EFFECT OF HOUSEHOLD ALLOCATION'S REMITTANCE ON ENTREPRENEUR'S INVESTMENT

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Abstract

This study investigates the factors influencing the allocation of remittances by households towards entrepreneurial investments, accounting for the fact that this allocation is censored at zero and interconnected with savings. Using a bivariate Tobit model applied to data from a Vietnamese household survey, the key findings reveal that, although costs and funding sources for securing overseas employment, skill development, and savings accumulation have no significant impact, the age of overseas workers, their place of origin, and the household income level are positively correlated with the share of remittances directed toward entrepreneurial activities.

Keywords: Migration, Remittance, Bivariate Tobit model, Vietnam.

JEL Classification: J12, J15, J61.

1. INTRODUCTION

Remittances have become a vital source of economic resources for many developing nations. In Vietnam, remittance inflows have averaged around 10 billion dollars annually over the past decade, accounting for a significant portion of the country's foreign capital. Effectively utilizing these funds presents an opportunity to improve household incomes and drive economic growth. One key potential lies in encouraging households to invest remittances in productive ventures. If even a third of remittances are allocated to entrepreneurial activities, it could substantially boost household incomes and contribute to broader national economic development.

This paper aims to explore how households allocate remittances toward productive investments, particularly focusing on entrepreneurship and savings. Entrepreneurial investments can lead to the creation of small businesses such as restaurants and retail shops, while savings can take the form of formal deposits in financial institutions or informal methods like gold investments.

The paper examines the key factors influencing remittance allocation toward entrepreneurship by analyzing four main categories: the costs of securing overseas employment and sources of financing, work experience and savings accumulation, individual characteristics, and household characteristics. The analysis of Vietnamese household microeconomic data presents two major challenges. First, 72% of households reported no entrepreneurial investment, and 32% reported no savings. As Greene (2003) highlights, when a large proportion of the dependent variable equals zero, OLS estimates can be biased toward zero, depending on the censoring of the data. Amemiya's (1984) Tobit model addresses this issue, particularly in expenditure analyses. Lee (1993) further extended this to the multivariate Tobit model, which

has been applied in studies like Yoo (2005) on bottled water expenditure and Günden et al. (2011) on milk consumption.

The second challenge involves the potential interrelationship between entrepreneurial investment and savings. As Gentry and Hubbard (2004) and Jackson and Madison (2022) suggest, ignoring the interaction between these two types of investments and analyzing them independently could result in biased findings. Hsiao (2014) also emphasizes the need for an integrated approach to accurately capture these dynamics.

To address these issues, this paper employs a bivariate Tobit model, which accounts for both the data censoring and the possible interrelationship between entrepreneurial investment and savings. This approach ensures a more precise understanding of remittance allocation decisions and their implications for household economic activities. The paper uses data from a 2017 state-funded household survey across 16 provinces in Vietnam, areas known for high labor export. The findings indicate that while costs, funding sources, skill development, and savings accumulation do not significantly influence remittance allocation, factors such as the age of overseas workers, their place of origin, and household income levels are positively associated with the share of remittances allocated to entrepreneurial ventures.

The structure of the paper is as follows: Section 2 reviews the literature, Section 3 introduces the model and data, Section 4 discusses the estimation results, and Section 5 offers concluding remarks.

2. LITERATURE REVIEW

The relationship between remittances and productive investment has been the subject of extensive research. Several studies have underscored the importance of remittance inflows in boosting household income and fostering entrepreneurial activity. De and Ratha (2012) emphasize that remittance use is often influenced by the joint decisions of overseas workers and their families, with remittances frequently earmarked for specific purposes. Tingsabadh (1989) found that in Thailand, one-third of remittances are directed toward financial savings, while Mahmud (1989) noted that 40-50% of remittances in Bangladesh are saved. These findings are supported by Salahuddin et al. (2021), who highlight the positive impact of remittances on national savings and economic growth, as remittance-receiving households engage in various forms of savings, including fixed deposits.

