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The Cambodian Debt Trap? A Study of the Relationship between
Remittance and Household Debt

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Abstract

The study explores the relationship between remittances and household debt in Cambodia. Common sentiment identifies remittances as a means of firstly alleviating, and eventually breaking, the poverty cycle through the direct increase of income. Whilst advocated by a large number of global and national development agencies, recent studies into the remittance-poverty nexus have identified a positive relationship between the former and debt: wherein debt itself is a constraint to escaping poverty. This paper employs the special regression approach to build upon the empirical methodologies present in comparable studies. The result aligns with these studies and identifies a positive and significant relationship between household received remittances and debt: thus confirming the research hypothesis that remittances incentivize migrant households to borrow more money.

Remittances are shown to be associated with a minimum increase to debt burden of 6 percent.

This insight can be explained from two perspectives. On the demand side migrant households take on loans in order to satisfy capital or expense requirements on both productive and unproductive assets. Remittances form part of a financial confidence to repay debts wherein receiving households view their incomes as stable. On the supply side, lenders (both formal and informal) view remittances as a mechanism of reducing lending constraints whereby they function as collateral on loans. Particularly in informal markets remittances work to convey trusted confidence of a family's ability to repay.

With the result, the paper concludes that remittances and loans complement each other because the reception of remittances engenders a subsequent burden of debt in order to address difficulties vis-á-vis liquidity shortages for their primary consumption needs, economic activities, shocks, and other purposes for which the regular remittances flow is insufficient.

Keywords *Remittance, Debt, Endogenous Regressor, Instrumental Variable, Special Regression Approach, Demand, Supply*

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Introduction

Global remittances, which include flows to high-income countries, increased 7% from $573 billion in 2016 to $613 billion in 2017 and became the second largest capital inflow in low- and middle-income countries: accounting for a record level of $466 billion in 2017, an increase of 8.5% over $429 billion in 2016 according to World Bank (2018). A well-known labor migration in Southeast Asia, Cambodia's remittances – defined as an income that migrants send to their family left-behind from cross-border employment – contribute 3% of GDP and risen by 165% from 2009 to 2014 from $142 million to $376 million (World Bank, n.d.). Remittances are regarded as having a very important role in reducing poverty and inequality, providing social benefits and multiplier effects, and contributing to economic growth and development. The OECD and the CDRI (2017) found that the majority of migrant households use remittances to repay their debt (See Appendix 1); therefore, conforming to the expectation that debt per household should be reduced by the additional increase of remittances. However, Cambodia Socio-Economic Survey (2014) contradicts this assumption by showing that Cambodian debt per household had actually increased by 132% simultaneously with remittances for the same period of years from 2009 to 2014. (See Appendix 2). Herein we have the interest of this paper: what is the relationship between remittances and migrant family's debt within Cambodia?

The aim of the paper is to find the relationship between households receiving remittances and their financial decision making with respect to taking on board debt (formal or informal). It will then further explore and analyze the motivations that affect their decision to accumulate debt, as well as the sources of the loans themselves. These allow us to see both demand-driven (migrant households or borrowers) and supply-driven (lenders) implications of the financial services and the relationship with remittances.

In order to achieve the research purposes, the paper will ask the following questions: What is the association between income outside the local economy (remittances) and the determination to access to loans of the migrant households? What are the motives and sources of getting loans and its implications to Cambodian context?

This paper therefore proposes the following hypothesis: *remittances directly affect the financial decision making of migrant household, incentivize recipients to take on debt.* To test the research hypothesis, the study deploys the empirical strategy of 'Special Regression Approach' as advocated by Lewbel (J. Metrics, 2000).

The structure of the paper is designed in five sections as follows. Section I describes the research problem, research question, and research hypothesis. In the following section II it will review the related literatures, evaluate what has been addressed and identify the gap to be fulfilled. Section III introduces the data sources and describes its definitions with descriptive statistics and explains the empirical strategy on how the data is utilized in regard to using 'Special Regression Method'. Understanding the effect of remittances on household debt faces several methodological challenges of selection bias (the differences between migrant and non-migrant family on the observed and unobserved characteristics), reverse causality (debt may cause migration or in reverse migration roles as collateral for debt or they both may response to the third variable), and specification bias (the complicated association between the two makes it difficult to form a correct the model equation). As explicated more detail in section four, the study applies several tactics in order to tackle those concerns. The study provides six specifications in the model (household conditions, shock histories, economic activities, investment, consumption, and provincial economic development) with inclusion of two

instrumental variables (distance to the nearest Cambodia-Thailand border and variation of employment creation in Thailand). Section V presents the finding of the paper. The result shows a strong positive significant effect of remittances on household debt and confirms with the paper's hypothesis that remittances incentivize migrant family to take up loans. The last section VI resumes the research finding and provides policy options to improve the migrant family's financial management and role of financial institutions.

Literature Review

Migration and Remittances on Cambodia Socioeconomics Development

Cambodia is a well-known labor migration nation in Southeast Asia with a rapid increase of 160% migrants from half a million to 1.2 million in between 2000 and 2015 which is equivalent around 7.6% of Cambodia's total population (OECD and CDRI, 2017). Two major factors motivate migrant households' decisions: firstly, there are push factors such as poverty, lack of employment, income insufficiency, landlessness, and inability to repay debt (Maltoni, 2006; Chan, 2009; IOM, 2010); and secondly there are pull factors, for example a substantial wage differences between the country of origin and the destination country as well as social network that connects and shares with current migrant, former migrant, and non-migrant (Massey et al., 1993). Thailand is the main country of destination where hosted 1.8 million Cambodian migrants in 2018 (Kong, 2018).

Remittances income have traditionally been prescribed as a key tool for alleviating poverty and debt burden in developing nations. However, a number of recent studies on the relationship identify contradictions. Tong (2012) found in his study of migration and poverty that remittances account for 20% of households' income and have helped reduce poverty by 7.35%; however, its impact on income inequality is surprisingly low which implies that even though remittances contribute to a household's income they do not address the income gap as measured by the Gini coefficient. Similar to Tong (2012), a study from Roth et al. (2014) found a global poverty reduction of 7% attributed to total international remittances. They also found that the "dependency effect" of emigrant on reducing weekly working hours by 5% to 9% of adults employed. The impact of migration exists not only in poverty reduction literature, but also in other empirical studies on children left behind's well-being on three different areas: education, child labor and health (Hing, Phann and Lun, 2014); labor market, agriculture, education; and on investment and financial service (OECD and CDRI, 2017).

