Chapter 2

Economic Impacts of Remittances from Migrants on Educational Expenditure, Health Expenditure, and Debt Payment: Empirical Evidence from Rural Cambodia

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1. Introduction

New economic opportunities in urban areas, wage differentials between urban and rural areas, poverty, and strategic coordination within family members to maximise family welfare have been hypothesised to induce rural–urban and international migration around the world (Harris and Todaro, 1970; Stark and Bloom, 1985; Chan, 2009; Hing and Lun, 2011; Hing, Pide, and Dalis, 2011; Maltoni, 2007; Godfrey et al., 2001; Escobar et al., 1998). At the same time, remittances have increased exponentially (World Bank, 2014), and their impact has been documented extensively, (e.g. Calero et al., 2008; Rodriguez, 1998; Vargas-Lundius et al., 2008; Wendy et al., 2011; Amuedo-Dorantes and Pozo, 2006, 2010; Cox-Edwards and Ureta, 2003; Adam, Rechard, and Cuecuecha, 2010; Halliday, 2006; Taylor, 2003; Mansour et al., 2011),[1] but empirical studies on the economic impact of internal and international migration in Cambodia are not up to date. Amongst them, Tong (2011), provided empirical evidence of the impact of remittances, finding that internal and international remittances could reduce the poverty ratio by 4.73% and 7.35%, respectively, and poverty could be reduced even more by taking the poverty gap into account. In line with Tong (2011), Roth and Tiberti (2017) found that remittances contributed significantly to reducing the poverty

[1] Net inflows of foreign direct investment are $0.8 billion and net official development assistance received was $0.7 billion in 2008. It is also worth noting that the amount of internal remittances was not available (World Bank, 2014).

headcount, although by a much smaller magnitude, as remittances ease consumption constraints. Remittances from migrant factory workers in Phnom Penh contributed to household income in Takeo Province (Luch, 2010). Using the 2009 Cambodia Socio-Economic Survey, Luch (2012a, 2012b) and Fukui and Luch (2017) found that migration and remittances have a significant impact on household income variations and children's education. In addition, both remittances and migration were found to have a positive impact on child educational expenditure (Fukui, Miwa, and Luch, 2013; Fukui and Luch, 2013); child health expenditure (Iwasawa, Inada, and Fukui, 2014); and household expenditure, credit constraint, and investment in agriculture (Mong, 2014).

However, this study fills the gap in the literature regarding the impact of remittances on education expenditure, debt payments, and health expenditure by using a unique survey data compiled by the authors in the two provinces that have the largest number of migrants, Battambang and Prey Veng. Unlike data used in the above-mentioned studies in the context of Cambodia, which was not designed to study migration issues, this study uses data specifically designed for studying migration, and includes detailed amounts of internal and international remittances over a 1-year period that each household receives from each migrating family member. Therefore, this study can identify the impact of internal and international remittances on health expenditure, education expenditure, and debt payments that the previous studies could not. The analyses cited assess only the impact of internal remittances or migration because the data do not provide enough information on remittances from the international migrants. Moreover, to reduce multicollinearity that can lead to an upward bias in the estimate of remittances regarding other important factors, such as income and assets that were bought using remittance receipts, the questionnaire was designed to exclude the impact of remittances on these items.

This study investigates the economic impact of internal and international remittances on educational expenditure, health expenditure, and debt payments using survey data collected from Battambang and Prey Veng provinces in 2015. It is structured as follows. Section 2 explains the research method,

including the process of data collection and descriptive statistics; Section 3 provides empirical evidence and discussion points; and Section 4 concludes the study.

2. Descriptive Statistics

Table 2.1 presents important variables, such as expenditure, household characteristics, and assets at the household and individual levels. On average, expenditure on education is smaller than expenditure on health (4.5 versus 7.4 on the logarithmic scale). Some households spend a significant proportion of total expenditure on debt payment, implying that debt payment is one of the major reasons for rural–urban and international migration. According to informal discussions with village and commune chiefs and other focal people in Prey Veng Province, several households in Prey Veng Province migrated to Thailand and other parts of Cambodia because indebtedness had forced them to sell their small parcel of land to pay the debt, leading to landlessness in several cases.[2]

Table 2.1: Descriptive Statistics

	Household Level		**Individual Level**	
Variable	Obs.	Mean	Obs.	Mean
Expenditure and house improvement				
Educational expenditure (log)	635	4.121	2,660	4.539
Health expenditure (log)	635	7.435	2,660	7.396
Debt payment (log)	635	3.452	2,660	3.636
House improvement (if yes=1)	635	0.031	2,660	0.040
Type of remittances				
Total remittances (log)	635	2.912	2,660	3.575
Internal remittances (log)	635	1.404	2,660	1.642
International remittances (log)	635	1.508	2,660	1.933
Assets				
Value of electronics (log)	635	10.953	2,660	11.020
Value of furniture (log)	635	7.531	2,660	7.593
Value of equipment (log)	635	4.587	2,660	4.723
Value of transports (log)	635	11.584	2,660	11.572

[2] Informal discussion with village chiefs in Prey Veng Province (November 2015).

Value of agricultural asset (log)	635	3.399	2,660	3.289
Value of livestock (log)	635	6.531	2,660	6.476
Land category				
Landless	635	0.348	2,660	0.376
0.1–5000	635	0.337	2,660	0.306
5001–10000	635	0.195	2,660	0.184
10001–20000	635	0.054	2,660	0.060
20001–40000	635	0.030	2,660	0.036
40001–80000	635	0.024	2,660	0.028
80001+	635	0.013	2,660	0.010
Income				
Net agricultural income (log)	635	9.223	2,660	9.586
Other incomes (log)	635	7.578	2,660	7.268
Household characteristics				
Sex of household head/sex of member (male=1)	635	0.809	2,660	0.194
Status of head/members				
Single	632	0.016	2,610	0.422
Widow	632	0.160	2,610	0.061
Married	632	0.809	2,610	0.493
Divorced	632	0.014	2,610	0.015
Others	632	0.002	2,610	0.008
Education of head/members				
No class	564	0.000	2,363	0.000
Preschool	564	0.087	2,363	0.071
Class 1 completed	564	0.016	2,363	0.034
Class 2 completed	564	0.025	2,363	0.042
Class 3 completed	564	0.044	2,363	0.053
Class 4 completed	564	0.092	2,363	0.093
Class 5 completed	564	0.090	2,363	0.083
Class 6 completed	564	0.119	2,363	0.098
Class 7 completed	564	0.083	2,363	0.087
Class 8 completed	564	0.131	2,363	0.104
Class 9 completed without certificate	564	0.098	2,363	0.082
Class 10 completed	564	0.085	2,363	0.091
Class 11 completed	564	0.041	2,363	0.042
Class 12 completed without certificate	564	0.009	2,363	0.023
Lower secondary diploma	564	0.057	2,363	0.043
Higher secondary diploma			2,363	0.004
Technical/vocational pre-secondary diploma	564	0.007	2,363	0.018
Technical/vocational post-secondary diploma			2,363	0.000
Bachelor’s degree	564	0.002	2,363	0.009
Master’s degree	564	0.014	2,363	0.018
Doctoral degree			2,363	0.004