Remittances are also often invested in productive activities. Woodruff and Zenteno (2001), Vaaler (2011), and Khakhkarov (2018) document that approximately 20% of remittances are allocated to micro-sized businesses in urban Mexico. Yavuz and Bahadir (2021) further explore the role of ethnic diversity in amplifying the positive relationship between remittances and new business creation in developing countries. Piras (2021) adds that remittances are more likely to support firm creation in less economically complex nations, suggesting that remittance-led entrepreneurship varies according to a country's economic structure. These studies collectively highlight the importance of tailoring policies to encourage the optimal use of remittances for productive investments, particularly in fostering entrepreneurship.

The determinants of remittance allocation have been explored through various lenses, including gender, household characteristics, and individual attributes. Guzmán et al. (2008) find that gender plays a decisive role in remittance allocation, with female-headed households more likely to invest in human capital, such as education. This is consistent with De Arcangelis and Joxhe (2021), who found that female Filipino migrants tend to allocate remittances toward education. Carling (2008) emphasizes that both household and individual characteristics, including psychological and social factors, significantly influence allocation decisions. Bal et al. (2022) similarly find that cognitive and social factors impact asset allocation among relocated households in Hangzhou, China.

The duration of migration also plays a critical role in remittance allocation decisions. Dustmann and Kirchkamp (2002) argue that returning migrants have a comparative advantage in entrepreneurial activities, a finding echoed by Bolzani (2022), who shows that motivations and preparedness for returning home are key drivers of entrepreneurial investment among migrants. Lindstrom (1996) and Reyes (2001) further highlight that longer migration periods can positively influence long-term investment decisions, while Kratz (2020) notes that migration duration affects economic well-being, shaping future investment behaviors. Family assets are another important factor, as De la Brière et al. (2002) suggest, with recent research by Burchardi et al. (2019) showing that family and community ties can significantly influence foreign direct investment decisions, highlighting the role of social networks in investment behavior.

3. MODEL SPECIFICATION AND DATA

3.1. Model specification

Our model is built on that of Maddala (1998). Consider the following system of equations:

$$y_{1i} = max(x'_{1i}\beta_1 + \epsilon_{1i}, 0), \qquad (1)$$

$$y_{2i} = max(x'_{2i}\beta_2 + \epsilon_{2i}, 0), \qquad (2)$$

where $i=1,2, ..., N$ is the ith observation, y_{1i} is the observed variable of entrepreneurs' investment, y_{2i} is the observed variable of savings, x is a vector of regressors that relates to y_{1i}, x_{2i} is a vector of regressors that relates to y_{2i}, and ε_{1i} and ε_{2i} are disturbances with zero mean, unit variance and being serially independent. Two vectors of parameters, β_1 and β_2 will be estimated. For estimation, in general, at least one exogenous variable in equation (1) does not enter in equation (2) to ensure the identification of β_2.

This model can be rewritten as follows:

$$y^*_{1i} = x'_{1i}\beta_1 + \epsilon_{1i}, \qquad (3)$$

$$y^*_{2i} = x'_{2i}\beta_2 + \epsilon_{2i}, \qquad (4)$$

and

$$y_{1i} = max(y^*_{1i}, 0), \qquad (5)$$

$$y_{2i} = max(y_{2i}^*, 0), \qquad (6)$$

Where y_{1i}^* and y_{2i}^* are latent variables of entrepreneurs' investment and savings, respectively.

The model could be expressed in terms of the joint distribution of (y_{1i}^*, y_{2i}^*) with an assumption of a bivariate normal distribution, $BVN(x_{1i}'\beta_1, x_{2i}'\beta_2, \sigma_1^2, \sigma_2^2, \rho)$, where σ_1, σ_2, and ρ are the standard deviation of the marginal distribution of y_{1i}^* and y_{2i}^*, the the correlation coefficient of the two latent variables, y_{1i}^* and y_{2i}^*.

