of the non-efficient credit market. Furthermore, the study finds that credit is a risk-coping tool for rural households to cope with idiosyncratic risks: health, crime and unemployment shocks. However, credit appears not to be a risk-coping tool for mitigating common shocks.

Furthermore, remittances are found to have no impacts on credit demands when crime, unemployment and common shocks occur, but credit appears to be more responsive to mitigate these risks. For health risk, remittances are found to have negative impacts on credit, and this indicates that recipient households reduce demands for loans when health risk occurs. It gives an indication that remittance-recipient households seek liquidity assistance from migrants and non-migrants rather than taking credit to mitigate the risk. To some extent, remittances can reduce household burdens caused by health risk, which is identified as a major and severe issue affecting rural Cambodia. In this regard, remittances can function as insurance against health risk, and can substitute for credit to cope with this risk to some extent. This result can be explained by the major and severe damages caused more by health risk than by the others, an insufficient sum of remittances to cover all the shocks, and the strong attachment of migrants to help households in time of hardship. It shows how migrants highly value the importance of their responses to families' needs of necessary help, especially when the family livelihoods are threatened by adverse health shock. It may suggest that remittances enable those exposed households to require fewer loans or to make the decision to apply for credit with the assurance of being able to repay the loan through remittances.

Chapter 6: Regarding the impacts of remittances on household agricultural input expenditure, it is found that total remittances have negative impacts on crop planting expenditure, either on seed or chemical fertiliser purchases, but have positive impacts on livestock raising expenditure, either on livestock feed purchase or total expenses to raise livestock. The impacts are found to be larger when remittances from migrants are analysed.

These results indicate that remittances enable recipient households to change their spending behaviours from crop input into livestock expenditure. This pull-out effect of remittances raises concern whether it is a complete move-out from agriculture, and this can be seen through its effect on agricultural income as de Brauw (2010) identifies. The study further finds that remittances have no impacts on agricultural income, but have positive impacts on non-agricultural and total household income. It indicates that recipient households do not move out from agriculture completely, but adjust their activities through the engagement in high-return livestock activity upon the receipts of remittances. It can also give an indication that remittances may affect other sources of household income (Miluka et al., 2010). Similar findings are found when the impacts of internal and international remittances, and the impacts in rural poor households are examined, and when the study checks robustness of the investigation by changing a number of proxies to represent crop and livestock expenditure.

The positive findings of remittances on livestock expenditure support the NELM's hypotheses about the lessening of credit constraint in agriculture, where, in these findings, remittances are capital for rural recipient households to overcome the constraints in the engagement in high-value livestock activity. The findings also support the NELM when remittances function as insurance against investment failures in the context of a missing insurance market. It is because the findings show that rural recipient households appear to move out from familial subsistence-based but high-risk crop farming into high-value high-risk but more liquid and less persistent livestock activities. When remittances function as insurance against any livestock failures, these households are more likely to be involved and to have more spending in this high-return and high-risk activity. The multifunctional roles of livestock can also help explain these results. Moreover, the characteristic difference in the utilisation of labour between crop planting and livestock raising activities can help explain the results. However, it seems not to indicate that migration causes labour constraint in Cambodia's agriculture since a number of existing studies identify the labour market in Cambodia as abundant and underutilised, and as not yet having reached the point where the

supply is drained (CDRI, 2007b; World Bank, 2009; ADB, 2012b; and Theng and Flower, 2014). The findings may suggest that recipient households would rather change their productive spending behaviour when they receive remittances, where remittances can have an effect on agriculture in the unconstrained labour market through the investment of remittances in productive assets (Taylor and Wyatt, 1996).

7.2. Policy Implications

Because of these significant findings, there are possible policy implications. The research finds that migration has positive impacts on increasing household total expenditure, food expenditure, and non-food expenditure, especially on increasing education and communication spending. The research also finds that cash income of remittances improves liquidity and financial conditions of recipient households, and thus reduces their debt burdens and financial constraints. Remittances are further found to enable rural households to overcome credit and risk constraints in livestock activity which is a high-value and high-return activity. These findings give an indication that the government should promote and facilitate labour migration further since it gives positive impacts on those outcomes. The government can further promote and facilitate labour migration through reducing migration costs, making migration procedures easier, circulating local and non-local job information informatively, and connecting migrants with employers directly. By promoting this labour migration, the government can also reduce demographic pressure by allowing the large amount of post-civil war baby boomers to have jobs.

Since migration and remittances are found to increase household investment spending on education and communication, and also on livestock expenses, the government should create policies to reduce unnecessary expenses for sending remittances by migrants, so that migrant households could have more capital to make more investment spending. In this way, the government should address the costs for sending remittances by migrants or make the sending of remittances easier whether remittances are sent within the country or from abroad.

The government should also promote and facilitate the use of remittances for investment by encouraging migrant households to use these transfers to invest in other productive assets.

Because of the significant findings that rural households appear to shift away from subsistence crop planting into high-value high-return livestock activities upon the receipts of remittances, this indicates that the government should not restrict labour movement. If the government's policies limit this labour movement, these households may be unable to escape from agricultural constraints, and thus they will continue to experience poor production.

7.3. Recommendations for Further Research

Although this research finds significant and important results in the impacts of migration and remittances on household expenditure patterns, credit borrowing, and agricultural input expenditure in Cambodia, this research has some limitations, and thus, there is room for further investigation. In the analysis of credit borrowing, the research is unable to separate new borrowings from the outstanding debts rural households have taken. If the data allow the research to identify these new borrowings, the impacts of remittances on credit borrowing in rural households and how migration plays a significant role in household risk-coping strategies would be seen more clearly. Throughout the assessment, this research uses cross-section data to investigate the impacts of migration and remittances on the above indicators; therefore, there are difficulties in examining and understanding the comprehensive impacts. With cross-section data, this research is unable to capture changing trends and variations in household expenditure, credit borrowing and agricultural input purchases across time, but with panel data, which would capture the changing trends and variations, the impacts could be shown more clearly. However, to the best of the author's knowledge, panel data that can allow researchers to empirically analyse the impacts of migration and remittances in Cambodia are not yet available. Even when these data are available, research without addressing the exogeneity of migration and remittances may have confounding results. However, since Cambodia is presently engaged in migration and there is a lack of

empirical research to examine the impacts, the subject of the research deserves further study with comprehensive methods and data to assess the impacts.

Furthermore, throughout the assessment, this research identifies migration and remittances as internal or international migration, internal and international remittances, and whether remittances are from migrants or non-migrants. However, through the data the research uses, this research cannot identify migrants as permanent, seasonal, circular or commute. As Mendola (2012) indicates, rural households can decide to be involved in either one or more forms, and these types of migration can have different roles and impacts on household consumption, investment and livelihoods. As Atamanov and van den Berg (2012) find, seasonal and permanent migration have different impacts on household agricultural income. They find that permanent migrants reduce household agricultural income, but seasonal migrants have no impacts on the income. By understanding the different impacts and roles these types of migration have, future empirical studies in the Cambodian context which can identify these types of migration are necessary in order to see how rural Cambodian households behave among these forms of migration, and to understand how these forms of migration impact on these rural households.

As has been stated, there is a limited amount of empirical research in analysing the impacts of migration and remittances in Cambodia. To the best of the author's knowledge, the empirical studies so far include the analysis of remittances on poverty (Tong, 2011a); the assessment of migration and remittances on income sources, income variation, and child education (Luch, 2012); the marriage decision of migrants (Yagura, 2012); and the examination of the impacts of migration on household expenditure patterns (Chapter 4), the impacts of remittances on household credit borrowing (Chapter 5), and the impacts of remittances on household agricultural input expenditure (Chapter 6). Therefore, there are a wide range of subjects for future investigation in order to conduct a thorough impact analysis of migration and remittances in the Cambodian context. For instance, future studies should address the impacts on household health indicators, labour participation in household

activities, entrepreneurship behaviours, and off-farm activities upon migration. From the investigation in Chapter 6, remittances are found to have positive impacts on non-farm income, indicating that migration may have impacts on small businesses of rural households. Therefore, future studies which could identify non-farm activities in more detail are strongly suggested in order to understand household entrepreneurship behaviours upon the migration decision. Also, future studies could address the impacts on macroeconomic level indicators such as economic growth or financial development, where, to the best of the author's knowledge, there is not yet any empirical macroeconomic analysis in Cambodia. With these suggestions, the impacts of migration and remittances in Cambodia would be more comprehensively and thoroughly understood.

