AN ANALYSIS OF POVERTY DYNAMICS IN THE VIETNAM DEVELOPMENT CONTEXT

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Abstract: *Our paper examined the poverty dynamics as well as the determinants of poverty in Vietnam. In order to deal with the initial problem, that causes bias estimator, we use a methodology suggested by Heckman (1988) that estimate the poverty probability at the beginning through a set of exogenous instruments including control variable in the main model and other pre-sample information. The estimators could be obtained through using command* `redprob` *in Stata (Steward, 2006). Considering three measures of poor, our estimation results show that, first, the poverty lines of Vietnam government and the World Bank has just captured a small poorest group but not reflected the real poverty problem that Vietnam is currently dealing with. Second, the poverty status of a household significantly depends on its poverty status in the past. However, the effect of poverty status will be weaker in the long-term and give opportunities for household successfully to escape from the poverty. Third, we also confirm that land as property that could reduce poverty in Vietnam, especially in the rural area where almost people work in agriculture sector.*

1. Introduction

After 30 years of Doi Moi (Renovation), Vietnam economy is currently considered as an emerging market standout compared with other its peers in Southeast Asia such as Philippines, Indonesia, Malaysia, Thailand and Singapore. In the 15 year-period from 1990 to 2014, the country has successfully moved up to low-middle income status with the annual GDP growth rate has been approximately 6.76% in average[1], the per capital income increased from around 100 USD to approximately 2100 USD by the end of 2015 (World Bank)[2].

In parallel with the economic development, the poverty rate of the country has radically dropped from 58% in 1993 to 11.8% in 2011 (UNDP)[3]. In fact, not only people's earning have considerably improved, non-income indicators regarding education, health, infrastructure also changed step by step through 30 years and reach out notable achievements. The current poor people were certainly better off than poor in previous period, for example, the rate of poor households have access to electricity increased approximately third times from 37% 1993 to 90% in 2009.

Despite of the impressive transformation Vietnam economy has achieved in recent years, it cannot be denied that the effect of economic development process on population groups has not been identical. While the economic growth rates in urban areas as well as of the Kinh group has rapidly increased thanks to the process of industrialization and modernization, trade liberalization and international integration, this rate in rural area and of the ethnic minorities has been relatively modest. Following the descriptive statistics of VHLSS, in the period 1993 – 2008, while the percentage of poor households in Kinh/Hoa group has dramatically reduced from 53.9% to only 9%, the fall of this rate in ethnic minorities has been really humble, from 86.4% to 50.3%. In addition, despite of the rapid poverty reduction in rural areas, in 2008, the rate of poor household in rural area has been relatively higher than in urban area (18.7% and 3.3%, respectively). Therefore, the gaps between rural and urban areas, Kinh people and ethnic minorities day by day have broadened. The wider disparity between rich and poor and among social groups has been considered as the dark side that the government has to deal with it to reach out the sustainable development process.

In recent years, there has been a lot of policies and interventions of government and NGOs implemented to reduce poverty as well as to improve social and economic equality in Vietnam. Some of them has brought many benefits and improved a lot the living standard of poor and near poor households in Vietnam but there also exists a vast of wasted and inefficient policies and projects. The fail of each poverty reduction project is mainly caused by its wrong design, or in other words, interventions of those projects are not suitably designed for the targeted beneficiaries. Indeed, depend on each type of poverty (i.e. chronic poverty and/or transitory poverty), we need to design different policies intervention to make the poverty targeted programs reach the appropriate goals. In this paper,

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[1] Source: http://databank.worldbank.org/data/reports.aspx?source=2&country=VNM&series=&period=#, calculated by authors.

[2] http://www.worldbank.org/en/country/vietnam/overview

[3] http://www.vn.undp.org/content/vietnam/en/home/ourwork/povertyreduction/in_depth/

we focus on studying the nature of poverty dynamics in Vietnam and answering the question: whether or not the current poverty status of Vietnamese households is affected by their poverty status in the past. We build an econometric model in which we hypothesize that poverty status of each household depend on its status in the previous period, other household characteristics variables including household size, children, the working status of household members, land owner status, living region and characteristics of household head such as age, gender, educational level and ethnicity. In order to deal with the endogeneity of the initial condition we follow the approach proposed by Heckman (1981) and use the Heckman estimator in the program $redprob$ of Stata. Our results show that, first, the poverty lines of Vietnam government and the World Bank has just captured a small poorest group including minority people who cannot communicate in Vietnamese and live in rural area but not reflected the real poverty problem that Vietnam is currently dealing with. Second, the poverty status of a household significantly depends on its poverty status in the past. However, the estimator of lagged poverty status is smaller than zero, the effect of poverty status in previous periods, thus, will be weaker in the long-term and give opportunities for household successfully to escape from the poverty. Third, we also confirm that land as property that could reduce poverty in Vietnam, especially in the rural area where almost people work in agriculture sector.

Section 2 is literature review of the poverty dynamics in developing countries as well as in the case of Vietnam. Section 3 is data and methodology. It is followed by the section on results and discussions. Section 5 gives out concluding remarks and policy recommendation.