Denote the joint normal distribution function of $(\varepsilon_{1i}, \varepsilon_{2i})$ by $g(.)$. The likelihood function to be maximized is:

$$L(\beta_1, \beta_2 | x_{1i}', x_{2i}', y_1, y_2) = \prod_{\{i|y_{1i}>0, y_{2i}>0\}} g(y_{1i} - x_{1i}'\beta_1, y_{2i} - x_{2i}'\beta_2) \qquad (7)$$

$$\prod_{\{i|y_{1i}>0, y_{2i}=0\}} \int_{-\infty}^{-x_{2i}'\beta_2} g(y_{1i} - x_{1i}'\beta_1, \epsilon_2) d\epsilon_2$$

$$\prod_{\{i|y_{1i}=0, y_{2i}>0\}} \int_{-\infty}^{-x_{1i}'\beta_1} g(\epsilon_1, y_{2i} - x_{2i}'\beta_2) d\epsilon_1$$

$$\prod_{\{i|y_{1i}=0, y_{2i}=0\}} \int_{-\infty}^{-x_{2i}'\beta_2} \int_{-\infty}^{-x_{1i}'\beta_1} g(\epsilon_1, \epsilon_2) d\epsilon_1 d\epsilon_2,$$

Where $\prod$ denotes product over all observations. As we can see from the last term of equation (7), each stage of iteration requires a double integral.

Hence, if the correlation parameter, ρ, is equal to zero, the joint normal density function would reduce to the product of two independent normal densities. As a result, a univariate Tobit model could be applied so that equations (3) and (4) are estimated individually.

3.2. Data

This paper covers a household remittance allocation collected from a state-funded survey on households in 2017. The study area of this research is restricted to 16 provinces from the North to South of Vietnam, where the main flow of labor export comes from. The sample consists of 1017 households that had or has an overseas worker.

The definitions and sample statistics are presented in Table 1. Figure 1 plots the average percentage of remittance allocation across households. These options can be collapsed into three main categories, which are common in the analysis of remittance literature: consumption, human capital, and productive investment.

Figure 1: Average remittance allocation of recipient households
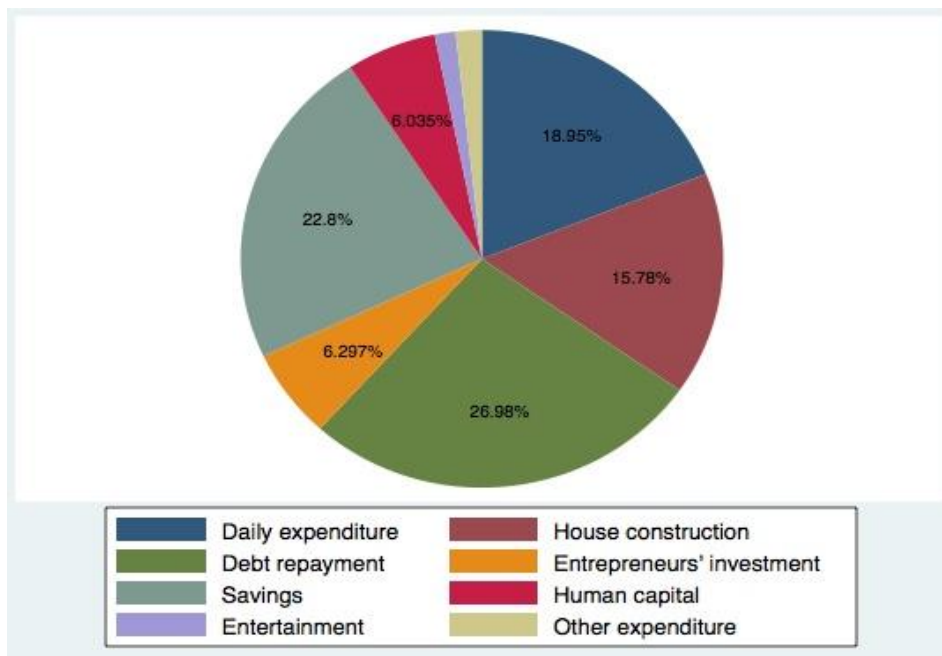
Source: Author's calculation

