

University of Wisconsin-Madison
Department of Agricultural & Applied Economics

Staff Paper No. 581

March 2016

Rural-Urban Migration and Remittances in Vietnam
Evidence from Migrant Tracer Data

By

Diep Phan and Ian Coxhead

**AGRICULTURAL &
APPLIED ECONOMICS**

STAFF PAPER SERIES

Copyright © 2016 Diep Phan & Ian Coxhead. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Rural-urban migration and remittances in Vietnam

Evidence from migrant tracer data^a

Diep Phan^b

Ian Coxhead^c

This version: March 10th, 2016

Abstract

We examine remittance behavior of rural-urban migrants in Vietnam using a unique data set that links the 2012 round of the Vietnam Household Living Standards Survey (VHLSS) with a 2013 tracer study of migrants from VHLSS households. We estimate factors associated with remittances, taking migrant selection issues into account. Consistent with the altruism hypothesis for remittances, we find that remittance flows are larger when migrants have higher wages and less attachment to the destination, and when rural households have lower per-capita earning capacity. We do not find support for a self-interest remittance motive. We also estimate impacts of net remittances on per capita income in migrant-sending rural households, taking into account the endogeneity of remittances. We find that migration and remittances increase the incomes of rural households. However, the estimated direct income effects are small, and become smaller still as migrants become more established in their new place of residence. Members of ethnic minority groups gain far less than others from migration and remittances. More data and research are needed to broaden these assessments to include non-economic benefits and costs of migration.

^a Forthcoming in X. Meng and A. Liu (eds), *Rural-Urban Migration in Vietnam*. We thank the VRUMS project for financial support, and Nguyen Phong, Nguyen Manh Hai and their staff at GSO and CIEM respectively for outstanding work in the design and conduct of the data-gathering survey. Xin Meng, Bob Gregory, Amy Liu and participants at a conference held in Hanoi, January 2015 provided very helpful comments on an earlier draft. Remaining errors are ours alone.

^b Beloit College, phand@beloit.edu

^c University of Wisconsin-Madison, ian.coxhead@wisc.edu

1. Introduction

Since the mid-1990s, most of Vietnam's new employment growth has taken place in or nearby to a few major cities. Since a majority of the population still lives in towns and rural areas, migration for work has become increasingly common. According to census data, Vietnam's internal migration rate has approximately doubled each decade since the beginning of economic liberalization and reform in the late 1980s, from about 2% in 1989, to 4% in 1999 and over 8% in 2009 (Phan and Coxhead 2010; GSO 2009). Over this time farm employment has stagnated in absolute terms, and as a result has fallen sharply as a share of the country's labor force, from over 70% in 1990 to under 50% by 2012. Migration destinations are highly concentrated: according to the 2009 census, 63% of all interprovincial migrants over the previous 5-year period moved to or within the four-province Ho Chi Minh City metropolitan area, and another 20% moved to one of the other three large urban areas, Hanoi, Da Nang and Can Tho (GSO 2011).

Migration, in the Vietnamese context, serves the dual purpose of increasing the incomes of individual workers and, through remittances that they send back, of spreading the gains from spatially concentrated economic growth to a broader population of non-migrants. From the perspective of a rural household, voluntary migration for employment should raise total household income (inclusive of migrants' income). Even if migration for employment reduces productive capacity at home, increased earning power on the part of the migrant in another location should more than compensate for the loss in rural income. Unforeseen shocks aside, the larger the earnings difference between destination and sending region, the more likely that migration will increase incomes of origin households. The volatility of total household income may also be reduced through a broadening of the portfolio of occupations and sectors from which income is derived. The welfare of the migrant and of her or his origin household may change by different amounts, however. Remittances determine the within-household distribution of net monetary gains from migration. There are other costs to be borne as well: financial costs and risks, psychic costs when households divide, and since migrants are usually positively selected on ability, skills and entrepreneurial energy, a loss of human capital, at least temporarily, in the domicile. Remittances may also change behavior, for example by inducing changes in household labor supply, educational investments, or investments in other assets.

Recognizing these links, modern theories of migration emphasize that migration decisions and remittances are jointly determined (see survey in Rapoport and Docquier 2006). An implication is that migrants are non-randomly selected from the population of those eligible to migrate, and

their motives for doing so, along with other characteristics more commonly included in empirical analyses of the migration decision, are important (McKenzie et al. 2010; Gibson et al. 2011). If the same factors that cause migrants to move also explain remittance-sending choices, there is an omitted variable problem. That is, without additional information we cannot tell whether it is migration per se that changes outcomes for the origin family, or some other underlying reason.¹ The selection issue can be addressed using instrumental variables (IV), but the set of candidate instruments—such as historical outmigration rates, or job opportunities in destinations—is limited (Antman 2012). Some recent studies provide estimation strategies and results in support of a two-stage or integrated approach to estimation of the migration decision and the decision to send remittances (Garip 2012).

In the literature on rural-urban migration in Vietnam, there have been a number of studies examining the determinants and impacts of migration and remittances on household welfare and poverty and inequality. Some use data from migrant surveys, such as the 2004 Vietnam Migration Survey, which has detailed information the migrants and their families at the destination, but no data on the origin households (e.g. Niimi et al. 2009, Niimi and Reilly 2011). Others use data from the Vietnam Household Living Standard Surveys (VHLSS), conducted by the General Statistical Office (GSO) of Vietnam in 1993, 1997, and every two years since 2002. These surveys provide detailed information on origin households. They also provide information on migrants and remittances, but because it is provided by a rural household member and not by the migrants themselves, this information tends to be unreliable. Researchers using VHLSS data can exploit the panel dimensions of these surveys to identify and define migrants, then examine the impact of migration on changes in household per capita expenditure and other welfare measures. They typically find that migration and remittances help improve rural households' income or expenditure and so reduce poverty, but that impacts on inequality are ambiguous.

