The Impact of Migration and Remittance on Household Welfare: Evidence from Vietnam

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The Impact of Migration and Remittance on Household Welfare: Evidence from Vietnam

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Abstract

This paper examines the pattern and the impact of migration and remittances on household welfare in Vietnam using fixed-effects regressions and panel data from Vietnam Household Living Standard Surveys 2010 and 2012. Overall, the effect of migration as well as remittances on employment of remaining members on home households is small. People in households with migration and remittances tend to work less than people in other households. There is no evidence that migration and remittances can help household members to work more on non-farm activities. Remittances, especially international remittances help receiving households increase per capita income and per capita expenditure. Although migration leads to an increase in remittances, it also leads to a reduction in income earned by migrants if they had not migrated. However, per capita consumption expenditure of migrant-sending households increases because of a reduction in household size.

Key words: migration, remittances, impact evaluation, household welfare, poverty, Vietnam.

JEL Classification: O15, R23, I32

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1. Introduction

Migration has been a popular livelihood strategy of people, especially in developing countries. According to the New Economics Theory of Migration, migration is viewed as a collective decision of not only individuals but also their families, and the main incentive for migration is high income in the destination areas (Stark and Bloom, 1985; Stark and Taylor, 1991; Stark, 1991). Households can decide to move the whole family or just send individual members for migration. The migration cost of the whole family is often high for migrating households. As a result households tend to send one or two members for migration.

In addition to impacts on migrants, migration also has different impacts on migrant-sending households. Migration means the absence of labors in the home households, and this can affect the labor supply and consumption pattern of the households. Remaining adult people might spend more time on housework and taking care of dependent members, thereby less time on working. Taylor and López-Feldman (2010) find that migration reduces labour-intensive production of household due to a shortage of labour. A change in household composition due to migration can lead to a change in consumption pattern of remaining members.

Another direct impact of migration on the migrant-sending households is through remittances (Stark and Taylor, 1991; Stark, 1991; McKenzie and Sasin, 2007). Migrants send remittances to their home households for several reasons. Firstly, migration can be a decision of the whole family instead of individual members. Households are expected to have higher income through remittances as they send their members for migrations. Thus after finding jobs and having income, migrants are expected to send remittances to contribute to the household income. For some households, migration is costly and they have to borrow to pay for migration. Remittances are used to pay for this debt.

Secondly, migrants can send remittance simply because of altruism. According the altruism theories the utility of a person depends on not only her own consumption but also on the consumption of her/his family, and as a result sending remittances to family can increase the utility of migrants (Becker, 1974; Barro, 1974; Cox, 1987, 1992). The remittances are expected to increase not only income but also consumption of households.

Thirdly, as interpreted by the theory on exchange motives, migrants can send remittances to home households to get some benefits in return (Cox, 1987). For example, migrants can send remittances so that the recipients will take care of their assets or family or invest in activities with high return on capital than in destination areas. Thus remittances can lead to a change in not only consumption but also labor and production of home households.

The total effect of migration on migrant-sending households is a priori unknown, since there are different channels through which migration can affect the migrant-sending households. Whether migration helps home households improve welfare and reduce poverty is an empirical question. There are a large number of studies on the effects of migration on welfare of migrant-sending households. The findings are mixed. Adams and Page (2005) find a strong effect on poverty reduction of international remittances in developing countries. Positive impacts of remittances on household welfare and child education are found in some studies such as Adams (1991, 2004, 2006), Acosta et al. (2007), Adams et al. (2008); Taylor and Lopez-Feldman (2010).

However, several studies do not find positive effects of international remittances on migrant-sending households. For example, using cross-countries data, Cattaneo (2005) does not find any effect of international remittances on poverty reduction. Other studies such as Stahl (1982) and Azam and Gubert (2006) do not find poverty-reducing effects of remittances. In Yang (2004), migration is showed to reduce labor supply and income of remaining household members in the Philippines. In several studies, parental migration has a negative effect of children's education (e.g., Kiros and White, 2004; McKenzie and Rapoport, 2006; Antman, 2010; Wang, 2011)

The existing studies, both theoretical and empirical, show a wide diversity of results of the impact of migration on migrant-sending households. Whether the effect of migration is positive or negative depend on different country context, and this calls for more empirical studies to better understand the economic effects of international migration and remittances. In this study, we will aim to estimate the effect of migration and remittances on labor supply, consumption and poverty of home households in Vietnam.

Vietnam is a transition country with a large flow of internal as well as international migration. According to the 2009 Population and Housing Census, around 8.5 percent of

the Vietnamese population changed their residence during 2004-2009. There are around 3.2 million Vietnamese living abroad (Nguyen and Mont, 2012). These people send a large flow of international remittances to Vietnam. In 2014, the total remittances to Vietnam reached 11 billion USD, accounting for around 6 percent of total GDP (Phuong, 2014).

There are several studies looking at the effect of migration and remittances on migrants' origin households. Migration is found to have a positive effect on households' consumption and poverty reduction in several studies including Brauw and Harigaya (2007), Nguyen et al. (2008), Nguyen et al. (2011). Using Vietnam Household Living Standard Surveys (VHLSS) 2002 and 2004, Nguyen (2008) finds that international remittances helped receiving household increase consumption and reduce poverty. However, using VHLSSs 2006 and 2008 Nguyen and Mont (2012) and Nguyen et al. (2013) do not find a poverty-reducing effect of international remittances.

Compared with previous studies on migration and remittances in Vietnam, this study has several different aspects. Firstly, this study uses more updated household surveys (Vietnam Household Living Standard Surveys in 2010 and 2012) to analyse the pattern and impact of migration and remittances. Migration and remittances are dynamic and changing significantly overtime in Vietnam. Secondly, this examines the effect of both migration and remittances, while most previous studies mainly focus on either migration or remittances. Thirdly, this study will look at the impact of migration and remittances on different outcomes of households including education, labor, income and consumption. By examining the impact on a series of household outcomes, this study is expected to provide an insightful understanding of mechanism that migration can affect migrant-sending households.

This paper is structured in 6 sections. The second section introduces the data sets used in this study. The third section presents description of the migration and remittance trend in Vietnam. The fourth and fifth sections present the estimation method and empirical results of the impact of migration and remittances, respectively. Finally, the sixth section discusses the main findings and policy recommendations.

2. Data set

This study relies on the Vietnam Household Living Standard Surveys in 2010 and 2012. The 2010 and 2012 VHLSSs were also conducted by GSO with technical supports from the World Bank in Vietnam. Each VHLSS covered 9,399 households, representative at regional levels. VHLSSs contain panel data on 4,157 households.

The data set includes detailed data on individuals, households and communes. Individual data consist of information on demographics, education, employment, health, migration. Household data are on durables, assets, production, income and expenditures, and participation in government's programs.

Regarding remittances, all the VHLSSs contain data on remittances, both domestic and foreign, received by households. However, information on migrants is limited in VHLSSs. In all the VHLSSs, there are questions on household members who are working far from home. Information includes gender, age, and education of these migrants. However, there is no information on the current location of the migrants. As a result, we are not able to identify whether migrants are living inside or outside Vietnam.

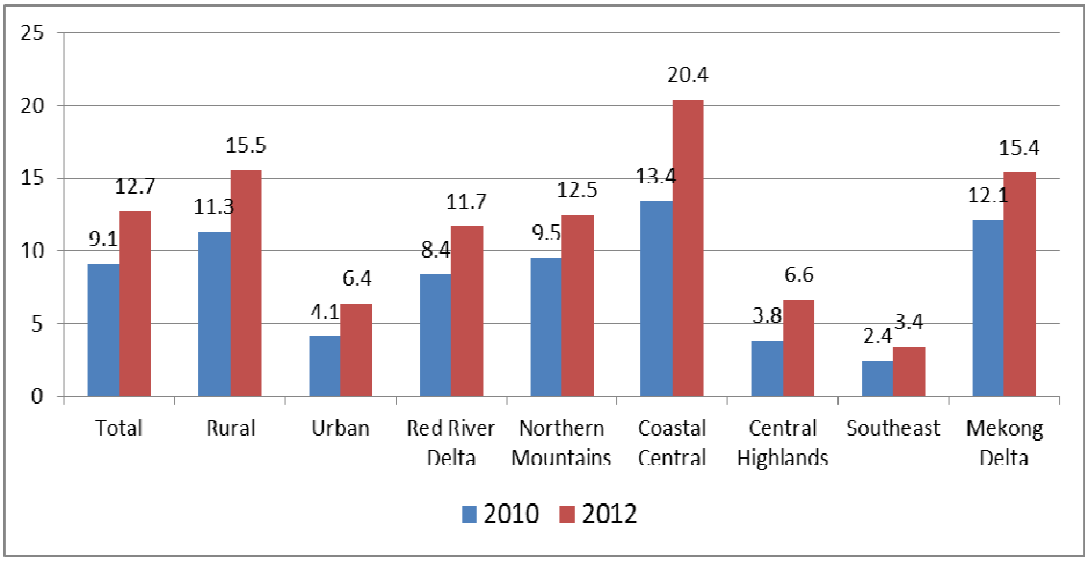
Unlike the 2010 VHLSS and previous VHLSSs, the 2012 VHLSS contains a special module on migration. It asked households about their migrating members: employment and characteristics of migrating members. It also contains data on the current location of migrants so that we can define internal and international migrants.