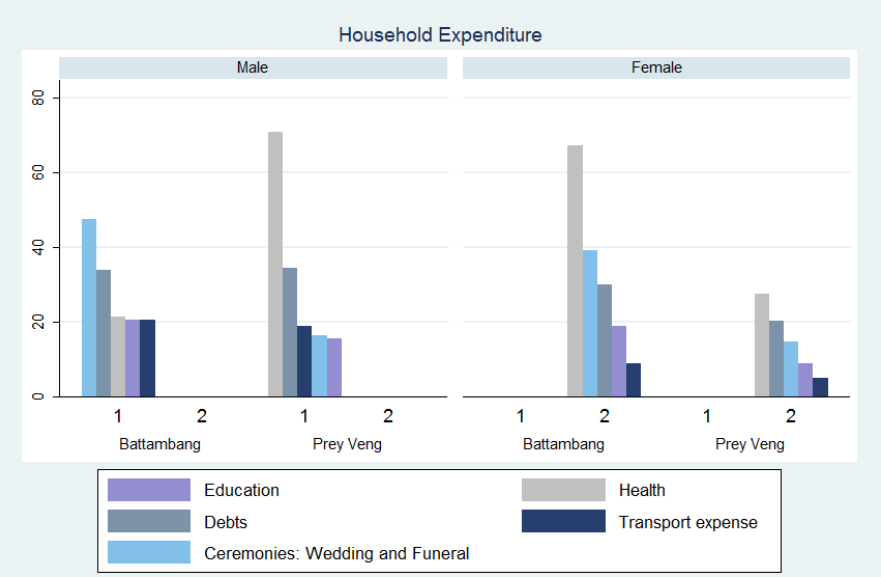
Age of head/members				
0–3			2,613	0.056
4–11			2,613	0.126
12–15			2,613	0.064
16–18			2,613	0.052
19–35	629	0.221	2,613	0.339
36–44	629	0.231	2,613	0.123
45–54	629	0.312	2,613	0.137
55+	629	0.235	2,613	0.101
Sex of school-aged children 4–18 (male=1)	634	0.811	2,612	0.479
Household members				
No. of young dependents			2,660	0.242
No. of school age	635	1.098	2,660	1.266
No. of working age	635	3.162	2,660	3.355
No. of dependents (65+)	635	0.427	2,660	0.407
House characteristics				
Clay	635	0.019	2,660	0.018
Wooden planks	635	0.773	2,660	0.778
Bamboo strips	635	0.030	2,660	0.031
Cement/brick/stone	635	0.117	2,660	0.128
Parquet/polished wood	635	0.022	2,660	0.019
Polished stone/marble	635	0.000	2,660	0.000
Vinyl	635	0.002	2,660	0.001
Ceramics tiles	635	0.003	2,660	0.003
Others	635	0.109	2,660	0.108
Lighting				
State electricity	635	0.883	2,660	0.882
Generator	635	0.002	2,660	0.002
Battery	635	0.069	2,660	0.069
Kerosene lamp	635	0.014	2,660	0.013
Candle	635	0.003	2,660	0.003
None	635	0.002	2,660	0.001
Solar	635	0.006	2,660	0.006
Others	635	0.017	2,660	0.020
Use of toilet				
Own toilet	635	0.803	2,660	0.814
Public toilet/pit latrine or shared with others	635	0.047	2,660	0.048
Open land	635	0.137	2,660	0.123
Main source of drinking water				
Piped in dwelling or on premise	635	0.161	2,660	0.185
Public tab	635	0.013	2,660	0.014
Tubed/piped well or borehole	635	0.025	2,660	0.024
Protected dug well	635	0.071	2,660	0.080

Unprotected dug well	635	0.409	2,660	0.362
Pond, river or stream	635	0.279	2,660	0.295
Water treatment				
Boil	635	0.584	2,660	0.576
Filter	635	0.241	2,660	0.256
With aluminium	635	0.014	2,660	0.014
No	635	0.164	2,660	0.155
Districts				
Battambang	635	0.031	2,660	0.040
Aek Phnom	635	0.227	2,660	0.254
Pea Reang	635	0.323	2,660	0.280
Sithor Kandal	635	0.146	2,660	0.141
Thmor Kol	635	0.272	2,660	0.284

Source: The authors' calculation from Household Survey (2015).

Figure 2.1 depicts the type of expenditures by households in the previous month converted into a year and split by the gender of the household head and migrant status in the target provinces. Health expenditure accounts for the largest household expenditure (more than $60 per month) in households headed by women in Battambang Province for the returned migrant household and by households headed by men in Prey Veng Province for the non-migrant household. Debt payment reaches $90 for migrant households headed by women and $220 for migrant households headed by men in Prey Veng Province.

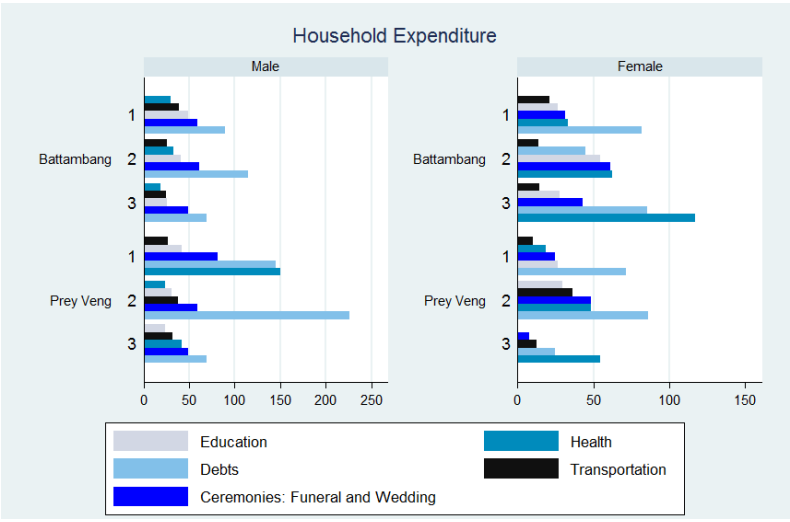
Figure 2.1: Type of Expenditure of Households Headed by Men and Women by Province ($)



Note: The expenditure is for the last month in United States dollars.
Source: Household Survey (2015).

Figure 2.2 reveals the difference in expenditure amongst households with migrants, without migrants, and with returned migrants, by province and gender. The amount of expenditure in United States (US) dollars is similar to the percentage shown in Figure 2.1 for which debt payment, health expenditure, and ceremonies remain higher.

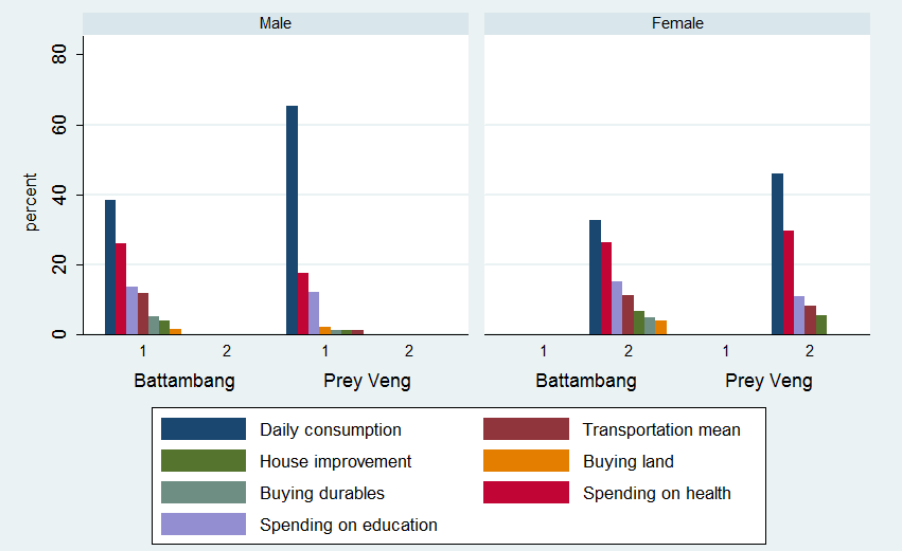
Figure 2.2: Type of Expenditure by Type of Migrants and Province ($)



1 = non-migrant households, 2 = migrant households, 3 = returned migrant households.