Nguyen Viet Cuong (2009) uses the VHLSS 2002-2004 and finds that both internal and international remittances increased the income and consumption expenditures of the recipients. A large portion of international remittances was used for saving and investment, while most internal remittances were used for consumption expenditures. Nguyen Viet Cuong et al. (2011) use the VHLSS 2004-2006 panel and a difference-in-differences method with propensity score matching. They find that both work and non-work migration have a positive impact on per capita

¹ In fact, as Gibson et al. (2013) have pointed out, there are multiple selection problems: self-selection into migration; the decision of an entire household to move or to leave some members behind; migrants' decisions to return home, and the timing of migration decisions.

expenditures of migrant-sending households and reduce the incidence, depth, and severity of poverty. Both types of migration reduce inequality, albeit very slightly. Similarly, Nguyen Duc Loc et al. (2012) also used a difference-in-differences method with propensity score matching with data from 2008-2010 and found that migration contributed significantly to rural household income growth. Their data consisted of a random sample of 2,200 households from three provinces, Dak Lak, Thua Thien Hue, and Ha Tinh. The survey also tracked 229 migrant household members of the surveyed rural households, who migrated to HCMC, Dong Nai, or Binh Duong. They also found that migration is more likely to be observed among households with high human and social capital endowments and among rural households that are financially better off. This suggests that migration might aggravate income disparities within villages. But it might reduce disparities between provinces, because outmigration is more pronounced from provinces with fewer job opportunities.

De Brauw and Harigaya (2007) studied seasonal migration and household incomes in rural Vietnam between 1993 and 1997. They found that such migration added 5.2 percentage points to annualized household income growth, reducing rural poverty by 3 percentage points. Nguyen Thu Phuong et al. (2008) used 2004 VHLSS data and reduced-form linear models to explore the effects of short-term and long-term migration on households, finding significant gains in household expenditure but also evidence of higher inequality in sending areas. Niimi et al. (2009) used a Tobit model and data from the 2004 Vietnam Migration Survey to examine determinants of remittances. They found that remittances increased with migrant's earning potential, and that migrants use remittances to help smooth consumption in origin households in the face of economic uncertainty. Using micro data from a cross-sectional four-province migration survey, Phan (2012) explored links between migration and households' ability to overcome credit constraints that inhibit agricultural investments.

It is notable that none of these studies has successfully conducted a joint estimation of the determinants of migration and those of remittances. As we shall see in the next section, the data requirements for an integrated analysis are formidable. In this paper, we contribute to literature on internal migration in Vietnam by examining the determinants of remittances, taking into account selection into migration. This is possible because we use a data set that provides information both on migrant households and on their origin households. We also investigate the impact of remittances on per capita income in origin households, correcting for potential endogeneity of remittance flows.

2. Data and descriptive statistics

Our data come from the Vietnam Rural-Urban Migration Survey 2013 (VRUMS), conducted by Australian National University in coordination with the Central Institute for Economic Management (CIEM) of Vietnam. The survey collected data and information on 869 migrant households, whose heads (the migrants) were living and working in Hanoi or the HCMC cluster² in 2012. These migrants come from the rural household base of the large-sample Vietnam Household Living Standard Survey (VHLSS) 2012, which was undertaken by the Vietnam General Statistical Office and has 46,995 households, of which 33,480 were rural households. As a result, it is possible to link VRUMS 2013 and VHLSS 2012 to create an 844-observation data set, in which each observation is one migrant-rural household pair.

Table 1 gives summary statistics on the net remittance variable, which is defined as the difference between remittances sent by migrants in the cities to origin households and remittances received by migrants from origin households in the 12-month period prior to the interview date. This variable takes a negative value when transfers from the origin household to the migrant exceed those received from the migrant. The table shows that a large percentage of migrant households (551 out of 762 households with reported net remittances, or 72%) have positive net remittances. Among those households, the average amount sent is 14.1 million VND. This is about 16% of the average annual income of the migrant households (89 million VND), and 19% of the average annual income of the origin households (73.9 million VND). About 24% (181 out of 762) households have zero net remittances, and 4% (30 out of 762 households) have negative net remittances. These results are similar to those obtained from the 2004 Vietnam Migration Survey by Niimi et al. (2009). They reported that 55% of migrants sent money home, and among those that remitted, the average share of remittances in migrant earnings was about 17%.

Table 2 shows net remittances by migrants' region of origin and by their current location. There is significant regional variation in average net remittances. Households in the Red River Delta receive the largest transfers from migrants (14.6 million VND on average). This is as expected, given that the Red River Delta is in the Hanoi hinterland, and migrants in Hanoi remit twice as much compared to migrants in HCMC, as will be discussed in more detail below. Similarly, households from the Northern Mountains region receive more than households in all other regions except Red River Delta, again presumably due to their proximity to Hanoi. Households

² We define the HCMC cluster as HCMC itself together with three neighboring provinces: Binh Duong, Dong Nai and Ba Ria/Vung Tau

from the Central Highlands receive the smallest transfers, which is also expected. It may also be the case that migrants from this region have low earning potential, so they are able to remit less.

Migrant households in Hanoi remitted about twice as much as those in the HCMC cluster (14.6 vs. 7.7 million VND). This is in contrast with the result in Niimi et al. (2009), who reported that migrants living in HCMC remitted larger amounts than migrants in Hanoi. This suggests there might be important differences between these two groups of migrants in the VRUMS sample. Table 3 compares other characteristics of these two groups. Interestingly, there is no statistically significant difference in monthly wages of migrants or in their annual family incomes³, yet the difference in net remittances is quite substantial. There are no significant differences in terms of gender or marital status or number of years living in the city. The migrant group in Hanoi is more educated (10.5 vs. 9.5 years of schooling), which might simply reflect the national historical trend that the north of Vietnam is generally more educated than the south. Although the two migrant groups do not differ in the number of years since migrating to the city, Hanoi migrants are more likely to be permanent migrants: 27.8% of migrants in Hanoi have a local *ho khau* (residence certificate) against just 13.5% in HCMC, and 21.1% of migrants in Hanoi own a house in the city, against just 13.2% in HCMC. Finally, a higher percentage of migrants in the HCMC cluster has outstanding loans in the origin than in Hanoi (23% vs. 14%), and the average amount of principal outstanding also seems higher (10.8 vs. 6.8 million VND), though the difference is not statistically significant.