3. Migration and remittances in Vietnam

Figure 1 presents the percentage of household having at least a migrant, either internal or international migrants in 2010 and 2012. The proportion of migrant-sending households in Vietnam increased from 12.1% to 15.4% during 2010-2012. This proportion increased in both rural and urban areas and in all the six regions. Rural households are much more likely to send migrants than urban ones. Northern and Coastal Central is the region having the highest proportion of migrant-sending households. Located in the center of Vietnam, people in this region can move to either Red River Delta or Central Highland or Southeast.

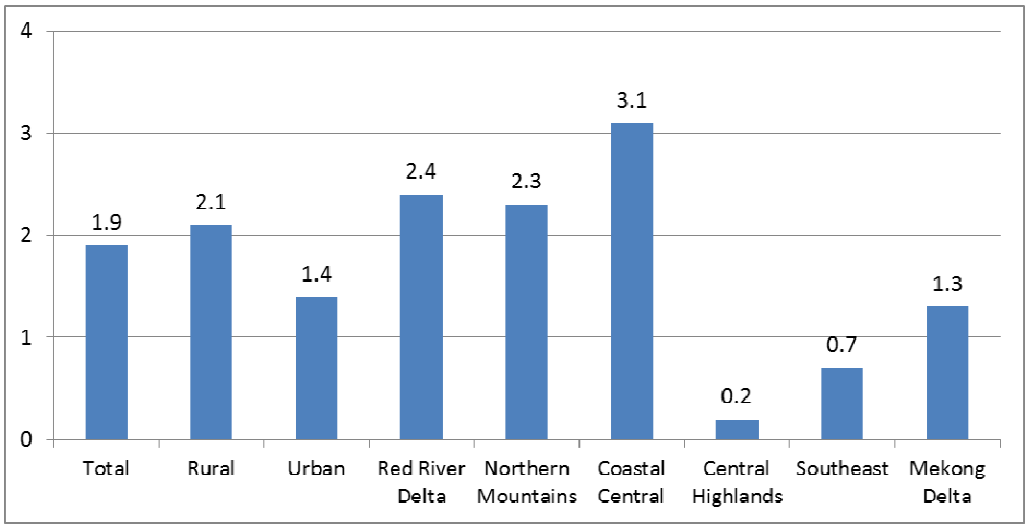
Southeast which is the richest region in Vietnam has the lowest proportion of migrant-sending households.

Figure 1: The percentage of households having migrants



Source: authors' estimates from VHLSSs 2010 and 2012

Figure 2: The percentage of households having international migrants



Source: authors' estimates from VHLSSs 2010 and 2012

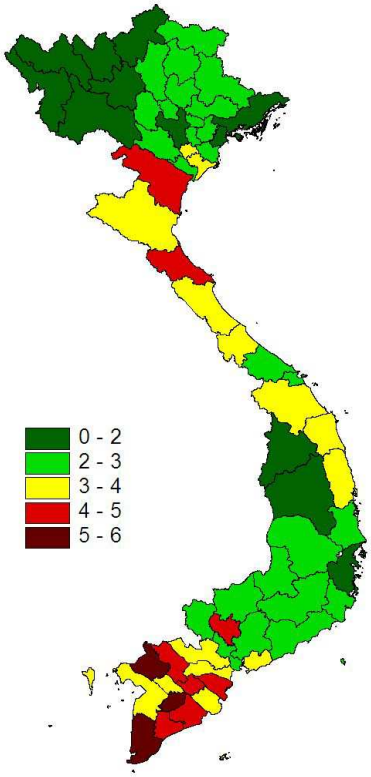
In Figure 2, we present the percentage of households having at least an international migrant using the 2012 VHLSS. As mentioned in previous section, there are no data on the location of migrants in the 2010 VHLSS, and as a result we cannot separate the internal and international migrants in the 2010 VHLSSs. It shows that the proportion of households with international migrant is 1.9%, lowers than the proportion of

households with internal migrants. Northern and Coastal Central is the region having the highest proportion of international-migrant-sending households, while Central Highland has the lowest proportion.

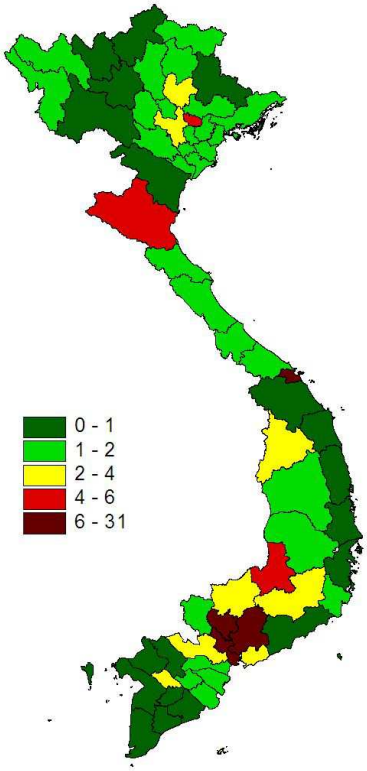
In Figure 3, we used the 2014 Mid-term Population and Housing Census to examine the geographical pattern of migration. The 2014 Mid-term Population and Housing Census contains data on the change of residence of the population within the five years during 2009-2014. It shows that a high proportion of out-migration in some provinces in Northern and Coastal Central and Mekong River Delta regions. Hau Giang and Ca Mau are the two provinces with the highest rate of out-migration with the rate of 5.4% and 5.2%, respectively. Regarding in-migration, Binh Duong and Ho Chi Minh city are the two provinces attract the most migrants. People in Northern Mountain are less likely to migrate, since the cost of migrants can be high for them. This area is also poor and there is a low inflow of migrants to this area.

Figure 3: Emigration and immigration rate by provinces

Percentage of households migrating out of province during 2009-2014



Percentage of households migrating into province during 2009-2014



Source: authors' estimates from the 2014 Mid-term Population and Housing Census

The percentage of households receiving internal and international remittances was 27.4 percent and 33.3 percent in 2010 and 2012, respectively. The proportion of households receiving remittances is lower than the proportion of households having migrants, since remittances are sent to households by not only household members but also households' relatives. The proportion of households receiving international remittances was 4.4 percent in 2010 and 4.6 percent in 2012. Rural households are more likely to receive internal remittances but less likely to receiving international remittances than urban households.

It should be noted that not all migrant-sending households receive remittances. In 2010, 9.5 percent and 69.3 percent of migrant-sending households received international and internal remittances, respectively. In 2012, these corresponding figures are 9.6 percent and 57.6 percent, respectively.

Table 1: The percentage of households with migrants and remittances by regions

Areas	% having migrating members		% receiving internal remittances		% receiving international remittances	
	2010	**2012**	**2010**	**2012**	**2010**	**2012**
Total	9.1	12.7	27.4	33.3	4.4	4.6
Urban/rural						
Rural	11.3	15.5	28.5	33.6	3.4	3.7
Urban	4.1	6.4	25.0	32.6	6.7	6.9
Regions						
Red River Delta	8.4	11.7	27.6	35.9	3.2	3.3
Midlands and Northern Mountains	9.5	12.5	25.4	28.1	2.6	1.9
Northern and Coastal Central	13.4	20.4	29.6	33.0	5.2	5.3
Central Highlands	3.8	6.6	8.1	10.8	1.8	1.9
Southeast	2.4	3.4	28.3	41.1	6.5	7.1
Mekong Delta	12.1	15.4	30.7	33.4	5.2	5.9

Source: authors' estimates from VHLSSs 2010 and 2012

Table 2 presents the proportion of households with migration and remittances by several characteristics of households. Kinh households are more likely to have a higher proportion of migration and remittances than ethnic minorities. Households with female heads are more likely to receive more remittances than households with male heads. Possibly, men tend to migrate than women, and without men in home households women are more likely to become household heads.

