The Effect of Education on Poverty in Rural Vietnam

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This paper provides updated evidence on the effect of education on poverty status in rural Vietnam, using the 2018 Vietnam Household Living Standard Survey. We examine both the effect on the incidence and intensity of poverty by employing both logit and fractional logit regression models. The study finds households with better education are more likely to avoid poverty or that it will at least make them more affluent. These conditions were observed even after controlling for the variables of household demographic factors, non-farm employment, migration and various types of land. The study reveals that migration and non-farm participation have a reducing effect on poverty reduction. We find a significant difference in the education attainments, migration and non-farm participation between the poor and non-poor. Finally, our study provides some helpful policy recommendations that improve the access of the poor to education and non-farm activities, and should be applied and promoted in rural Vietnam.

Keyword: *education, fractional logit, poverty incidence, poverty intensity, rural Vietnam.*

1. Introduction

Vietnam has attained high and sustainable rates of economic growth over the past three decades. The country has changed from one of the poorest countries with per capita income of around $100 in the 1980s, to a middle lower income economy with per capita income of $2,300 (current US$) in 2010 (Quyen, 2019). In addition, the poverty rate dropped dramatically, from more than 50% in 1980s to only 9.8% in 2016[1]. Approximately three quarters of the population could be viewed as economically secure whose income can afford daily necessities and cover economic shocks. However, poverty alleviation remains an issue in Vietnam (Pimhidzai, 2018). Vietnam is the 13th most populated country in the world with more than 95 million people in which 9.8 % of its population live in poverty; this equates to

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[1] The GSO-World Bank poverty line in 2016 is US$3.34 per day in 2011 PPP

about 9 million poor people. This number is larger than that of the whole population of some countries such as Laos, Israel, and Libya (Quyen, 2019).

Education has played a crucial role, among other factors in making a successful story of Vietnam. Several studies confirm the positive effect of education on household income, wages, and poverty reduction in Vietnam. For instance, households with better education were more likely to increase their income and avoid poverty in the Northwest region (Tran, Tran, & Nguyen, 2020; Tran, Nguyen, Vu, & Nguyen, 2015) and the North central region (Nguyen & Tran, 2018). Using data from the Labour Force Survey, Tran, Pham, Vo, Luu, and Nguyen (2019) found that workers with higher levels of education were found to have higher wage earnings than do those with lower levels. Notably, evidence from quantile regression indicates that the positive effect tends to increase with higher wage percentile, suggesting that education has a reducing effect on wage inequality in Vietnam.

Our study contributes to the extant literature by two main aspects:

(i) We provide new evidence for the effect of education on poverty reduction in rural Vietnam using the most recent dataset from the Vietnam Household Living Standard Survey [VHLSS] in 2018.

(ii) We further examine the effect of education on the poverty gap or on poverty intensity, instead of looking at the poverty incidence only which is commonly found in the literature.

Only investigating poverty incidence has a shortcoming because it is unable to explore or even ignore the determinants of the intensity of poverty (Tran et al., 2015). As noted by Ravallion (1996), poverty incidence only reflects a jump or discontinuity in the distribution of well-being at the poverty line, and it does not show how poor the poor are. To address this limitation, in this study, a fractional logit model was utilised to examine factors affecting the poverty intensity in rural Vietnam.

Our main research objectives were to examine the effect of education on (i) poverty incidence and (ii) poverty gap or poverty intensity, using the updated data from the 2018 VHLSS. We provide evidence that households with better education have more chance of avoiding poverty and reducing their poverty intensity. The findings are robust, as variables are controlled including various important individual and household characteristics. This paper is organised as follows: data and econometric methods are presented in Section 2, results and discussion follow in Section 3 and the paper concludes and provides some policy implications in Section 4.

