

# Determinants of the Dynamic of Households' Poverty Gap in Vietnam

Nguyễn Việt Hưng  
Faculty of Economics.  
National Economics University,  
Vietnam

**Abstract:-** The study uses the multinomial logit to identify factors affecting the dynamics of household poverty. Results of the analysis indicate that the following factors have improved the household's ability to escape poverty: (i) Male headed household, (ii) Head completed secondary or tertiary education, and (iii) The risk of vulnerability to poverty is low. Meanwhile, factors that have contributed to preventing a poor household from falling into poverty in 2018-2020 are: (i) young to middle-aged (nearly 40 years old), (ii) The head of household is a full spouse; (Iii) Household has large values of property or house; And (iv) Head of household working in a foreign sector.

**Keywords:-** Multinomial Logit, Promotive Effect, Preventive Effect, Poverty.

## I. INTRODUCTION

There is a relatively large body of research on household poverty in the developing countries like Vietnam (Patrick & Rosemary, 2013; Edmore & Nicholas, 2018). Numerous studies have been conducted on various subjects and time periods to identify the demographic characteristics of poor households, providing a foundation for poverty reduction policies. However, due to the limitations of previous data, particularly the lack of panel data, the dynamic nature of household poverty has remained largely unexplored. Fortunately, recent household surveys have seen a significant increase in the number of households surveyed repeatedly, making it possible to delve deeper into the dynamic nature of poverty. Specifically, we can now identify households that are more likely to escape poverty or those that are more likely to avoid falling back into poverty.

In this study, using a multinomial logit regression technique and a panel dataset in two years 2018 and 2020, the author aims to investigate specific demographic characteristics of household that help them more likely to escape poverty, as well as which household demographic characteristics are associated with a higher probability of maintaining a non-poor status.

## II. MODEL SPECIFICATION

To examine the dynamic nature of poverty between 2018 and 2020, i.e., to identify the factors influencing the transition between poverty and non-poverty states, a multinomial logit regression model can be employed (Gaiha et al., 2007).

In this case, the multinomial logit model is similar to the binary logit model, except that the dependent variable can take on more than two categorical values. Specifically, the probability of a household falling into a specific category  $j$  is

$$\Pr(Y_i = j) = \frac{e^{\beta X_{ij}}}{\sum_{j=0}^3 e^{\beta X_{ij}}} \quad (1)$$

In which,  $Y_i$  would take one of four values:

$Y_i = 0$  if this household is non-poor in both years 2018 và 2020.

$Y_i = 1$  if this household is non-poor in 2018 but poor in 2020.

$Y_i = 2$  if this household is poor in 2018 but non-poor in 2020.

$Y_i = 3$  if this household is poor in both years 2018 and 2020.

One category will be selected as the reference, and in this case, it is the category where  $Y_i = 0$ , meaning no poverty in both years.

The coefficients will be normalized to zero. Then, the probability of each case will be

$$\Pr(Y_i = 0) = \frac{1}{1 + \sum_{j=1}^3 e^{\beta X_{ij}}} \quad (2)$$

$$\Pr(Y_i = j) = \frac{e^{\beta X_{ij}}}{1 + \sum_{j=1}^3 e^{\beta X_{ij}}}, \quad j = 1, 2, 3 \quad (3)$$

Gaiha et al. (2007) have demonstrated a method to identify the protective effect, meaning the likelihood that a household not considered poor in 2018 will remain not poor in 2020. This determination is based on a comparison of equations (2) and (3), as follows:

$$\ln \left[ \frac{\Pr(Y_i = 1)}{\Pr(Y_i = 0)} \right] = \hat{\beta}_1 X_i \quad (4)$$

In this context, the numerator represents the probability of a non-poor household becoming poor, while the denominator represents the probability of a non-poor household remaining non-poor. Therefore, a defensive effect would decrease this ratio, specifically when the coefficient  $\beta_1$  is negative (assuming positive values of  $X$ ). Variables with a negative and statistically significant  $\beta_1$  imply that as  $X$  increases, the likelihood of a non-poor household remaining non-poor also increases. Conversely, if  $\beta_1$  is positive and statistically significant, an increase in  $X$  would lead to an increase in the ratio, suggesting a higher probability of transitioning from a non-poor to a poor state.