People with higher education tend to migrate than those with lower education, since they can find jobs in destination easier (Borjas, 2005; Chiquiar and Hanson, 2005). However, Table 2 shows that the association between education of household heads and

migration as well as remittances is not strong. Households with high education heads have a lower proportion of sending migrants than households with low education heads. However, there is a strong association between consumption expenditure and remittances, especially international remittances. Households receiving remittances tend to belong to high expenditure quintile.

Table 2: Percentage of households with migrants and remittances by household variables

Household groups	% having migrating members		% receiving internal remittances		% receiving international remittances	
	2010	**2012**	**2010**	**2012**	**2010**	**2012**
Ethnicity						
Kinh/Hoa	9.5	13.4	28.9	34.9	4.8	5.1
Ethnic minorities	5.9	8.1	17.3	22.8	1.4	1.3
Gender of household head						
Female head	10.3	12.6	29.6	37.3	5.7	6.9
Male head	8.7	12.8	26.6	31.9	3.9	3.8
Completed education level of head						
< Primary	9.2	13.2	27.5	33.7	3.4	3.5
Primary	8.8	12.7	26.7	33.1	4.5	4.5
Lower-secondary	11.7	15.1	30.1	34.7	4.1	5.1
Upper-secondary	7.9	10.8	28.8	33.8	5.3	4.9
Technical degree	8.0	12.0	24.8	31.6	6.3	4.7
Post-secondary	3.8	6.3	23.0	29.7	4.7	7.1
Per capita expenditure quintile						
Poorest	5.8	11.0	23.6	32.0	1.0	2.1
Near poorest	11.6	13.8	27.9	33.7	2.0	2.8
Middle	11.7	15.1	30.4	35.1	3.4	3.7
Near richest	10.0	13.9	29.1	35.2	5.9	5.7
Richest	6.3	10.2	25.7	30.7	8.4	8.1

Source: authors' estimates from VHLSSs 2010 and 2012

Table 3 presents the average remittances received by households in nominal price. Although the amount of internal remittances increased during 2010-2012, the amount of internal remittances decreased during this period. Remittances play an important role for households. In 2012, for households receiving remittances, internal remittances and international represent for 8.8 percent and 37.9 percent of total household expenditure, respectively.

The average amount of internal remittances received by urban households was higher than the average amount of internal remittances received by rural ones in both years 2010 and 2012. The international remittances were higher for urban households than rural households in 2010. However, in 2012 rural households received a higher amount of

international remittances than urban households. This interesting change should be examined in further studies to understand the reasons.

The ratio of remittances to consumption expenditure is higher in rural households than urban ones. In Midlands and Northern Mountains, international remittances account for a high proportion in the total expenditure in 2012 for receiving households.

Table 3: Remittance amount by urban/rural areas and regions

Areas	Internal remittance amount (thousand VND)		Share of internal remittance in total expenditure (%)		International remittance amount (thousand VND)		Share of international remittance in total expenditure (%)	
	2010	**2012**	**2010**	**2012**	**2010**	**2012**	**2010**	**2012**
Total	3715.0	4723.3	9.3	8.8	36261.6	35349.0	42.1	37.9
Urban/rural								
Rural	3234.7	4167.1	9.4	9.3	31164.4	37792.7	47.7	48.5
Urban	4809.2	6021.3	9.1	7.5	42063.9	32313.5	35.7	24.8
Regions								
Red River Delta	4405.8	5901.7	9.1	9.9	41749.1	36975.2	61.1	44.7
Midlands and Northern Mountains	2052.5	2945.2	8.1	7.5	45616.2	46380.8	68.2	66.5
Northern and Coastal Central	3058.3	3640.2	9.3	7.9	24855.0	32339.9	34.2	37.8
Central Highlands	1460.6	2859.5	4.0	4.2	4711.0	11738.0	7.2	6.0
Southeast	5224.4	6229.3	10.7	9.3	41804.0	28056.3	36.2	23.2
Mekong Delta	3974.6	4892.3	10.6	10.1	38827.1	40388.4	37.3	36.5

Source: authors' estimates from VHLSSs 2010 and 2012

The ratio of remittances in total consumption expenditure is higher for disadvantaged household groups such as ethnic minority households and households with low expenditure and low education heads.

Table 4: Remittance amount by urban/rural areas and regions

Household groups	Internal remittance amount (thousand VND)		Share of internal remittance in total expenditure (%)		International remittance amount (thousand VND)		Share of international remittance in total expenditure (%)	
	2010	**2012**	**2010**	**2012**	**2010**	**2012**	**2010**	**2012**
Ethnicity								
Kinh/Hoa	4064.5	5133.4	13.4	12.6	36922.6	34752.9	42.0	36.7
Ethnic minorities	1314.8	1942.2	9.4	9.6	20237.6	51515.0	43.4	72.2
Gender of household head								
Female head	5762.1	6104.0	21.5	15.9	37362.0	33432.4	44.9	35.8
Male head	2994.5	4234.6	9.8	10.8	35697.0	36569.8	40.6	39.3
Completed education level of head								
< Primary	3056.2	4492.8	17.4	16.5	22644.1	30303.5	37.1	38.7
Primary	2976.4	4347.7	13.4	12.7	35150.2	36398.1	43.0	38.3
Lower-secondary	3061.4	4052.8	11.4	11.2	35317.5	39585.5	53.6	48.8
Upper-secondary	4666.3	5496.3	10.5	9.9	35431.0	28948.5	32.6	24.8
Technical degree	4167.3	5426.4	10.9	10.3	49868.8	37423.8	42.2	36.5
Post-secondary	8646.5	7179.0	10.1	6.3	46377.2	33907.3	29.1	20.6

Household groups	Internal remittance amount (thousand VND)		Share of internal remittance in total expenditure (%)		International remittance amount (thousand VND)		Share of international remittance in total expenditure (%)	
	2010	**2012**	**2010**	**2012**	**2010**	**2012**	**2010**	**2012**
Per capita expenditure quintile								
Poorest	1624.4	2679.8	13.0	14.3	13354.6	24285.0	50.4	55.3
Near poorest	2485.7	3098.2	13.7	13.2	20425.7	25207.4	44.9	45.2
Middle	3064.6	4455.6	15.0	13.4	21765.3	28244.7	46.6	35.8
Near richest	3461.9	5648.7	10.8	12.0	23459.8	41194.8	35.6	45.3
Richest	7147.8	7119.6	13.0	9.1	55101.2	39771.4	43.3	28.4

Source: authors' estimates from VHLSSs 2010 and 2012

4. Estimation methods

In this study, we will estimate the effect of migration and remittances on a number of outcomes including labor supply, income, consumption and poverty status of households. We first estimate the effect of migration, and then the effect of remittances. We assume a similar specification for estimating the effect of migration on household outcomes:

$$\ln(Y_{it}) = \beta_0 + \beta_1 G_t + X_{it}\beta_2 + \beta_3 Migration_{it} + u_i + v_{it}, \quad (1)$$

where $\ln(Y_{it})$ is log of per capita income or log of consumption expenditure of household *i* in year *t*; X_{it} is a vector of household variables; $Migration_{it}$ is a dummy variable indicating whether the household *i* has at least a migrant in year *t*; u_i and v_{it} are unobserved time-invariant and time-variant variables, respectively.