Migration in the context of Cambodia is becoming more dynamic, diverse and complex, with many researchers paying attention to the issues and impacts of migration on poverty, labor market, agriculture, education and investment. These leave gaps that are needed in migration studies to shed an understanding upon the phenomenon. This paper accordingly identifies the aforementioned contradiction that the impact of migration on financial decision, and more specifically the effect of remittances on household debt, has not been scrutinized enough. Whilst the volume of remittances has increases, so too has the amount of household debt.

The Effect of Remittances on Financial Services

The different lines of research have demonstrated multiple views on the effect of remittances and financial services. One claims that remittances function as a form of credit substitution when migrant households need liquidity to overcome restrictions on investment in human capital or physical capital of their family; it is often tied within a theoretical framework of imperfect credit markets (Calero et al., 2009; Taylor and Wyattt, 1996). Guiliano and Ruiz-Arranz (2009) found that countries with low financial development have higher growth because remittances can substitute for the inaccessible credit or absent of financial markets and enable individuals and enterprises to increase their investment in human and physical capital. Remittances do not only substitute for credit for investment purposes but also for emergencies such as health related problems and shocks, as found in Ambrosius and Cuecuecha (2013); households are less likely to rely on debt to finance their unexpected negative events.

Other research has claimed that remittances are the key facilitator in financial development; a number of empirical studies have found that remittances have positively associated with saving at the cross-country level (Aggarwal et al., 2011; Gupta et al., 2009). Ambrosius and Cuecuecha (2014) argued possible reasons for the impact of remittances on the amount of saving from two sides. From financial institutions side, banks need more capital in capturing remittances to develop their financial system by targeting recipient of remittances. From the other side, remittances receivers are having demand for savings options. To realize its effect, it is suggested migrant households to have financial knowledge and transmit it together with remittances.

In addition to remittances substitution for credit demand, and as key facilitator in financial development, the effect of remittances on the lead of having debt is found to be positive in Senegal using the OLS estimator with household fixed effect and instrumental variable (Mbaye, 2015)[1]. The result shows a complementarity between remittances and credit markets that households increase the reliability of their family members living abroad through remittances as collateral between borrowers and lenders in a credit contract to secure loan taking. A deeper analysis shows that a given migrant's family are driven by loans for consumption and food in particular; from informal rather than formal institutions. In line with the Senegalese case, the effect of remittances and debt is also found to be consistent in Mexico (Ambrosius and Cuecuecha, 2014): that the "remittances facilitate taking up loans". Using Mexican household data and the linear probability method with instrumental variables, they argue that there is a positive impact of remittances on loans and that the financial incentives may operate both through demand-driven and supply-driven channels. "From the demand side, a more flexible budgetary constraint among remittances-receiving households might reduce their risk aversions and increase the propensity of potential borrowers to take up debt. From the lenders' point of view, an additional and relatively stable source of income from outside the local economy enhances the creditworthiness of borrowers".

As informed by the above discussed literature, we begin to understand the competing and contradictory factors at play in the remittances, debt, development nexus. The next section seeks to test these insights with respect to the Cambodian circumstance in order to identify its state of play in the Kingdom.

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[1] Despite the fact that there are two case studies of Mexico and Senegal about the effect of remittances and household debt, they fail to approach the proper econometric model for their analysis with the given type of data (binary outcome and discrete endogenous variable). They utilize the ordinary least square regression method with instrumental variable to solve problem of endogeneity in variable of remittances which is unlikely able to use with the binary dependent variable and binary endogenous variable. The two-stage least squares (2SLS) is applied only if the outcome of interest is continuous (Amemiya, 1974).

Data and Empirical Strategy

Data

This research employs the data that originated from the Cambodia Socio-Economic Survey (CSES) in 2014: a sample size of 12,906 households coming from approximately 779 communes, and conducted by the National Institute of Statistics at the Cambodia Ministry of Planning. The data aims to provide essential information about the living condition of the Cambodian population and to understand the extent of poverty by asking households and their household members about housing conditions, education, economic activities, household production and income, household level and structure of consumption, health, vulnerability to food shortages and victimization.

The paper utilizes the special regression method proposed by Lewbel (J. Metrics, 2000): considered to be a very simple, but extremely effective estimator approach for binary choice models with endogenous variables, and therefore appropriate for driving the analysis of international remittances and household debt.

The binary choice model is written as:

$$D = I\,(X^e\beta_e + X^0\beta_0 + V + \varepsilon \geq 0) \text{ with instrument Z}$$

The main dependent variable is constructed with the binary indicator *Debt*, representing whether households reported to having borrowed money in the past 12 months from formal financial institutions (Banks, NGOs, or MFIs) and/or informal sources (relatives, friends, or moneylender). Around 30% of households in the sample reported as having outstanding debt. In addition, the primary variable of interest *Remit* is a binary variable that takes on a value of 1 if the household have received remittances abroad in the last 12 months and 0 if not. Unlike the CSES 2011, households were not asked about their family current migration in CSES 2014. Understanding migration information is missed but data on remittances appear on Other Income section in the survey that asked the amount of income households received through remittances abroad which represent 6.3% in the sample meaning that there are labors outflow approximately 1 million in Cambodia in 2014.

The study also includes a number of control variables[2] of household condition, such as areas where 1 indicated households living in urban and 0 in rural *(Urbrur)*, gender of household head given 1 to male and 0 to female head *(Headsex)*, age of the head of household *(Headage)*, number of member in the household *(HHsize)*, household head year of education *(Yearedu)*, a binary whether the household has land as an asset *(Land)*, number of member occupant (Occupant), daily income per capita measured in hundred US dollar *(Income)*, and daily expense per capita measured in hundred dollar *(Expenditure)*. It takes into account the types of shocks members of household have experienced for instance, the loss of crop *(Losscrop)*, illness of household member *(Illness)*, and unemployment member *(Lossjob)*. Other control variables are added in such as household economic activities: agricultural expenditure *(Agriexp)*, and non-agricultural expenditure *(Nonagriexp)*, household consumption: the expense on food consumption *(Foodcon)* and the expense on non-food consumption *(Nonfoodcon)*, household investment indicated as education expenditure *(Eduexp)* and binary

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[2] Expanded definitions of the variables and descriptive statistics can be found in Appendix 3 and Appendix 4 respectively.

variable of dwelling whether household has constructed, extended, or repaired the houses or buildings.

The study involves the analysis at provincial level indicated as the annual average rainfall in provincial city *(Rainfall)* and the expenses on projects implemented in every communes in 2014 *(Comexp)*. The data on the rainfall is available online at World Weather Online website which stores the previous history data on climate: such as temperature, visibility, weather, rain amount, and UV index. To have an annual average rainfall, it requires one to sum the monthly average amount of rain in each province. The commune expenditure data from more than 779 municipalities is also feasible online through the National Committee for Sub-National Democratic Development (NCDD) in Project Implementation Database. The combination of including household level and provincial level in the analysis give the study precise in exploring factors influenced on making decision to borrow money.