Table 4 compares important characteristics of the origin households of migrants in Hanoi vs. HCMC (see columns 1 and 2). There are no statistically significant differences in household size, number of children, or monthly per capita income. The origin households of HCMC migrants tend to have a lot more land under cultivation, reflecting the well-established fact that average farm sizes in the south of Vietnam are larger than in the north. Given Vietnam's geography and historical migration flows, it is not surprising that all migrants in Hanoi come from the Red River Delta, the Northern Mountains, and the Central Coast regions, while the majority of HCMC migrants come from the Mekong River Delta or the Central Coast region.

In short, the main differences between the two migrant groups are that Hanoi migrants send home a lot more remittances, and they are also more likely to be permanent migrants with residence

³ Although migrants in Hanoi have much lower average annual family income than migrants in HCMC, the standard deviation of migrants in HCMC is very high.

certificate and housing ownership. However, whether these are true differences or the result of sample selection bias during the surveying process remains unclear.

Table 4 also compares characteristics of VRUMS households vs. non-VRUMS rural households in the VHLSS large sample (see columns 4 and 5). VRUMS households (i.e., households with Hanoi and HCMC migrants) tend to be smaller in size, have fewer children, have higher monthly per capita income, and have less land than households without migrants.

3. Determinants of remittances

3.1. Empirical framework

Migration and remittance decisions can be modeled at either individual or household level. In this section, we treat them as individual decisions and use the following framework to simultaneously study the decision to migrate and the decision to remit:

$$M_i = \beta_m' \mathbf{Z}_m + \varepsilon_m \quad (1)$$

$$R_i = \beta_r' \mathbf{Z}_r + \varepsilon_r \quad (2)$$

where i indexes rural residents who are *potential* migrants, M_i is an indicator for whether the rural resident migrates, and R_i is the net amount remitted by the migrant, given the migration decision. Note that R_i is observed only if the rural resident migrates. \mathbf{Z}_m is a vector of all household and individual characteristics that affect the migration decision, while \mathbf{Z}_r includes all migrant and household characteristics affecting the amount remitted. \mathbf{Z}_m and \mathbf{Z}_r can be overlapping, but some components of \mathbf{Z}_r are not in \mathbf{Z}_m (such as the wage or income of the migrants).

Given adequate data, the above pair of equations can be estimated using the Heckman sample selection method. However, it is common practice to estimate equation (2) only, due to lack of data. Migration surveys usually collect data *either* on migrants *or* on their origin households. In the former case, researchers do not have data on those who did not migrate, making estimation of (1) impossible. This has been the case in previous studies of the welfare impacts of migration in Vietnam. Unless those who migrate are randomly chosen from the population of potential migrants (which seems highly unlikely), this approach is likely to be the source of sample selection bias.

Although our linked VHLSS-VRUMS data set has information on both migrants and origin households, we still lack the data on the relevant non-migrant cohort required to estimate equation (1). That is because migrants in the VRUMS sample left their origin households at various points in time prior to the survey year 2012, so the relevant non-migrant cohort is not the same for all migrants. For example, migrants who left in the year 2008 should be compared with non-migrant individuals in the same year, 2008, but these are not the same individuals as the non-migrants found in the VHLSS 2012 sample.

Furthermore, due to sampling errors, those migrants captured by the VRUMS survey are not necessarily a random sample from the population of migrants out of VHLSS households. For now, we assume that the VRUMS survey team successfully identified migrants to Hanoi and HCMC from the VHLSS sample, and that migrants missed by the VRUMS survey team were random, so that to estimate equation (1) is equivalent to running a probit regression on whether a VHLSS rural household is in the VRUMS survey.⁴ If this sample is not random, then all estimates could be biased. We guess that if the VRUMS survey team did indeed miss migrants in a systematic way, it's most likely they missed the less successful migrants (those with low-paid informal sector jobs or no jobs at all), so we may be able to make some informed guesses on the direction of bias in the estimates.

With these important caveats in mind, we use the Heckman selection method. For the first stage, we estimate equation (1), the selection equation, as a probit of whether a VHLSS rural household has a migrant in either Hanoi or HCMC cluster in 2012—that is, whether a VHLSS rural household is in the VRUMS sample. To satisfy the exclusion restriction, the identifying instruments for the selection equation are origin households' poverty status in 2007 and an ethnic minority dummy. Both of these variables are statistically significant and have large magnitudes in the selection equation, but are not statistically significant in equation (2), the outcome equation.

3.2. Explanatory variables and sample size

Explanatory variables in the vector \mathbf{Z}_m for the selection equation include various rural or origin household characteristics. They include an ethnic minority dummy, a dummy for being a poor household in 2007, household head age, gender, schooling years, and regional dummies. The ethnic minority dummy and household poverty status in 2007 are the identifying instruments for

⁴ The dependent variable for this probit equals one if a rural VHLSS household is in the VRUMS survey, i.e., if this household sends a migrant to either Hanoi or HCMC. It equals zero otherwise.

the selection equation because they are not statistically significant in the outcome equation but are important determinants in the selection equation.

Explanatory variables in the vectors Z_r for the outcome equation are listed in Tables 5a and 5b, along with the signs of their expected impacts on net remittances and their means and standard deviations. Migrants send remittances for many reasons. These include altruism, insurance, bequests, loan repayments, and exchange (Lucas and Stark 1985; Townsend 1994). If altruism is the motivation, then remittances should be positively associated with migrant income and working conditions (monthly wage, formal employment status) or if the migrant is the oldest child (which in Vietnamese culture implies greater family responsibility). We expect that remittances should be lower if there are more children in the migrant households, and higher if there are more children in the origin households. They should be negatively associated with income and wealth (such as agricultural land per capita) in the origin household.⁵

Self-interest, rather than altruism, can also be a motivation to remit. In this case, the migrant might send remittances because s/he anticipates returning home in the future and needs to invest or build reputation and network linkages. She might also have an aspiration to inherit origin family assets. According to this theory, remittances should be positively associated with the origin household's assets: the wealthier is origin household, the greater the expected value of the inheritance, so migrants would send more remittances in hope of receiving a larger share of the inheritance. The probability of inheritance (number of siblings, oldest child dummy) is also likely to be important in the self-interest case.