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Appendix A

Supplementary Estimation Tables for Chapter 4

Table A.1: List of variables and descriptions

<i>Variables</i>	<i>Descriptions</i>
Migration	1=if household has a migrant aged 15-64 years old migrated 2004-2009.
Past migration	1=if households has any past migrants before five years ago.
<i>Household characteristics</i>	
Male head	1= if the head of household is male, 0 otherwise.
Head ≤ 24	1= if the household head is below 24 years old, 0 otherwise.
Head 25_34	1= if the household head is between 25 and 34 years old, 0 otherwise.
Head 35_44	1= if the household head is between 35 and 44 years old, 0 otherwise.
Head 45_54	1= if the household head is between 45 and 54 years old, 0 otherwise.
Head 55_64	1= if the household head is between 55 and 64 years old, 0 otherwise.
Head ≥ 65	1= if the household head is older than 65 years old, 0 otherwise.
HH size	numbers of household members.
<i>Household education</i>	
Head zero	1= if the household head has no education, 0 otherwise.
Head primary	1= if the household head has achieved primary education, 0 otherwise.
Head lower	1= if the household head has achieved lower secondary school, 0 otherwise.
Head upper	1= if the household head has achieved upper secondary school, 0 otherwise.
Head vocational	1= if the household head has achieved vocational training, 0 otherwise.
Head college	1= if the head has achieved higher education (college/university), 0 otherwise.
<i>Household assets</i>	
Landless	1=if household does not own, or own but rent out any farming and cropping lands, 0 otherwise.
Land 0-0.5 ha	1=if household owns, or owns but rents out less than 0.5 hectors of farming and cropping lands, 0 otherwise.
Land 0.5-1 ha	1=if household owns, owns but rents out 0.5-1 hectors of farming and cropping lands, 0 otherwise.
Land 1-2 ha	1=if household owns, owns but rents out 1-2 hectors of farming and cropping lands, 0 otherwise.
Land 2-4 ha	1=if household owns, owns but rents out 2-4 hectors of farming and cropping lands, 0 otherwise.
Land 4-8 ha	1=if household owns, owns but rents out 4-8 hectors of farming and cropping lands, 0 otherwise.
Land ≥ 8 ha	1=if household owns, owns but rents out more than 8 hectors of farming and cropping lands, 0 otherwise.
Livestock	total values of household livestock currently owned in riels.
Durable goods	total values of households durable goods currently owned in riels.
<i>Village characteristics</i>	
Enterprise	1=if the village of households has any industrial or commercial enterprises (factory, hotel, restaurant or company) employing more than 10 persons in the village or within 10km from the village, 0 otherwise.
Electricity	percentage of households in the village having public or private electricity.

NGO project	1=if the village has any NGO development projects presently functioning.
Bus stop	distance in km from the village of households to the nearest bus stop.
<i>Regional areas</i>	
Plain region	1= if household is in Kompong Cham, Kandal, Prey Veng, Svey Rieng, and Takeo provinces, 0 otherwise.
Tonle Sap region	1= if household is in Bantey Meanchey, Battambang, Kompong Chhnang, Kompong Thom, Pursat, and Siem Reap, 0 otherwise.
Coastal region	1= if household is in Kompot, Koh Kong, Sihanoukville, and Kep, 0 otherwise.
Plateau region	1= if household is in Kompong Speu, Kratie, Mondulhiri, Preah Vihear, Ratanakiri, Stung Treng, Oddar Meanchey, and Pailin, 0 otherwise.
Phnom Penh	1= if household is in Phnom Penh, 0 otherwise.
Urban	1= if household is in urban areas, 0 otherwise.
<i>Expenditure variables</i>	
Expenditure	Total annual per capita household expenditure in riels
Food expenditure	Per capita household expenditure on food both purchased and non-purchased in cash and in kinds (such as fish, meat, vegetables, cereals, etc...) in the last 12 months in riels.
Consumer goods	Per capita household expenditure on consumer/durable goods such as domestic appliances, furniture, clothing, footwear, personal care, and personal effects in the last 12 months in riels.
Education	Per capita household expenditure on education such as school fees, textbooks, tuition, etc... in the last 12 months in riels.
Health	Per capita household expenditure on medical care such as doctor fees, drugs, hospital charges, etc... in the last 12 months in riels.
Recreation	Per capita household expenditure on recreation goods and supplies, tour travelling, accommodation, etc... in Cambodia and abroad in the last 12 months in riels.
Communication	Per capita household expenditure on cellphones, phone service fees, phone internet charges, internet charges, postage stamps, fax, etc... in the last 12 months in riels.
Other goods	Per capita household expenditure on special occasions, gambling, domestic salaries, and transportation in the last 12 months in riels
Non-food	Per capita household expenditure on consumer goods, education, health, recreation, communication, and other goods in riels.
<i>Expenditure shares</i>	
Food share	Shares of per capita food expenditure to total per capita household expenditure.
Consumer share	Shares of per capita consumer/durable goods expenditure to total per capita household expenditure.
Education share	Shares of per capita education expenditure to total per capita household expenditure.
Health share	Shares of per capita medical expenditure to total per capita household expenditure.
Recreation share	Shares of per capita recreation expenditure to total per capita household expenditure.
Commun share	Shares of per capita communication expenditure to total per capita household expenditure.
Other goods	Shares of per capita expenditure on other goods to total per capita household expenditure.

Table A.2: Regression of total expenditure per capita on migration

	<i>Total Expenditure</i>		<i>Tobit</i>	<i>IV Tobit</i>	<i>Rural</i>		<i>Urban</i>	
	<i>OLS</i>	<i>2SLS</i>			<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	0.0002 (0.011)	1.787** (0.753)	0.0001 (0.011)	1.789** (0.753)	0.001 (0.013)	1.784*** (0.659)	0.006 (0.026)	-3.303 (32.614)
Male head	0.027** (0.012)	0.019 (0.022)	0.027** (0.012)	0.019 (0.022)	0.033** (0.013)	0.017 (0.026)	0.010 (0.025)	-0.003 (0.150)
Head 25_34	-0.003 (0.024)	0.012 (0.032)	-0.003 (0.024)	0.012 (0.032)	0.013 (0.026)	0.026 (0.033)	-0.112 (0.076)	-0.232 (1.189)
Head 35_44	0.074*** (0.025)	-0.086 (0.075)	0.074*** (0.025)	-0.086 (0.075)	0.091*** (0.026)	-0.086 (0.074)	-0.016 (0.073)	0.015 (0.328)
Head 45_54	0.130*** (0.025)	-0.403* (0.227)	0.130*** (0.025)	-0.403* (0.227)	0.143*** (0.027)	-0.449** (0.221)	0.046 (0.072)	0.464 (4.127)
Head 55_64	0.149*** (0.026)	-0.563* (0.302)	0.149*** (0.026)	-0.564* (0.302)	0.144*** (0.028)	-0.609** (0.281)	0.103 (0.074)	0.967 (8.516)
Head>64	0.081*** (0.027)	-0.442** (0.223)	0.081*** (0.027)	-0.442** (0.223)	0.081*** (0.029)	-0.483** (0.213)	0.033 (0.076)	0.521 (4.818)
HH size	-0.112*** (0.003)	-0.091*** (0.010)	-0.112*** (0.003)	-0.091*** (0.010)	-0.117*** (0.003)	-0.094*** (0.010)	-0.108*** (0.006)	-0.128 (0.190)
Head primary	0.070*** (0.012)	0.005 (0.034)	0.070*** (0.012)	0.004 (0.034)	0.083*** (0.012)	0.006 (0.036)	-0.007 (0.036)	-0.066 (0.592)
Head lower	0.138*** (0.014)	0.130*** (0.024)	0.139*** (0.014)	0.130*** (0.024)	0.146*** (0.015)	0.119*** (0.028)	0.073* (0.038)	-0.127 (1.970)
Head upper	0.228*** (0.020)	0.196*** (0.035)	0.228*** (0.020)	0.196*** (0.035)	0.246*** (0.025)	0.224*** (0.041)	0.128*** (0.043)	0.020 (1.059)
Head vocational	0.327*** (0.057)	0.260*** (0.091)	0.327*** (0.057)	0.260*** (0.091)	0.326*** (0.095)	0.190 (0.171)	0.220*** (0.073)	0.073 (1.457)
Head college	0.504*** (0.047)	0.529*** (0.061)	0.504*** (0.047)	0.529*** (0.061)	0.592*** (0.091)	0.673*** (0.095)	0.351*** (0.066)	0.091 (2.567)
Land 0-0.5 ha	-0.003 (0.016)	0.059 (0.037)	-0.002 (0.016)	0.059 (0.037)	0.006 (0.017)	0.090** (0.042)	-0.030 (0.051)	0.279 (3.050)
Land 0.5-1 ha	-0.016 (0.016)	0.027 (0.033)	-0.016 (0.016)	0.027 (0.033)	-0.003 (0.017)	0.059 (0.037)	-0.085* (0.048)	0.006 (0.903)
Land 1-2 ha	0.028* (0.016)	0.036 (0.027)	0.028* (0.016)	0.036 (0.027)	0.037*** (0.031)	0.061** (0.056)	0.059 (0.052)	0.044 (0.199)
Land 2-4 ha	0.044**	0.044	0.044**	0.045	0.060***	0.075**	-0.051	-0.156