Finally, we have two additional variables of instrument: first, *Distance is* obtained from measuring the distance from communes where households reside to the closest border of Cambodia-Thailand such as Poipet Border, Anlong Veng Border, O'Smach Border, Cham Yeam Border using Google Map. While measuring, little problem happened that more than a hundred communes could not be found the name. To tackle with this issue, it is worth to identify the latitude and longitude coordinates (Lat Long coordinates) which could specify geographic location virtually any point on earth. These got from Elevation Map that registered the Lat Long coordinates, then paste to Google Map. Hence, the problem of unspecified location has been solved. Second, average job creation *(Jobcreate)* in Thailand from 2004 to 2014 acquires from the National Statistical Office of Thailand. It is noted that employment in destination country for Cambodian migrants is at mean 385,127.3 during the last 11 years.

Empirical Strategy

As identified by several theorists[3], studying the effect of remittances on household debt and borrowing poses several methodological challenges. First, non-identical average socioeconomics conditions among migrant households and non-migrant households cause the selection bias due to self-selection of migrants. Second, an unobservable characteristics or omitted variable at household level may have implication on remittances and debt. Third, possible endogenous problem could result in the reverse causality between remittances (or migration) and debt such that migration could be a household coping strategy in response to high debts, or that remittances make loans accessible. Fourth, the study of migration and remittances decision is a complicated phenomenon that it is difficult to find a correct form of representative equation of the household decision, which may lead to specification bias.

Several strategies are employed in response to these concerns. First, the detail information of CSES 2014 allows the study to analyze further the household socioeconomic status as a comprehensive set of indicators on living conditions. The study uses various variables related to household conditions, household unexpected shocks, household economic activities, household consumption, and household investment to control for unobserved factors that could have an effect on the household decision: as well as to solve self-selection of migrants and omitted variable bias. In addition to different levels of household analysis, the study involves indicators on the level of economic development of provinces where households live as indicated amount of commune expenditure, and total average rainfall annually because it may have a link to higher debt in different households' communes. Second, the study employs instrumental variables strategy in order to remove the issue of reverse causality of remittances

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[3] Ambrosius and Cuecuecha (2014), Mbaye (2015)

and household debt. Following the previous studies (Demirgüç-Kunt et al., 2011; Cordova, 2005; Woodruff and Zenteno, 2007), distance is a variable instrumented for endogenous remittances in essence to be considering an exogenous variable that strongly correlates to the cost of migration. Instrumental variable is measured in kilometer from the commune where migrant households live to the closest border of Cambodia-Thailand as car and bus transportation are the mainstream way and less costly for them to reach the country crossing line. Another instrumental variable used for remittances is the economic conditions in the country of destination (Adams and Cuecuecha, 2010, Adams and Cuecuecha, 2013, Anzoategui et al., 2014 and Yang 2008). Job creation in Thailand where Cambodian migrants move to is the instrumental variable because it is better explained the migration factor and the positive influence on the sending of remittances. Meanwhile, Thai labor market condition, which is exogenous and uncorrelated with unobserved components, do not have a direct effect on changes in debt level among Cambodian households.

Distance to the nearest border might be correlated with economic conditions of households and hence possibly violate the exogeneity assumption. Therefore, the combination by multiplying distance and Thai job creation to one indicator *(Disjob)* give the validity of instruments as following Demirgüç-Kunt et al. (2011).

The paper utilizes the special regression method, a very simple approach but massively effective estimator for binary choice models with endogenous variables,[4] driving for the analysis of international remittances and household debt. Special regressor estimators were first initiated by Lewbel (J. Metrics, 2000). Their application is amply described in Dong and Lewbel (2012, BC WP 604) and further developed in Dong and Lewbel (2015) assuming that the model includes a particular regressor, V, with three certain properties. First, it is exogenous that E (V|ε) = 0 and occurs as an additive term in the model. Second, V is continuously distributed with a large support, a condition normally satisfied with any normally distributed regressor. A third condition, preferable but not strictly necessary, is that V have a thick-tailed distribution. A regressor with greater kurtosis will be more useful as a special regressor.

Let V be some conveniently chosen exogenous regressor that is known to have a positive coefficient, and now let X be the vector of all the other regressors in the model. The binary choice model is written as:

$$D = I (X^e \beta_e + X^0 \beta_0 + V + \varepsilon \geq 0) \text{ utilizing instrument Z}$$

Where D is binary dependent variable whether households reported to have debt *(Debt)* and X^e *(Remit)* is a discrete endogenous variable that whether households receive remittances abroad. X^0 is the set of control variables included household level such as household condition, household unexpected shocks, household economic activities, household consumption, and

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[4] Several approaches exist for binary outcome such as linear probability model (LPM) with instruments using ivprobit model, maximum likelihood estimation, and control function-based estimation. The problem with these models is they can only apply with continuous endogenous regressor while often researchers attempt to estimate a category response, or discrete choice model where one or several independent variables are endogenous or hard to measure (Baum, Dong, Lewbel, Yang, 2012). Pertaining to binary outcome with discrete endogenous regressor, the alternative approach is to use Lewbel and Dong (2015) special regressor method with a particular 'special regressor', V, considered to be exogenous and exists additively in the model. It must be a continuous variable with thick tails of kurtosis.

household investment, and provincial level indicated as commune expenditure and rainfall. Household age is employed as special regressor V in the study because age is exogenous so it is conditionally independent from error term in respect as continuous distribution, and "human capital theory suggests it should appear linearly (or at least monotonically) in a threshold crossing model of the utility of migration". As following the investigation in female labor force participation in Turkey (Limanli, 2017) and the study of domestic migration in United States (Dong, 2010) deploy age as the special regressor for their empirical strategy in this approach. The command of sspecialreg written by Baum (2012) has been used for the study of remittances and debt.