Table 1: Definition and Statistical Description

Variable	Definition	Obs	Mean	Std. Dev.
BUS	Percentage of remittance allocation to entrepreneurs' investment with zero observation	1,016	6.26	13.47
SAV	Percentage of remittance allocation to savings with zero observation	1,016	22.67	24.84
REM	Level of received remittances	1,016	21.13	6.80
Duration	Years spent overseas	1,015	3.15	2.22
Return	Dummy for having already returned (1=Returned; 0=otherwise)	1,015	0.34	0.48
Developed	Dummy for country destination (1=EU, USA, Japan, Korea; 0=otherwise)	1,017	0.89	0.31
Cost	Costs for obtaining overseas employment	1,016	2.68	1.17
Cost funding	Dummy for funding the cost by HH saving only (1=Yes; 0=No)	1,017	0.21	0.41
Age	Age of overseas worker in 2017	1,015	30.86	6.69
Male	Dummy for gender (1=Male; 0=Female)	1,017	0.76	0.43
Marriage	Dummy for marriage status (1=Married; 0=otherwise)	1,017	0.44	0.50
Region	Dummy variable for birthplace (1=South; 0=North)	1,017	0.18	0.38
Language	Language proficiency (Elementary=1; Limited working=2; Professional working =3)	993	2.15	0.77
Education	Education attainment (Primary=1; Secondary=2; High school=3; College=4; Graduate=5; Post-graduate=6)	1,017	3.02	0.90
Members	Number of members in HH	1,016	4.33	1.63

Non-working	Percentage of HH non-working member	1,016	31.35	29.26
Poverty	Dummy variable for poverty status (1=poverty; 0=otherwise)	1,017	0.03	0.16
Land	Dummy variable for land ownership (1=own land; 0=otherwise)	1,017	0.92	0.27
HH Income	Average monthly HH income (m.VND)	1,014	24.49	18.27
HH Saving	Average monthly HH savings (m.VND)	1,007	13.21	13.48
Ben-to-BUS	Opinion concerning Benefits of remittance to entrepreneurs' investment (1=Bad; 2=Moderate; 3=Good)	815	1.61	0.74
Ben-to-SAV	Opinion concerning Benefits of remittance to saving (1=Bad; 2=Moderate; 3=Good)	939	2.31	0.76

Source: Authors' calculation

4. RESULTS DISCUSSION

We begin by analyzing the determinants of the three types of allocations. The observation from Table 2, which highlights the opposing effects of factors influencing consumption and productive investment allocation, is consistent with various studies on remittances in developing countries. Remittances, while not significantly driving increased consumption at the household level, show a positive correlation with productive investments. This aligns with findings by Taylor et al. (2003), Osili (2007), and Woodruff and Zenteno (2007), who also noted the potential of remittances to foster investment rather than consumption. In the context of selected remittance-receiving countries, remittances have been shown to positively influence economic growth, with education expenditure, energy use, and income also contributing positively to growth, while poverty negatively impacts it (Zaman et al., 2021). Furthermore, remittances have been found to enhance financial depth and stability, particularly in low and middle-income countries, although their use for consumption can negatively affect financial expansion. In Bangladesh, a portion of remittances is diverted to reverse flows, indicating that not all remittances are used for consumption or investment, which may overstate their impact on economic growth (Das & Chowdhury, 2019). Interestingly, in a broader study of low and middle-income countries, remittances were found to have a negative impact on economic growth, suggesting a remittance curse effect, which contrasts with the positive investment correlation observed in other studies (Lacheheb & Ismail, 2020).

Next, we delve deeper into the breakdown of productive investment. As previously mentioned, the data is censored, with 733 households (72%) and 328 households (32%) reporting zero investment in entrepreneurship and savings, respectively. It is also possible that these two types of investments are interrelated. To estimate the parameters for entrepreneurial investment and savings, the likelihood function in equation (7) is applied. To satisfy the identification condition, the variables Ben-to-SAV and Ben-to-BUS are excluded from the equations for savings and entrepreneurial investment, respectively.