	(0.018)	(0.031)	(0.018)	(0.031)	(0.019)	(0.033)	(0.054)	(1.047)
Land 4-8 ha	0.169***	0.208***	0.170***	0.208***	0.182***	0.248***	0.223***	0.453
	(0.025)	(0.048)	(0.025)	(0.048)	(0.027)	(0.053)	(0.077)	(2.280)
Land over 8 ha	0.223***	0.129	0.223***	0.129	0.215***	0.116	0.387***	0.197
	(0.048)	(0.092)	(0.048)	(0.092)	(0.050)	(0.093)	(0.134)	(1.877)
Livestock (log)	-0.009***	-0.015***	-0.009***	-0.015***	-0.008***	-0.016***	-0.011***	-0.014
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)	(0.002)	(0.024)
Durable (log)	0.058***	0.052***	0.058***	0.052***	0.051***	0.046***	0.107***	0.123
	(0.002)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)	(0.009)	(0.158)
Enterprise	0.017*	-0.008	0.017*	-0.008	0.029***	0.013	-0.033	0.217
	(0.010)	(0.021)	(0.010)	(0.021)	(0.011)	(0.020)	(0.040)	(2.456)
Electricity (%)	0.002***	0.003***	0.002***	0.003***	0.003***	0.003***	0.000	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.023)
NGO project	-0.024**	-0.020	-0.024**	-0.020	-0.014	-0.015	-0.073***	-0.095
	(0.009)	(0.016)	(0.009)	(0.016)	(0.010)	(0.018)	(0.026)	(0.226)
Bus stop	0.001	0.002*	0.001	0.002*	0.001	0.002*	-0.011	-0.014
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.035)
Plain	-0.155***	-0.265***	-0.155***	-0.265***	0.177***	0.203*	-0.150***	0.110
	(0.021)	(0.058)	(0.021)	(0.058)	(0.053)	(0.107)	(0.031)	(2.570)
Tonle Sap	-0.214***	-0.303***	-0.214***	-0.303***	0.123**	0.174	-0.221***	-0.032
	(0.021)	(0.051)	(0.021)	(0.051)	(0.053)	(0.108)	(0.030)	(1.864)
Coastal	-0.095***	-0.206***	-0.095***	-0.206***	0.210***	0.249**	0.020	0.388
	(0.026)	(0.064)	(0.026)	(0.064)	(0.056)	(0.112)	(0.050)	(3.644)
Plateau	-0.174***	-0.265***	-0.174***	-0.265***	0.165***	0.197*	-0.257***	-0.208
	(0.023)	(0.055)	(0.023)	(0.055)	(0.054)	(0.109)	(0.039)	(0.487)
Urban	0.048**	0.133***	0.048**	0.133***	-	-	-	-
	(0.019)	(0.048)	(0.019)	(0.048)	-	-	-	-
Constant	14.259***	14.338***	14.259***	14.338***	13.977***	13.977***	13.963***	13.959***
	(0.040)	(0.068)	(0.040)	(0.068)	(0.066)	(0.121)	(0.144)	(0.250)
<i>F test</i>	-	8.281	-	-	-	10.566	-	0.0097
<i>(p-value)</i>	-	(0.004)	-	-	-	(0.000)	-	(0.921)
<i>Wu-Hausman</i>	-	16.223	-	-	-	21.507	-	0.0565
<i>(p-value)</i>	-	(0.000)	-	-	-	(0.000)	-	(0.812)
<i>Chi2</i>	-	-	-	5.65	-	-	-	-
<i>P>chi2</i>	-	-	-	0.02	-	-	-	-
<i>Number of Obs</i>	11,773	11,773	11,773	11,773	9,453	9,453	2,320	2,320

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table A.3: Regressions of expenditure and expenditure shares (1)

	<i>Food</i>		<i>Non-food</i>		<i>Consumer</i>		<i>Education</i>		<i>Health</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	-0.023** (0.010)	1.490** (0.653)	0.055*** (0.019)	3.316** (1.337)	-0.025 (0.022)	3.459** (1.445)	0.225** (0.113)	31.095*** (11.193)	0.130 (0.117)	7.139 (5.112)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	14.180*** (0.036)	14.247*** (0.060)	12.091*** (0.069)	12.235*** (0.122)	10.858*** (0.074)	11.011*** (0.130)	-3.316*** (0.324)	-1.954** (0.959)	6.683*** (0.399)	6.992*** (0.491)
<i>F test</i>	-	8.281	-	8.281	-	8.281	-	8.281	-	8.281
<i>(p-value)</i>	-	(0.004)	-	(0.004)	-	(0.004)	-	(0.004)	-	(0.004)
<i>Wu-Hausman</i>	-	14.003	-	19.589	-	17.411	-	56.771	-	2.397
<i>(p-value)</i>	-	(0.000)	-	(0.000)	-	(0.000)	-	(0.000)	-	(0.121)
<i>Number of Observation</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>

Table A.4: Regressions of expenditure and expenditure shares (2)

	<i>Recreation</i>		<i>Communication</i>		<i>Other goods</i>		<i>Food share</i>		<i>Consumer share</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	0.257** (0.123)	8.280 (5.341)	0.492*** (0.116)	21.923** (8.517)	0.090*** (0.028)	4.790** (1.896)	-0.016*** (0.003)	-0.059 (0.127)	-0.004** (0.001)	0.110* (0.067)
Log expenditure	-	-	-	-	-	-	-0.121*** (0.003)	-0.121*** (0.003)	0.003* (0.001)	0.002 (0.002)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	1.628*** (0.389)	1.982*** (0.497)	-2.417*** (0.349)	-1.471** (0.740)	10.112*** (0.124)	10.319*** (0.196)	2.6313*** (0.0481)	2.6293*** (0.0488)	0.0057 (0.0203)	0.0109 (0.0239)
<i>F test</i>	-	8.281	-	8.281	-	8.281	-	8.288	-	8.288
<i>(p-value)</i>	-	(0.004)	-	(0.004)	-	(0.004)	-	(0.004)	-	(0.004)
<i>Wu-Hausman</i>	-	3.042	-	25.269	-	21.186	-	0.121	-	4.478
<i>(p-value)</i>	-	(0.081)	-	(0.000)	-	(0.000)	-	(0.728)	-	(0.034)
<i>Number of Observation</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>	<i>11,773</i>

Table A.5: Regressions of expenditure and expenditure shares (3)