Independent Variables	Binary Dependent Variable: Household Debt (1/0)					
	Spec (1)	Spec (2)	Spec (3)	Spec (4)	Spec (5)	Spec (6)
Remit	**0.0583**** **(0.0216)**	**0.0696**** **(0.0232)**	**0.0886***** **(0.0221)**	**0.0994**** **(0.0341)**	**0.0910***** **(0.0251)**	**0.0849*** **(0.0467)**
Headage	0.00124*** (0.0004)	0.00158* (0.0006)	0.00280*** (0.0005)	0.00298*** (0.0004)	0.00271*** (0.0003)	0.00274*** (0.0004)
Urbrur	-0.0134** (0.0051)	-0.0164* (0.0067)	-0.0220*** (0.0055)	-0.0225*** (0.0035)	-0.0203*** (0.0039)	-0.0210*** (0.0063)
Headsex	0.0165*** (0.0043)	0.0208** (0.0076)	0.0320*** (0.0064)	0.0339*** (0.0052)	0.0312*** (0.0050)	0.0306*** (0.0048)
HHsize	0.00454** (0.0016)	0.00565* (0.0026)	0.00971*** (0.0021)	0.00726*** (0.0018)	0.00706*** (0.0010)	0.00713*** (0.0013)
Yearedu	0.000703*** (0.0002)	0.000916** (0.0003)	0.00207*** (0.0006)	0.00197*** (0.0003)	0.00199*** (0.0003)	0.00198*** (0.0004)
Land	0.000171 (0.0019)	-0.00157 (0.0015)	-0.0134*** (0.0041)	-0.0154*** (0.0044)	-0.0128*** (0.0035)	-0.0139*** (0.0039)
Occupant	-0.00703** (0.0023)	-0.00894* (0.0042)	-0.0167*** (0.0036)	-0.0149*** (0.0031)	-0.0136*** (0.0017)	-0.0139*** (0.0018)
Income	-0.00226 (0.0043)	-0.00308 (0.0054)	-0.00552 (0.0068)	-0.00622 (0.0050)	-0.00579 (0.0056)	-0.00567 (0.0043)
Expenditure	-0.00159 (0.0041)	-0.00205 (0.0055)	-0.00579 (0.0135)	-0.00628 (0.0055)	-0.00398 (0.0063)	-0.00428 (0.0066)
Losscrop		0.00835* (0.0036)	0.0137*** (0.0035)	0.0145*** (0.0040)	0.0136*** (0.0026)	0.0131** (0.0049)
Illness		0.00263 (0.0023)	0.00317 (0.0028)	0.00335 (0.0029)	0.00313 (0.0023)	0.00354 (0.0035)
Nojob		-0.00329 (0.0060)	-0.00651 (0.0091)	-0.00325 (0.0128)	-0.00253 (0.0053)	-0.00345 (0.0075)
Agriexp			0.0317*** (0.0054)	0.0327*** (0.0058)	0.0280*** (0.0039)	0.0282*** (0.0039)
Nonagriexp			0.0139*** (0.0029)	0.0136*** (0.0023)	0.0131*** (0.0025)	0.0124** (0.0045)
Eduexp				0.0151***	0.0136***	0.0137***

	(1)	(2)	(3)	(4)	(5)	(6)
				(0.0031)	(0.0025)	(0.0041)
Dwelling				0.0254^{*}	0.0233^{***}	0.0242^{*}
				(0.0135)	(0.0052)	(0.0094)
Foodcon					-0.00393	-0.00408
					(0.0036)	(0.0032)
Nonfoodcon					0.000202^{**}	0.000190^{*}
					(0.0001)	(0.0001)
Rainfall						0.0000490
						(0.0000)
Comexp						0.0000104
						(0.0001)
N	11494	11494	11494	11494	11494	11494

Bootstrapped standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Empirical Finding

Table 1: The Estimated Marginal Effects of Migrant Household Debt

The above table presents the estimated marginal effects of covariates by the special regressor estimators age of household's head *(Headage)*. Marginal effects are calculated from coefficient, β, estimates using formulas given in Lewbel, Dong, and Yang (2012). The study reports marginal effects because they have more direct economic relevance than β, and because they are directly comparable across specifications.

It provides six specifications and their results from the use of 'Special Regression Method' with instrument Z. In specification (1) with analysis control for the household condition, it is found that remittances have a strong positive and statistically significant effect associated with household debt with the marginal effect 0.0583. This shows that the recipients of remittance are likely to increase the probability of having debt by 5.83%. It also shows that male head households *(Headsex)* that have an older year of age *(Headage)*, have a larger member size *(Hhsize)*, and have higher years of education *(Yearedu)* are more likely to have borrowed money. In comparison, households living in urban locations *(Urbrur)* that have additional employed member *(Occupant)* are less likely to have taken on board debt. Household income and expenditure are found to exhibit insignificant statistics.

In addition to specification (1) the study includes household stock history during the last 12 months given as specification (2). Households receiving remittances display increasing debt by the marginal effect 6.96%. This specification tells alike about the shock histories that households who experience losing crops *(Losscrop)* correspond to having debt and are uncorrelated with households who have illness and injury of a family member *(Illness)* or have a family member who lost their job *(Nojob)*.

To extend the analysis the paper further specification (3) adds household economics activities. Observing from the results, there is a positive significant effect of remittances on debt by the marginal effect of 0.0886 – migrant households are more likely to have probability increased debt by 8.86%. Also, the economic activities factors that whether households have been doing agriculture *(Agriexp)* and non-agriculture *(Nonagriexp)* relate to probability of having debt as showing the positive and significant statistic.

This research continues involving household investment factors as control variables in specification (4): remittances continue to exhibit a large, positive and statistically significant effect on the likelihood of increasing debt by around 9.94% upon a migrant family. While there is significant statistic of remittances, the factors of household investment such as if the family has spent money education *(Eduexp)* and has constructed, repaired, or extended buildings *(Dwelling)* are also linked with the household debt.

In regard to specification (5), where variables of household consumption are introduced, the sign of coefficient again provides the consistent coefficient output that is both positive and significant. Remittances display a marginal effect of 0.0910 tell and accordingly the probability of raising debt by 9.10% upon the receipt of remittance. In this specification, food consumption *(Foodcon)* has no association statistic with debt whereas non-food consumption *(Nonfoodcon)* has negative association statistic with debt.

The last specification (6) engages all factors that are identified across the literature to influence by introducing variables from the provincial level. Despite having more controls in the model, remittances perpetuate to be positive significant statistic in this study. The likelihood of households having received remittances is corresponding to augment debt in probability of 8.49%. However, it found no statistically significant of provincial analysis such as rainfall *(Rainfall)* and commune expenditure *(Comexp)*.

Crossing all six specifications with the variable of instrument, the estimations confirm the positive effect of remittances on household debt while holding other factors constant – a strong evidence emerges that migrant households are incentivized to borrow more money through the receipt of remittances from family living and working abroad.

Beyond the direct relationship, households exhibiting older male heads, living in rural areas, with bigger member size and with the shock of losing crops are more likely to possess debt. Furthermore, households who have economic activities such as agriculture and non-agriculture, have expensed on member's education and have constructed, repaired, and extended the houses or buildings are more likely to have borrowed money.