The interrelationship of the two investment types is tested by employing the t-test and the likelihood ratio test. Both tests use the null hypothesis in which there is no interrelationship in the data, $\rho=0$. The test statistic shows that we can reject the null hypothesis at a 1% level.

Hence, our data should be studied in a bivariate Tobit model. In addition, the Wald test statistic indicates that at a 1% level of significance, we can reject the null hypothesis that all slope coefficients are zero.

Table 2: OLS estimation of consumption, human capital, and productive investment

Variables	Consumption	Human capital	Productive investment
REM	-0.211	-0.0190	0.285**
	(0.141)	(0.0511)	(0.132)
Cost	1.567**	-0.255	-1.062
	(0.741)	(0.261)	(0.715)
Cost funding	-9.738***	0.388	9.655***
	(2.204)	(0.663)	(2.219)
Developed	3.700	1.428	-4.866*
	(2.777)	(0.868)	(2.600)
Return	-4.063*	-0.996	5.367***
	(2.094)	(0.705)	(2.056)
Age	-0.0321	0.148**	-0.0903
	(0.163)	(0.0649)	(0.151)
Marriage	4.780**	2.413***	-6.763***
	(1.975)	(0.718)	(1.888)
Poverty	6.450	-2.955*	-3.265
	(5.153)	(1.784)	(4.865)
Land	-2.441	-2.004	4.316*
	(3.035)	(1.483)	(2.544)
HH Income	-0.360***	0.0275	0.328***
	(0.0837)	(0.0190)	(0.0863)
HH Saving	-0.297**	-0.0492*	0.348**
	(0.131)	(0.0258)	(0.141)
Constant	79.45***	1.813	16.46**
	(8.646)	(3.265)	(8.079)
Observations	978	978	978
R-squared	0.201	0.099	0.231
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			
Explanatory variables also include *Duration, Male, Region, Language, Education, Member, and Non-working,* but their coefficients are statistically insignificant. In addition, we use fixed effects of occupation sector and HH main sector.			

Table 3: Estimation results of bivariate to bit model

Variables	Entrepreneurs' investment	Savings
Duration	-0.438	-0.547
	(0.585)	(0.525)
REM	-0.192	0.397**
	(0.205)	(0.192)
Cost	0.260	-1.885*
	(1.230)	(1.072)
Cost funding	-3.666	12.41***
	(3.479)	(3.029)

Developed	-8.436**	1.418
	(3.892)	(3.764)
Return	4.479	5.387**
	(3.044)	(2.722)
Age	0.467*	-0.0650
	(0.241)	(0.221)
Married	-4.635	-8.831***
	(3.087)	(2.722)
Region	10.26**	-10.12**
	(4.290)	(4.055)
Member	0.400	-1.567**
	(0.799)	(0.759)
Land	-1.518	9.005**
	(4.743)	(4.419)
HH Income	0.411***	0.199**
	(0.0930)	(0.0868)
HH Saving	0.0769	0.497***
	(0.128)	(0.113)
Ben-to-BUS	11.96***	
	(1.832)	
Ben-to-SAV		2.198
		(1.623)
Constant	-44.80***	-5.622
	(12.94)	(12.00)
σ_1	3.357***	
	(0.0502)	
σ_2	3.395***	
	(0.0333)	
ρ	-0.163***	
	(0.0508)	
Observations	782	
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		
Explanatory variables also include *Gender, Language, Education, Poverty, and Non-working,* but their coefficients are statistically insignificant. In addition, we use fixed effects of occupation sector and HH main sector.		