Regarding remittances, we have data on the size of international and internal remittances. We can estimate the impact of both international and internal remittances on household outcomes as follows:

$$\ln(Y_{it}) = \beta_0 + \beta_1 G_t + X_{it}\beta_2 + \beta_3 \ln(International\_re_{it}) + \beta_4 \ln(Internal\_re_{it}) + u_i + v_{it}, \quad (2)$$

where $International\_re_{it}$ and $Internal\_re_{it}$ are amount of international remittances and internal remittances received by household *i* at time *t*, respectively. To measure the elasticity of household income (or consumption expenditure) to remittances, we use a double-log function in which both income (or consumption expenditure) and remittances are measured in log. A problem with the logarithm of remittances is that there are households with zero value of remittances. To avoid the dropping of observations without

land, we apply the method of Battese (1997) which allows zero values of explanatory variables in the double-log function. According to Battese (1997), the following equation is estimated instead of equation (2):

$$\begin{aligned}\ln(Y_{it}) = \beta_0^* + \beta_1 G_t + X_{it}\beta_2 + \beta_3 \ln\left(International\_re_{it}^*\right) + \beta_4 I\{International\_re_{it} = 0\} \\ + \beta_5 \ln\left(Internal\_re_{it}^*\right) + \beta_6 I\{Internal\_re_{it} = 0\} + u_i + v_{it},\end{aligned} \quad (3)$$

where $I\{International\_re_{it} = 0\}$ is the indicator variable which is equal to one if $International\_re_{it} = 0$, and zero if $International\_re_{it} > 0$. $International\_re_{it}^*$ is equal to $International\_re_{it}$ if $International\_re_{it} > 0$, and one if $International\_re_{it} = 0$. Similarly, variables $I\{Internal\_re_{it} = 0\}$ and $Internal\_re_{it}^*$ are defined by the same way.

A challenge in estimating the impact of migration as well as remittances is the bias caused by omitted variables. Households with migration and remittances can differ from households without migration and remittances in not only observed characteristics but also unobserved characteristics. To deal with bias, a standard econometric method is instrumental variable regression. Finding an instrument which is strongly correlated with migration or remittances but do not affect outcomes directly is very difficult. Thus in this study, we can use the panel nature of the data to avoid this endogeneity bias. More specifically, we will use household fixed-effect regression, which relies on a main assumption of the method that unobserved variables in the outcome equation that are correlated with both outcome and migration (remittances) remained unchanged during the period 2010-2012. Fixed-effects regression can eliminate the unobserved variables, u_i that are time-invariant during the panel data period. The fixed-effect regression is still biased if the unobserved time-variant variables are correlated with migration and remittances. It is expected that the bias caused by the omitted time-variant variables is small once we control for observed variables and time-invariant observed variables.

It should be noted that we use both household outcomes and individual outcomes. The individual outcomes are school enrolment and employment variables. For individual outcomes, we also use a similar function as equations (1) and (3).

5. Empirical results

5.1. The impact of migration and remittances on individual outcomes

In this section, we present the empirical findings from the impact of migration and remittances on original households of migrants using fixed-effects regression. We first examine the effect on individual outcomes including school enrolment and labor supply using individual fixed-effects regression. The control variables include household-level. Individual variables such as age and gender are eliminated in fixed-effects regression. We tend to use more exogenous control variables, which are not affected by migration and remittances (Heckman et al., 1999; Angrist and Pischke, 2008). The outcome variables are listed in Tables A.1 to A.3 in Appendix, while the explanatory variables are list in Table A.4 in Appendix. We also try regressions without explanatory variables. The results are similar to those in regressions with explanatory variables. In this paper, we present the results from regression using the explanatory variables.

In Table 5, we regress the school enrollment of children and young people on migration. There is no significant effect of migration on school enrolment of children aged 6 to 14. However, there is a significant effect for young people from 15 to 22. These ages are corresponding to ages in the upper secondary school and college/university in Vietnam. Adolescents in migrant-sending households have the probability of attending schools, around 0.08 higher than those in other households. This difference is quite high given that the enrolment rate of this age group is around 50 percent. There is no effect of remittances on school enrolment. It implies that the main channel through which migration can improve education is not remittances. This finding should be interpreted with caution. The positive relation between migration and education might be caused by omitted variables. According to Coxhed (2014) migrants tend to have higher education than non-migrants in Vietnam. Members in migrant-sending households might have more education than those in households not sending migrants because of not migration but other factors such as culture or household's attention to education.

Table 5: Fixed-effects regression of school enrolment

Explanatory variables	Sample of children aged 6-14		Sample of people aged 15-22	
Having at least a migrant (yes=1, no=0)	-0.0389		0.0794**	
	(0.0246)		(0.0385)	
Log of internal remittance		0.0060		0.0088
		(0.0068)		(0.0117)
Log of international remittance		0.0131*		0.0171
		(0.0072)		(0.0253)
Receiving internal remittance (yes=1, no=0)		0.0404		0.0536
		(0.0567)		(0.0873)
Receiving international remittance (yes=1, no=0)		0.1175*		0.0745
		(0.0708)		(0.2132)
Household size	0.0036	0.0075	0.0010	-0.0036
	(0.0087)	(0.0085)	(0.0097)	(0.0092)
Proportion of children below 15 in household	0.3487***	0.3349***	-0.0005	0.0276
	(0.0586)	(0.0581)	(0.1136)	(0.1134)
Proportion of elderly above 60 in household	0.0201	-0.0101	-0.1757	-0.1433
	(0.1066)	(0.1053)	(0.1611)	(0.1614)
Proportion of female members in household	-0.0909	-0.1035	-0.1533	-0.1267
	(0.1133)	(0.1124)	(0.1212)	(0.1192)
Sex of household head (male=1; female=0)	0.0078	0.0185	-0.0933**	-0.0857**
	(0.0473)	(0.0463)	(0.0395)	(0.0395)
Age of household head	0.0212***	0.0228***	0.0151	0.0161
	(0.0065)	(0.0064)	(0.0124)	(0.0124)
Age of household head squared	-0.0002***	-0.0002***	-0.0001	-0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Number of schooling years of household head	-0.0020	-0.0023	-0.0001	-0.0010
	(0.0034)	(0.0033)	(0.0078)	(0.0081)
Dummy year 2012	-0.0280***	-0.0306***	-0.1237***	-0.1207***
	(0.0069)	(0.0072)	(0.0126)	(0.0129)
Constant	0.2973*	0.0839	0.3165	0.1666
	(0.1693)	(0.1907)	(0.3410)	(0.4129)
Observations	4726	4726	4186	4186
Number of individuals	2363	2363	2093	2093
R-squared	0.05	0.05	0.07	0.07

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: authors' estimates from VHLSSs 2010 and 2012

Table 6 examines the effect of migration and remittances on the probability of working of household members. Around 10 percent of children have to work for income generation activities, but they have to work only few hours per months (Table A.1 in Appendix). The proportion of the elderly working is higher in migrant-sending households than other households. However, regression analysis shows there is no significant effect of migration on working for children as well elderly.

Young people aged 15-22 in migrant-sending households are less likely to work than those in other households. This is consistent with the findings on education. These people are more likely to study, thus less likely to work.

Receipt of international remittances reduces the probability to work of children and people slightly. If the international remittance amount increases by 1 percent, the

probability of working of people aged 23-60 decreases by 0.025 percentage point. This effect is very small.