Regarding sample size, we were able to link 844 VRUMS households (out of the original VRUMS sample of 869 households) to a corresponding number of VHLSS rural households (out of the original VHLSS sample size of 33,480 rural households). However, many explanatory variables in both surveys have missing values. As a result the sample size for estimation is limited to 642 VRUMS households, linked to a reduced VHLSS sample of 33,329 rural households.

3.3. Results

Before discussing the results, we must re-emphasize two important points. First, all results derived from the VRUMS data refer to migration from rural areas of Vietnam to Hanoi and the

⁵ Although we have data on origin households' income, this variable is not exogenous because of simultaneity so we do not include it as an explanatory variable.

HCMC cluster only. We cannot draw any robust inferences about the determinants or impacts of migration and remittances of rural-urban migration in Vietnam in general. That said, in the 2009 Census migration to Hanoi and the HCMC cluster accounted for 65% of total internal migration. Second, as also discussed above, our estimates are likely to be biased if the VRUMS survey team was less successful in tracing migrants who have obtained low-paid informal sector jobs, or no jobs at all, or who have in other ways had less satisfactory migration outcomes leading to lower earnings. If this is the case then we expect that for variables with expected positive coefficients, the estimates obtained are biased upward, while for variables with expected negative coefficients, the bias will be downward.

Results from Heckman estimation of equations (1) and (2) are given in Table 6. The likelihood ratio test rejects the null hypothesis that the two equations in Table 6 are independent (the chi-square statistic is 93.49; its p-value is essentially zero). For comparison, we also report OLS estimates of equation (2), in Table 7. Comparing Tables 6 and 7, the OLS estimates tend to be larger than the Heckman estimates. The OLS estimate of one important variable, migrant's monthly wage, is almost twice as large as in the Heckman estimate. For some variables (residency status or having a formal job), OLS estimates are not statistically significant while Heckman estimates are. These important differences in results confirm that estimation of remittances must take sample selection issues into account. This finding accords with Garip (2012), who also uses an integrated approach to jointly estimate the migration and remittance decisions, and finds that the empirical results and conclusions can be considerably different once selection into migration is taken into account.

The Hanoi dummy is positive, large, and statistically significant, which is not surprising given the descriptive analysis earlier. It remains a puzzle why migrants in Hanoi remit so much more than their counterparts in the HCMC cluster, even after controlling for wages and many characteristics of migrants and origin households.

Male migrants remit twice as much female migrants, but other migrant characteristics such as age and education do not have statistically significant impacts. The influence of education is most likely felt through its effect on migrants' earning potential, which is already controlled for in this regression.

The two variables that measure a migrant's capacity to send remittances (migrant monthly wage, and formal job dummy) have positive signs as expected and indicate that the better the migrant's

job or earnings, the more remittances sent. A migrant employed in the formal sector sends 2.7 million VND more per year than one without a formal job, other things equal. An increase of one million VND in the migrant's *monthly* wage increases annual remittances by about 1.3 million VND, yielding a remittance-earnings elasticity of 0.73 at the sample means. This is higher than the remittance-earnings elasticity computed in Niimi et al. (2009) for Vietnamese migrants to Hanoi, HCMC, and Quang Ninh.⁶ This elasticity, however, is small when compared with the remittance-earnings elasticity of Chinese migrants found in Liu and Reilly (2004) and other studies. But as noted earlier, if the VRUMS sample is not random and misses some (or many) migrants that are less successful economically, then our estimate of the impact on remittances of the migrant's monthly wage is probably biased upward. Even so, we cannot predict whether the remittance-earnings elasticity from a random sample would be larger or smaller than computed above, because if a random sample included a larger fraction of less-successful migrants, then mean wages and remittances in that sample would also be lower. Without more information on earnings and remittance behavior across the migrant income distribution we cannot predict whether this ratio would be larger in a random sample, or smaller.

A migrants' number of siblings and the dummy for being eldest child do not have any statistically significant impact on remittances. These results do not lend support to the conjecture that remittances are motivated by self-interest.

Results on the number of children in migrant households in the city and at the origin are as expected, with the former variable taking a positive sign and the latter a negative sign; both are statistically significant.

Housing and residency dummies both measure the migrant's attachment to the destination (or his/her lack of attachment to the origin). Again, the results are as expected. Net remittances are smaller when the migrant has registered his/her residency at the destination, and when the migrant owns a house at the destination. A migrant who owns a house at the destination sends 6.4 million VND less per year than one without a house. A migrant who has acquired an urban *ho khau* (that is, who has registered his residency in the city) sends home 3.5 million VND less per year compared to one who has not. This result accords with the findings of Niimi et al. (2009) for Vietnamese migrants and of Liu and Reilly (2004) for Chinese migrants. Although residency status is associated with lower remittances, number of years living in the city is associated with a

⁶ In Niimi et al. (2009), an increase of one million VND in migrant's monthly income raises annual remittances by VND 600,000.

very slightly higher level of remittances. One more year in the city is associated with an increase of 0.21 million VND in remittances sent.

The loan coefficient is positive and statistically significant as expected, but it is very small. A one million VND increase in the size of the migrant's outstanding loan is associated with just 0.05 million VND more per year in net remittances.

In the selection equation, the ethnic minority dummy is negative, suggesting that minority groups are less likely to have migrants in either Hanoi or HCMC. This result confirms the familiar finding that members of ethnic minority groups are participating at a much lower rate in Vietnam's economic growth and transformation than their ethnic majority counterparts. Also in the selection equation, a household's poverty status in 2007 has a positive association with being in the VRUMS, or with the likelihood of having a migrant in either Hanoi or HCMC. This suggests that migration and remittances may be poverty-reducing, as poor households are more likely to have migrants in Hanoi and HCMC—in the VRUMS sample, at least.

In summary, using the VRUMS-VHLSS data set, we are able to study the determinants of remittances, controlling for the characteristics both of migrants and their origin households. We are also able to (imperfectly) control for sample selection issues. As a result, our estimates may suffer less from omitted variable biases or sample selection biases than other studies of remittances in Vietnam. Most of our estimates accord with prior expectations. One puzzling finding is the substantially higher amount remitted by migrants in Hanoi even after controlling for earnings and other important characteristics. Further research is needed to explain this interesting finding.