We now proceed with a detailed interpretation of the regression results in Table 3. Regarding the first set of variables, the length of time a worker stays abroad appears to be a key factor in enhancing the living standards of migrant workers' families. The longer a worker remains overseas, the greater the likelihood that their family will allocate remittances toward investments. Although the effect of time spent abroad on investment is not precisely measured, it is anticipated that the accumulation of human capital and entrepreneurial ideas during this period can be applied to starting a business and increasing entrepreneurial activities. However, Table 3 shows that the effect of overseas duration is not statistically significant, as the typical three-year contract is insufficient to establish this pathway. Migrant workers may face saving constraints in their home country, and remittances help them pursue productive investments. The level of remittances does not necessarily encourage entrepreneurial activities, as noted by

Funkhouser (1992) and Yang (2008), but it is positively associated with savings from remittances. This could be because Vietnamese people are generally risk-averse and prefer to invest in safer assets. Tanaka et al. (2010) found that Vietnamese from impoverished villages tend to exhibit loss aversion.

The cost of migration reduces the amount of savings. When this cost is fully covered by the worker's family, savings increase because the family does not need to pay off debt incurred from migration. However, neither of these factors impacts capital investment. In terms of individual characteristics, the worker's age has a positive but modest effect on capital investment, while married workers allocate 8.8% less to savings compared to unmarried workers. This can be interpreted as unmarried workers saving more in preparation for marriage, while married individuals spend more on daily family expenses. Education level and language proficiency do not show any significant effects.

Interestingly, whether overseas workers come from the northern or southern regions of Vietnam significantly influences their investment preferences. Southern Vietnamese are more likely to channel remittances into business activities, while Northern Vietnamese tend to prioritize savings. One possible explanation is cultural differences. Kim (2007) found that Southern Vietnam has a more consumer-oriented culture, while Northerners are known for being savers. Another reason could be the desire for public recognition, as documented by Benzing et al. (2005). Entrepreneurs in the North may start businesses to gain public recognition and demonstrate successful careers, a motivation reinforced by the praise of the communist Prime Minister for young entrepreneurs.

Regarding household characteristics, low economic status does not significantly influence investment behavior. It may be that impoverished households primarily use remittances to meet basic needs. This is supported by the finding that larger families save a smaller portion of remittances. However, the proportion of non-working family members does not have an impact. The statistical significance of total household income during the period of overseas work underscores its importance in directing remittances toward productive investments. This is because day-to-day expenses are covered by other income sources. Additionally, the proportion of savings from remittances is positively correlated with the household's total savings.

Lastly, there exist omitted variables such that those who export their labor or work longer in foreign countries may be more talented and therefore can take advantage of entrepreneurial activity. To capture this omission, we employ the data on the self-evaluation of benefits of remittance to investment. The coefficient of *Ben-to-BUS* is consistent with expectation and statistically significant, while that of *Ben-to-SAV* is statistically insignificant.

5. CONCLUSION

This paper investigates the determinants of remittance allocations toward entrepreneurial investments, accounting for the interrelationship between different types of investments and the presence of censored data through the application of a bivariate Tobit model. The findings

reveal that the proportion of remittances directed towards entrepreneurial activities is influenced by factors such as the age of overseas workers, their birthplace, and the household income level. In contrast, the costs and sources of financing for securing overseas employment, overseas work experience, and savings accumulation do not play a significant role in determining entrepreneurial investment.

Our findings suggest a number of important implications. First, they suggest that policy efforts to promote entrepreneurial activities among remittance-receiving households should focus on demographic characteristics such as the age and location of workers, as these factors appear to shape investment decisions. Programs designed to encourage entrepreneurship may benefit from targeting younger workers and regions with a strong entrepreneurial culture. Additionally, considering the strong influence of household income levels, efforts to provide financial education and support to families with lower incomes could help channel remittances into productive ventures.

Moreover, the study underscores the importance of understanding cultural and regional differences in investment behavior. Tailored interventions that consider local cultural attitudes towards risk and business creation may be more effective in guiding remittance usage toward entrepreneurship. Overall, the research highlights the need for a nuanced approach to policy design that takes into account the various factors influencing how remittances are allocated to entrepreneurial activities, ultimately contributing to economic growth and development in remittance-dependent regions.

Footnotes

Consumption includes daily expenditure, house construction, debt repayment, travel and entertainment, and other expenditure. Human capital consists of allocation to health and education. Productive investment covers entrepreneurship activities and savings.

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