2. Data and Econometrics Methods

2.1. Data and poverty measures

The VHLSS is an ongoing longitudinal survey of the Vietnamese population that has been conducted by the Vietnamese General Statistical Office (GSO) every two years. Approximately 46,000 households were surveyed for their responses to questions on income, expenditures, economic activity, education, healthcare, durable assets, migration, and various

types of land use including annual cropland, perennial cropland, forestland and residential land. We use a sub-sample of rural households from the 2018 VHLSS. Data from various files were merged into a file including various information on household demographic characteristics, land, economic activities, education and income. After removing missing information, the data on 29,722 households was used for the statistical analyses.

In this study, the outcome variable is the incidence and intensity of poverty. We measured poverty using the official poverty line for the period 2016-2020 (adjusted for inflation) applied to per capita incomes in rural Vietnam. We adopted the class of poverty measures proposed by Foster, Greer, and Thorbecke (2010). The FGT class of poverty measures is given as follows:

$$P_\alpha = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{Z-Yi}{Z}\right)^\alpha$$

Where N means the size of the total population (or sample); Yi indicates income per capita of the household i; Z is the poverty line; q is the number of households with income per capita below Z (the number of poor households); α is Poverty Aversion Parameter Index which has the values of 0, 1 and 2 representing the incidence, intensity and severity of poverty, respectively.

When $\alpha=0$, then the FGT is expressed as $P_0 = \frac{q}{N}$, which is the *headcount index* (incidence of poverty) measuring the proportion of the population that is counted as poor. By far, this measure is most commonly used because of its straightforward application and simple calculation (Nguyen & Tran, 2018). However, as already noted, this measure does not measure the intensity of poverty (Ravallion, 1996).

When $\alpha=1$, the FGT class of poverty measure (P_1) is displayed as: $P_1 = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{Z-Yi}{Z}\right)^1$, which is the *poverty gap index* or poverty intensity or the depth of poverty. This shows the extent to which individuals fall below the poverty line as a percentage of the poverty line. This measure shows the mean proportionate poverty gap in the population (where the non-poor have a zero poverty gap). This offers information concerning how far off the poor are from the poverty line. Thus, the poverty gap index has an advantage because it measures the intensity of poverty (Tran et al., 2015).

2.1. Econometric method

We model factors affecting poverty incidence by employing a logit model with the response variable being a binary variable that has a value of one if a household was identified as poor and a value of zero otherwise. The logit model takes form as follow:

$$\Pr(Y = 1|X) = \frac{Exp\left(\beta'_s X'_s\right)}{1 + Exp\left(\beta'_s X'_s\right)}$$

where the coefficients $\boldsymbol{\beta'_s}$ are the parameters that need to be estimated and $\boldsymbol{X'_s}$ represents various explanatory variables as given in Figure 1 and Table 2. The logit models the probability of a household being poor (Y=1). It should be noted that the maximum likelihood estimation (MLE) of the logit model automatically accounts for the heteroscedasticity in $\boldsymbol{Var(Y|X)}$ (Wooldridge, 2016).

We applied the fractional logit model to estimate factors affecting the poverty intensity because the response variable (poverty intensity or poverty gap) takes the values in the interval [0, 1]

$$\mathrm{E}(Y|X) = G(X|\boldsymbol{\beta}X) = \frac{Exp\left(\boldsymbol{\beta'_s X'_s}\right)}{1 + Exp\left(\boldsymbol{\beta'_s X'_s}\right)}$$

The fractional logit model can be estimated using the quasi-maximum likelihood estimator, with heteroscedasticity-robust asymptotic variance. Following the rural sustainable livelihood framework and empirical studies (Coulombe & McKay, 1996; DFID, 1999; Grootaert, 1997; Mukherjee & Benson, 2003; Tran et al., 2020; Tran et al., 2015), poverty status was assumed to be determined by household demographic characteristics, education and various types of land. Also, regional dummy variables were included to control for the regional fixed effects. The name, definition and measurements of included variables are given in Table 1.