To have a better understanding of Cambodia context regarding migration, the paper presents the Table 2 below to illustrate the purposes and sources of borrowing money from migrant households. Most households receiving remittances have borrowed money mainly for unproductive reasons (63.24%) rather than productive (36.76%). On one hand, productively, they use loans to spend on agriculture activities, for example, commodity rice, vegetable gardening, and farming activities such as crop cultivation, livestock raising, fishing and fish breeding, private forestry etc., which constitutes about 24.11%. Spending on non-agriculture activities, such as business, transportation, handicraft work and construction work reported from migrant family represents 12.65%. On the other hand, unproductively, recipients of remittances use loan for their consumption needs, with 28.46% of households citing consumption (such as food, clothes and any other items that are fundamental to the daily activities of the household) as the reason they borrowed money. Loans in addition are used to improve dwelling for example, reconstructing or extending the house or building stated about 10.67%. Also 8.30% of migrant households with loans spend for unexpected shocks such as

illness, injury, and accident while 3.95% of them spend it for rituals such as marriage ceremony, and funeral. The rest of them; moreover, use it to purchase of consumption durables and service the existing debts of 7.51% and 3.56% respectively.

Out of all migrant households with debt, 66.50% received loans provided by formal institutions, which includes banks (47.43%) and NGOs, non-profit and profit (18.97%). Households with loans from informal institutions represent 33.50% of the total number of households with loans. Informal institutions comprise relatives in Cambodia (11.46%), relatives living abroad (1.19%), friends or neighbors (2.77%), moneylender (14.23%), trader (1.58%), landlord (0.40%), employer (0.40%), and other sources (1.58%).

Table 2: Descriptive about Reasons for and Sources of Loans

Purpose of borrowing	Migrant
Productive used of loans	
Agricultural activities	24.11%
Non-agricultural activities	12.65%
Total	36.76%
Unproductive used of loans	
Household consumption needs	28.46%
Purchase/improvement of dwelling	10.67%
Illness, injury, accident	8.30%
Other emergencies (fire, flood, thief)	0.00%
Rituals (marriage ceremony, funeral etc.)	3.95%
Purchase of consumption durables	7.51%
Servicing and existing debts	3.56%
Other	0.79%
Total	63.24%
Source of borrowing	**Migrant**
Formal source	
Bank	47.43%
NGO (non-profit and profit)	18.97%
Total	66.50%
Informal source	
Relatives in Cambodia	11.46%

Relatives who live abroad	1.19%
Friends/neighbors	2.77%
Moneylender	14.23%
Trader	1.58%
Landlord	0.40%
Employer	0.40%
Other	1.58%
Total	33.50%

Source: CSES, 2014

The regression results, alongside the empirical support of documented reasons and sources of having debt, affirm the research hypothesis that remittances incentivize migrant household to borrow more money or take more loan as it becomes an expected regular income or roles as a creditworthiness. From the demand side, borrowers (the migrant family) may depend on an additional source of income (remittances) to repay their debt; and from supply side, lenders may trust remittances on par with collateral for loans because receivers of remittances have an additional and relatively stable source of income.

Migration and financial decision (taking up loans) can be both perceived as asset accumulation and risk-management (Ambrosius and Cuecuecha, 2014). They may substitute for each other in case that remittances function as a source of insurance or there is a credit constraint; nonetheless, the positive finding effect of its relationship in the study could be interpreted that they both complement each other because the reception of remittances might face difficulties vis-á-vis liquidity shortages for their primary consumption, shocks, and other purposes, and less likely on economic activities by which the regular remittances flow cannot be sufficiently financed.

Conclusion and Policy Recommendations

Having expounded the methodological challenges of selection bias, omitted variable, and reverse causality by including the factors analysis of household levels and provincial levels with instrumental variables of distance to the nearest Cambodia-Thailand border and job creation in country of destination of Cambodian migrant, the result from special regression method verifies that remittances have incentivized borrowing of migrant households. Remittances are shown to be associated with a minimum increase to debt burden of 6 percent.

This argument is viewed from two perspectives: first from demand side, migrant households take loans in the need of capital to expense on productive purposes 36.76% such as expenditure on agriculture, non-agriculture, and commonly on unproductive purposes 63.24% for instance the spending on food consumption, dwelling, unexpected shock, rituals, durable goods, paying debt, and others. These imply that borrowers who are migrant households are confident to repay their debt with remittances.

Second from supply side, lenders, consist of 66.50% from formal institutions (Banks and NGOs) and informal institutions (relatives in Cambodia, relatives living abroad, friends or neighbors, moneylender, trader, landlord, employer, and other sources). From the views of lenders, remittances reduce lending constraint and function substantially as collateral to loans taking as they trust migrant family's ability to repay debt through the income from outside economy.

With this result, the paper concludes that remittances and loans complement each other because the reception of remittances might face difficulties vis-á-vis liquidity shortages for their primary consumption, economic activities, shocks, and other purposes by which the regular remittances flow cannot be sufficiently financed.

Remittances and financial decision of migrant households have been persistently imperative topic on the policy agenda since remittance receiving households use remittances and loans simultaneously to make their living. While migrant households have ability to access to loans taking through remittances, the issue becomes rather complex when demand for additional financial tools do not potentially produce for benefits as consequence recipient of remittances are also able to fall into debt trap if the use of loans does not meet income generation.

The situation of remittances and debt in the Cambodian context in the short run can be viewed positively as it helps migrant families ensure their living requirements such as food, transport and accommodation. However, in the long run migrant families may find themselves over-indebted as found that loans are financed predominantly unproductive. It is suggested that migration is a mechanism of poverty reduction; nonetheless, it could not be ascertained that migrant households are over-indebted for unproductive purposes which could bring them back into the poverty easily when facing even small shocks.

The research conveys two policy options to evade this phenomenon.

The first policy recommendation regards the demand side of the nexus. Remittance receiving migrant have to be equipped with the financial education, support and institutional protection that ensure productive and appropriate borrowing practice. Borrowers without financial literacy are far more vulnerable to falling into the debt trap easily through unsafe borrowing from informal institutions, or misguided spending.

Comprehension of financial literacy allows the households to recognize the advantages of sending remittances through official channels rather than unofficial channels which cumulate

the saving. Moreover, they are able to have ability to manage their capital in financial services such as credit for investment, saving, small and medium enterprise loans. Government, NGOs, and financial institutions itself act in a very crucial role as educator to promote financial literacy because they are the main agent to be influence on the households. To be able to access financial education, first all parties involved need to clearly identify the location of households with migration through the commune authority so that they can gather them all in one place for several sessions a month learning the basic of understanding family's financial management. Second, all materials and training should be free of charge offering to migrant households and incentivize them to join the learning. An alternative incentive is to open saving account without taking any charge from migrant households; this could be one of the ideal way to involve them into the formal financial institution and promote sending remittances through official channels. Having the official bank account along with having educated on financial literacy for migrant family will improve their financial decision better notably the use of remittances and loans for any productive purposes; additionally, they are in control to not falling into debt trap because of uneducated financial literacy.