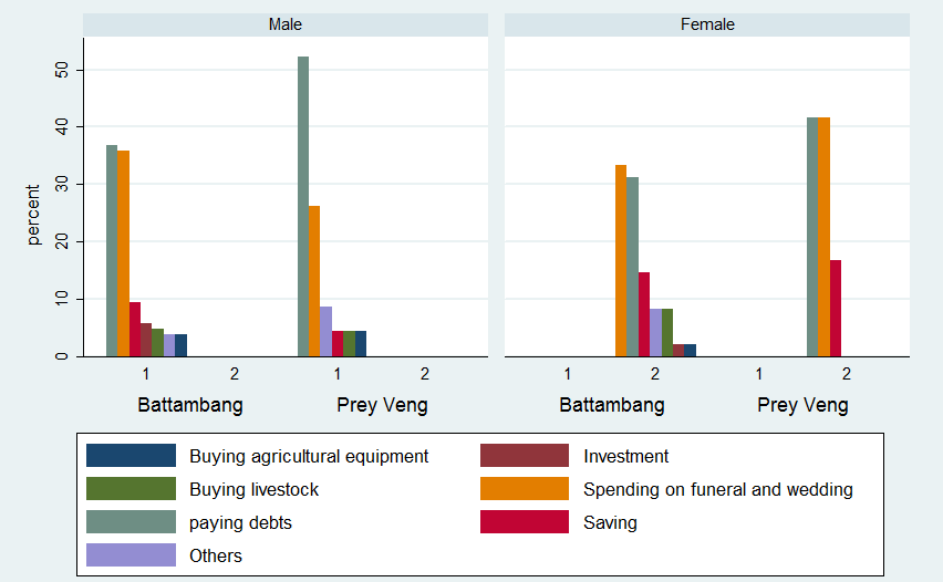
Source: Household Survey (2015).
Figure 2.3a shows that households use about 3% of remittances for house renovation and maintenance. Remittances are reportedly used mostly for daily consumption, followed by health, and education, which is in line with the findings of Maltoni (2007).

Figure 2.3a: Use of Remittances of Households Headed by Men and Women by Province (%)



Source: Household Survey (2015).

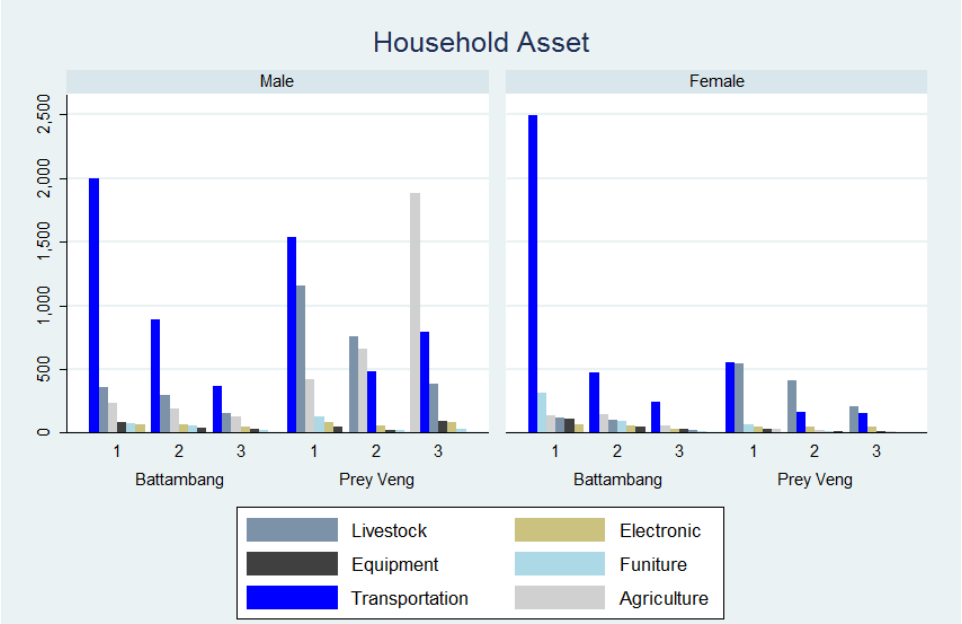
Figure 2.3b: Use of Remittances of Households Headed by Men and Women by Province (%)



Source: Household Survey (2015).

Table 2.1 also reveals that amongst the assets that households acquire, transportation is the largest in the logarithm form, followed by electronic items, and furniture. Figure 2.4 provides the value of assets in US dollars. To avoid multicollinearity, these values exclude any assets bought with previous remittances. The value of transportation is especially large in Battambang Province regardless of whether the household head is male or female.

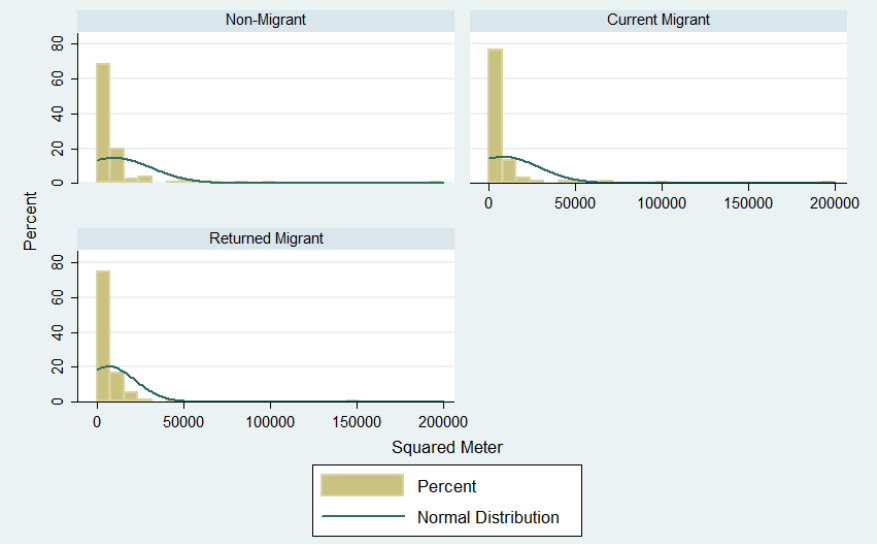
Figure 2.4: Value of Assets by Province ($)



1 = non-migrant household, 2 = current migrant household, 3 = returned migrant household.
Note: Value of current assets that do not use remittances for purchase in United States dollars.
Source: Household Survey (2015).

In the land category, 35% of households are landless and 33% have landholdings of 0.1–5,000.0 square metres. Households with 5,001–10,000 square metres of land make up only 19% of the total. The remaining households own more than 10,000 square metres of land. Figure 2.5 depicts land ownership by migrant status. Households that have had no migrants in the last 5 years own more agricultural land compared with households that have current migrants. This result is consistent with the informal discussions about the tendency for migrant households to own smaller pieces of agricultural land.

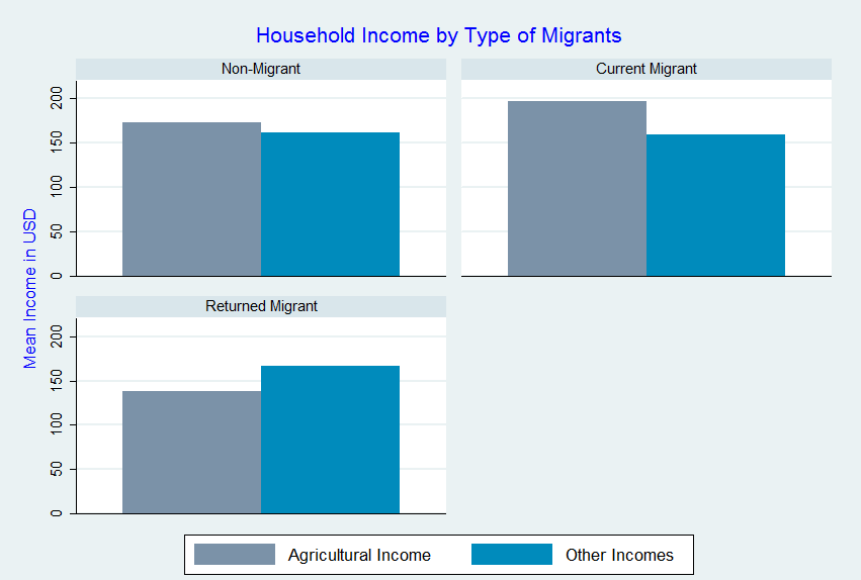
Figure 2.5: Agricultural Land by Migrant Status (%)



Source: Household Survey (2015).