4. Impacts of remittances on origin households

4.1. Theoretical impacts

The expected impact of remittances on rural household income is ambiguous. This relationship should depend on the household's livelihood strategy and how remittances fit into this strategy. When households send out migrants, they lose a productive (or potentially productive) member of the family labor force, and as a result the household enterprise may either earn less or incur extra costs by hiring labor to replace the migrant. The resulting drop in net income of the sending household may or may not be offset by remittances, depending on how large the remittances are

and how they are used. If the household's strategy is to use remittance income to substitute for traditional sources of rural earnings (farming, non-agricultural businesses, etc.) in order to increase and/or diversify income, then migration and remittances should have no impact on other income-generating activities other than through the loss of household labor. But according to the New Economics of Labor Migration, households might also use migration as a way to overcome credit constraints and/or obtain funding to finance investments in agriculture or non-agricultural businesses. In that case, we should see a positive impact of remittances on income from other activities as well.

4.2. Empirical framework, explanatory variables, and sample size

If migration were not merely an individual choice but also a household decision, then an ideal empirical framework to study and determinants and impacts of migration and remittances would involve using household-level data to estimate the following system of three equations:

$$M_h = \alpha_m' \mathbf{X}_m + \varepsilon_m \quad (3)$$

$$R_h = \alpha_r' \mathbf{X}_r + \theta M + \varepsilon_r \quad (4)$$

$$Y_h = \alpha_y' \mathbf{X}_y + \gamma_1 M + \gamma_2 R + \varepsilon_y, \quad (5)$$

where h indexes rural households who can potentially send out migrants. M_h is a measure of migration at household level—either the number of migrants or a binary migration indicator. R_h is net remittances received by the origin household (and can be negative if the origin household sends money to the migrant). Y_h is some measure of welfare in the origin household, for example income, expenditure, agricultural productivity, or investments in children's education. \mathbf{X}_m is a vector of household characteristics that affect the migration decision. \mathbf{X}_r is a vector of migrant and household characteristics that affect the remittance amount, and \mathbf{X}_y includes household characteristics that affect the welfare measure. There can be overlaps among the three vectors \mathbf{X}_m , \mathbf{X}_r , and \mathbf{X}_y , and the error terms in the three equations can be correlated. Note that equation (4) is always observed since M can be zero—a contrast with equation (2), which is observed only if there is migration.

Estimating this system demands a lot from the data, because instruments are needed to identify both migration and remittances. Another disadvantage of system estimation is that misspecification in one equation can spill over to others. As a result, in this paper we choose to

estimate the reduced form of equation (5) only. Specifically, we use the instrumental variable method to estimate the impact of net remittances on per capita income in origin households, correcting for potential endogeneity of remittances and using the VRUMS sample only. Instruments for remittances (variables in vector \mathbf{X}_r) include a number of variables from VRUMS that have been shown to be statistically significant determinants of remittances. These are the migrant's monthly wage income; dummies for whether the migrant is in Hanoi, whether the migrant has a formal sector job, whether the migrant owns a house, and whether the migrant registers his/her residency at the destination; number of children in the migrant household, number of years living at the destination, and the amount of any outstanding loan that the migrant must service in the origin household. The variables in vector \mathbf{X}_y explaining rural households' per capita income include cultivated land per capita, ethnicity, characteristics of the household head (gender, age, and years of education) and regional dummy variables.

Once again, several explanatory variables (including the net remittance variable) have missing values. Therefore the sample size for the OLS regression of rural household per capita income is only 746 households, and the sample size for the IV regression is 647 households.

4.3. Results

Results for the first stage regression are presented in Table 8, and for the second stage in Table 9. To test for endogeneity of net remittances, we performed Wooldridge's score test and regression-based test (Wooldridge 1995, cited in Stata 13 Manual). The latter rejects the null hypothesis of exogeneity at less than 5% significance level (p-value = .033), while the former can reject this null hypothesis at 10% significance level (p-value = .098). To test for validity of instruments (i.e., to check that they are uncorrelated with the structural error term), we perform Wooldridge's test of overidentifying restrictions. The test statistic is not significant at 10% level (p-value = 0.3744), meaning that we cannot reject the null hypothesis that our instruments are valid.

For comparison purposes, in Table 10 we present results from an OLS regression of the determinants of per capita income of origin households. These indicate that net remittances have no statistically significant impact on per capita income. But the IV results in Table 8 show the impacts to be positive and statistically significant, though small. A one million VND increase in net remittances is associated in these estimates with a 0.01 million VND increase in monthly per capita net income in the origin household. Evaluated at the sample means, this is an elasticity of .06.

The average magnitude of this estimated impact seems small, given large differences in earnings capabilities between rural and urban Vietnam. But as discussed earlier, households that send out migrants lose some productive potential at home and/or may incur additional expenses if labor must be hired in to carry out tasks previously performed by out-migrants. Moreover, there is at least weakly positive selection of migrants on education and ability, so the average stock of human capital in the origin household is lowered by their departure and this may represent a significant loss of earning power. On average, these losses are more than compensated by remittance flows, but they should be taken into account when considering the magnitude of the impact of remittances on origin household incomes.

The differences between OLS and IV results in this portion of the analysis once again confirm the importance of correcting for endogeneity of remittance-sending behavior. Thanks to the VRUMS survey, in this paper we have a merged data set with information on rural households and migrant data. This allows us to find good instruments for the remittance variable, and makes it possible to correct for endogeneity—although, as previously discussed, we can do so only for a restricted sample due to the lack of instruments for the migration equation.

5. Concluding remarks

In this paper we have examined remittance behavior of rural-urban migrants in Vietnam, using a unique data set that links the 2012 round of the Vietnam Household Living Standards Survey with a 2013 tracer study of migrants from VHLSS households. We have estimated factors associated with remittances, taking migrant selection issues into account. We have also estimated the impacts of net remittances on per capita income of rural households, taking the endogeneity of remittances into account.