Additionally, Gaiha et al. (2007) outlined a method to identify the improvement effect, which involves determining the likelihood of a household that was poor in 2018 becoming non-poor by 2020. This is done by comparing the probabilities between states  $j = 2$  and  $j = 3$ .

$$\ln \left[ \frac{\Pr(Y_i = 2)}{\Pr(Y_i = 3)} \right] = (\hat{\beta}_2 - \hat{\beta}_3) X_i \quad (5)$$

Assuming  $X$  is positive, if coefficient  $\beta_2$  is significantly larger than  $\beta_3$ , then the improvement effect on the status will be more pronounced. In other words, increasing the value of  $X$  will make it easier for that household to escape poverty.

Demographic variables will be used to examine and explain the impact on a household's ability to escape poverty as well as the ability to prevent a household from falling into poverty. Specifically, the following variables will be used to explain the dynamics of poverty status: head of household's gender, head's age and age-squared, marital status, ethnicity (Kinh), log of house value, average working hours of household members, the ratio of females in the household, education level (represented by dummy variables for secondary, tertiary, and college education), work sector (represented by dummy variables for public sector, FDI sector, agriculture, and self-employment), and region of residence (represented by the remaining dummy variables).

### III. DATA AND ESTIMATION RESULTS

#### ➤ Data:

We utilize household survey data from 2018 and 2020 to determine whether each household falls below or above the poverty line in each respective year. The relative poverty line, defined as half of the median household consumption of households in the sample, will be used to demarcate the boundary between poverty and non-poverty.

#### ➤ Estimation Results:

To simplify the analysis of these two effects, we will run a multinomial model corresponding to two different reference cases. For the improvement effect, we choose the reference case as being poor in both periods, and the coefficient of the reference case will have a value of 0. Then the coefficient of the case of being poor in 2018 and not poor in 2020 will represent the direction of the impact of the corresponding variable on the ability to escape poverty, i.e., the improvement effect. For the prevention effect, we will choose the reference case as not being poor in both periods. Then the estimated coefficient for the case of not being poor in 2018 and poor in 2020 will show the impact of the corresponding variable on the likelihood of falling into poverty, and reversing the direction will tell us the impact of that variable on the ability to continue not falling into poverty.

First, we will consider the impact of variables on the ability to escape poverty, i.e., the improvement effect. The gender of the household head has a positive sign and is statistically significant. This means that when the household head is male, the likelihood of a poor household escaping poverty is higher. This is entirely reasonable in reality because men are usually more active and adventurous than women, who tend to be more accepting of the status quo. Therefore, if a household is currently in poverty, and the household head is male, the likelihood of that household escaping poverty in the future will be higher. On the other hand, if the household head is female, it is more likely that the household will continue to remain in poverty in the future.

The completion of secondary and upper secondary education, which is both positive and statistically significant, implies that households with heads who have completed these levels of education are more likely to escape poverty compared to those whose heads have not completed secondary education. However, university education is not statistically significant, meaning that households with heads who have completed university degrees are no more likely to escape poverty than those whose heads have not completed. This result raises questions about the value of university education in terms of a household's ability to escape poverty. According to numerous studies, the rate of return on higher education is generally higher (Psacharopoulos and Patrinos, 2002), suggesting that a household's likelihood of escaping poverty should improve when the household head has a university degree.

Meanwhile, households residing in the Central, Red River Delta, and Southeast regions are less likely to escape poverty compared to those residing in the Northern mountainous region. The measure reflecting vulnerability to poverty has a contrasting effect on the probability of escaping poverty, meaning that households with a high vulnerability to poverty are less likely to escape poverty, and vice versa (due to the negative and statistically significant coefficient)

Thus, from the results of our research, the following factors have helped improve households' ability to escape poverty:

- Household head is male
- Household head has completed secondary or high school education
- The vulnerability to poverty is low
- The household resides in the Northern Mountainous regions or the South Western region

Next, we analyze the factors that can help prevent households from falling into poverty, meaning households that were not poor in 2018. We then examine which factors helped these households to remain non-poor in 2020.

The variable of household head gender in this case has a negative sign. A negative sign implies that if the household head is male, the probability of falling into poverty in the following period will be lower, meaning a better ability to prevent falling into poverty. However, this variable is not statistically significant, so we are uncertain about the impact of the household head's gender on the ability to prevent falling into poverty.

The age variable in this case is statistically significant, with a negative first-order coefficient and a positive second-order coefficient. With these signs, we expect that with a younger age of the household head, the ability to prevent falling into poverty will be better, but when exceeding a certain age (in this case, about 40 years old), the probability of transitioning to a state of poverty increases.

The variable of housing value has a negative sign and is statistically significant, implying that households with higher asset or housing values are less likely to transition to a state of poverty, meaning the poverty prevention effect is better when households have higher asset values.