Table 6: Fixed-effects regression of working

Explanatory variables	Sample of children aged 6-14		Sample of people aged 15-22		Sample of people aged 23-60		Sample of people aged from 60	
Having at least a migrant (yes=1, no=0)	0.0088		-0.0876**		-0.0108		0.0487	
	(0.0492)		(0.0375)		(0.0096)		(0.0334)	
Log of internal remittance		-0.0058		-0.0157		-0.0032		0.0019
		(0.0070)		(0.0100)		(0.0033)		(0.0124)
Log of international remittance		-0.0432*		-0.0442*		-0.0252**		-0.0466
		(0.0234)		(0.0261)		(0.0104)		(0.0357)
Not receiving internal remittance (not=1, yes=0)		-0.0305		-0.1322*		-0.0230		0.0310
		(0.0529)		(0.0764)		(0.0227)		(0.1029)
Not receiving international remittance (not=1, yes=0)		-0.3896*		-0.3423		-0.2309**		-0.3418
		(0.2186)		(0.2311)		(0.0959)		(0.3563)
Household size	-0.0065	-0.0093	0.0039	0.0084	0.0017	0.0014	-0.0246	-0.0280*
	(0.0093)	(0.0102)	(0.0120)	(0.0113)	(0.0045)	(0.0043)	(0.0151)	(0.0152)
Proportion of children below 15 in household	-0.225***	-0.213***	0.2031*	0.1748	-0.0046	-0.0064	0.2331	0.2451*
	(0.0712)	(0.0687)	(0.1159)	(0.1117)	(0.0296)	(0.0297)	(0.1516)	(0.1484)
Proportion of elderly above 60 in household	-0.0245	-0.0097	0.1737	0.1450	-0.0170	-0.0204	0.1396	0.1362
	(0.1619)	(0.1579)	(0.1877)	(0.1886)	(0.0431)	(0.0428)	(0.1229)	(0.1222)
Proportion of female members in household	-0.0406	-0.0232	0.1341	0.1067	0.0268	0.0240	0.0642	0.0512
	(0.1348)	(0.1325)	(0.1145)	(0.1122)	(0.0457)	(0.0452)	(0.1153)	(0.1178)
Sex of household head (male=1; female=0)	-0.0243	-0.0350	0.0088	0.0050	0.0095	0.0090	-0.0185	-0.0158
	(0.0520)	(0.0506)	(0.0574)	(0.0540)	(0.0368)	(0.0371)	(0.0818)	(0.0847)
Age of household head	-0.0193**	-0.0206**	-0.0228*	-0.0245**	-0.0073*	-0.0074*	-0.0088	-0.0078
	(0.0096)	(0.0097)	(0.0117)	(0.0113)	(0.0044)	(0.0043)	(0.0156)	(0.0154)
Age of household head squared	0.0002*	0.0002**	0.0002**	0.0002**	0.0000	0.0001	0.0001	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
Number of schooling years of household head	0.0006	0.0009	-0.0101	-0.0096	-0.0037*	-0.0037*	0.0069	0.0067
	(0.0046)	(0.0046)	(0.0080)	(0.0082)	(0.0021)	(0.0021)	(0.0080)	(0.0077)
Dummy year 2012	0.0480***	0.0513***	0.1056***	0.1030***	0.0111**	0.0113***	-0.070***	-0.064***
	(0.0089)	(0.0092)	(0.0121)	(0.0120)	(0.0043)	(0.0042)	(0.0155)	(0.0149)
Constant	0.7679***	1.2299***	0.9918***	1.4976***	1.1441***	1.4013***	0.7149	1.0266*
	(0.2715)	(0.3438)	(0.3461)	(0.4077)	(0.1304)	(0.1551)	(0.4699)	(0.6017)
Observations	4726	4726	4186	4186	15406	15406	2806	2806
Number of individuals	2363	2363	2093	2093	7703	7703	1403	1403
R-squared	0.03	0.04	0.05	0.05	0.01	0.01	0.04	0.04

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: authors' estimates from VHLSSs 2010 and 2012

In Table 7, we regress the number of working hours per month on migration and remittances. It shows that migration and remittances reduce the working hours of people aged from 15 to 60. Internal remittances tend to decrease the working hours of children. However, there are no significant effects of migration as well remittances on working hours of the elderly.

Table 7**:** Fixed-effects regression of the number of working hours per month

Explanatory variables	Sample of children aged 6-14		Sample of people aged 15-22		Sample of people aged 23-60		Sample of people aged from 60	
Having at least a migrant (yes=1, no=0)	6.71		-21.84***		-7.21**		-1.70	
	(5.01)		(8.14)		(3.60)		(6.26)	
Log of internal remittance		-1.93**		-1.82		-3.19**		-1.59
		(0.96)		(2.22)		(1.29)		(1.77)
Log of international remittance		-0.65		-8.96**		-6.42**		-3.34
		(2.27)		(4.15)		(2.89)		(5.29)
Not receiving internal remittance (not=1, yes=0)		-13.23**		-9.63		-27.07***		-8.15
		(6.68)		(17.22)		(10.20)		(13.73)
Not receiving international remittance (not=1, yes=0)		-6.25		-70.19*		-51.68*		-10.36
		(18.65)		(36.00)		(26.81)		(52.37)
Household size	-1.36	-2.08	-2.25	-1.01	-0.26	-0.23	-4.52	-4.93*
	(1.46)	(1.45)	(2.95)	(2.95)	(1.56)	(1.50)	(2.83)	(2.88)
Proportion of children below 15 in household	-38.74***	-36.12***	49.16**	41.35*	-4.73	-5.59	25.20	25.47
	(9.48)	(9.34)	(23.96)	(24.02)	(12.62)	(12.53)	(28.19)	(27.55)
Proportion of elderly above 60 in household	-3.75	2.40	27.43	20.33	-1.09	-2.91	11.42	10.32
	(25.18)	(24.93)	(42.75)	(43.26)	(13.66)	(13.55)	(23.62)	(22.77)
Proportion of female members in household	-0.41	1.04	77.83***	71.24***	17.81	17.03	1.00	-0.09
	(18.39)	(18.02)	(26.71)	(26.56)	(18.02)	(17.65)	(16.69)	(16.94)
Sex of household head (male=1; female=0)	0.31	-1.12	8.96	7.09	16.95	16.41	2.60	4.83
	(5.84)	(5.81)	(12.84)	(12.56)	(15.52)	(15.65)	(9.62)	(10.09)
Age of household head	-2.54***	-2.86***	-2.47	-2.75	1.47	1.45	1.88	1.82
	(0.91)	(0.92)	(3.86)	(3.86)	(1.86)	(1.87)	(2.66)	(2.64)
Age of household head squared	0.02***	0.03***	0.03	0.03	-0.01	-0.01	-0.02	-0.02
	(0.01)	(0.01)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
Number of schooling years of household head	-0.19	-0.13	-3.86**	-3.63**	-0.40	-0.50	-0.83	-0.86
	(0.50)	(0.50)	(1.58)	(1.62)	(0.94)	(0.95)	(1.35)	(1.29)
Dummy year 2012	5.54***	6.07***	29.40***	28.80***	-4.92***	-4.88***	-8.07***	-7.38***
	(1.07)	(1.10)	(2.82)	(2.87)	(1.67)	(1.66)	(2.34)	(2.29)
Constant	96.50***	126.74***	114.56	198.28*	119.74**	198.82***	24.48	46.29
	(26.22)	(31.66)	(111.36)	(118.03)	(55.09)	(62.44)	(84.50)	(102.38)
Observations	4726	4726	4186	4186	15406	15406	2806	2806
Number of individuals	2363	2363	2093	2093	7703	7703	1403	1403
R-squared	0.04	0.04	0.09	0.09	0.01	0.01	0.02	0.03

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: authors' estimates from VHLSSs 2010 and 2012

There is no evidence that migration and remittances can help household members to work more on non-farm activities (Table 8). It implies that remittances are not used for investment in household production or entrepreneurs activities.

Table 8**:** Fixed-effects regression of having nonfarm work

Explanatory variables	Sample of children aged 6-14		Sample of people aged 15-22		Sample of people aged 23-60		Sample of people aged from 60	
Having at least a migrant (yes=1, no=0)	-0.0146		-0.0169		-0.0134		0.0217	
	(0.0187)		(0.0232)		(0.0162)		(0.0225)	
Log of internal remittance		-0.0052*		-0.0145**		-0.0036		-0.0066
		(0.0027)		(0.0057)		(0.0053)		(0.0081)
Log of international remittance		-0.0128		-0.0171		-0.0021		-0.0277
		(0.0097)		(0.0127)		(0.0108)		(0.0323)
Not receiving internal remittance (not=1, yes=0)		-0.0292		-0.0937**		-0.0135		-0.0187
		(0.0203)		(0.0431)		(0.0424)		(0.0678)
Not receiving international remittance (not=1, yes=0)		-0.1036		-0.1889		-0.0187		-0.1820
		(0.1041)		(0.1178)		(0.0996)		(0.3123)
Household size	0.0040	0.0039	-0.0090	-0.0095	-0.0005	-0.0004	-0.0077	-0.0113