	<i>Education share</i>		<i>Health share</i>		<i>Recreation share</i>		<i>Communication share</i>		<i>Other goods share</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	-0.001 (0.001)	0.131** (0.058)	0.0067** (0.0027)	-0.3170** (0.1544)	0.0007 (0.0005)	-0.0029 (0.0202)	0.0020*** (0.0007)	0.0390 (0.0271)	0.0109*** (0.0021)	0.0981 (0.0860)
Log expenditure	0.008*** (0.001)	0.008*** (0.001)	0.0799*** (0.0037)	0.0799*** (0.0043)	0.0055*** (0.0006)	0.0055*** (0.0006)	0.0032*** (0.0006)	0.0032*** (0.0007)	0.0226*** (0.0023)	0.0226*** (0.0024)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	-0.1093*** (0.0168)	-0.103*** (0.0220)	-1.0730*** (0.0529)	-1.0879*** (0.0636)	-0.0731*** (0.0088)	-0.0732*** (0.0088)	-0.0528*** (0.0095)	-0.0511*** (0.0105)	-0.3288*** (0.0339)	-0.3248*** (0.0351)
<i>F test</i>	-	8.288	-	8.288	-	8.288	-	8.288	-	8.288
<i>(p-value)</i>	-	(0.004)	-	(0.004)	-	(0.004)	-	(0.004)	-	(0.004)
<i>Wu-Hausman</i>	-	9.880	-	9.61	-	0.03	-	2.342	-	1.176
<i>(p-value)</i>	-	(0.002)	-	(0.002)	-	(0.864)	-	(0.126)	-	(0.278)
<i>Number of Observation</i>	11,773	11,773	11,773	11,773	11,773	11,773	11,773	11,773	11,773	11,773

Table A.6: Regressions of expenditure and expenditure shares in rural areas (1)

<i>Rural</i>	<i>Food</i>		<i>Non-food</i>		<i>Consumer</i>		<i>Education</i>		<i>Health</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	-0.027** (0.012)	1.570*** (0.594)	0.062*** (0.021)	2.943*** (1.086)	-0.030 (0.024)	3.349*** (1.243)	0.336*** (0.120)	22.982*** (7.637)	0.015 (0.127)	3.319 (3.972)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	13.978*** (0.063)	13.950*** (0.110)	11.578*** (0.119)	11.528*** (0.203)	10.155*** (0.125)	10.097*** (0.232)	-3.319*** (0.744)	-3.709*** (1.423)	3.958*** (0.838)	3.901*** (0.846)
<i>F test</i>	-	10.566	-	10.566	-	10.566	-	10.566	-	10.566
<i>(p-value)</i>	-	(0.000)	-	(0.000)	-	(0.000)	-	(0.000)	-	(0.000)
<i>Wu-Hausman</i>	-	20.403	-	19.866	-	22.976	-	43.206	-	0.742
<i>(p-value)</i>	-	(0.000)	-	(0.000)	-	(0.000)	-	(0.000)	-	(0.389)
<i>Number of Observation</i>	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453

Table A.7: Regressions of expenditure and expenditure shares in rural areas (2)

<i>Rural</i>	<i>Recreation</i>		<i>Communication</i>		<i>Other goods</i>		<i>Food share</i>		<i>Consumer share</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	0.324** (0.133)	5.533 (4.240)	0.557*** (0.132)	19.715*** (7.009)	0.104*** (0.031)	4.295*** (1.545)	-0.0176*** (0.0036)	0.0139 (0.1105)	-0.0039** (0.0015)	0.1128* (0.0583)
Log expenditure	-	-	-	-	-	-	-0.1180*** (0.0038)	-0.1180*** (0.0038)	0.0008 (0.0015)	0.0008 (0.0018)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	-0.333 (0.773)	-0.422 (0.810)	-2.823*** (0.632)	-3.154** (1.298)	9.707*** (0.170)	9.635*** (0.285)	2.6048*** (0.0572)	2.6044*** (0.0571)	0.0042 (0.0235)	0.0028 (0.0281)
<i>F test</i>	-	10.566	-	10.566	-	10.566	-	10.575	-	10.575
<i>(p-value)</i>	-	(0.000)	-	(0.000)	-	(0.000)	-	(0.001)	-	(0.001)
<i>Wu-Hausman</i>	-	1.745	-	24.172	-	22.084	-	0.083	-	6.161
<i>(p-value)</i>	-	(0.186)	-	(0.000)	-	(0.000)	-	(0.773)	-	(0.013)
<i>Number of Observation</i>	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453

Table A.8: Regressions of expenditure and expenditure shares in rural areas (3)

<i>Rural</i>	<i>Education share</i>		<i>Health share</i>		<i>Recreation share</i>		<i>Communication share</i>		<i>Other goods share</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	-0.0004 (0.0011)	0.0696** (0.0341)	0.0071** (0.0031)	-0.3080** (0.1357)	0.0008* (0.0005)	0.0049 (0.0148)	0.0021*** (0.0007)	0.0438* (0.0231)	0.0118*** (0.0023)	0.0630 (0.0708)
Log expenditure	0.0053*** (0.0012)	0.0053*** (0.0013)	0.0885*** (0.0042)	0.0886*** (0.0049)	0.0029*** (0.0005)	0.0029*** (0.0005)	0.0027*** (0.0006)	0.0027*** (0.0007)	0.0178*** (0.0024)	0.0178*** (0.0025)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	-0.0802*** (0.0184)	-0.081*** (0.0206)	-1.1803*** (0.0610)	-1.1765*** (0.0726)	-0.0381*** (0.0084)	-0.0382*** (0.0084)	-0.0454*** (0.0088)	-0.0459*** (0.0102)	-0.2649*** (0.0373)	-0.2655*** (0.0376)
<i>F test</i>	-	10.575	-	10.575	-	10.575	-	10.575	-	10.575
<i>(p-value)</i>	-	(0.001)	-	(0.001)	-	(0.001)	-	(0.001)	-	(0.002)
<i>Wu-Hausman</i>	-	5.509	-	11.130	-	0.074	-	4.694	-	0.557
<i>(p-value)</i>	-	(0.019)	-	(0.000)	-	(0.785)	-	(0.030)	-	(0.456)
<i>Number of Observation</i>	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453	9,453

Table A.9: Regressions of expenditure and expenditure shares in urban areas (1)

<i>Urban</i>	<i>Food</i>		<i>Non-food</i>		<i>Consumer</i>		<i>Education</i>		<i>Health</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	-0.002 (0.023)	-9.557 (86.983)	0.039 (0.042)	21.525 (196.165)	0.006 (0.055)	3.248 (40.657)	-0.270 (0.318)	539.693 (4,874.5)	0.743** (0.308)	279.002 (2,509.2)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	13.986*** (0.114)	13.974*** (0.618)	11.768*** (0.242)	11.794*** (1.408)	10.655*** (0.234)	10.659*** (0.314)	-4.945*** (0.967)	-4.287 (34.597)	7.644*** (1.136)	7.983 (17.760)
<i>F test</i>	-	0.0097	-	0.0097	-	0.0097	-	0.0097	-	0.0097
<i>(p-value)</i>	-	(0.921)	-	(0.921)	-	(0.921)	-	(0.921)	-	(0.921)
<i>Wu-Hausman</i>	-	0.596	-	0.941	-	0.0121	-	13.383	-	3.081
<i>(p-value)</i>	-	(0.440)	-	(0.332)	-	(0.912)	-	(0.000)	-	(0.079)
<i>Number of Observation</i>	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320

Table A.10: Regressions of expenditure and expenditure shares in urban areas (2)

<i>Urban</i>	<i>Recreation</i>		<i>Communication</i>		<i>Other goods</i>		<i>Food share</i>		<i>Consumer share</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	0.036 (0.313)	223.387 (2,025.92)	0.159 (0.208)	109.061 (995.41)	0.048 (0.066)	16.197 (149.530)	-0.0072 (0.0075)	-6.1256 (54.8994)	-0.0025 (0.0035)	-0.0655 (1.8552)
Log expenditure	-	-	-	-	-	-	-0.1336*** (0.0068)	-0.1142 (0.1915)	0.0086*** (0.0030)	0.0088 (0.0070)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	2.425** (1.162)	2.697 (14.358)	-2.106** (0.974)	-1.973 (7.135)	9.956*** (0.442)	9.976*** (1.185)	2.8158*** (0.0985)	2.5369 (2.7723)	-0.0783* (0.0445)	-0.0811 (0.1013)
<i>F test</i>	-	0.0097	-	0.0097	-	0.0097	-	0.009	-	0.009
<i>(p-value)</i>	-	(0.921)	-	(0.921)	-	(0.921)	-	(0.920)	-	(0.920)
<i>Wu-Hausman</i>	-	2.099	-	1.146	-	0.257	-	2.654	-	0.001
<i>(p-value)</i>	-	(0.147)	-	(0.284)	-	(0.612)	-	(0.103)	-	(0.970)
<i>Number of Observation</i>	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320