Our results are largely in accord with theoretical expectations and also with findings of other studies in the literature. In particular, we find that remittance flows are larger when migrants have higher wages and less attachment to the destination, and when rural households have a stronger need for remittances. These findings are consistent with the altruism hypothesis for remittances. By contrast, we do not find support for a self-interest motive on the part of remittances-sending migrants.

Migration and remittances seem to be poverty-reducing, since we find that rural households' lagged poverty status is a positive predictor of having migrants in Hanoi and HCMC, and there is a positive (though small) and statistically significant impact of remittances on rural household per capita income. Although this result applies to the VRUMS sample, it accords with the existing literature, which finds similar poverty-reducing impacts of migration and remittances.

Our findings suggest that policies to encourage and facilitate migration will have social benefits. The macroeconomic rationale for rural-urban migration is well understood: economic growth in Vietnam, as in most emerging economies, is highly concentrated around cities and ports, and requires the wholesale movement of labor from rural areas to realize the full growth potential of increased trade, investment, infrastructure and technologies. At the microeconomic scale, rural to urban migration by active members of the labor force has the potential to reduce rural poverty through the remittance channel. Finally, our study also indicates the potential benefits of policies that promote labor market access by Vietnam's ethnic minority, as these groups currently have a much lower likelihood of sending migrants out to cities.

It should not be forgotten, however, that our data and analysis span only the narrowly economic realm. We do not, in this study, have access to measures of some potentially important countervailing costs, such as those associated with the separation of parents from children, spouses from one another, or migrants from the communities and cultures of their domicile. Although we have exploited an unusually rich data sources in this study, a more complete accounting of the costs and benefits of migration and remittances demands one that is richer still.

References

- Antman, F.M., 2012. "The impact of migration on family left behind." In A.F. Constant and K.F. Zimmerman, eds: *International Handbook on the Economics of Migration*. Cheltenham, UK and Northampton, MA., USA: Edward Elgar: 293-308.
- Nguyen Viet Cuong, M. van den Berg, and R. Lensink, 2011. "The impact of work migration and non-work migration on household welfare, poverty and inequality: new evidence from Vietnam." *Economics of Transition* 19(4): 771-799.
- Nguyen Viet Cuong and D. Mont, 2012. "Economic impacts of international migration and remittances on household welfare in Vietnam." *International Journal of Development Issues* 11(2): 144-163.
- Nguyen Viet Cuong, 2009. "The Impact of international and internal remittances on household welfare: evidence from Vietnam." *Asia-Pacific Development Journal* 16(1) pp. 59-92
- De Brauw, A., and T. Harigaya, 2007. "Seasonal migration and improving living standards in Vietnam." *American Journal of Agricultural Economics* 89(2): 430-447.
- Garip, F., 2012. "An integrated analysis of migration and remittances: modeling migration as a mechanism for selection." *Population Research & Policy Review* 31(5), pp. 393-433.
- Gibson, J., D. McKenzie, and S. Stillman, 2011. "This impacts of international migration on remaining household members: omnibus results from a migration lottery program." *Review of Economics and Statistics* 93(4): 1297-1318.
- Gibson, J., D. McKenzie and S. Stillman, 2013. "Accounting for selection and duration-dependent heterogeneity when estimating the impact of emigration on incomes and poverty in sending areas." *Economic Development and Cultural Change* 61(2): 247-280.
- GSO, 2009. *Report on the 2009 Population Census*. Hanoi: GSO.
- GSO, 2011. *Migration and Urbanization in Vietnam: Patterns, Trends and Differentials*. Hanoi: GSO.
- Liu, Q. and B. Reilly, 2004. "Income transfers of Chinese rural migrants: some empirical evidence from Jinan" *Applied Economics* 36: 1295-1313.
- Lucas, R.E.B., & O. Stark, 1985. "Motivations to remit: Evidence from Botswana." *Journal of Political Economy* 93(5), 901-918.
- McKenzie, D., S. Stillman, and J. Gibson, 2010. "How important is selection? Experimental vs. non-experimental measures of the income gains from migration." *Journal of the European Economic Association* 8(4), 913-945.
- Nguyen Thu Phuong, Ngo Thi Minh Tam Tran, Thi Nguyet Nguyen, and R. Oostendorp, 2008. "Determinants and impacts of migration in Vietnam." Depocen Working Paper Series No. 2008/01, Hanoi.

Niimi, Yoko and Barry Reilly, 2011. "Gender differences in remittance behavior: evidence from Vietnam." *Singapore Economic Review* 56(2), pp. 215-37.

Niimi, Yoko, Thai Hung Pham, Barry Reilly, 2009. "Determinants of remittances: recent evidence using data on internal migrants in Vietnam" *Asian Economic Journal* 23(1) pp. 19-39.

Nguyen Duc Loc, K. Raabe, and U. Grote, 2012. "Rural-urban migration, household vulnerability, and welfare in Vietnam" *World Development* 71, pp. 79-93.

Phan, D., 2012. "Migration and credit constraints: theory and evidence from Vietnam." *Review of Development Economics* 16(1): 31-44.

Phan, D., and I. Coxhead, 2010. "Interprovincial migration and inequality during Vietnam's transition." *Journal of Development Economics* 91(1), January: 100-112.

Rapoport, H., and F. Docquier, 2006. "The economics of migrants' remittances." IZA Discussion Papers No. 1531.

Stata "IVRegress postestimation" <http://www.stata.com/manuals13/rivregresspostestimation.pdf>
Accessed June 3rd 2015.

Townsend, R.M., 1994. "Risk and insurance in village India." *Econometrica* 62(3): 539-591.

Wooldridge, J. M., 1995. "Score diagnostics for linear models estimated by two stage least squares." In G. S. Maddala, P. C. B. Phillips and T. N. Srinivasan, eds.: *Advances in Econometrics and Quantitative Economics: Essays in Honor of Professor C. R. Rao* Oxford: Blackwell, pp. 66-87.

Table 1: Summary statistics on net remittances

	# of households	Average net remittance (million VND)	SD	Min	Max
Full VRUMS sample	869	9.4	19.23	-80	240
HHs with no reported value on net remittances	107	NA	NA	NA	NA
Households with negative net remittances	30	-19.2	22.63	-80	-0.2
Households with zero net remittances	181	0	0	0	0
Households with positive net remittances	551	14.1	19.72	0.2	240

Note: net remittance is the difference between the amount sent by migrants to origin households and the amount sent by origin households to migrants; takes negative value if origin households send more than they receive.