The second policy recommendation turns to look at the supply side contention. Financial institutions are crucial in directing households the right ways to use the credits and assure appropriate volume of debt in a household. Before offering loans to migrant households, lenders should strictly scrutinize their borrowing histories and abilities to repay debt as some might use loans for non-beneficial purposes then borrow more money from formal or particularly informal lenders to service the existing debt in confident of having remittances. Therefore, lenders should have not taken remittances alone as collateral for migrant households to get loans. This has to be governed by the central bank to look over the financial institutions or lenders who might be giving loans without knowing the intentions of borrowers just to get higher interest rate of debt – typically refer to informal lenders. There should be regulations on the loans providers by two options. First, the providers could only offer a limit amount of loans to migrant family depending on the purpose of their borrowing because it constraints them not to offer the big volume of loans that could end up in over-indebtedness for recipient of remittances households. Second, set up an exact number of loans for each financial institutions to offer loans to migrant family; doing so, lenders could not provide loans as much as they normally do to households who have members migrate abroad. These are applied when the borrowers are having members going abroad for work. Prior to restrict on accessing to loans for migrant households, financial institutions also have essential roles to promote entrepreneurship and start-up by supporting in term of ideas, strategies, training on financial management, and business loans which could give opportunities to the households in improving living and earning more income.

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Appendices

Appendix 1: Actions Taken by Household Receiving Remittances
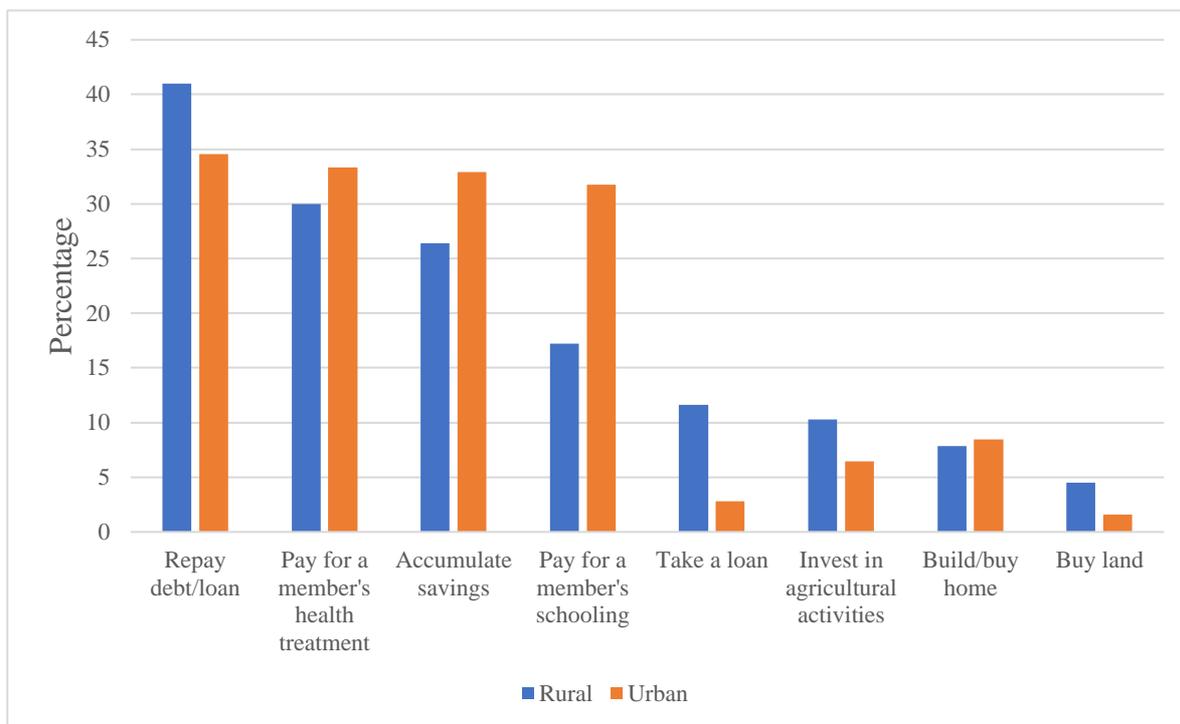
Source: OECD/CDRI, 2017

The appendix 1 presents the activities taken by households receiving remittance in rural and urban. Paying debt which has the highest percentage (41% in rural and 34.5% in urban) is the most common activity followed by actions of paying for a member's health treatment (30% in rural and 33.3% in urban), accumulating savings (26.4% in rural and 32.9% in urban), and paying for a member's schooling (17.2% in rural and 31.7% in urban). The rest four activities such as taking a loan, investing in agricultural activities, building or buying home, and buying land are the least common actions reported by households receiving remittance.

Appendix 2: The Increase of Remittances and Debt per Household from 2009 to 2014

Remittances (Thousand Dollar)