Table A.11: Regressions of expenditure and expenditure shares in urban areas (3)

<i>Urban</i>	<i>Education share</i>		<i>Health share</i>		<i>Recreation share</i>		<i>Communication share</i>		<i>Other goods share</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
Migration	-0.0033 (0.0042)	4.7726 (42.7032)	0.0030 (0.0055)	-0.8729 (8.3261)	0.0003 (0.0019)	0.0291 (1.1295)	0.0015 (0.0022)	-0.3210 (3.0308)	0.0082 (0.0057)	2.5833 (23.18)
Log expenditure	0.0146*** (0.0032)	-0.0006 (0.1488)	0.0486*** (0.0072)	0.0514* (0.0291)	0.0150*** (0.0021)	0.0149*** (0.0040)	0.0048** (0.0024)	0.0058 (0.0109)	0.0420*** (0.0065)	0.0338 (0.0803)
Household characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household education	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Household assets	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Village characteristics	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Regional areas	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Constant	-0.2447*** (0.0468)	-0.0270 (2.1529)	-0.6306*** (0.1021)	-0.6705 (0.4182)	-0.2147*** (0.0311)	-0.2134*** (0.0577)	-0.0739** (0.0334)	-0.0886 (0.1572)	-0.5736*** (0.0915)	-0.4563 (1.1610)
<i>F test</i>	-	0.009	-	0.009	-	0.009	-	0.009	-	0.009
<i>(p-value)</i>	-	(0.920)	-	(0.920)	-	(0.920)	-	(0.920)	-	(0.920)
<i>Wu-Hausman</i>	-	5.518	-	0.110	-	0.001	-	0.106	-	0.882
<i>(p-value)</i>	-	(0.018)	-	(0.740)	-	(0.976)	-	(0.745)	-	(0.348)
<i>Number of Observation</i>	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320	2,320

Appendix B

Supplementary Estimation Tables for Chapter 5

Table B.1: List of variables and descriptions

<i>Variables</i>	<i>Descriptions</i>
Credit	Total amounts of outstanding debts that household has borrowed in riels.
Credit share	Ratio of total amounts of household outstanding debts to total monthly household expenditure.
Remittances	Total monthly remittances received in cash and in-kind from migrants and from relatives or others in 10,000 riels in 2009.
Health shock	dummy if household has any members got acute illness or injured any time in the past 30 days and hospitalization was needed.
Crime shock	dummy if household or any members has been exposed to theft, burglary or robbery in the past 12 months.
Unemployed shock	dummy if any household members has an unemployed shock (unemployed but employed any time before) during the past 12 months.
Village shocks	dummy if the village of household has experienced rainfall shock (worse than normal, too late or too early), crops damaged by floods or too much rain, and bad harvest in the past season.
Past migration history	numbers of past migrant members in household before five years ago.
Village remit norm	Ratio of numbers of remittance recipient households in the village to total numbers of households in the village.
<i>Head gender and age</i>	
Male head	dummy if the household head is male.
Age under 24	dummy if the household head is below 24 years old.
Age 25_34	dummy if the household head is between 25 and 34 years old.
Age 35_44	dummy if the household head is between 35 and 44 years old.
Age 45_54	dummy if the household head is between 45 and 54 years old.
Age 55_64	dummy if the household head is between 55 and 64 years old.
Age over 65	dummy if the household head is older than 65 years old.
<i>Head education</i>	
Head no education	dummy if the head has no education.
Head primary	dummy if the head has achieved primary education.
Head lower	dummy if the head has achieved lower secondary education.
Head upper	dummy if the head has achieved upper secondary education.
Head vocational	dummy if the head has achieved vocational training.
Head college	dummy if the head has achieved higher education.
<i>Head occupation</i>	
Head unemployed	dummy if the head is unemployed in the past 12 months.
Head wage labour	dummy if the head is wage labour in the past 12 months.
Head self-employed	dummy if the head is self-employed in the past 12 months.
<i>Numbers of Household members by age</i>	
Under 5	numbers of household members younger than 5 years old.
Age 6-14	numbers of household members aged between 6-14 years old.
Age 15-64	numbers of household members aged between 15-64 years old.
Age over 65	numbers of household members older than 65 years old.
<i>Housing characteristics and assets</i>	
Room	numbers of rooms in the house (excluding kitchen/toilet/bathroom).
Floor	dummy if the house's floor is earth clay floor.
Landless	dummy if household does not own any farming and cropping lands.
Land less than 0.5 ha	dummy if household owns less than 0.5 hectors of lands.
Land 0.5-1 ha	dummy if household owns 0.5-1 hectors of lands.

Land 1-2 ha	dummy if household owns 1-2 hectors of lands.
Land 2-4 ha	dummy if household owns 2-4 hectors of lands.
Land 4-8 ha	dummy if household owns 4-8 hectors of lands.
Land over 8 ha	dummy if household owns lands larger than 8 hectors.
Durable goods	total values of household durable goods currently owned in riels.
Poor	dummy if household is poor.
<i>Village characteristics</i>	
Bus stop (km)	distance in Km from the village of households to the nearest bus stop.
Electricity (%)	% of households in the village access to public or private electricity.
Water (%)	% of households in the village has piped water in dwelling or premises.
Credit units	dummy if there is a bank/loan credit unit in the village.
NGO Projects	dummy if village has any NGO development projects currently functioning.
Enterprise	dummy if there is any industrial or commercial enterprise (such as factory, hotel, restaurant or company) employing more than 10 persons in the village or within 10km from the village.
Health facility	dummy if the village of household has any community health centres, referral hospitals, province hospitals, national hospitals or private hospitals.
<i>Village access to common property resources</i>	
Cultivated land	dummy if the village gets access to land for cultivation.
Fish to catch	dummy if the village gets access to fish for catching from lake or river.
Timber to take	dummy if the village gets access to timber for house construction.
Firewood to collect	dummy if the village gets access to firewood collection.
Bamboo to take	dummy if the village gets access to bamboo to be taken.
Open land	dummy if the village gets access to open land for animal grazing.
Fruit to pick	dummy if the village gets access to fruit to be picked.
Wild animals to hunt	dummy if the village gets access to wild animals to be hunted.
<i>Regional zones</i>	
Plain region	dummy if household is in Kampong Cham, Kandal, Prey Veng, Svey Rieng, and Takeo provinces.
Tonle Sap region	dummy if household is in Banteay Meanchey, Battambang, Kampong Chhnang, Kampong Thom, Pursat and Siem Reap.
Coastal region	dummy if household is in Kompot, Koh Kong, Sihanoukville, and Kep.
Plateau region	dummy if household is in Kampong Speu, Kratie, Mondulhiri, Preah Vihear, Ratanakiri, Stung Treng, Oddar Meanchey and Pailin.

Table B.2: The effects of internal remittances and shocks on credit borrowing

<i>Variables</i>	<i>Total Internal Remittances</i>		<i>Internal Migrant Remittances</i>		<i>Total Internal Remittances</i>		<i>Internal Migrant Remittances</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Remittances	0.002 (0.006)	-0.139* (0.085)	0.004 (0.006)	-0.286* (0.177)	0.003 (0.006)	-0.150* (0.085)	0.004 (0.006)	-0.311* (0.178)
Health (dummy)					0.180** (0.089)	0.196** (0.089)	0.180** (0.089)	0.211** (0.092)
Crime (dummy)					0.355* (0.202)	0.357* (0.204)	0.354* (0.202)	0.360* (0.207)
Unemployed (dummy)					0.423** (0.174)	0.381** (0.177)	0.422** (0.174)	0.372** (0.180)
Village shocks (dummy)					0.077 (0.095)	0.049 (0.095)	0.077 (0.095)	0.025 (0.100)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village access-resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.239 (0.265)	0.390 (0.265)	0.239 (0.265)	0.367 (0.278)	-0.007 (0.295)	0.191 (0.297)	-0.006 (0.294)	0.186 (0.317)
<i>Endogeneity</i>								
Robust score chi2 (p-value)		2.855 (0.091)		2.914 (0.087)		3.402 (0.065)		3.446 (0.063)
Robust regression F (p-value)		2.881 (0.089)		2.941 (0.086)		3.432 (0.064)		3.478 (0.062)
<i>Weak Instruments</i>								
F statistics (p-value)		35.867 (0.000)		19.847 (0.000)		35.867 (0.000)		19.414 (0.000)
<i>Over-identified</i>								
Score chi2 (p-value)		0.114 (0.735)		0.0751 (0.784)		0.0835 (0.773)		0.054 (0.816)
<i>N</i>	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%. Please be noted that the levels of significance of remittances in columns (2) and (4) are significant at 10.4% and 10.6%, respectively, and they are in the bound of significance at 10%.