Table 2: Net remittances by region of origin households and city of migrant households

	# of hhs	Average net remittance (million VND)	SD	% of hhs with negative net remittance	% of hhs with zero net remittance	% of hhs with positive net remittance	Average net positive remittance (million VND)	SD
By region of origin households								
Red River Delta	111	14.6	34.2	0	27.9	72.1	20.3	38.9
North Mountain	80	11.5	13.3	0	21.3	78.8	14.6	13.4
Central Coast	241	7.9	15.6	5	27.4	67.6	12.8	15.8
Central Highland	37	6.6	19.6	5.4	24.3	70.3	11.5	19.7
Southeast	33	8.0	16.5	15.2	12.1	72.7	13.8	14.7
Mekong River Delta	244	8.5	14.2	21.3	4.1	74.6	12.7	10.9
By city of migrant households								
Hanoi	183	14.9	28.7	1.1	26.2	72.7	20.6	31.8
HCMC cluster	563	7.6	14.7	4.8	23.3	71.9	12.0	13.2

Table 3: Hanoi and HCMC migrant samples

	Migrant households in HCMC cluster	Migrant households in Hanoi	t statistic of mean difference
# of households	600	269	
Average annual family income (million VND)	93	81	1.03
SD of annual income	(184)	(71.14)	
Average monthly wage of migrants (million VND)	5.4	5.3	0.24
SD of monthly wage	(7.7)	(4.5)	
Average age of migrant (also household head)	30.3	31.6	2.01
% of male migrants	0.68	0.73	1.49
% of married migrants	55%	60%	1.26
Average years of schooling	9.5	10.5	4.84
% of households with <i>ho khau</i> residence certificate	13.5%	27.8%	5.13
% of households with housing ownership in city	13.2%	21.1%	2.87
# of years since migration to city	8.2	8.3	0.1
% of migrants with outstanding loans in origin	23%	14%	2.84
Average amount of outstanding loans (million VND)	10.8	6.8	1.04
SD of average loan amount	(52.3)	(27.03)	

Table 4: Incomes of VRUMS and non-VRUMS households in the VHLSS large sample

	Origin households of HCMC migrants	Origin households of Hanoi migrants	t statistic of mean difference	Origin households of VRUMS migrants (Hanoi and HCMC)	non-VRUMS rural households in VHLSS large sample	t statisti of mean differenc
# of households	588	256		844	32,687	
Household size	3.77	3.68	0.85	3.75	3.9	2.79
Number of children	0.855	0.809	0.85	0.84	1.05	4.66
Monthly per capita income (million VND)	1.71	1.78	0.76	1.73	1.60	3.14
SD for average income	(1.23)	(1.31)		(1.3)	(1.66)	
Land (meters squared)	4909	2463	4.84	4152	6344	6.18
SD for average land	(8039)	(2944)		(6968)	(10,106)	
Composition of sending regions (per cent)						
Red River Delta	7.0	41.4		17.4	21.4	
North Mountain	2.7	35.9		12.8	20.0	
Central Coast	35.4	22.7		31.5	21.8	
Central Highland	6.5	0.0		4.5	6.8	
Southeast	5.8	0.0		4.0	8.6	
Mekong River Delta	42.7	0.0		29.7	21.4	
	100.0	100.0		100.0	100.0	

Note: there were 869 households in the VRUMS sample, but only 844 households could be matched to the VHLSS large sample

Table 5: Explanatory variables for estimating determinants of net remittances

Variable name	Description or definition	Expected sign	Mean (SD)
A: explanatory variables from VRUMS			
Hanoi dummy	= 1 if migrant is in Hanoi; 0 if migrant is in HCMC cluster	?	.01 (.46)
Migrant monthly wage	Measure of capacity to send remittances (million VND)	+	5.4 (6.9)
Formal job dummy	= 1 if migrant's job has unemployment insurance, injury insurance, or pension	+	.44 (.5)
Migrant outstanding loan amount	In million VND	+	13.3 (114)
Children in migrant household	No. children in migration household	-	.4 (.7)
Migrant gender	=1 if male	+	.7 (.7)
Migrant age	Age of migrant in years	+	30 (9)
Migrant education years	Schooling years (0 through 12)	+	9.8 (2.8)
Migration length	Years in city since migration	-	8.2 (7.3)
Housing dummy	= 1 if migrant owns a house at destination	-	.15 (.36)
Ho khau dummy	= 1 if migrant has registered his/her residency at destination	-	.18 (.38)
Migrant # of siblings	No. siblings in migrant's origin family	-	3.6 (2.1)
Oldest child dummy	=1 if migrant is oldest child in family	?	.23 (.45)
B: explanatory variables from VHLSS			
Children in origin household	No. children in origin household	+	.91 (.95)
Per capita land	Cultivated land per person (m ² *1000) of origin households	?	1.2 (1.8)
Head gender dummy	= 1 if head of origin household is male	?	.81 (.39)
Head age	Age of head of origin household	+	51.2 (11.8)
Head education years	Years of schooling (0 through 12) of origin household head	+	7.4 (3.3)
Regional dummies	North Mountains, Coastal, Central Highlands, Southeast, Mekong River Delta (omitted: Red River Delta)		