3. Results and Discussion

3.1. Descriptive statistical analysis

Table 1 provides poverty measures by ethnic groups in rural Vietnam in 2018. The poverty head count index and poverty intensity is 5.7% and 1.35% for the whole rural population, respectively. However, the poverty rate and poverty intensity is 18.75% and 4.45% for ethnic minorities. The corresponding figures are only 2.7% and 0.06% for the Kinh population. Thus, the results confirm that the poverty status is closely linked with ethnicity in rural Vietnam.

Table 1: Poverty status by ethnicity

Poverty measures (%)	Headcount	Poverty gap
Whole rural population (29772)	5.70%	1.35%
Ethnic Minorities (5596)	18.75%	4.45%
Kinh Population (majority) (24126)	2.70%	0.06%

Note: Poverty is measured using the official rural poverty line for the period 2016-2020 and is adjusted for inflation.

Figure 1 compares the highest education levels of household heads between the poor and non-poor in rural Vietnam. For the whole sample, one fifth of household heads had no formal education. The figure, however, is much higher for the poor (about 36%) than that for the non-poor (about 19%). About 31% of household heads in the non-poor group attained lower

secondary education while that for the poor is only about 25%. In addition, the proportion of household heads with vocational education and college/university degrees (8.24% and 4.17%) is much greater for non-poor households than that for poor households (0.12% and 0.00%). This difference in education attainment between the two groups implies that education is a major factor contributing to the well-being gap between the poor and non-poor in rural Vietnam.

Table 2 reports the main characteristics of rural households by poverty status. Unsurprisingly, the proportion of households with the heads in the Kinh population group is much lower among the poor than that among the non-poor (38% vs 84%). The average age of household heads among the non-poor is about three years older than that of those among the poor. Also, the average household size and dependency ratio is larger for the poor than those for the non-poor. It is evident that the share of households with migration, wage and non-farm self-employment is much higher for the non-poor than that for the poor. For instance, about 14% of non-poor households reported having at least one migrant, while the corresponding figure is only 4% for poor households. The finding suggests that diversifying towards non-farm activities is closely associated with poverty status in rural Vietnam. Regarding the difference in land holding, Table 2 reveals that on average, poor households had more annual cropland and forestland than non-poor households, while the latter owned more perennial cropland and aquaculture land than the former.
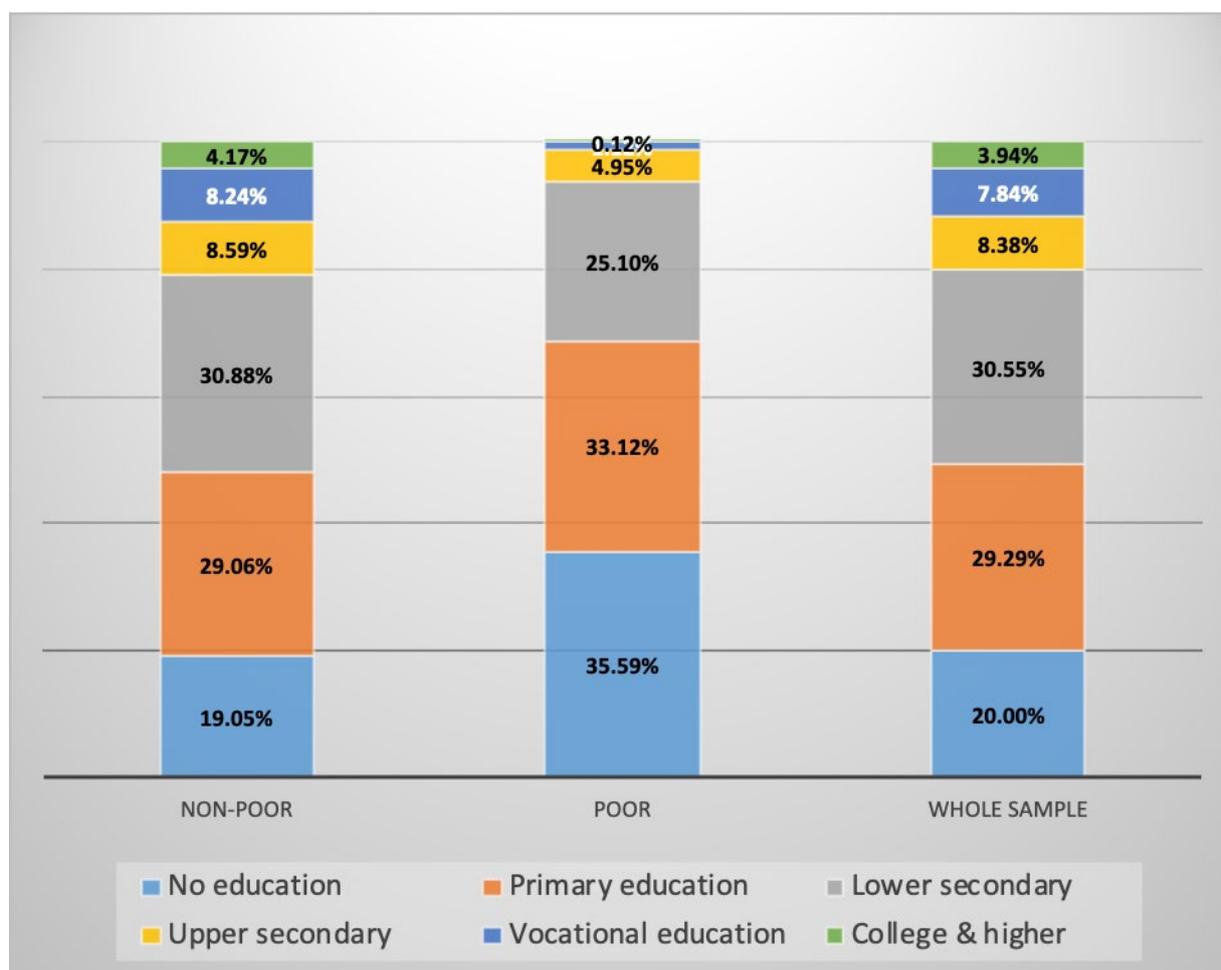
Figure 1. Highest education levels of rural household heads by poverty status