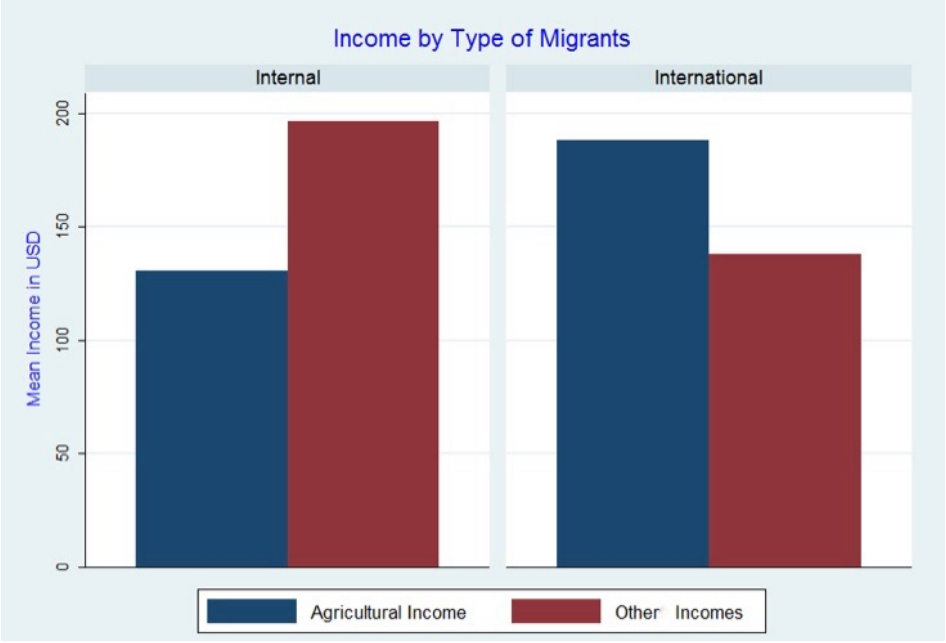
Figures 6 and 7 show that the agricultural incomes of households that have current migrants are larger than those that do not. Taking internal and international migration into consideration, households that have current international migrants have a larger agricultural income, whereas those with internal migrants have a larger income from other sources.

Figure 2.6: Income by Migrant Status ($)



Source: Household Survey (2015).

Figure 2.7: Income by Internal and International Migrants ($)



Source: Household Survey (2015).

There are 1.3 school-age children and 3.0 working-age members in each household on average (Table 2.1). Household members aged 4–11 account for 12%, and those aged 12–17 make up 12%. This suggests that school-age children account for 24% of total household members.

3. Estimation Results and Discussion

This study uses the Ordinary Least Squared method, to provide empirical evidence of the impact of total remittances in logarithmic form.

3.1 The impact of remittances on educational expenditure

The impact of remittances on schooling has been documented in several studies around the globe (Acosta et al., 2007; Acosta, 2011; Adam, Rechard, and Cuecuecha, 2010; Alcaraz, Chiquiar, and Salcedo, 2012; Amuedo-Dorantes and Pozo, 2006, 2010; Borraz, 2005; Antman, 2011; Bansak and Chezum, 2009).

Appendix 1, Table A1.1 provides the estimation result using the Ordinary Least Squared method on the impact of remittances on educational expenditure to fill the gap in the literature regarding Cambodia. Remittances are classified into total remittances, remittances from international migrants, and remittances from internal migrants. Educational expenditure in the form of a logarithm is the total educational expenditure by households in the last year. The amount of expenditure increases in proportion to the number of school-age children. To investigate the different effects of remittances, this study takes advantage of the household-level and individual-level estimates. The coefficients of remittances are expected to be positive and exogenous. This study also includes other important variables, such as household assets; household income; the number of household members, especially the number of school-age children in each household; and the education level of each household member. In theory, educational expenditure increases in tandem with household income, which includes agricultural income and income from other sources.

The estimation results in Appendix 1 indicate that the estimate of total remittances is positive and significant at the 5% and 1% levels at both the household and individual levels, but the magnitude of the estimated total remittances at the household level is larger than at the individual level. Educational expenditure increases by 0.084% and 0.055% with every 1% increase in total remittances (columns (1) and (2)). From the existing findings on the impact of remittances on school attendance by children aged 6–17, using the Cambodia Socio-Economic Survey 2009, it is interesting to note that school attendance increases by 0.5% if households received remittances from migrant workers (Luch, 2012b). Mong (2014), using the Cambodia Socio-Economic Survey 2009, found a positive impact of remittances on educational expenditure, but the magnitude of the estimate was significantly greater than the estimates provided in Appendix 1. In Mong (2014), a 1% increase in remittances leads to a 35% increase in educational expenditure.

In greater detail, educational expenditure regresses the internal remittances to distinguish the impact of such remittances. The estimation provides that internal remittances do not contribute to educational expenditure at the household level but contribute significantly to the increase in educational expenditure of 0.07% at the individual level. In the same set, it is interesting to study in detail the number of school-age children and the number of working-age family members at the individual level. The estimate of the number of school-age children is as expected and positively significant at a 1% level, suggesting that educational expenditure increases according to the number of school-age children. In contrast, the estimate for the number of working-age members is negative and significant at a 1% level in all the models. This implies that educational expenditure decreases by about 0.5% for each additional working-age member. However, it is important to note that the educational level of the household head is one of the most important factors for the educational status of the children (Benhabib and Spiegel, 1994; Barham and Boucher 2010) in relation to educational expenditure (Mong, 2014). In this study, educational expenditure increases according to the educational level of the household head. The estimate

of household members with a bachelor's degree at the household level is significant at a 1% level, indicating that these households tend to value education and spend more on their children's education.

Sources of income are, in theory, amongst the main predictors of educational expenditure. Table A1.1 shows that the effect of remittances on educational expenditure is smaller when income from agriculture and other sources is controlled, as part of these two sources of income is spent on the children's education. In this estimation, the contribution by agricultural income is about 0.04% at the individual level. The estimate of remittances from international migrants is larger than that of internal migrants, but its significant level is only at the 10% level (column (5)). This implies that agricultural income plays an important role in the expenditure on children's education, although internal remittances and international remittances contribute more.

It is important to note that the sources of income in rural households in Cambodia are diverse. Remittances are one of the important sources of income (Luch, 2010), and are used as one of the risk-coping mechanisms, as rural households are prone to shocks (Luch, 2012a), and such remittances could prevent them from falling further into chronic poverty (Tong, 2011). As a result, remittances and other sources of income play a crucial role in stabilising household consumption (Combes and Ebeke, 2011), especially educational expenditure. Other empirical studies of rural Cambodia have found the importance of cash transfers on school attendance and the dropout rate by school-age children, especially girls. School-age children from the households that were chosen for the study are predicted to attend school on a more regular basis than before, and as a result they are less likely to drop out from school, especially the female students (Filmer and Schady, 2008, 2010).