Table 6: Determinants of net remittances: Heckman model

Dep. var: net remittances	Estimate	SE	t-stat	p-value
Migrant in Hanoi=1	6.070	1.701	3.57	0
Migrant monthly wage	1.261	0.156	8.08	0
Migrant formal job =1	2.702	1.117	2.42	0.016
Migrant outstanding loan	0.055	0.006	8.61	0
Migrant no. children in HH	-2.552	0.928	-2.75	0.006
Migrant male=1	2.094	1.170	1.79	0.074
Migrant age	-0.032	0.079	-0.4	0.689
Migrant education years	-0.088	0.225	-0.39	0.695
Migrant minority =1	-4.694	3.270	-1.44	0.151
Migrant years since moved	0.213	0.099	2.15	0.032
Migrant own house=1	-6.402	1.977	-3.24	0.001
Migrant residence cert.=1	-3.447	1.992	-1.73	0.084
Migrant no. siblings	0.260	0.288	0.9	0.367
Migrant birth order	-0.105	1.255	-0.08	0.933
Origin HH head male=1	1.778	1.869	0.95	0.342
Origin HH head age	0.162	0.060	2.71	0.007
Origin HH head education years	0.085	0.237	0.36	0.721
Origin HH no. children	1.295	0.612	2.11	0.034
Origin HH land per cap.	-0.418	0.303	-1.38	0.167
Constant	-85.150	7.452	-11.43	0
Selection equation: dep. var. = VRUMS dummy				
Origin HH minority=1	-0.410	0.060	-6.81	0
Origin HH poor in 2007=1	0.132	0.043	3.07	0.002
Origin HH head male=1	0.104	0.044	2.36	0.018
Origin HH head age years	0.004	0.001	2.91	0.004
Origin HH head education years	0.023	0.005	4.34	0
Constant	-2.966	0.129	-22.95	0

LR test of independent equations (rho=0): Chi2 = 93.48; p-value = 0

censored observations: 32687

uncensored observations: 642

Dependent variable (first equation) is measured in million VND.

Region dummy variables included in both equations but not reported.

Table 7: Determinants of remittances: OLS regression

Dep. var: net remittances	Estimate	SE	t-stat	p-value
Migrant in Hanoi=1	6.859	2.008	3.42	0.001
Migrant monthly wage	2.130	0.693	3.07	0.002
Migrant formal job =1	2.227	1.447	1.54	0.124
Migrant outstanding loan	0.051	0.006	9.06	0
Migrant no. children in HH	-3.363	0.970	-3.47	0.001
Migrant male=1	2.494	1.283	1.94	0.052
Migrant age	-0.075	0.083	-0.9	0.369
Migrant education years	-0.230	0.238	-0.97	0.335
Migrant minority =1	0.954	2.646	0.36	0.719
Migrant years since moved	0.152	0.129	1.17	0.241
Migrant own house=1	-8.556	2.654	-3.22	0.001
Migrant residence cert.=1	-1.606	2.766	-0.58	0.562
Migrant no. siblings	0.341	0.281	1.21	0.226
Migrant birth order	0.087	1.468	0.06	0.953
Origin HH head male=1	-0.646	1.612	-0.4	0.689
Origin HH head age years	0.072	0.050	1.44	0.152
Origin HH head education years	-0.467	0.224	-2.08	0.038
Origin HH no. children	1.461	0.663	2.2	0.028
Origin HH land per cap.	-0.229	0.533	-0.43	0.668
Constant	-1.539	4.728	-0.33	0.745

No. obs: 642

R-squared: 0.418

Dependent variable is measured in million VND.

Region dummy variables included but not reported.

Table 8: IV regression: first stage results

Dep. var: net remittances	Estimate	S.E.	t-stat	p-value
Origin HH land per cap.	-0.289	0.345	-0.84	0.401
Origin HH minority =1	1.250	3.245	0.39	0.7
Origin HH head male =1	-0.216	1.721	-0.13	0.9
Origin HH head age	0.038	0.056	0.69	0.489
Origin HH head education years	-0.547	0.218	-2.5	0.013
Migrant in Hanoi =1	6.694	2.019	3.32	0.001
Migrant monthly wage	2.141	0.173	12.35	0
Migrant formal job =1	2.247	1.311	1.71	0.087
Migrant no. children in HH	-3.286	1.074	-3.06	0.002
Migrant own house =1	-8.779	2.265	-3.88	0
Migrant residence cert. =1	-1.584	2.261	-0.7	0.484
Migrant years since moved	0.179	0.119	1.51	0.133
Migrant outstanding loan =1	0.050	0.005	9.53	0
Migrant male =1	2.472	1.370	1.8	0.072
Migrant age years	-0.031	0.088	-0.35	0.724
Migrant education years	-0.325	0.266	-1.22	0.222
Constant	1.786	5.270	0.34	0.735
Adjusted R-squared:	0.330			
# of observations:	703			

Dependent variable is measured in million VND.

Region dummy variables included but not reported.

Table 9: IV regression: 2nd stage regression

Dep. var.: monthly per capita income in origin household	Estimate	S.E.	t-stat	p-value
Net remittance receipts	0.010	0.004	2.77	0.006
Origin HH land per cap.	0.157	0.029	5.34	0
Origin HH minority =1	-0.427	0.274	-1.56	0.119
Origin HH head male =1	-0.103	0.146	-0.7	0.482
Origin HH head age	-0.003	0.004	-0.63	0.532
Origin HH head education years	0.098	0.017	5.72	0
Constant	1.119	0.352	3.18	0.002
# of observations				703
R-squared				0.14
Chi-squared statistic for Wooldridge score test of endogeneity				2.76
p-value				0.97
Chi-squared statistic for Wooldridge regression-based test of endogeneity				4.58
p-value				0.33
Chi-squared statistic for Kleibergen-Paap rk LM under-identification test				39.71
p-value				0.000
F statistics for Cragg-Donald test of weak identification				39.64
Critical value for 10% maximal IV relative bias				11.49
Hansen J statistic for test of over-identification				7.84
p-value				0.55

Dependent variable is measured in million VND.

Region dummy variables included but not reported.

Table 10: Determinants of per capita income: OLS regression

Dep. var.: annual per capita income in origin household	Estimate	S.E.	t-stat	p-value
Net remittance receipts	0.004	0.003	1.32	0.187
Origin HH land per cap.	0.171	0.033	5.13	0
Origin HH minority =1	-0.433	0.252	-1.72	0.087
Origin HH head male =1	-0.064	0.128	-0.5	0.617
Origin HH head age	-0.002	0.004	-0.46	0.648
Origin HH head education years	0.087	0.015	5.67	0
Constant	1.149	0.322	3.57	0
Adjusted R-squared				0.14
# of observations				746

Dependent variable is measured in million VND.

Region dummy variables included but not reported.