Explanatory variables	Sample of children aged 6-14		Sample of people aged 15-22		Sample of people aged 23-60		Sample of people aged from 60	
	(0.0052)	(0.0048)	(0.0093)	(0.0093)	(0.0062)	(0.0059)	(0.0120)	(0.0118)
Proportion of children below 15 in household	-0.0808**	-0.0768**	0.0628	0.0633	0.0118	0.0117	0.0268	0.0367
	(0.0358)	(0.0347)	(0.0832)	(0.0841)	(0.0475)	(0.0472)	(0.1200)	(0.1176)
Proportion of elderly above 60 in household	-0.0784	-0.0732	0.0957	0.1020	-0.0113	-0.0138	0.0015	0.0017
	(0.0735)	(0.0746)	(0.1194)	(0.1201)	(0.0576)	(0.0576)	(0.1191)	(0.1157)
Proportion of female members in household	0.0599	0.0623	0.1029	0.1004	0.0208	0.0196	0.1778*	0.1684*
	(0.0672)	(0.0660)	(0.0920)	(0.0916)	(0.0576)	(0.0574)	(0.0938)	(0.0974)
Sex of household head (male=1; female=0)	-0.0331	-0.0346	0.0468**	0.0490**	0.0128	0.0114	0.0597	0.0638
	(0.0345)	(0.0349)	(0.0213)	(0.0211)	(0.0416)	(0.0416)	(0.0405)	(0.0429)
Age of household head	-0.0086*	-0.0086*	-0.0050	-0.0061	-0.0181**	-0.0183**	0.0102	0.0102
	(0.0044)	(0.0045)	(0.0053)	(0.0053)	(0.0086)	(0.0086)	(0.0094)	(0.0093)
Age of household head squared	0.0001*	0.0001*	0.0000	0.0000	0.0002**	0.0002**	-0.0001	-0.0001
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Number of schooling years of household head	0.0020	0.0021	-0.0050	-0.0048	-0.0049	-0.0046	-0.0017	-0.0019
	(0.0018)	(0.0018)	(0.0058)	(0.0058)	(0.0035)	(0.0035)	(0.0059)	(0.0057)
Dummy year 2012	0.0084*	0.0099**	0.0301***	0.0323***	-0.0038	-0.0031	-0.034***	-0.0274**
	(0.0043)	(0.0046)	(0.0075)	(0.0076)	(0.0069)	(0.0068)	(0.0122)	(0.0109)
Constant	0.2322**	0.3657**	0.1999	0.5043**	0.7866***	0.8244***	-0.1812	0.0453
	(0.1176)	(0.1660)	(0.1566)	(0.1961)	(0.2431)	(0.2638)	(0.2748)	(0.3968)
Observations	4726	4726	4186	4186	15406	15406	2806	2806
Number of individuals	2363	2363	2093	2093	7703	7703	1403	1403
R-squared	0.01	0.02	0.01	0.01	0.01	0.01	0.02	0.03

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: authors' estimates from VHLSSs 2010 and 2012

Table 9 shows that migration tends to decrease the labor participation of household members. Young people aged 15 to 22 in migrant-sending households tend to attend school, and as a result they are less likely to work. However, for people aged 23 to 60, having a migrant in their families reduce the probability of having a wage job by 0.03.[1] Possibly, because of the absence of migrants the remaining adult members have to spend more time on housework and take care of other dependents, and they are less likely to participate into labor market.

Table 9**:** Fixed-effects regression of having wage jobs

Explanatory variables	Sample of children aged 6-14		Sample of people aged 15-22		Sample of people aged 23-60		Sample of people aged from 60	
Having at least a migrant (yes=1, no=0)	0.0059		-0.0604*		-0.0297*		-0.0016	
	(0.0130)		(0.0343)		(0.0160)		(0.0186)	
Log of internal remittance		-0.0037		-0.0149		-0.0010		-0.0074
		(0.0052)		(0.0111)		(0.0047)		(0.0058)
Log of international remittance		-0.0029		-0.0411**		-0.0188		-0.0050
		(0.0092)		(0.0182)		(0.0138)		(0.0043)
Not receiving internal remittance (not=1, yes=0)		-0.0292		-0.0858		-0.0116		-0.0500
		(0.0376)		(0.0857)		(0.0373)		(0.0445)
Not receiving international remittance (not=1, yes=0)		-0.0258		-0.3037*		-0.1692		-0.0349
		(0.0953)		(0.1599)		(0.1281)		(0.0496)
Household size	-0.0027	-0.0036	0.0104	0.0122	0.0064	0.0078	-0.0017	-0.0028

[1] The proportion of people aged 23-60 having wage jobs is around 34% for households with migrants and 42% for households without migrants.

Explanatory variables	Sample of children aged 6-14		Sample of people aged 15-22		Sample of people aged 23-60		Sample of people aged from 60	
	(0.0054)	(0.0052)	(0.0135)	(0.0130)	(0.0052)	(0.0050)	(0.0092)	(0.0093)
Proportion of children below 15 in household	-0.193***	-0.191***	0.0267	0.0136	-0.0298	-0.0397	-0.0333	-0.0288
	(0.0425)	(0.0431)	(0.1120)	(0.1113)	(0.0482)	(0.0476)	(0.0764)	(0.0753)
Proportion of elderly above 60 in household	0.0978	0.1038	0.2734	0.2544	-0.0809*	-0.0865*	0.0295	0.0302
	(0.0864)	(0.0868)	(0.1838)	(0.1837)	(0.0480)	(0.0483)	(0.0565)	(0.0567)
Proportion of female members in household	-0.0353	-0.0333	0.1384	0.1268	0.1361**	0.1274**	-0.1088	-0.1095
	(0.0762)	(0.0758)	(0.1377)	(0.1348)	(0.0618)	(0.0619)	(0.0880)	(0.0885)
Sex of household head (male=1; female=0)	-0.0159	-0.0178	0.0069	0.0023	-0.0216	-0.0226	-0.0069	-0.0031
	(0.0310)	(0.0314)	(0.0445)	(0.0449)	(0.0441)	(0.0440)	(0.0155)	(0.0168)
Age of household head	-0.0058	-0.0062	-0.0203	-0.0212	0.0138*	0.0137*	0.0020	0.0017
	(0.0041)	(0.0041)	(0.0191)	(0.0192)	(0.0074)	(0.0074)	(0.0020)	(0.0019)
Age of household head squared	0.0001	0.0001	0.0002	0.0002	-0.0001**	-0.0001**	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0002)	(0.0002)	(0.0001)	(0.0001)	(0.0000)	(0.0000)
Number of schooling years of household head	0.0001	0.0000	-0.0082	-0.0073	-0.0015	-0.0017	-0.0035	-0.0036
	(0.0020)	(0.0020)	(0.0081)	(0.0081)	(0.0036)	(0.0037)	(0.0031)	(0.0031)
Dummy year 2012	0.0104***	0.0110***	0.1140***	0.1137***	-0.0097	-0.0105*	-0.0071	-0.0054
	(0.0034)	(0.0035)	(0.0126)	(0.0124)	(0.0063)	(0.0063)	(0.0059)	(0.0060)
Constant	0.2756**	0.3424**	0.5966	1.0065*	0.0422	0.2248	0.1054	0.2015
	(0.1115)	(0.1586)	(0.5514)	(0.5768)	(0.2236)	(0.2555)	(0.0938)	(0.1312)
Observations	4726	4726	4186	4186	15406	15406	2806	2806
Number of individuals	2363	2363	2093	2093	7703	7703	1403	1403
R-squared	0.03	0.04	0.07	0.08	0.01	0.01	0.01	0.01

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: authors' estimates from VHLSSs 2010 and 2012

5.2. The impact of migration and remittances on individual outcomes

In Tables 10 to 12, we examine the impact of migration on household-level outcomes. For each outcome variable, we present three modes. Model 1 does not include explanatory variables. Model 2 includes explanatory variables, but not household size. Model 3 include explanatory variables as in Model 2 and plus household size. Migration means a decrease in the household size. Models 2 and 3 investigate whether the effect of migration and remittances on per capita income and consumption of home households is through the reduction in household size.

Table 10 presents regression of log of per capita income on migration and remittances. All the three models produce similar estimates of the effect of migration and remittances. It shows that per capita income of migrant-sending households is not statistically significantly higher than per capita income of households not sending migrants. Possibly, migration leads to an increase in remittances but a reduction in income

earned by migrants if they had not migrated. As a result, the total effect of migration is not large.

The receipt of remittances, especially international remittances, helps households increase their income significantly. According to Model 3, a one percent increase in internal remittances or international remittances results in a 0.055 percent or a 0.16 percent increase in per capita income. The dependent variable is measured by per capita. Since the household size at mean is around 4, a one percent increase in internal remittances or international remittances results in a 0.22 percent or a 0.64 percent increase in per capita income, respectively. The elasticity is less than one. It implies that although migrant-sending households increase their income by remittances, they also experience a reduction in income due to the absence of migrants in their households.

It should be noted that the coefficient of two dummy variables "Not receiving internal remittance" and "Not receiving international remittance" are positive. It means that without any remittance households receiving remittances have lower per capita income than households not receiving remittances.