3.2 Impact of remittances on health expenditure

The share of expenditure on health is larger in rural Cambodia. Maltoni (2007), in his descriptive evidence, found that health expenditure accounted for more than 30% of the remittances

households received. In this study, health expenditure is as high as 60% in Prey Veng and Battambang provinces, regardless of the gender of the household head, and about 30% of total remittances are reportedly spent on health treatment. Damme et al. (2004) found that people in rural areas spend about 50% of the per capita income on medical treatment. These descriptive findings are in line with existing studies. Ruger (2003) suggested that health expenditure could be a root cause of poverty, as people in rural Cambodia reduce future consumption and are willing to take on debt to stabilise future consumption. Yagura (2005 and 2011) found that in the absence of a social safety net, rural households facing serious health issues sell their productive assets to cope with health shocks. However, people in rural areas use several financial channels to fund medical treatment (Damme et al., 2004), and remittances have been found empirically to smooth household income variations at times of shock (Luch, 2012a) and increase the total household income (Luch, 2010) in rural Cambodia.[3] Therefore, this study investigates the impact of total remittances, and the remittances from internal and international migrants, on households' expenditure on health.

However, it is worth distinguishing between health expenditure to improve health status and health treatment that increases expenditure as a result of health shocks in a given period of time. Notably, households from a higher economic stratum that have a good education level and access to better sanitation may spend more on health improvement than poorer households. In this study, the data we collected lacked such fine detail, so it is difficult to separate the various effects, especially those on education, energy usage, and water usage.

Table A1.2 shows that the estimate of total remittances at the household and individual levels are positive and significant at a 1% level, indicating the strong impact of total remittances on health expenditure via the welfare of the household in the community of origin of the migrants. Total remittances contribute about 1% and 0.07% to households' expenditure on health at the

[3] In Burkina Faso, remittances have empirically been found to be one of the factors that increase the chance of households living above the poverty line (Yameogo, 2014).

household and individual level. The estimate of internal remittances is greater than that of total remittances and international remittances. A 1% increase in internal remittances leads to an increase in household health expenditure by 0.14% at the household level and 0.06% at the individual level. Compared to the estimate of internal remittances, household expenditure on health increases by 0.04% for every 1% increase in international remittances at the individual level (Table A1.2, columns (5) and (6)).

It is interesting to compare the estimates for technical and vocational training for a post-secondary diploma, higher education diploma, and attending university. The estimate for the higher diploma and technical and vocational post-secondary diploma is negative and significant at the 10% and 5% levels at the household level, suggesting that households whose heads have a diploma tend to spend less on health. This could be because they have enough capacity to receive greater disseminated information and are more hygiene-conscious than those with lower levels of education, for example using sanitary toilets and drinking boiled water. The coefficients for public toilets and open land are positively significant at the individual level, which suggests that these households are more likely to be exposed to disease, and therefore spend more on health treatment. The same logic can be drawn from the significant impact of water use of and access to energy. The estimate for using water from a river or pond is negatively significant, meaning that such households are relatively poorer and less likely to spend on health treatment. Moreover, households that have a generator, solar panels, or report having access to electricity are likely to be richer, and the prediction is strongly in line with this; they are more likely to spend on health improvement.[4]

Health expenditure is expected to rise with an increase in the number of household members. The estimation results provide strong empirical evidence accordingly. In contrast to the number

[4] Please also note that we do not report the estimates of toilet and water usage in Table A1.2 to reduce the length of the chapter. For curious readers, this information is available upon request.

of school-age children and the working-age population, an additional number of members is associated with a 0.28%–0.35% increase in health expenditure at the individual level.

House characteristics are also a good indicator of household wellbeing. The results show that the estimate for a house with a polished or parquet floor is negatively significant at a 1% level, indicating that such households are more likely to be wealthier and healthier, and to spend less on health treatment. Agricultural income has a negative effect on health expenditure. The higher the agricultural income, the smaller the health expenditure. Agricultural income has a positive association with the optimal size of agricultural land and agricultural assets. The estimation results show that health expenditure at the household level increases by 1.1%–1.2% if the households have 1–4 hectares of agricultural land, and this increases by 0.09% with every 1% increase in the value of agricultural assets and livestock.

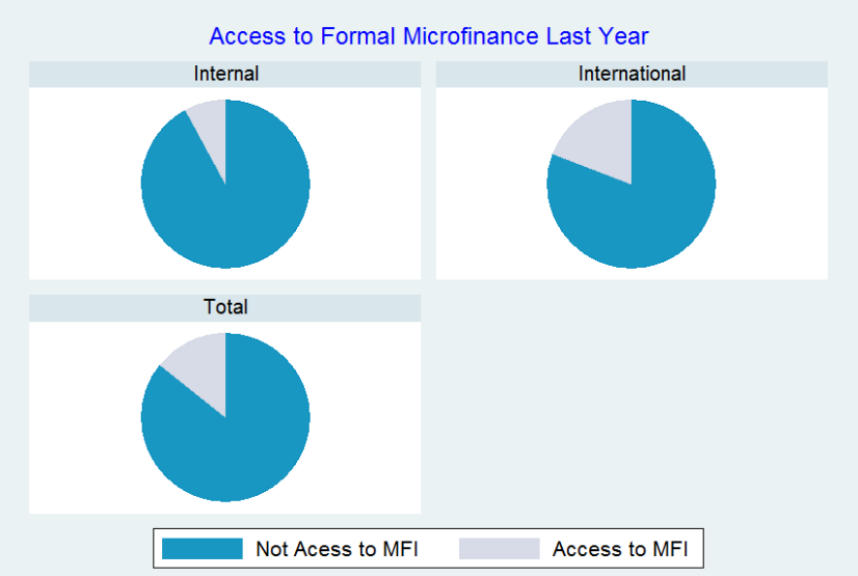
3.3 Impact of remittances on debt payments

Indebtedness is a serious issue in Cambodia. Loans are one of the strategies to mitigate health shocks (Damme et al., 2004) for medical treatment that could result in poverty (Ruger, 2003), and to some extent a natural calamity, such as drought and flood, that leads to a decrease in income and an increase in debt (CARE, 2011). The absence of social insurance and solid networks that protect rural people from borrowing at high interest rates (Ruger, 2003) and selling productive assets (Yagura, 2007) could lead to poverty if households lack sufficient wealth. However, remittances are found to be a coping mechanism to smooth income variations (Luch, 2012a) that could reduce household budget constraints and prevent poverty (Mong, 2014). In Mong (2014), a 1% increase in migrant remittances leads to a 0.27% reduction in borrowing shocks. The estimation results in this study are consistent with the above-mentioned studies, but only remittances from international migrants go to debt payments.

Table A1.3 provides the estimates of internal remittances at the individual level, with international remittances significant at a 5% and 1% level. The estimate of internal remittances

at an individual level is negative, which is against common sense but justifiable, as internal remittances are used mainly for consumption items, and international remittances are more likely used for debt payments. As indicated in Figure 2.8, international migrant households have greater access to formal microcredit. It is reasonable to believe that internal remittances are more likely to be spent on daily consumption, in contrast to international remittances, which are more likely spent on debt payments. The estimation results in columns (5) and (6) provide empirical evidence that a 1% increase in international remittances leads to an increase in debt payments of 0.14% at the household level and 0.09% at the individual level.

Figure 2.8: Access to Microfinance Last Year



Source: Household Survey (2015).