2. Literature review

Different approaches have been applied to study poverty as a dynamic process, depending on the main focus of the research, and on the availability of data. Typically, for our purpose, three types of models have been estimated for poverty dynamics and persistence. The multinomial logit model is appropriate when the focus is on the mobility of poverty and only short panel of survey data is available, a typical situation in developing countries, where usually a panel data consists of only two waves of household data. When there are a larger number of rounds of panel data poverty transition has also been investigated using hazard models and random effect probit models. The hazard model is appropriate in investigating the duration dependence while random effect probit model is often specified for state dependence.

A number of studies on poverty dynamics in developing countries (e.g., Bigsten et al., 2003; Keddir and McKay, 2005; Quisumbing, 2011; Dercon and Porter, 2011) used the multinomial logit (MNL) model. This model involves constructing a polytomous variable for both those who are out of poverty and those who remain in poverty and examining their correlates. In addition, consistent estimation of the parameters of the MNL model hinges on a strong assumption of Independence of Irrelevant Alternatives (IIA). One could overcome the limitation of this model by using other models which relax the IIA assumption, such as the sequential model (Baulch and Vu, 2011), ordered logit (or probit), and stereotype logistic models (Baulch, 2011). There has been a number of studies on poverty dynamics in developing countries such as South Africa (Aliber, 2003, Carter & May, 2001), Uganda (Deiniger & Okidi, 2003), Cote d'Ivoire

(Grootaert & Kanbur, 1995), Egypt (Haddad & Ahmed, 2003), India (Khrisna, 2004), Ethiopia (Dercon and Krishnan, 2000), Argentina (Cruces and Wodon, 2003), Bangladesh (Sen, 2003) for Bangladesh, Kenya and Madagascar (Barret et al, 2006). Most of these countries studies only focus on the mobility in poverty status and attempt to distinguish chronic from transient poverty and not take into account the issue of unobserved heterogeneity and state dependence effect.

The hazard rate model was originally proposed by Bane and Ellwood (1986) and applied to US data for the period 1970-1982. The poverty dynamics uncovered by this class of model is the duration dependence, i.e. the longer the household stays poor the lower the probability that household exits poverty. For example, the importance of duration dependence is reported by Arranz and Canto (2010) in their study on poverty exit and re-entry rates in Spain that the rates vary not only with personal or household characteristics but also with spell accumulation and with the duration of past spells. Hazard models have been estimated for Canada (Finnie, 2000), the UK using the British Household Panel Survey (Jarvis and Jenkins, 1997; Jenkins, 2000; Jenkins et al., 2001, Devicienti, 2002), Spain (Cantó-Sánchez, 1996; Arranz and Cantó, 2010), Sweden (Hansen and Wahlberg, 2004), Germany (Biewen, 2006) and Turkey (Demir Şeker and Dayioğlu, 2014). International comparative analysis between developed countries is performed by Duncan et al. (1993), Fouarge and Layte (2005) and Andriopoulou and Tsakloglou (2011). For developing countries, Bigsten and Shimeles (2008) used proportional hazard models to examine the correlates of poverty-exit and re-entry in Ethiopia. Their results reveal that it is hard to exit poverty once a household falls into poverty, while it is easier to maintain non-poor status once they have moved out of poverty.

Dynamic probit models, which are used in this paper and presented in detail in the next sub-section, are a class of discrete choice models where current poverty is modeled as a function of poverty in the previous period. The main rationale behind modeling poverty using a dynamic probit model is the presence of state dependence. Initially the dynamic probit model is developed to understand whether past unemployment was a determinant of future unemployment that is whether unemployment was a persistent phenomenon. This model allow us to address such question as 'whether observed persistence in economic phenomena is due to underlying differences in individual characteristics or due to genuine causal effects of past on future outcomes' (Biewen, 2009, p. 1097). There is a large amount of evidence found in several countries (mainly OECD countries) that an individual or a household experiencing a poverty spell today is much more likely to experience it again in the future (Duncan et al., 1993; Oxley et al. 2000; Mejer and Linden, 2000; OECD, 2001; Biewen, 2004 and Giraldo et al. 2006). In the dynamic probit model, current state of poverty is modeled as a function of previous period's poverty. In addition, there are unobserved household or individual characteristics that make specific groups prone to poverty that should be taken care of while modeling poverty. These unobservable can be factors such as individual motivation, parental effects, rate of time preference and risk aversion parameters. Few papers have analyzed the issue of unobserved heterogeneity and state dependence effect of poverty as well as issues of endogeneity of initial conditions (Stevens, 1999; Cappellari and Jenkins, 2001). The use of this method in developing countries has, however, been very limited due to its requirement of a large number of rounds of panel data, which are still difficult to find in developing countries. Bigsten and Shimeles (2008) analyze the dynamics of poverty for Ethiopia using state dependence model and found

that the current poverty in Ethiopia is strongly driven by the past history in poverty. Giraldo et al (2002) present no evidence of significant effect of true state dependence of poverty using panel Italian household income and wealth survey. Their analysis reveals that the length of panel does not make any significant difference for the degree of dependence between the states in different time periods.