Variables such as ethnicity, the proportion of women in the household, and average working hours do not have a significant statistical effect on poverty prevention. Meanwhile, the marital status of the household head is statistically significant and has a negative sign, implying that when the household head has a spouse, the household's poverty prevention effect is better than when the household head is single.

Within the group of dummy variables reflecting the household head's occupation type, variables working in the state sector and foreign sector carry a negative sign, although only the foreign sector variable is statistically significant. Thus, households whose head works in the foreign sector have a better chance of preventing poverty compared to the domestic private sector, and generally better than the agricultural or self-employed sectors.

The dummy variable classifying six regions, with the northern mountainous region as the reference value, mostly carries negative signs and is statistically significant. This indicates that households residing in the northern mountainous region have a better ability to prevent poverty compared to other regions. Conversely, the Red River Delta and Southeast regions are two areas with a higher risk of returning to poverty, meaning households that were not poor in 2018 but have a higher probability of falling into poverty in 2020.

Finally, the dummy variable for the household's vulnerability to poverty is also statistically significant and carries a positive sign. This implies that households with a higher vulnerability to poverty, meaning a higher probability of falling into poverty in the future, have indeed had a higher probability of transitioning from non-poor to poor status between 2018 and 2020.

**Table 1: Estimation Results on the Change in Poverty Status between 2018 and 2020 using a Multinomial Logit Model**

Explanatory Variables	Poor_Nonpoor (Improvement Effect)	Nonpoor_Poor (Preventive Effect)
_cons	5.66434 (2.6805)	1.3601 (1.2115)
Gender	1.1439*** (0.4233)	-0.3383 (0.2114)
Age	-0.0541 (0.0684)	-0.1160*** (0.0354)
age_sq	0.00016 (0.0007)	0.00161*** (0.0004)
log_housevalue	-0.2038 (0.1777)	-0.1536* (0.0824)
Ethnic group	0.1720 (0.4814)	-0.3740 (0.2580)
ratio_female	0.56646 (0.5513)	-0.1018 (0.3406)
work_hour_mean	0.0020	-0.0019

	(0.0033)	(0.0017)
Marriage	0.4445 (0.4309)	-0.5319** (0.2284)
Secondary	1.1898*** (0.4345)	-0.2573 (0.1986)
Tertiary	1.6998** (0.7000)	-0.2261 (0.2446)
College	-0.045 (1.2783)	0.0106 (0.3716)
agri_work	-0.0194 (0.4317)	-0.0285 (0.2390)
public_work	0.3797 (0.9125)	-0.3897 (0.3131)
self_work	0.61199 (0.5266)	0.15368 (0.2308)
fdi_work	-0.8045 (1.1785)	-2.0305** (0.8196)
Central Region	-2.1616*** (0.6004)	0.8008*** (0.2987)
Red River Delta	-1.9792*** (0.6480)	1.13522*** (0.3269)
Central Highlands	-1.0665 (0.7882)	0.8408** (0.3690)
Mekong River Delta	0.0044 (0.6019)	0.2692 (0.3142)
Southe Eastern region	-1.1859* (0.6766)	1.3206*** (0.3408)
Vunlnerability to Poverty	-4.1804*** (0.5732)	3.6954*** (0.3202)

*Source: Calculated by the author*

To summarize, based on the aforementioned statistical analysis and inferences, we can identify the following factors that have contributed to preventing households from falling into poverty during the 2018-2020 period:

- Household head is of young to middle age (near 40 years old)
- Household head has a spouse
- Household has significant assets or housing
- Household head works in a foreign region
- Household head resides in the northern mountainous region or the Mekong Delta.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

In this study, we employ a multinomial logit model to analyze the dynamic process of poverty status. The analysis results indicate that households with a household head under 40 years old are less likely to fall below the poverty line. Conversely, households with a household head over 40 years old have a higher probability of transitioning from non-poor to poor status. Households with both a husband and a wife are also less likely to move from non-poor to poor. Similarly, households with significant asset values and those working in foreign regions tend to be better at maintaining their income and expenditure above the poverty threshold compared to other households.

On the other hand, regarding the ability to escape poverty, the research shows that households with a male head are more likely to escape poverty than those with a female head. Similarly, households whose head has completed secondary or tertiary education are also more likely to escape poverty. Households with a low vulnerability to poverty are more likely to escape poverty compared to those with a high vulnerability to poverty.

Based on these findings, we can recommend that the government should pay more attention to poor households with female heads or heads with low levels of education. If these groups are not targeted, the likelihood of long-term poverty will increase for them due to their limited ability to escape poverty on their own.

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