The ability to pay debt is strongly related to the number of working-age members in a household. Compared to educational expenditure, which has a negative relationship with the number of school-age members, the estimates in Appendix 2 provide that the estimate of the number of working-age members is positive and significant at a 5% and 1% level. From this estimation, households that have more working-age members can earn more income, or can diversify their income sources, and sending migrants is one of the options. Another good predictor is the value

of assets. Table A1.3 shows the positive association between the value of furniture and equipment and payment of debt. Households that possess a greater value of these two assets can pay debt at 0.04% and 0.07%. However, the value of transportation, such as a hand tractor, car, or motorbike, has a negative relationship with debt payment, which implies that households that hold such assets may borrow money to buy them. According to interviews with the village chiefs in Prey Veng Province, more and more villagers have secured loans from microcredit institutions to buy transportation. Buying a hand tractor to replace agricultural workers is a trend in the villages studied, as a considerable number of people aged 15–40 have chosen to migrate internally or internationally. This provides a very clear picture of the relationship between migration, remittances, and debt payments.

In contrast to the case of educational expenditure, for which the level of education of the household head plays a crucial role in the level expenditure, debt payments are negatively associated with a higher level of education of the household head. The estimates for the household heads that have earned a secondary technical or vocational training degree, bachelor's degree, or master's degree have negative associations with debt payments.[5]

4. Conclusion

In Cambodia, remittances from migrants have contributed to the development of the migrants' communities of origin via various channels, but there have been only a few empirical studies so far (i.e. Tong, 2011; Luch, 2010, 2012a, 2012b; Mong, 2014; Iwasawa, Inada, and Fukui, 2014). This study could fill the gap in the literature regarding the impact of internal and international

[5] It is important to note that to reduce the length of the chapter, we do not report the estimates of head education in Table A1.3. Curious readers may make a request the full estimation results.

remittances on the welfare of the migrants' households. By taking advantage of the survey data collected from Prey Veng and Battambang provinces and applying a simple econometric method (the Ordinary Least Squared method), breaking the estimation into household and individual levels, we found that total remittances contribute about 0.8% at the household level and 0.5% at individual level to educational expenditure for every 10% increase in total remittances. We also found a similar impact due to internal and international remittances on educational expenditure. It is interesting to note that internal and international remittances contribute to education expenditure by the same magnitude.

The impact of remittances on health expenditure is greater in our estimation. A 10% increase in total remittances leads to increases in health expenditure of 0.94% at the household level and 0.6% at the individual level. Moreover, the estimate of the internal remittances is bigger than that of international remittances, 1.3% and 0.6%, versus 0.39% and 0.44% respectively. This implies that remittances by internal migrants are more likely to be used for health expenditure than remittances by international migrants.

It is also interesting to investigate the impact of remittances on debt payments. Total remittances have no impact on debt payments, but international remittances have contributed significantly to debt payments. A 10% increase in international remittances leads to increases in debt payments of 1.4% at the household level and 0.9% at the individual level. This finding suggests that international remittances play an important role in relaxing credit constraints in rural Cambodia and could reduce the incidence of poverty.

Although remittances have contributed to the welfare gain of the recipient household in the short run by increasing the likelihood of health consumption, educational expenditure, and debt payments, any policy implication drawn from this should be cautious. The estimates of remittances are statistically significant, but the magnitude is smaller than 1, suggesting that remittances are inelastic and have little role to play, perhaps because of the endogeneity and selectivity problems. As found in the study of Roth and Tiberti (2017) in Cambodia, although

remittances ease consumption at household level, they are likely to reduce the household labour supply and increase leisure. Short-term migration policy that aims to increase the number of migrants to solve for short-term labour market issue would bring a long-term systematic change in rural labour supply and demand. The impact of migration and remittances deserves more investigation using panel data and more advanced econometric models.

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Appendix 1

Table A1.1: The Determinants of Educational Expenditure

Dependent variable: Educational expenditure (log)	(1)	(2)	(3)	(4)	(5)	(6)
	Total remittances		**Internal remittances**		**International remittances**	
	HH	**Individual**	**HH**	**Individual**	**HH**	**Individual**
Remittances (log)	0.0840**	0.0550***	0.0718	0.0695***	0.0767*	0.0278
	(2.26)	(3.48)	(1.34)	(3.06)	(1.65)	(1.45)
Value of electronics (log)	–0.0598	–0.0497*	–0.0553	–0.0467	–0.0527	–0.0441
	(–0.97)	(–1.73)	(–0.89)	(–1.62)	(–0.86)	(–1.53)
Value of equipment (log)	0.00313	0.00709	–0.00379	0.00292	0.00104	0.00475
	(0.08)	(0.37)	(–0.10)	(0.15)	(0.03)	(0.25)
Value of furniture (log)	0.0711**	0.109***	0.0752**	0.112***	0.0695**	0.111***
	(2.01)	(6.58)	(2.15)	(6.79)	(1.96)	(6.72)
Value of transports (log)	0.00813	0.0122	–0.00857	0.00216	0.00509	0.00682
	(0.23)	(0.75)	(–0.25)	(0.13)	(0.14)	(0.41)
Value of agricultural asset (log)	0.0425	0.0467***	0.0423	0.0449**	0.0492	0.0503***
	(1.12)	(2.61)	(1.10)	(2.48)	(1.30)	(2.82)
Value of livestock (log)	0.0215	0.0168	0.0282	0.0217	0.0215	0.0194
	(0.71)	(1.15)	(0.93)	(1.50)	(0.70)	(1.32)
Net agricultural income (log)	0.0369	0.0477**	0.0239	0.0338*	0.0403	0.0464**
	(0.98)	(2.57)	(0.64)	(1.84)	(1.06)	(2.44)
Other incomes (log)	0.0159	0.00601	0.0204	0.00859	0.0146	0.00447
	(0.33)	(0.25)	(0.42)	(0.36)	(0.30)	(0.19)
No. of school age	2.263***	2.044***	2.271***	2.042***	2.274***	2.046***
	(12.64)	(23.11)	(12.62)	(23.03)	(12.70)	(23.08)
No. of working age	–0.487***	–0.442***	–0.467***	–0.442***	–0.458***	–0.416***
	(–3.79)	(–8.20)	(–3.60)	(–8.06)	(–3.65)	(–7.80)
No. of dependents (65+)	0.435	–0.164	0.297	–0.186	0.441	–0.0928
	(0.94)	(–1.09)	(0.64)	(–1.23)	(0.95)	(–0.62)
Sex of household head	Yes	Yes	Yes	Yes	Yes	Yes

Marital status	Yes	Yes	Yes	Yes	Yes	Yes
Education of heads/member	Yes	Yes	Yes	Yes	Yes	Yes
Age category	Yes	Yes	Yes	Yes		Yes
Sex of child	Yes	Yes	Yes	Yes	Yes	Yes
Land Category	Yes	Yes	Yes	Yes	Yes	Yes
House characteristics (made from)	Yes	Yes	Yes	Yes	Yes	Yes
Lighting sources	Yes	Yes	Yes	Yes	Yes	Yes
Use of toilet	Yes	Yes	Yes	Yes	Yes	Yes
Main source of drinking water	Yes	Yes	Yes	Yes	Yes	Yes
Water treatment	Yes	Yes	Yes	Yes	Yes	Yes
Districts	Yes	Yes	Yes	Yes	Yes	Yes
Constant	2.215	0.417	2.953	0.921	2.351	0.570
	(0.75)	(0.38)	(1.00)	(0.82)	(0.80)	(0.50)
N	558	2338	558	2338	558	2338
Adj. R^2	0.364	0.414	0.360	0.414	0.361	0.411

HH = household.
Note: t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01
Source: Authors' estimation using Household Survey (2015).