Table 10: Household fixed-effects regression of log of per capita income

Explanatory variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Having at least a migrant (yes=1, no=0)	0.0322	0.0415	0.0048			
	(0.0261)	(0.0263)	(0.0262)			
Log of internal remittance				0.0555***	0.0584***	0.0526***
				(0.0084)	(0.0082)	(0.0083)
Log of international remittance				0.1676***	0.1690***	0.1592***
				(0.0235)	(0.0235)	(0.0238)
Not receiving internal remittance (not=1, yes=0)				0.3950***	0.4139***	0.3775***
				(0.0667)	(0.0648)	(0.0648)
Not receiving international remittance (not=1, yes=0)				1.3958***	1.4070***	1.3249***
				(0.2172)	(0.2163)	(0.2188)
Household size			-0.0795***			-0.0686***
			(0.0100)			(0.0098)
Proportion of children below 15 in household		-0.5022***	-0.2717***		-0.5107***	-0.3161***
		(0.0797)	(0.0820)		(0.0766)	(0.0795)
Proportion of elderly above 60 in household		-0.0317	-0.1983***		-0.0483	-0.1949***
		(0.0728)	(0.0754)		(0.0714)	(0.0736)
Proportion of female members in household		0.0317	0.0581		0.0218	0.0415
		(0.0874)	(0.0836)		(0.0842)	(0.0814)
Sex of household head (male=1; female=0)		-0.0736	-0.0346		-0.0685	-0.0332
		(0.0668)	(0.0671)		(0.0657)	(0.0663)
Age of household head		0.0223	0.0255*		0.0270*	0.0294*
		(0.0146)	(0.0155)		(0.0147)	(0.0155)
Age of household head squared		-0.0002*	-0.0002*		-0.0003**	-0.0003**
		(0.0001)	(0.0001)		(0.0001)	(0.0001)
Number of schooling years of household head		-0.0008	-0.0004		-0.0007	-0.0003
		(0.0058)	(0.0059)		(0.0058)	(0.0059)
Dummy year 2012	0.4172***	0.4140***	0.4148***	0.4079***	0.4052***	0.4058***
	(0.0107)	(0.0122)	(0.0123)	(0.0103)	(0.0119)	(0.0119)
Constant	9.4796***	9.1541***	9.2743***	7.6763***	7.2269***	7.4543***

Explanatory variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	(0.0057)	(0.4166)	(0.4390)	(0.2313)	(0.4917)	(0.5133)
Observations	8314	8314	8314	8314	8314	8314
Number of households	4157	4157	4157	4157	4157	4157
R-squared	0.39	0.40	0.41	0.41	0.42	0.43

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: authors' estimates from VHLSSs 2010 and 2012.

Table 11 presents the effect of migration and remittances on log of per capita consumption expenditure. When household size is not controlled, the effect of migration on per capita expenditure is positive. However, the effect of migration is smaller and not significant when household size is controlled for. So the effect of migration on per capita expenditure is mainly through the household economies of scale. As the household size decreases, the per capita expenditure increases. This finding is consistent with the finding that there are no significant effects of migration on per capita income.

The effect of remittances on expenditure is positive and significant in models either with or without household size. According to Model 3, a one percent increase in internal remittances or international remittances results in a 0.03 percent or a 0.05 percent increase in per capita income, respectively. The effect of remittances on expenditure is smaller than the effect on income. It means that remittances are also used for saving or buying household assets.

Table 11: Household fixed-effects regression of log of per capita expenditure

Explanatory variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Having at least a migrant (yes=1, no=0)	0.0573***	0.0639***	0.0138			
	(0.0198)	(0.0195)	(0.0187)			
Log of internal remittance				0.0365***	0.0384***	0.0296***
				(0.0074)	(0.0069)	(0.0065)
Log of international remittance				0.0624***	0.0613***	0.0462***
				(0.0184)	(0.0174)	(0.0165)
Not receiving internal remittance (not=1, yes=0)				0.2648***	0.2799***	0.2243***
				(0.0587)	(0.0559)	(0.0534)
Not receiving international remittance (not=1, yes=0)				0.5228***	0.5079***	0.3824***
				(0.1609)	(0.1526)	(0.1455)
Household size			-0.1086***			-0.1049***
			(0.0087)			(0.0084)
Proportion of children below 15 in household		-0.6188***	-0.3039***		-0.6164***	-0.3189***
		(0.0661)	(0.0650)		(0.0657)	(0.0647)
Proportion of elderly above 60 in household		0.1228*	-0.1049		0.1201*	-0.1040
		(0.0734)	(0.0733)		(0.0721)	(0.0725)
Proportion of female members in household		-0.0595	-0.0235		-0.0602	-0.0301
		(0.0763)	(0.0701)		(0.0745)	(0.0689)
Sex of household head (male=1; female=0)		-0.1643***	-0.1110*		-0.1676***	-0.1136*
		(0.0599)	(0.0601)		(0.0589)	(0.0598)
Age of household head		0.0098	0.0141		0.0122	0.0159
		(0.0107)	(0.0109)		(0.0105)	(0.0107)
Age of household head squared		-0.0001	-0.0001		-0.0001	-0.0002
		(0.0001)	(0.0001)		(0.0001)	(0.0001)
Number of schooling years of		0.0067	0.0073		0.0069	0.0076

Explanatory variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
household head		(0.0053)	(0.0054)		(0.0054)	(0.0055)
Dummy year 2012	0.3747***	0.3681***	0.3693***	0.3710***	0.3648***	0.3658***
	(0.0095)	(0.0102)	(0.0099)	(0.0095)	(0.0102)	(0.0100)
Constant	9.5171***	9.5642***	9.7284***	8.7289***	8.7272***	9.0749***
	(0.0050)	(0.2833)	(0.2828)	(0.1758)	(0.3287)	(0.3289)
Observations	8314	8314	8314	8314	8314	8314
Number of households	4157	4157	4157	4157	4157	4157
R-squared	0.45	0.47	0.50	0.45	0.47	0.51

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: authors' estimates from VHLSSs 2010 and 2012.

Finally, we examine the effect of migration and remittances on expenditure poverty in Table 12. The effect of migration on expenditure poverty is negative and small, and it's only significant in Model 2. Regarding the effect of remittances, only internal remittances have significant and negative effects on poverty. This is because internal remittances cover a larger proportion of households than international remittances. However, the magnitude of the effect of internal remittance on poverty is very small. According to Model 3, if the internal remittances increase by 1 percent, the probability of being poor decreased by only 0.00012.

Table 12: Household fixed-effects regression of poverty status

Explanatory variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Having at least a migrant (yes=1, no=0)	-0.0268	-0.0298*	-0.0136			
	(0.0170)	(0.0170)	(0.0167)			
Log of internal remittance				-0.0136**	-0.0151**	-0.0122**
				(0.0061)	(0.0061)	(0.0060)
Log of international remittance				-0.0139	-0.0151	-0.0101
				(0.0094)	(0.0094)	(0.0097)
Not receiving internal remittance (not=1, yes=0)				-0.1088**	-0.1193**	-0.1010**
				(0.0500)	(0.0496)	(0.0492)
Not receiving international remittance (not=1, yes=0)				-0.1135	-0.1239	-0.0826
				(0.0907)	(0.0909)	(0.0934)
Household size			0.0350***			0.0345***
			(0.0066)			(0.0067)
Proportion of children below 15 in household		0.1810***	0.0796		0.1782***	0.0804
		(0.0569)	(0.0599)		(0.0569)	(0.0600)
Proportion of elderly above 60 in household		-0.0077	0.0657		-0.0095	0.0642
		(0.0465)	(0.0482)		(0.0466)	(0.0483)
Proportion of female members in household		-0.0280	-0.0396		-0.0286	-0.0385
		(0.0531)	(0.0528)		(0.0528)	(0.0525)
Sex of household head (male=1; female=0)		0.0326	0.0155		0.0357	0.0179
		(0.0407)	(0.0404)		(0.0401)	(0.0401)
Age of household head		-0.0207***	-0.0221***		-0.0214***	-0.0227***
		(0.0078)	(0.0079)		(0.0078)	(0.0079)
Age of household head squared		0.0002***	0.0002***		0.0002***	0.0002***
		(0.0001)	(0.0001)		(0.0001)	(0.0001)
Number of schooling years of household head		-0.0044	-0.0046		-0.0047	-0.0049
		(0.0038)	(0.0038)		(0.0038)	(0.0038)
Dummy year 2012	-0.0457***	-0.0423***	-0.0427***	-0.0453***	-0.0418***	-0.0422***
	(0.0063)	(0.0067)	(0.0067)	(0.0063)	(0.0066)	(0.0067)
Constant	0.1916***	0.6634***	0.6105***	0.4105***	0.9187***	0.8044***

Explanatory variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	(0.0037)	(0.2113)	(0.2135)	(0.1017)	(0.2427)	(0.2489)
Observations	8314	8314	8314	8314	8314	8314
Number of households	4157	4157	4157	4157	4157	4157
R-squared	0.02	0.02	0.03	0.02	0.03	0.04

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: authors' estimates from VHLSSs 2010 and 2012.