Table B.3: The effects of remittances on credit borrowing by shock categories

<i>Dependent Variable: Credit Borrowing</i>	<i>Total Internal Remittances</i>		<i>Internal Migrant Remittances</i>		<i>N</i>
	<i>OLS (1)</i>	<i>2SLS (2)</i>	<i>OLS (3)</i>	<i>2SLS (4)</i>	
No Health Shock	0.009 (0.011)	-0.152 (0.097)	0.010 (0.010)	-0.304 (0.199)	5,801
Health Shock	-0.005 (0.006)	-0.231* (0.138)	-0.002 (0.006)	-0.543* (0.333)	3,495
No Crime Shock	0.003 (0.006)	-0.130 (0.089)	0.004 (0.006)	-0.259 (0.178)	9,052
Crime Shock	0.022 (0.043)	-0.365 (0.304)	-0.027 (0.066)	-1.631 (1.182)	244
No Unemployed Shock	0.004 (0.007)	-0.133 (0.089)	0.005 (0.006)	-0.272 (0.185)	8,650
Unemployed Shock	-0.034* (0.019)	-0.103 (0.286)	-0.010 (0.042)	-0.416 (0.927)	646
No Village Shocks	-0.010 (0.008)	-0.057 (0.132)	-0.005 (0.008)	-0.109 (0.261)	2,286
Village Shocks	0.006 (0.008)	-0.138 (0.120)	0.006 (0.009)	-0.286 (0.252)	7,010

*Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%. Please be noted that the 2SLS estimations of remittances on credit borrowing in columns (2) and (4) in time of health and no health shocks satisfy all econometric tests of 2SLS, while the others cannot rule out the exogeneity of remittances. Please be also noted that the level of significance of remittances in column (4) in time of health shock is significant at 10.3%, and it is in the bound of significance at 10%.*

Table B.4: The effects of remittances per capita and shocks on credit borrowing

<i>Variables</i>	<i>Total Remittances Per Capita</i>		<i>Migrant Remittances Per Capita</i>		<i>Total Remittances Per Capita</i>		<i>Migrant Remittances Per Capita</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Remittances	0.007 (0.015)	-0.478* (0.286)	0.052 (0.034)	-0.798* (0.481)	0.009 (0.015)	-0.508* (0.282)	0.055 (0.034)	-0.850* (0.477)
Health (dummy)					0.181** (0.089)	0.152 (0.096)	0.181** (0.089)	0.165* (0.094)
Crime (dummy)					0.355* (0.202)	0.342* (0.206)	0.357* (0.202)	0.323 (0.204)
Unemployed (dummy)					0.424** (0.174)	0.309 (0.200)	0.427** (0.174)	0.341* (0.197)
Village shocks (dummy)					0.077 (0.096)	0.018 (0.100)	0.080 (0.096)	0.016 (0.099)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village access-resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.233 (0.265)	0.793** (0.403)	0.212 (0.265)	0.689* (0.367)	-0.016 (0.294)	0.675 (0.457)	-0.040 (0.294)	0.552 (0.419)
<i>Endogeneity</i>								
Robust score chi2 (p-value)		3.064 (0.080)		3.427 (0.064)		3.618 (0.057)		4.012 (0.045)
Robust regression F (p-value)		3.095 (0.078)		3.466 (0.063)		3.656 (0.056)		4.057 (0.044)
<i>Weak Instruments</i>								
F statistics (p-value)		23.199 (0.000)		16.751 (0.000)		23.385 (0.000)		16.637 (0.000)
<i>Over-identified</i>								
Score chi2 (p-value)		0.0089 (0.924)		0.0011 (0.973)		0.0029 (0.957)		0.00008 (0.992)
<i>N</i>	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table B.5: The effects of internal remittances per capita and shocks on credit borrowing

<i>Variables</i>	<i>Total Internal Remittances Per Capita</i>		<i>Internal Migrant Remittances Per Capita</i>		<i>Total Internal Remittances Per Capita</i>		<i>Migrant Internal Remittances Per Capita</i>	
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>	<i>(7)</i>	<i>(8)</i>
Remittances	0.014 (0.023)	-0.507* (0.313)	0.037 (0.032)	-0.917 (0.574)	0.016 (0.023)	-0.548* (0.312)	0.038 (0.033)	-0.991* (0.575)
Health (dummy)					0.180** (0.089)	0.192** (0.089)	0.180** (0.089)	0.198** (0.089)
Crime (dummy)					0.355* (0.202)	0.344* (0.203)	0.355* (0.202)	0.348* (0.203)
Unemployed (dummy)					0.424** (0.174)	0.343* (0.185)	0.424** (0.174)	0.376** (0.180)
Village shocks (dummy)					0.078 (0.096)	0.028 (0.095)	0.079 (0.096)	0.016 (0.098)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village access-resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.229 (0.266)	0.705** (0.354)	0.229 (0.265)	0.543* (0.301)	-0.020 (0.296)	0.563 (0.400)	-0.019 (0.295)	0.383 (0.345)
<i>Endogeneity</i>								
Robust score chi2 (p-value)		2.930 (0.086)		3.067 (0.079)		3.485 (0.062)		3.611 (0.057)
Robust regression F (p-value)		2.957 (0.085)		3.097 (0.078)		3.517 (0.061)		3.646 (0.056)
<i>Weak Instruments</i>								
F statistics (p-value)		29.878 (0.000)		16.297 (0.000)		29.317 (0.000)		16.157 (0.000)
<i>Over-identified</i>								
Score chi2 (p-value)		0.1068 (0.743)		0.0884 (0.766)		0.0828 (0.773)		0.0699 (0.791)
<i>N</i>	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%. Please be noted that the level of significance of remittances in column (2) is significant at 10.5%, and it is in the bound of significance at 10%. The level of significance of remittances in column (4) is significant at 11%.

Table B.6: The effects of remittances per capita and shocks on credit borrowing by shock categories

	<i>Total Remittances Per Capita</i>		<i>Migrant Remittances Per Capita</i>		<i>Total Internal Remittances Per Capita</i>		<i>Internal Migrant Remittances Per Capita</i>		<i>N</i>
	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	<i>OLS</i>	<i>2SLS</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
No Health Shock	0.014 (0.017)	-0.404 (0.259)	0.058 (0.041)	-0.693 (0.445)	0.025 (0.029)	-0.497 (0.324)	0.038 (0.031)	-0.922 (0.628)	5,801
Health Shock	-0.015 (0.026)	-1.074* (0.624)	0.033 (0.054)	-1.940* (1.194)	-0.016 (0.037)	-1.015* (0.603)	0.022 (0.064)	-1.876* (1.127)	3,495
No Crime Shock	0.008 (0.015)	-0.449 (0.301)	0.055 (0.034)	-0.717 (0.478)	0.015 (0.023)	-0.466 (0.320)	0.040 (0.033)	-0.827 (0.574)	9,052
Crime Shock	-0.131 (0.091)	-0.703 (0.719)	-0.233 (0.249)	-5.014 (3.349)	-0.040 (0.236)	-1.932 (1.445)	-0.213 (0.301)	-6.058 (4.142)	244
No Unemployed Shock	0.011 (0.015)	-0.462 (0.299)	0.052 (0.035)	-0.806 (0.528)	0.022 (0.024)	-0.480 (0.321)	0.043 (0.034)	-0.867 (0.594)	8,650
Unemployed Shock	-0.012 (0.043)	-0.243 (0.698)	0.097 (0.174)	-0.264 (0.845)	-0.119* (0.061)	-0.403 (1.028)	-0.043 (0.107)	-1.286 (2.768)	646
No Village Shocks	-0.023 (0.014)	-0.158 (0.382)	0.003 (0.029)	-0.163 (0.680)	-0.025 (0.024)	-0.178 (0.419)	-0.009 (0.032)	-0.264 (0.694)	2,286
Village Shocks	0.015 (0.019)	-0.481 (0.413)	0.068 (0.043)	-0.864 (0.755)	0.030 (0.033)	-0.520 (0.455)	0.059 (0.052)	-1.021 (0.902)	7,010

*Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%. Please be noted that in the 2SLS estimations in columns (2) and (6) only the estimations of remittances on credit borrowing in time of health and no health shocks satisfy all econometric tests of 2SLS, while the others cannot rule out the exogeneity of remittances. In the 2SLS estimations in columns (4) and (8), almost all estimations of remittances satisfy all econometric tests of 2SLS, except those in time of unemployed, village and no village shocks. Please also be noted that the level of significance of remittances in column (4) in time of health shock is significant at 10.4%, and it is in the bound of significance at 10%.*

Appendix C

Supplementary Estimation Tables for Chapter 6

Table C.1: List of variables and descriptions

Variables	Descriptions
Planting seeds	Expenses on planting seeds, seedlings, young plants which were purchased or supplied from home production in the past two farming seasons in riels.
Chemical fertiliser	Expenses on chemical fertiliser, pesticide, weedicide and fungicide in the past two farming seasons in riels.
Feed livestock	Expenses on feed and other feed supplements for livestock or poultry purchased and (imputed) supplied from home farm or public land during the past 12 months in riels.
Livestock expense	Total expenses of all kinds of purchases in livestock raising i.e. feed, other feed supplements, veterinary services, medicine, service or technical support from government or other agencies, hired labour to care for the livestock, and others during the past 12 months in riels.
Seed fertiliser expenses	Total expenses to purchase planting seeds (planting seeds, seedlings, young plants which were purchased or supplied from home production) and chemical fertiliser (chemical fertiliser, pesticide, weedicide and fungicide) in the past two farming seasons in riels.
Total crop expenses	Total expenses of all kinds of materials in crop cultivation such as planting materials, fertiliser, hired draft power, hired labour, irrigation etc. in the past two farming seasons in riels.
Agricultural capital	Total purchases and payment for services of agricultural equipment such as carts, rollers, ploughs, harrows, rakes, roes, tractors, hand tractors, threshing machines etc. within the past 12 months in riels.
Livestock purchase	Total purchases in all kinds of livestock (cattle, buffaloes, pigs, chicken, etc.) during the past 12 months in riels.
Remittances	Monetary transfers in cash and in kind from migrants and from relatives or others in 2009 in riels.
Village remit norm	Ratio of numbers of remittance recipient households in the village to total numbers of households in the village.
Health shock	Dummy if household has any member got acute illness or injured any time in the past 30 days and hospitalisation was needed.
Head gender and age	
Male head	Dummy if the household head is male.
Age less than 24	Dummy if the household head is below 24 years old.
Age 25_34	Dummy if the household head is between 25 and 34 years old.
Age 35_44	Dummy if the household head is between 35 and 44 years old.
Age 45_54	Dummy if the household head is between 45 and 54 years old.
Age 55_64	Dummy if the household head is between 55 and 64 years old.
Age over 65	Dummy if the household head is older than 65 years old.
Head education	
Head no education	Dummy if the head has no education.
Head primary	Dummy if the head has achieved primary education.
Head lower	Dummy if the head has achieved lower secondary education.
Head upper	Dummy if the head has achieved upper secondary education.
Head vocational	Dummy if the head has achieved vocational training.
Head college	Dummy if the head has achieved higher education.
Head occupation	
Head unemployed	Dummy if the head is unemployed in the past 12 months.
Head wage labour	Dummy if the head is wage labour in the past 12 months.

Head self-employed	Dummy if the head is self-employed in the past 12 months.
<i>Household members by age</i>	
Under 5	Numbers of household members younger than 5 years old.
Age 6-14	Numbers of household members aged between 6-14 years old.
Age 15-64	Numbers of household members aged between 15-64 years old.
Age over 65	Numbers of household members older than 65 years old.
<i>Household assets</i>	
Landless	Dummy if household does not own any farming and cropping lands.
Land less than 0.5 ha	Dummy if household owns less than 0.5 hectors of lands.
Land 0.5-1 ha	Dummy if household owns 0.5-1 hectors of lands.
Land 1-2 ha	Dummy if household owns 1-2 hectors of lands.
Land 2-4 ha	Dummy if household owns 2-4 hectors of lands.
Land 4-8 ha	Dummy if household owns 4-8 hectors of lands.
Land over 8 ha	Dummy if household owns lands larger than 8 hectors.
Room	Numbers of rooms in the house (excluding kitchen/toilet/bathroom).
Floor	Dummy if the house's floor is earth clay floor.
Durable goods	Total values of household durable goods currently owned in riels.
<i>Village characteristics</i>	
Irrigated land	% of irrigated agricultural land in the village.
Manure/agro-chemical	Dummy if there is any shop selling manure and agro-chemicals in the village.
Technical support	Dummy if any households in the village receive any agricultural technical support from government agency, community organisation, NGOs, or private company.
Bus stop	Distance in Km from the village of households to the nearest bus stop.
Electricity	% of households in the village access to public or private electricity.
NGO Projects	Dummy if village has any NGO development projects currently functioning.
Enterprise	Dummy if there is any industrial or commercial enterprise (such as factory, hotel, restaurant or company) employing more than 10 persons in the village or within 10km from the village.
<i>Village access to common property resources</i>	
Cultivated land	Dummy if the village gets access to land for cultivation.
Fish to catch	Dummy if the village gets access to fish for catching from lake or river.
Timber to take	Dummy if the village gets access to timber for house construction.
Firewood to collect	Dummy if the village gets access to firewood collection.
Bamboo to take	Dummy if the village gets access to bamboo to be taken.
Open land	Dummy if the village gets access to open land for animal grazing.
Fruit to pick	Dummy if the village gets access to fruit to be picked.
Wild animals to hunt	Dummy if the village gets access to wild animals to be hunted.
<i>Regional zones</i>	
Plain region	Dummy if household is in Kampong Cham, Kandal, Prey Veng, Svey Rieng, and Takeo provinces.
Tonle Sap region	Dummy if household is in Banteay Meanchey, Battambang, Kampong Chhnang, Kampong Thom, Pursat and Siem Reap.
Coastal region	Dummy if household is in Kompot, Koh Kong, Sihanoukville, and Kep.
Plateau region	Dummy if household is in Kampong Speu, Kratie, Mondulhiri, Preah Vihear, Ratanakiri, Stung Treng, Oddar Meanchey and Pailin.

Table C. 2: First stage regressions (Ln riels)

Variables	Total Remittances (1)	Migrant Remittances (2)	Internal Remittances (3)	International Remittances (4)
Village remit norm	48.192*** (2.719)	18.229*** (1.878)	47.505*** (2.645)	2.221** (0.950)
Health shock	0.371*** (0.127)	0.300*** (0.107)	0.350*** (0.123)	0.053 (0.063)
Head gender and age	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes
Constant	0.591 (0.625)	-0.044 (0.484)	0.739 (0.597)	-0.355 (0.316)
F statistics	48.37	26.36	44.81	3.38
Adj R2	0.24	0.15	0.23	0.03
No. observations	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%

Table C.3: Regressions of total remittances on agricultural, non-agricultural and total household income (Ln riels)

Variables	Agriculture Income		Non-agricultural Income		Total Household Income	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
Remittances (total)	0.005*** (0.002)	-0.008 (0.005)	0.017*** (0.005)	0.058*** (0.020)	0.006*** (0.002)	0.016** (0.006)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes
Constant	13.254*** (0.107)	13.277*** (0.107)	10.097*** (0.316)	10.026*** (0.316)	13.437*** (0.116)	13.420*** (0.117)
<i>Endogeneity test</i>						
Robust score chi2 (p-value)		6.402 (0.011)		5.105 (0.023)		2.826 (0.092)
Robust regression F		6.410 (0.011)		4.694 (0.030)		2.708 (0.099)
<i>Weak instrument test</i>						
F statistics		170.71 (0.000)		170.71 (0.000)		170.71 (0.000)
<i>Over-identified test</i>						
Score chi2		0.075 (0.784)		2.753 (0.097)		1.174 (0.278)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%