Table A1.2: The Determinants of Health Expenditure

Dependent variable: Health expenditure (log)	(1)	(2)	(3)	(4)	(5)	(6)
	Total remittances		**Internal remittances**		**International remittances**	
	HH	**Individual**	**HH**	**Individual**	**HH**	**Individual**
Remittances (log)	0.0940***	0.0605***	0.137***	0.0613***	0.0388	0.0439**
	(2.91)	(4.57)	(3.87)	(3.55)	(0.88)	(2.57)
Value of electronics (log)	0.0261	-0.0299	0.0265	-0.0256	0.0359	-0.0246
	(0.49)	(–1.33)	(0.49)	(–1.13)	(0.67)	(–1.09)
Value of equipment (log)	–0.0702**	–0.0925***	–0.0769**	–0.0972***	–0.0763**	–0.0941***
	(–1.98)	(–5.54)	(–2.18)	(–5.81)	(–2.15)	(–5.63)
Value of furniture (log)	0.0636*	0.0697***	0.0695**	0.0726***	0.0642*	0.0714***
	(1.89)	(4.67)	(2.08)	(4.87)	(1.91)	(4.78)
Value of transports (log)	0.00372	–0.0251	–0.0139	–0.0363**	–0.00898	–0.0284*
	(0.11)	(–1.61)	(–0.43)	(–2.33)	(–0.27)	(–1.78)
Value of agricultural asset (log)	0.0454	0.0889***	0.0406	0.0879***	0.0522	0.0933***
	(1.37)	(6.25)	(1.22)	(6.11)	(1.57)	(6.61)
Value of livestock (log)	0.0415	0.0613***	0.0494*	0.0667***	0.0453	0.0628***
	(1.40)	(4.54)	(1.67)	(4.97)	(1.50)	(4.59)
Net agricultural income (log)	–0.0733**	–0.0550***	–0.0910***	–0.0688***	–0.0769**	–0.0533***
	(–2.12)	(–3.39)	(–2.63)	(–4.26)	(–2.18)	(–3.19)
Other incomes (log)	–0.0610	–0.0556**	–0.0551	–0.0535*	–0.0596	–0.0580***
	(–1.48)	(–2.48)	(–1.33)	(–2.37)	(–1.42)	(–2.60)
No. of school age	–0.286*	–0.109	–0.285*	–0.111	–0.271*	–0.106
	(–1.79)	(–1.58)	(–1.80)	(–1.60)	(–1.68)	(–1.53)
No. of working age	–0.215**	–0.0913**	–0.211*	–0.0849	–0.173	–0.0636
	(–1.96)	(–2.03)	(–1.94)	(–1.90)	(–1.61)	(–1.46)
No. of dependency (65+)	0.534	0.282**	0.368	0.278*	0.463	0.356***
	(1.20)	(2.08)	(0.85)	(2.03)	(1.01)	(2.64)
Sex of household head	Yes	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes	Yes
Education of member	Yes	Yes	Yes	Yes	Yes	Yes
Age category	Yes	Yes	Yes	Yes	Yes	Yes
Land category	Yes	Yes	Yes	Yes	Yes	Yes
House characteristics (made from)	Yes	Yes	Yes	Yes	Yes	Yes
Lighting sources	Yes	Yes	Yes	Yes	Yes	Yes
Use of toilet	Yes	Yes	Yes	Yes	Yes	Yes

Main source of drinking water	Yes	Yes	Yes	Yes	Yes	Yes
Water treatment	Yes	Yes	Yes	Yes	Yes	Yes
Districts	Yes	Yes	Yes	Yes	Yes	Yes
Constant	–1.508	–0.108	–0.730	0.429	–0.950	–0.0648
	(–0.50)	(–0.11)	(–0.24)	(0.44)	(–0.31)	(–0.07)
N	559	2348	559	2348	559	2348
Adj. R^2	0.174	0.203	0.176	0.200	0.162	0.198

Note: t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01. HH = household.

Source: Authors' estimation using Household Survey (2015).

Table A1.3: The Determinants of Debt Payments

Dependent variable: Debt payment (log)	(1)	(2)	(3)	(4)	(5)	(6)
	Total Remittances		**Internal Remittances**		**International Remittances**	
	HH	**Individual**	**HH**	**Individual**	**HH**	**Individual**
Remittances (log)	0.0371	0.0224	–0.0966	–0.0618***	0.140**	0.0931***
	(0.83)	(1.24)	(–1.61)	(–2.64)	(2.48)	(3.92)
Value of Electronics (log)	–0.0698	–0.0277	–0.0575	–0.0203	–0.0711	–0.0312
	(–1.04)	(–0.84)	(–0.86)	(–0.61)	(–1.07)	(–0.95)
Value of Equipment (log)	0.0922*	0.0728***	0.0869**	0.0707***	0.0998**	0.0782***
	(2.23)	(3.53)	(2.10)	(3.42)	(2.47)	(3.83)
Value of Furniture (log)	0.0591	0.0452**	0.0578	0.0476**	0.0528	0.0421**
	(1.37)	(2.31)	(1.35)	(2.45)	(1.23)	(2.17)
Value of Transports (log)	–0.0646	–0.0995***	–0.0745*	–0.104***	–0.0450	–0.0864***
	(–1.46)	(–4.77)	(–1.69)	(–5.00)	(–1.00)	(–4.11)
Value of agricultural asset (log)	–0.0173	0.0132	–0.00711	0.0193	–0.0129	0.0160
	(–0.38)	(0.64)	(–0.16)	(0.94)	(–0.29)	(0.79)
Value of livestock (log)	0.0265	0.0150	0.0286	0.0171	0.0178	0.00871
	(0.74)	(0.90)	(0.79)	(1.03)	(0.49)	(0.52)
Net agricultural income (log)	–0.0342	–0.0125	–0.0327	–0.0100	–0.0153	0.00555
	(–0.77)	(–0.58)	(–0.75)	(–0.47)	(–0.34)	(0.25)
Other incomes (log)	0.100*	0.0776***	0.0997*	0.0743***	0.0936*	0.0741***
	(1.88)	(2.73)	(1.86)	(2.60)	(1.80)	(2.65)
No. of school age	0.0367	0.149	0.0551	0.153*	0.0338	0.153*
	(0.19)	(1.60)	(0.28)	(1.64)	(0.17)	(1.64)
No. of working age	0.239	0.426***	0.292**	0.464***	0.232	0.428***
	(1.64)	(6.76)	(1.98)	(7.33)	(1.62)	(6.84)
No. of dependents (65+)	–0.342	–0.376*	–0.374	–0.273	–0.161	–0.345*
	(–0.60)	(–1.90)	(–0.67)	(–1.39)	(–0.28)	(–1.79)
Sex of household head	Yes	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes	Yes
Education of member	Yes	Yes	Yes	Yes	Yes	Yes

Age category	Yes	Yes	Yes	Yes	Yes	Yes
Land category	Yes	Yes	Yes	Yes	Yes	Yes
House characteristics (made from)	Yes	Yes	Yes	Yes	Yes	Yes
Lighting sources	Yes	Yes	Yes	Yes	Yes	Yes
Use of toilet	Yes	Yes	Yes	Yes	Yes	Yes
Main source of drinking water	Yes	Yes	Yes	Yes	Yes	Yes
Water treatment	Yes	Yes	Yes	Yes	Yes	Yes
Districts	Yes	Yes	Yes	Yes	Yes	Yes
Constant	12.70**	2.280	13.13**	2.334	11.84**	1.616
	(2.37)	(0.97)	(2.43)	(0.94)	(2.30)	(0.71)
N	559	2348	559	2348	559	2348
Adj. R^2	0.075	0.124	0.078	0.125	0.086	0.129

Note: t-statistics is in parentheses. * p<0.10, ** p<0.05, *** p<0.01. HH means household.
Source: Authors' estimation using Household Survey (2015).

Appendix 2: Sample Selection

Data for this study were collected from the third week of October 2015 to the second week of November 2015 in Prey Veng and Battambang Provinces.