Table 2: Main characteristics of households by poverty status

Explanatory variables	Non-poor		Poor		Whole sample	
	Mean	SD	Mean	SD	Mean	SD
Ethnic majority (Kinh/Hoa=1; 0=minor)	0.84	0.37	0.38	0.49	0.81	0.39
Age of household heads (years)	52.02	13.33	48.63	17.34	51.83	13.61
Marital status of household head (1=married; 0=not)	0.82	0.38	0.80	0.40	0.82	0.38
Gender of household head (1=male; 0=female)	0.79	0.41	0.80	0.40	0.79	0.41
Dependency ratio	0.39	0.31	0.50	0.29	0.39	0.31
Household size (number of members)	3.68	1.56	4.16	1.92	3.71	1.59
Migration (1=yes;0=not)	0.14	0.34	0.04	0.20	0.13	0.34
Non-farm self-employment (1=yes;0=not)	0.18	0.39	0.05	0.22	0.18	0.38
Wage employment (1=yes;0=not)	0.40	0.49	0.25	0.43	0.39	0.49

Annual cropland (m^2)	3129	18311	4696	8005	3218	17887
Perennial cropland (m^2)	1765	9137	966	4337	1719	8934
Forest land (m^2)	1727	10893	3991	14934	1857	11175
Aquaculture land (m^2)	517	4495	155	1689	496	4384
Garden land (m^2)	210	927	180	534	208	909
Observation	28025		1697		29772	

3.2. Econometric analysis of factors affecting the incidence and intensity of poverty

Tables 3 provide the results from logit and fractional logit models. Estimates are presented in the form of both coefficients and odd ratios (OR) for the logit model and relative proportion ratio (RPR) for the fractional logit model. Both ORs and RPRs are the exponentials of coefficients while the former measures the change in the odd of being and the latter shows the change in the relative proportion of poverty intensity, given there is a unit increase in the explanatory variable, while holding all other variables constant. It shows that most of the explanatory variables are statistically significant at 5 percent or lower level, with their signs as expected. Also, many coefficients in both models have the same sign and statistical significance. This implies that some factors that affect the incidence of poverty also affect the intensity of poverty (poverty gap). However, some other factors such as gender, aquaculture and forestlands, affect only the poverty incidence or the poverty intensity, but not both. This suggests that while these factors might not help the poor move out of poverty, they might make them less poor.