Table C.4: Regressions of total remittances on crop and livestock expenses of poor households (Ln riels)

Variables	Planting Seeds		Chemical Fertiliser		Feed Expense		Livestock Expense	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Remittances (total)	-0.010 (0.008)	-0.031 (0.030)	0.015 (0.026)	-0.192* (0.098)	0.014 (0.014)	0.090** (0.040)	0.004 (0.013)	0.061* (0.037)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	10.230*** (0.433)	10.286*** (0.447)	5.243*** (1.395)	5.815*** (1.428)	6.278*** (0.888)	6.067*** (0.889)	6.697*** (0.853)	6.539*** (0.852)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		0.516 (0.472)		4.909 (0.026)		4.577 (0.032)		2.836 (0.092)
Robust regression F (p-value)		0.497 (0.481)		6.652 (0.010)		4.499 (0.034)		2.812 (0.094)
<i>Weak instrument test</i>								
F statistics (p-value)		35.09 (0.000)		35.09 (0.000)		35.09 (0.000)		35.09 (0.000)
<i>Over-identified test</i>								
Score chi2 (p-value)		2.532 (0.111)		0.049 (0.825)		2.142 (0.143)		1.132 (0.287)
No. observations	1,664	1,664	1,664	1,664	1,664	1,664	1,664	1,664

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table C.5: Tobit and IV Tobit regressions of total remittances on crop and livestock expenses (Ln riels)

Variables	Planting Seeds		Chemical Fertiliser		Feed Expense		Livestock Expense	
	Tobit (1)	IV Tobit (2)	Tobit (3)	IV Tobit (4)	Tobit (5)	IV Tobit (6)	Tobit (7)	IV Tobit (8)
Remittances (total)	-0.014*** (0.004)	-0.063*** (0.014)	-0.007 (0.016)	-0.159*** (0.056)	0.037*** (0.007)	0.159*** (0.025)	0.023*** (0.007)	0.123*** (0.022)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	9.260*** (0.239)	9.345*** (0.242)	0.954 (0.892)	1.238 (0.903)	6.692*** (0.399)	6.481*** (0.409)	7.152*** (0.351)	6.979*** (0.359)
Log likelihood	-13371.33	-33052.57	-17463.47	-37146.54	-16390.80	-36064.89	-15708.67	-35384.38
LR chi2/Wald chi2 (Prob>chi2)	1439.01 (0.000)	1585.23 (0.000)	1676.41 (0.000)	1710.14 (0.000)	689.31 (0.000)	711.97 (0.000)	692.61 (0.000)	723.17 (0.000)
Wald test exogeneity (Prob>chi2)		14.65 (0.000)		8.15 (0.004)		25.26 (0.000)		22.23 (0.000)
<i>No. observations</i>	<i>6,575</i>	<i>6,575</i>	<i>6,575</i>	<i>6,575</i>	<i>6,575</i>	<i>6,575</i>	<i>6,575</i>	<i>6,575</i>

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table C.6: Regressions of total, migrant, internal and international remittances on total seed and fertiliser purchases (Ln riels)

Variables	Total seed and fertiliser purchases (dependent variable)							
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Remittances (total)	-0.016*** (0.005)	-0.068*** (0.017)						
Remittances (migrant)			-0.007 (0.006)	-0.168*** (0.045)				
Remittances (internal)					-0.012** (0.005)	-0.069*** (0.017)		
Remittances (international)							-0.030** (0.013)	-1.283** (0.575)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	10.094*** (0.279)	10.184*** (0.283)	10.070*** (0.279)	10.139*** (0.287)	10.088*** (0.279)	10.195*** (0.284)	10.058*** (0.279)	9.690*** (0.502)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		10.575 (0.001)		14.034 (0.000)		12.382 (0.000)		13.10 (0.000)
Robust regression F (p-value)		11.118 (0.001)		14.790 (0.000)		13.068 (0.000)		13.75 (0.000)
<i>Weak instrument test</i>								
F statistics (p-value)		170.71 (0.000)		53.12 (0.000)		174.89 (0.000)		3.17 (0.042)
<i>Over-identified test</i>								
Score chi2 (p-value)		1.033 (0.309)		2.291 (0.130)		0.986 (0.321)		1.075 (0.299)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table C.7: Regressions of total, migrant, internal and international remittances on total crop expenses (Ln riels)

Variables	Total crop expenses (dependent variable)							
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Remittances (total)	-0.007 (0.004)	-0.050*** (0.016)						
Remittances (migrant)			-0.001 (0.005)	-0.122*** (0.042)				
Remittances (internal)					-0.005 (0.004)	-0.051*** (0.016)		
Remittances (international)							-0.014 (0.011)	-0.910** (0.454)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	11.150*** (0.245)	11.225*** (0.248)	11.138*** (0.244)	11.190*** (0.250)	11.147*** (0.244)	11.233*** (0.248)	11.134*** (0.244)	10.871*** (0.397)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		8.398 (0.004)		8.937 (0.003)		9.155 (0.002)		7.604 (0.006)
Robust regression F (p-value)		8.589 (0.003)		9.133 (0.002)		9.369 (0.002)		7.756 (0.005)
<i>Weak instrument test</i>								
F statistics (p-value)		170.71 (0.000)		53.12 (0.000)		174.89 (0.000)		3.175 (0.042)
<i>Over-identified test</i>								
Score chi2 (p-value)		2.433 (0.118)		3.908 (0.048)		2.370 (0.123)		2.046 (0.152)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table C.8: Regressions of total, migrant, internal and international remittances on agricultural capital purchases (Ln riels)

Variables	Agricultural capital purchases (dependent variable)							
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Remittances (total)	-0.033*** (0.012)	-0.129*** (0.040)						
Remittances (migrant)			-0.003 (0.016)	-0.305*** (0.105)				
Remittances (internal)					-0.021 (0.013)	-0.131*** (0.041)		
Remittances (international)							-0.072*** (0.025)	-2.240* (1.163)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	1.410** (0.638)	1.574** (0.640)	1.354** (0.638)	1.483** (0.656)	1.391** (0.638)	1.595** (0.641)	1.331** (0.637)	0.695 (0.982)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		6.022 (0.014)		8.596 (0.003)		7.788 (0.005)		6.904 (0.009)
Robust regression F (p-value)		5.861 (0.015)		8.456 (0.004)		7.547 (0.006)		6.853 (0.009)
<i>Weak instrument test</i>								
F statistics (p-value)		170.71 (0.000)		53.12 (0.000)		174.90 (0.000)		3.175 (0.042)
<i>Over-identified test</i>								
Score chi2 (p-value)		2.690 (0.101)		3.857 (0.049)		2.636 (0.105)		2.612 (0.106)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

Table C.9: Regressions of total, migrant, internal and international remittances on livestock purchases (Ln riels)

Variables	Livestock (animal) purchases (dependent variable)							
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Remittances (total)	-0.035** (0.014)	0.078* (0.046)						
Remittances (migrant)			0.011 (0.017)	0.239** (0.120)				
Remittances (internal)					-0.035** (0.015)	0.079* (0.047)		
Remittances (international)							-0.017 (0.029)	2.110* (1.224)
Head gender and age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Head occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household members	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Housing and assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village resources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional zones	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.888*** (0.738)	3.692*** (0.742)	3.823*** (0.738)	3.725*** (0.747)	3.892*** (0.738)	3.681*** (0.743)	3.822*** (0.738)	4.446*** (1.048)
<i>Endogeneity test</i>								
Robust score chi2 (p-value)		6.871 (0.009)		3.877 (0.048)		6.743 (0.009)		5.210 (0.022)
Robust regression F (p-value)		6.363 (0.012)		3.685 (0.054)		6.255 (0.012)		4.950 (0.026)
<i>Weak instrument test</i>								
F statistics (p-value)		170.71 (0.000)		53.12 (0.000)		174.90 (0.000)		3.175 (0.041)
<i>Over-identified test</i>								
Score chi2 (p-value)		6.592 (0.010)		5.398 (0.020)		6.636 (0.010)		2.600 (0.106)
No. observations	6,575	6,575	6,575	6,575	6,575	6,575	6,575	6,575

Note: Standard errors in parentheses; * is significant at 10%; ** is significant at 5%; *** is significant at 1%.