1. Sampling Process

There are no available statistics on the number of migrant or non-migrant households. At 95% of the confidence interval, the ideal sample number is about 96. However, to achieve greater accuracy, we set the sample number of migrant and non-migrant households at 167 for each category. The sample size was adjusted to 172 to accommodate the possibility of a 10% non-response rate (Table A2.1).

Table A2.1: Sample Distribution by the Category of Respondents

Respondents	No. of Minimum Sample Size	No. of Adjusted Sample Size
Migrant households	166	172
Non-migrant households	166	288
Returned migrants (Individual and households)	332 (166 x 2)	440 (220 x 2)

Note: The questionnaire for returned migrants is divided into two parts—individual returned migrants and households with returned migrants. Returned migrants were interviewed individually and on behalf of their households. Therefore, this study can use a single data set consisting of migrant households, non-migrant households, and households with migrant workers plus returned migrants.
Source: The authors.

The number of samples is distributed in proportion between the non-migrant and migrant households in Prey Veng and Battambang Provinces. The sampling process began by collecting the total population in each selected province, the number of migrant households, and migrants who returned in between 2014 and 2015. Non-migrant households are those that have never had any member of the household migrate or have had no household members migrate in the last 5 years. Migrant households are those that currently have members working outside the community of origin. However, households that have both returned migrants and current migrants are excluded from the sample to avoid upward bias of the impact of migration and

remittances. Returned migrants are family members who have returned to their community of origin in the last 5 years and were living in the community of origin during the time of the survey.

The number of samples in each selected province was divided based on the population of each selected province. Battambang Province has a larger population than Prey Veng Province, so the number of samples selected in Battambang Province was larger than in Prey Veng Province. Because the number of international migrants in Battambang Province was larger than that of Prey Veng Province, the number of international migrant households selected was much higher in Battambang Province. The proportion of domestic migrant households selected in Prey Veng Province was higher than that in Battambang Province.

Quality control was handled by each supervisor at the respective study site before submission to the survey's team leaders for a final check. After quality control, the data was entered used the EPIC data plate form and was imported into Stata for the final analysis.

2. Location and Sample Size

Prey Veng Province. Consultation with the provincial municipality provided justification for the selection of Rumlech commune in Sithor Kondal district and Prey Pnov commune in Pea Reang district (Table 2.2).

Table A2.2 provides the characteristics of the population used to draw the number of samples. Table A2.3 shows the sample size in each selected commune based on the proportion of migrants to the total population. Table A2.4 describes the number of returned migrants selected for the sample frame. A total of 110 individual returned migrants were selected and invited to answer the household questionnaire. The returned migrants answered both the individual returned migrant questionnaire and the household questionnaire.

Table A2.2: Distribution of Total Population by Selected Communes

Commune	Total Population	Internal Migrants	International Migrants	Total Migrants	Total Non-Migrants
Rum Lech	9,543	2,000	1,600	**3,600**	**5,943**
Prey Pnov	21,849	1,203	4,265	**5,468**	**16,381**
Total	**31,392**	**3,203**	**5,865**	**9,068**	**22,324**

Source: Commune database (2015).

Table A2.3: The Selected Samples

Commune	Migrant Households			Non-Migrant Households	Total Households
	Internal	International	Total		
Rum Lech	13	11	**24**	40	**64**
Prey Pnov	8	28	**36**	110	**146**
Total	**21**	**39**	**60**	**150**	**210**

Source: The author's calculation from the Commune Database (2015).

Table A2.4: Returned Migrants

Commune	Internal	International	Total
Rom Lech	18	15	**33**
Prey Pnov	17	60	**77**
Total	**35**	**75**	**110**

Source: The author's calculation from the Commune database (2015).

Battambang Province. Tmor Korl district and Aek Phnum district were selected because Tmor Korl district has a high proportion of migrants, with an equal distribution between domestic and international migrants, and Aek Phnum district is located by Tonle Sap Lake, where agricultural activities are dominant.

Thmor Korl district stands second in terms of total migrants (16,244 migrant workers in 2014), of which domestic migrants account for 42.3% and the remainder are international migrant workers. From these figures, the two communes in Tmor Korl district that had the highest proportion of migrants were selected with an equal distribution of domestic and international migrants—Chrouy Sdau commune and Anlong Run commune.

Aek Phnum district is located by the Tonle Sap Lake. Migrants make up 8.5% of the population, distributed equally between domestic migrants (50.7%), and international migrants (49.3%). Preak Norint commune was chosen, because it has the highest proportion of migrants in this district.

Tables A2.5 and A2.6 present the total population size and the selected sample size from each commune, based on the proportion of the number of domestic and international migrants in each commune to the total population.

Table A2.5: Distribution of Total Population by the Selected Communes

Commune	Total Population	Internal Migrants	International Migrants	Total Migrants	Total Non-Migrant Households
Chrouy Sdau	11,129	723	2,419	**3,142**	**7,987**
Anlong Run	4,727	1,740	1,152	**2,892**	**1,835**
Preak Norint	13,000	1,425	1,476	**2,901**	**10,099**
Total	**28,856**	**3,889**	**5,047**	**8,936**	**19,920**

Source: Commune database (2015).

Table A2.6: The Distribution of the Samples in each Commune

Commune	Migrant Households			Non-Migrant Households	Total Households
	Internal	International	Total		
Chhrouy Sdao	9	30	**39**	55	**94**
Ang Lung Run	22	14	**36**	13	**49**
Prey Norrin	18	19	**37**	70	**107**
Total	**49**	**63**	**112**	**138**	**250**

Source: The author's calculation from the Commune database (2015).

Similarly, Tables A2.7 and A2.8 show the number of domestic and international returned migrants in each selected commune. It is worth noting that the sample size selected is not based on a random sampling process or a stratified random sampling process of the non-migrant households and migrant households. Because there were few returned migrants, to meet the project's objective of investigating returned migrants, any returned individual migrant was invited to interview at the individual and household levels.[6]

Table A2.7: The Distribution of Returned Migrants

Commune	Internal	International	Total
Chhrouy Sdao	10	33	**43**
Ang Lung Run	11	7	**18**
Prey Norrin	24	25	**49**
Total	**45**	**65**	**110**

Source: The author's calculation from the Commune database (2015).

[6] The questionnaire has two parts: The first part is the household questionnaire and the second part is the individual questionnaire for returned migrants only.

Total Sample Size in Prey Veng and Battambang Provinces. In summary, to avoid oversampling and to reduce attrition bias, the sampling process was based on a purposely stratified random sampling in proportion to the total population. The same method was not applied to the returned migrants due to the insufficient number of returned migrants. This method of selection could yield potential bias, but special treatment was given when analysing this factor. Table A2.8 summarises the sample size of migrant households, non-migrant households, returned migrants, and returned migrant households in Battambang and Prey Veng Provinces.

Table A2.8: Summary of the Number of Samples

Province	Prey Veng	Battambang	Total
Migrant households	60	112	**172**
Non-migrant households	150	138	**288**
Returned migrant households	110	110	**220**
Returned migrants	110	110	**220**

Source: The author's calculation from the Commune database (2015).

3. Limitations

This study adopted the purposefully stratified random sampling process, through which the samples were categorised into migrant households and non-migrant households within each selected province in selected communes with diverse characteristics. However, this selection can potentially induce attrition bias, as the number of samples within a selected commune is relatively small, and the selected households could be concentrated in one area.

It proved difficult to find returned migrants living in the survey sites between 2010 and 2015.[7] As one of the main objectives of the project is to investigate returned migrants, a sufficient number of returned migrants must be selected. To have a good representation, this study interviewed all returned migrants in the study sites. A significant drawback was that most of the returned migrants were selected and this created oversampling.

[7] It is important to note that returned migrants are not in the study frame, but the sample is collected for other purposes.