Debt per Household (Riel)
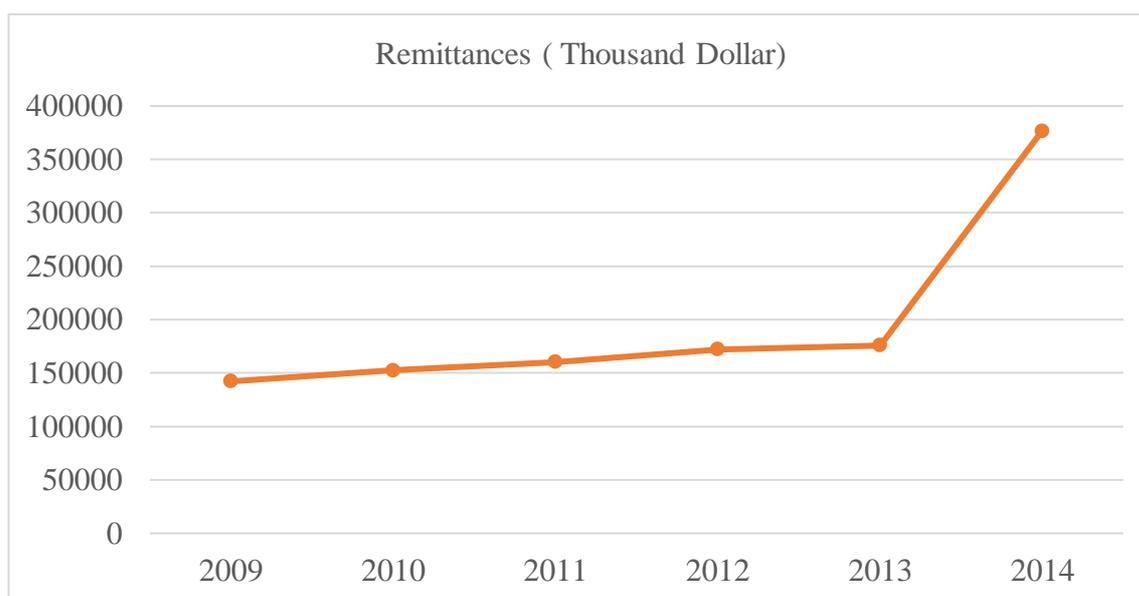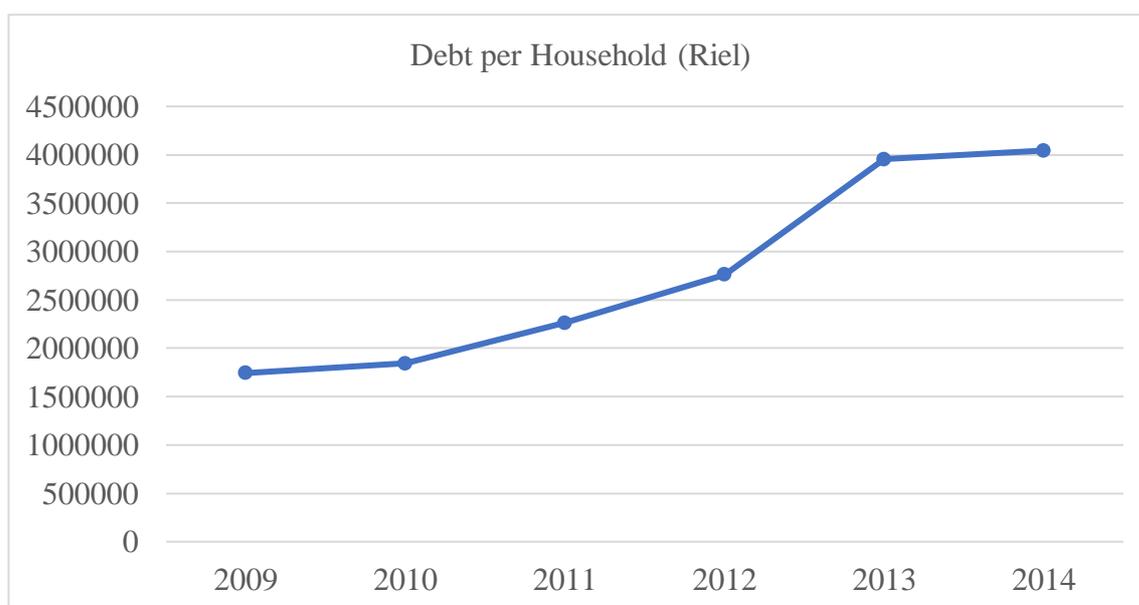
In overall, remittances and household debt had an increasing tendency during 2009 to 2014 respectively by 165% and 132%. Remittance grew slowly in dollar over the 5 years from 2009 to 2013 then went up significantly in 2014; meanwhile, amount of debt per household augmented slightly from 2009 to 2012 and increased remarkably higher in a year before it moved in the stable in volume.

Appendix 3: Data Description

Variable	Description
Debt	Household debt, binary variable that takes value 1 reported at least a household has one member borrowed money during the las 12 month 0 for otherwise
Remit	International remittances, binary variable whether a household received cash or in kind during the previous 12 months from emigrant living or working abroad
Urbrur	Geography, binary variable given 1 to urban and 0 to rural
Headsex	Gender of household head given 1 to male and 0 to female
Headage	Age of household head
HHsize	Household size, total number of member living in the household
Yearedu	Year of education of household head
Land	Land property, binary variable that takes 1 for households who possess at least a plot of land and 0 otherwise
Occupant	Number of occupant in the household
Income	Daily income per capita measured in hundred US dollar
Expenditure	Daily expense per capita measured in hundred dollar
Losscrop	Loss of the crop of household, binary variable that takes value 1 for those who experienced and 0 who did not
Illness	Illness of household member that binary variable 1 for illness and injury that required hospital treatment
Nojob	Loss of job, binary variable that value 1 is for household member who has been unemployed in the moment and 0 otherwise
Agriexp	Agricultural expenditure in thousand US dollar , continuous variable reported the expenses of agricultural activities such as cost of crop cultivation, livestock, fishery, forestry and hunting
Nonagriexp	Non-agricultural activities in thousand US dollar, continuous variable reported the expenses of non-agricultural activities such as capital goods, production materials, etc.,
Foodcon	Food consumption in hundred US dollar, continuous variable describes the amount of food consuming for households
Nonfoodcon	Non-food consumption in hundred US dollar, continuous variable describes the amount of non-food consumption for households
Eduexp	Education expenditure in hundred US dollar, continuous variable indicates the amount of spending on education in family
Dwelling	Dwelling, binary variable that takes value 1 for households who have constructed, or extended, or repaired any buildings used for residential, agricultural, commercial or industries purposes
Rainfall	An annual rainfall in Centimeter at provincial level
Comexp	Commune expenditure in thousand US dollar, expenses on projects implemented in every communes in the provinces of Cambodia in 2014
Distance	The nearest distance in Kilometer from communes where households located to the border of Thailand such as Poipet Border, Anlong Veng Border, O'Smach Border, Cham Yeam Border
Jobcreate	An average changes of employment creation in Thailand from 2004 to 2014

Appendix 4: Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Debt	12090	0.298	0.458	0	1
Remit	12090	0.063	0.243	0	1
Urbrur	12090	0.310	0.462	0	1
Headsex	12090	0.774	0.418	0	1
Headage	12090	47.815	13.841	16	96
Hhsize	12090	4.464	1.774	1	15
Yearedu	12090	5.341	4.222	0	22
Land	12090	0.574	0.494	0	1
Occupant	12090	2.611	1.311	0	10
Income	12090	0.033	0.220	0	19.063
Expenditure	12090	0.020	0.146	0	11.521
Losscrop	12090	0.156	0.363	0	1
Illness	12090	0.480	0.500	0	1
Nojob	12090	0.017	0.129	0	1
agriexp	12090	0.690	0.462	0	1
Nonagriexp	12090	0.315	0.465	0	1
Eduexp	12090	0.561	0.496	0	1
Dwelling	12090	0.019	0.138	0	1
Foodcon	12090	0.422	0.241	0	2.546
Nonfoodcon	12090	10.313	15.054	0.030	242.633
Rainfall	12090	142.777	36.879	85.534	324.653
Comexp	12090	19.823	12.569	0	116.060
Distance	12090	350.501	142.192	2.3	636
Jobcreate	12090	385127.281	0.000	385127.281	385127.281