6. Conclusions

This paper examines the pattern and the impact of migration and remittances on household welfare in Vietnam using fixed-effects regressions and panel data from Vietnam Household Living Standard Surveys 2010 and 2012. Rural households are more likely to send members for migration than urban households. However, the proportion of households receiving internal remittances is quite similar between urban and rural areas. The proportion of receiving international remittances is higher among urban households than rural ones.

Overall, the effect of migration as well as remittances on employment of remaining members on home households is small. People at the working age in households with migration and remittances are less likely to work than people in other households. They are also less likely to participate in labor market. Possibly, because of the absence of migrants the remaining members have to spend more time on housework and take care of other dependents. There is no evidence that migration and remittances can help household members to work more on non-farm activities. It implies that remittances are not used for household business or entrepreneurs activities.

Since migration does not help household members increase household business as well as non-farm employment, it can only benefit households through remittances. The results show that remittances, especially international remittances help receiving households increase per capita income and per capita expenditure. The effect of remittances on expenditure is smaller than the effect on income. It implies that receiving households use remittances on not only consumption but also saving and buying household assets.

Since remittances have a positive effect on per capita expenditure, they are expected to reduce expenditure poverty. Internal remittances cover a larger proportion of households than international remittances, and as a result only internal remittances have a small effect on poverty reduction. The effect on poverty is small, since remittances tend to non-poor households than poor ones.

The total effect of migration on per capita income of migrant-sending households is small and not statistically significantly. Although migration leads to an increase in remittances, it also leads to a reduction in income earned by migrants if they had not migrated. In addition, not all migrant-sending households are able to receive remittances (around two third of them receive remittances). As a result, the total effect of migration on household income is small. There are no significant effects of migration on total consumption expenditure of migrant-sending households. However, per capita consumption expenditure of migrant-sending households increases because of a reduction in household size.

In summary, remittances are important for migrant-sending households, especially households in ethnic minorities and poor regions. The positive effect of migration on welfare of migrant-sending households is mainly through remittances. Without remittances, there are significant effects of migration on migrant-sending households. Reduction of migration cost and provision of employment for migrants in destination areas are important to improve welfare of people in rural and poor areas.

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Appendix

Table A.1: Outcome variables of households with and without migrants

Variables	2010		2012	
	With migrants	Without migrants	With migrants	Without migrants
Household outcomes				
Per capita income	15998	17326	23701	25164
Per capita expenditure	15189	16949	22664	23451
Expenditure poor (poor=1; non-poor=0)	13.0	21.4	11.4	18.2
Individual outcomes				
Children aged 6-14				
Attending school (yes=1, no=0)	92.6	93.9	93.4	93.9
Working in the last month (yes=1, no=0)	9.7	10.0	9.5	7.9
Number of working hours per month	9.1	8.5	7.2	6.5
Having nonfarm work in the last month (yes=1, no=0)	1.2	1.1	1.8	0.7
Having wage job in the last month (yes=1, no=0)	2.1	1.2	1.3	0.8
People aged 15-22				
Attending school (yes=1, no=0)	50.7	47.6	51.4	50.8
Working in the last month (yes=1, no=0)	47.0	50.3	48.1	49.1
Number of working hours per month	74.0	84.3	82.1	82.9
Having nonfarm work in the last month (yes=1, no=0)	7.0	9.0	9.4	7.6
Having wage job in the last month (yes=1, no=0)	21.4	22.8	26.1	24.1
People aged 23-60				
Working in the last month (yes=1, no=0)	90.2	92.1	91.9	92.4
Number of working hours per month	164.8	175.8	161.6	173.9
Having nonfarm work in the last month (yes=1, no=0)	26.5	30.2	24.9	28.6
Having wage job in the last month (yes=1, no=0)	34.4	42.2	34.2	42.8
People aged 61+				
Working in the last month (yes=1, no=0)	51.2	43.4	59.0	41.3
Number of working hours per month	55.5	48.4	64.6	45.8
Having nonfarm work in the last month (yes=1, no=0)	9.2	10.5	10.0	8.7
Having wage job in the last month (yes=1, no=0)	4.0	4.7	7.3	4.7

Source: authors' estimates from VHLSSs 2010 and 2012

Table A.2. Outcome variables of households with and without internal remittances

Variables	2010		2012	
	With internal remittance	Without internal remittance	With internal remittance	Without internal remittance
Household outcomes				
Per capita income	17059	17970	25178	23895
Per capita expenditure	16576	17907	23516	22453
Expenditure poor (poor=1; non-poor=0)	20.3	22.2	16.8	20.2
Individual outcomes				
Children aged 6-14				
Attending school (yes=1, no=0)	93.7	94.8	94.0	93.2
Working in the last month (yes=1, no=0)	10.3	8.2	7.6	9.9
Number of working hours per month	8.7	7.6	6.1	8.4
Having wage job in the last month (yes=1, no=0)	1.4	0.5	0.9	0.5
People aged 15-22				
Attending school (yes=1, no=0)	48.3	46.2	51.1	49.6
Working in the last month (yes=1, no=0)	50.0	50.1	48.5	51.0
Number of working hours per month	82.6	87.3	82.4	84.4
Having wage job in the last month (yes=1, no=0)	23.4	19.6	24.8	22.0
People aged 23-60				
Working in the last month (yes=1, no=0)	91.9	92.2	92.2	92.7
Number of working hours per month	174.5	176.5	173.0	170.1
Having wage job in the last month (yes=1, no=0)	42.2	38.0	42.8	37.3
People aged 61+				
Working in the last month (yes=1, no=0)	44.0	45.2	44.8	43.0
Number of working hours per month	48.2	55.2	48.7	54.4
Having wage job in the last month (yes=1, no=0)	4.8	4.0	5.4	3.6

Source: authors' estimates from VHLSSs 2010 and 2012

Table A.3. Outcome variables of households with and without international remittances

Variables	2010		2012	
	With international remittance	Without international remittance	With international remittance	Without international remittance
Household outcomes				
Per capita income	27928	16737	37044	24449
Per capita expenditure	26946	16345	33783	22893
Expenditure poor (poor=1; non-poor=0)	5.1	21.3	5.8	17.8
Individual outcomes				
Children aged 6-14				
Attending school (yes=1, no=0)	98.0	93.7	95.8	93.8
Working in the last month (yes=1, no=0)	4.4	10.2	6.0	8.1
Number of working hours per month	2.7	8.8	2.9	6.7
Having wage job in the last month (yes=1, no=0)	0.0	1.3	0.0	0.9
People aged 15-22				
Attending school (yes=1, no=0)	60.8	47.3	64.9	50.3
Working in the last month (yes=1, no=0)	36.6	50.7	30.4	49.6
Number of working hours per month	61.4	84.5	51.7	83.9
Having wage job in the last month (yes=1, no=0)	17.2	23.0	19.4	24.5
People aged 23-60				
Working in the last month (yes=1, no=0)	83.1	92.3	83.3	92.7
Number of working hours per month	157.9	175.6	152.0	173.5
Having wage job in the last month (yes=1, no=0)	32.9	41.9	36.4	42.1
People aged 61+				
Working in the last month (yes=1, no=0)	37.8	44.5	34.6	45.2
Number of working hours per month	46.0	49.2	36.0	50.0
Having wage job in the last month (yes=1, no=0)	4.3	4.7	4.4	5.2

Source: authors' estimates from VHLSSs 2010 and 2012

Table A.4: Household-level explanatory variables

Household-level variable	**2010**		**2012**	
	Mean	Std. Dev.	Mean	Std. Dev.
Household size	3.964	1.566	3.935	1.576
Proportion of children below 15 in household	0.205	0.207	0.196	0.205
Proportion of elderly above 60 in household	0.131	0.263	0.146	0.278
Proportion of female members in household	0.520	0.203	0.522	0.201
Sex of household head (male=1; female=0)	0.753	0.432	0.743	0.437
Age of household head	49.47	14.05	51.00	13.96
Number of schooling years of household head	7.288	3.711	7.368	3.667
Number of observations	4157		4157	

Source: authors' estimates from VHLSSs 2010 and 2012