In this study, our variable of interest is the highest education level of household heads. The coefficients of the education variable are negative and highly statistically significant in both models, confirming that households with better education are more likely to avoid poverty or at least make them more affluent. For instance, the logit estimates in Table 3 shows that the odds of being poor for households with heads attaining primary education is about 40% lower than the odd of those without formal education. The same and larger effects are found for higher levels of education; 55% lower for lower secondary; 66% lower for upper secondary; 82% lower for vocational education and 98% lower for college/university degrees. Similarly, the effect of education on poverty intensity is also found in the fractional logit estimates. Holding all other variables constant, a household with the head completing primary education would reduce the relative proportion of poverty intensity by 34%. The corresponding effect for lower secondary is 52%; upper secondary is 65%, vocational is 86% and college/university is 97%. Our research finding is in line with previous finding in several developing countries which confirm the crucial role of education in poverty alleviation (Tarabini, 2010; Tilak, 2002;. Tran, 2014).

Table 3: The effect of education on poverty status

Explanatory variables	Poverty incidence (Logit)				Poverty gap (Fractional logit)			
	Coefficient	SE	OR	SE	Coefficient	SE	RPR	SE
Primary education	-0.51***	(0.073)	0.60***	(0.044)	-0.42***	(0.075)	0.66***	(0.049)
Lower secondary	-0.81***	(0.081)	0.45***	(0.036)	-0.73***	(0.079)	0.48***	(0.038)
Upper secondary	-1.08***	(0.143)	0.34***	(0.049)	-1.04***	(0.154)	0.35***	(0.054)
Vocational	-2.44***	(0.253)	0.09***	(0.022)	-1.98***	(0.319)	0.14***	(0.044)
College & higher	-3.78***	(0.707)	0.02***	(0.016)	-3.64***	(0.939)	0.03***	(0.025)
Ethnicity	-1.41***	(0.108)	0.25***	(0.026)	-1.16***	(0.094)	0.31***	(0.029)
Age	-0.03***	(0.003)	0.97***	(0.003)	-0.03***	(0.003)	0.97***	(0.003)
Marital status	-0.37***	(0.101)	0.69***	(0.069)	-0.43***	(0.110)	0.65***	(0.071)
Gender	0.10	(0.101)	1.11	(0.111)	0.21*	(0.109)	1.23*	(0.134)
Dependency ratio	1.85***	(0.119)	6.35***	(0.755)	1.60***	(0.127)	4.97***	(0.632)
Household size	0.06***	(0.020)	1.06***	(0.021)	0.07***	(0.019)	1.07***	(0.021)
Migration	-1.27***	(0.137)	0.28***	(0.039)	-1.23***	(0.160)	0.29***	(0.047)
Non-farm self-employment	-1.26***	(0.131)	0.28***	(0.037)	-1.22***	(0.150)	0.29***	(0.044)
Wage employment	-1.11***	(0.092)	0.33***	(0.030)	-1.13***	(0.080)	0.32***	(0.026)
Annual cropland	0.02*	(0.010)	1.02*	(0.011)	0.01	(0.011)	1.01	(0.011)
Perennial cropland	-0.05***	(0.013)	0.95***	(0.012)	-0.03***	(0.010)	0.97***	(0.010)
Forest land	-0.01	(0.012)	0.99	(0.012)	-0.02**	(0.009)	0.98**	(0.008)
Aquaculture land	-0.05***	(0.020)	0.95***	(0.019)	-0.03	(0.021)	0.97	(0.020)
Mekong River delta	-0.29*	(0.157)	0.75*	(0.118)	-0.34**	(0.161)	0.71**	(0.114)
South east	-0.92***	(0.247)	0.40***	(0.099)	-0.68***	(0.250)	0.51***	(0.127)