Appendix 5: Equation Model Specification

Specification No.	Equation

Spec 1:
remittances+household conditions

$$Y_{debt} = X_{remit}^e \beta^e + IV_{disjob} + V_{headage} + X_{urbrur}^1 \beta^1$$
$$+ X_{remit}^2 \beta^2 + X_{headsex}^3 \beta^3 + X_{hhsize}^4 \beta^4$$
$$+ X_{yearedu}^5 \beta^5 + X_{land}^6 \beta^6 + X_{occu}^7 \beta^7$$
$$+ X_{income}^8 \beta^8 + X_{exp}^9 \beta^9 + \varepsilon$$

Spec 2:
remittances+household conditions+ household unexpected shocks

$$Y_{debt} = X_{remit}^e \beta^e + IV_{disjob} + V_{headage} + X_{urbrur}^1 \beta^1$$
$$+ X_{remit}^2 \beta^2 + X_{headsex}^3 \beta^3 + X_{hhsize}^4 \beta^4$$
$$+ X_{yearedu}^5 \beta^5 + X_{land}^6 \beta^6 + X_{occu}^7 \beta^7$$
$$+ X_{income}^8 \beta^8 + X_{exp}^9 \beta^9 + X_{losscrop}^{10} \beta^{10}$$
$$+ X_{illness}^{11} \beta^{11} + X_{nojob}^{12} \beta^{12} + \varepsilon$$

Spec 3:
remittances+household conditions+ household unexpected shocks+household economic activities

$$Y_{debt} = X_{remit}^e \beta^e + IV_{disjob} + V_{headage} + X_{urbrur}^1 \beta^1$$
$$+ X_{remit}^2 \beta^2 + X_{headsex}^3 \beta^3 + X_{hhsize}^4 \beta^4$$
$$+ X_{yearedu}^5 \beta^5 + X_{land}^6 \beta^6 + X_{occu}^7 \beta^7$$
$$+ X_{income}^8 \beta^8 + X_{exp}^9 \beta^9 + X_{losscrop}^{10} \beta^{10}$$
$$+ X_{illness}^{11} \beta^{11} + X_{nojob}^{12} \beta^{12} + X_{agriexp}^{13} \beta^{13}$$
$$+ X_{nonagri}^{14} \beta^{14} + \varepsilon$$

Spec 4:
remittances+household conditions+ household unexpected shocks+household economic activities+household investment

$$Y_{debt} = X_{remit}^e \beta^e + IV_{disjob} + V_{headage} + X_{urbrur}^1 \beta^1$$
$$+ X_{remit}^2 \beta^2 + X_{headsex}^3 \beta^3 + X_{hhsize}^4 \beta^4$$
$$+ X_{yearedu}^5 \beta^5 + X_{land}^6 \beta^6 + X_{occu}^7 \beta^7$$
$$+ X_{income}^8 \beta^8 + X_{exp}^9 \beta^9 + X_{losscrop}^{10} \beta^{10}$$
$$+ X_{illness}^{11} \beta^{11} + X_{nojob}^{12} \beta^{12} + X_{agriexp}^{13} \beta^{13}$$
$$+ X_{nonagri}^{14} \beta^{14} + X_{eduexp}^{15} \beta^{15} + X_{dwel}^{16} \beta^{16}$$
$$+ \varepsilon$$

Spec 5:
remittances+household conditions+ household unexpected shocks+household economic activities+household investment+household consumption

$$Y_{debt} = X_{remit}^e \beta^e + IV_{disjob} + V_{headage} + X_{urbrur}^1 \beta^1$$
$$+ X_{remit}^2 \beta^2 + X_{headsex}^3 \beta^3 + X_{hhsize}^4 \beta^4$$
$$+ X_{yearedu}^5 \beta^5 + X_{land}^6 \beta^6 + X_{occu}^7 \beta^7$$
$$+ X_{income}^8 \beta^8 + X_{exp}^9 \beta^9 + X_{losscrop}^{10} \beta^{10}$$
$$+ X_{illness}^{11} \beta^{11} + X_{nojob}^{12} \beta^{12} + X_{agriexp}^{13} \beta^{13}$$
$$+ X_{nonagri}^{14} \beta^{14} + X_{eduexp}^{15} \beta^{15} + X_{dwel}^{16} \beta^{16}$$
$$+ X_{food}^{17} \beta^{17} + X_{nonfood}^{18} \beta^{18} + \varepsilon$$

Spec 6:
remittances+household
conditions+ household
unexpected
shocks+household economic
activities+ household
consumption+household
investment+provincial level

$$
\begin{aligned}
Y_{debt} = {} & X^e_{remit}\beta^e + IV_{disjob} + V_{headage} + X^1_{urbrur}\beta^1 \\
& + X^2_{remit}\beta^2 + X^3_{headsex}\beta^3 + X^4_{hhsize}\beta^4 \\
& + X^5_{yearedu}\beta^5 + X^6_{land}\beta^6 + X^7_{occu}\beta^7 \\
& + X^8_{income}\beta^8 + X^9_{exp}\beta^9 + X^{10}_{losscrop}\beta^{10} \\
& + X^{11}_{illness}\beta^{11} + X^{12}_{nojob}\beta^{12} + X^{13}_{agriexp}\beta^{13} \\
& + X^{14}_{nonagri}\beta^{14} + X^{15}_{eduexp}\beta^{15} + X^{16}_{dwel}\beta^{16} \\
& + X^{17}_{food}\beta^{17} + X^{18}_{nonfood}\beta^{18} + X^{19}_{rain}\beta^{19} \\
& + X^{20}_{comexp}\beta^{20} + \varepsilon
\end{aligned}
$$

The six specifications are introduced in the paper as they are fundamental and crucial model to the intuition of remittances and debt study. Specification 1 is a base model as informed in most literature development incorporating with author's point of view by including the household condition factors (geography, gender of household head, age of household head, household size, household head's year of education, land property, number of employment in family, income, and expense) which are influent on having debt. Specification 2 builds on the base model following the Mexico case (Ambrosius and Cuecuecha, 2014) adding household unexpected shocks (loss of crop, illness of household member, loss of job) as factors demanding for capital. The next specification 3, 4 and 5 models are constructed based on author's opinion by adding on the previous model introduce household economic activities (agricultural expenditure and non-agricultural expenditure), household investment (education and dwelling), and household consumption (food consumption and non-food consumption) as key motivators of debt uptake which is valuable as a means of further testing criteria to provide more robust insights. The last specification 6 is an add-on considering as the alternative model following the Mexico (2014) case involving analysis of provincial level as indicated by commune expenditure and rainfall in each communes where migrant households are living in to justify the different level of development in the commune is having an effect on decision on increasing debt.