Central Highlands	0.60***	(0.215)	1.82***	(0.391)	0.55***	(0.164)	1.73***	(0.283)
South Central	0.20	(0.169)	1.23	(0.207)	0.15	(0.171)	1.17	(0.199)
North Central	0.96***	(0.160)	2.61***	(0.417)	1.00***	(0.136)	2.73***	(0.372)
North West	0.88***	(0.192)	2.42***	(0.464)	0.88***	(0.156)	2.41***	(0.376)
North East	0.60***	(0.160)	1.82***	(0.290)	0.68***	(0.144)	1.98***	(0.284)
Constant	-0.27	(0.265)	0.76	(0.202)	-2.24***	(0.255)	0.11***	(0.027)
Pseudo R2/ Log pseudo likelihood	0.2511				-1497.9541			
Observations	29,722				29,722			

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Our study also found a number of factors affecting the incidence and intensity of poverty. For instance, the odds of being poor is 28% lower for a household who has at least one migrant than for those that do not. Similar effects are also found for a household with at least one member participating in wage or non-farm self-employment. Also, migration, wage or non-farm self-employment are also found to reduce the intensity of poverty in the fractional logit estimate. Similar findings are also observed in previous studies in Vietnam (Nguyen & Hoang, 2018; Nguyen, Van den Berg, & Lensink, 2011; Tran et al., 2015). Annual cropland has no little effect on poverty incidence and no effect on poverty gap. Perennial cropland reduce both the incidence and intensity of poverty. However, forestland is found to reduce poverty intensity while aquaculture land has a reducing effect on poverty incidence.

Larger household size and higher dependence ratio are found to increase the odds of a household being poor as well as the intensity of poverty. As expected, we find that households with heads in the Kinh population are much less likely to be poor and they are also, more affluent. The odds of being poor and the relative proportion of poverty intensity would be 75% and 69% lower for a household with heads belonging to the Kinh group. This supports previous findings that ethnicity is a major determinant of poverty in rural Vietnam (Baulch, Nguyen, Nguyen, & Pham, 2009; Dang, 2012; Tran et al., 2015). Finally, we found that regional characteristics have a significant effect on poverty status. Specifically, households with the same characteristics are less likely to be poor for those in the Mekong and South east regions and more likely to be poor for those in the North Central, North West and North East regions than those in the Red River Delta.

4. Summary of Findings

This study examined the effects of education on poverty in rural Vietnam, using updated data from the 2018 VHLSS and micro-econometric models. Differing from most previous studies that often focus only on factors affecting the poverty incidence, in this study, we investigated factors affecting both the incidence and intensity of poverty. We found a positive effect of

education on both poverty incidence and intensity. This suggests that better education helps the poor avoid poverty or at least make them more affluent in rural Vietnam. We also found that the poor have much lower levels of education than do the affluent. A useful implication here is that improving the access of better education to the poor, is expected to be an effective way to reduce poverty in rural Vietnam.

5. Conclusion and Implications

Our study also confirms several factors affecting poverty status in rural Vietnam. Notably, we found that participating in non-farm activities, such as migration, wage and self-employment, are crucial factors in reducing poverty; both the likelihood of falling into poverty and the level of poverty intensity. Our descriptive statistical analysis also indicated that non-farm participation is less common among the poor. This suggests that policies for promoting non-farm activities, combined with policies for improving the access of the poor to these, should be applied in rural Vietnam. Finally, the finding that ethnicity is a crucial factor in determining poverty status indicates that the well-being gap between the Kinh population and ethnic minorities remains the challenge for national sustainable development.

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