In these previous studies on Vietnam, typically a multinomial logistic model (hereafter MNL) of poverty dynamics is specified and estimated. Due to data limitation, typically these studies used two waves of survey data, mostly the Vietnam Living Standard Survey (1993-1997) or the Vietnam Household Living Standard Survey (2002-2010). Changes in poverty between two waves/years can be classified into four mutually exclusive outcomes: (i) being poor in both periods (P-P); (ii) being non-poor in the first period and poor in the second period (NP-P); (iii) being poor in the first period and non-poor in the second period (P-NP); and (iv) being non-poor in both periods (NP-NP). For example, Glewwe et al. (2002) and Justino et al. (2008) apply multinomial logit models to the panel of 4,300 households surveyed in the 1992/3 and 1997/8. Glewwe et al. (2002) find that households living in urban areas and the Red River Delta and South East were the most likely to escape poverty. Rising returns to education were also important in explaining rising living standards, with households headed by white-collar workers benefiting significantly. Using the same panel, Justino et al. find that trade liberalization has had a material and positive effect on rural household welfare, with most of this effect transmitted to poor households through labour market channels. Pham (2008) comes to similar conclusions using a MNL for the VHLSS 2002-2004-2006 panel. He also find that households living in the Northern Uplands and North Central Coast are more likely to be chronically poor compared to other geographic regions. Baulch and Vu (2010) extended the choice set in earlier studies to eight choices by adopting a sequential and nested logit models. They find that ethnic minority households with little or no education and those living in the Northern Uplands or Central Highlands are most likely to be chronically poor. They also detect the powerful lock-in effects that the “initial conditions” such as household size and composition, ethnicity, education have in trapping households in poverty. Different from these previous studies that use the VHLSS, Tran (2010) used the household survey data collected the ‘Vulnerability in Southeast Asia’ project funded by German Research Foundation. Despite using different datasets, similar findings are reported. Households of small size, have less number of dependents are more likely to be non-poor and households located in remote area also have higher probability of being poor. Other characteristics of household head such as sex, ethnic group, participating social associations, age, education attainment and occupation are drivers of household transition into and out of poverty. This paper also explores the effects of shocks and shows that shocks generally affect badly on household’s moving out of poverty.

Relatively little poverty dynamics research has been undertaken in developing countries, and specifically in Sub - Saharan Africa, mainly due to lack of longitudinal data that tracks and collects relevant information from individuals and households. The exceptions include, Grootaert and Kanbur (1995), Baulch and Hoddinott (2000), Carter and Many (2001), Deininger and Okidi (2003), Aliber (2003), Haddad and Ahmed (2003), Krishna (2004), Bigsten and Shimeles (2008).

Ahmed et al., (2007) identify at least seven major causes of persistent poverty in the context of developing countries: (i) slow growth, inequality and con ict, which limit the propensity of diversifying

livelihood to escape poverty; (ii) adverse ecology and remoteness of villages; (iii) the prevalence of shocks (adverse events) which often exert long-term impacts on uninsured households; (iv) poor health and disability, which not only drain households' resources but also limit their members' ability to work and earn income; (v) the inheritance of poverty; (vi) lack of assets and inability to invest in education, which could help households come out of poverty; and (vii) exclusion of some groups from access to resources, which perpetuates their poverty.

3. Methodology and Data Description

a. Methodology

To address our key research question about the dynamics of poverty in Vietnam, we design an econometric model in which the poverty status probability depends on the poverty status in the previous period as well as other characteristics of household and household head. Following the literature, we postulate that poverty status probability can be described by the latent variable model:

$$y_{it}^{*} = \gamma y_{it-1} + x_{it}'\beta + \alpha_i + u_{it} \qquad (i = \overline{1,N}; t = \overline{2,T}) \qquad (1)$$

Where y_{it}^{*} is the latent dependent variable of poverty status probability and y_{it} is the indicator variable for being poor, defined as follow:

$$y_{it} = \begin{cases} 1 & if \ \ y_{it}^{*} \geq 0 \\ 0 & else \end{cases}$$

The subscript i indexes individuals and the subscript t indexes time periods. N is taken to be large of 10,135 observation and considered as infinite, but T is typically small of five periods, therefore, asymptotic is only on N. y_{i1} is the poverty status of household at the initial period. x_{it} is a vector of explanatory variables including **household characteristics** such as household size, number of children below 5, living area, and land ownership, and **characteristics of household head** such as age, marital status, ethnicity, highest education level, whether household head works (i) for wage, (ii) in agriculture sector and (iii) in non-agriculture (service) sector.

The error terms u_{it} of the model have the distribution $u_{it} \sim N(0, \sigma_u^2)$. The unobserved household-specific time-invariant terms α_i have the distribution $\alpha_i \sim N(0, \sigma_\alpha^2)$. In the standard random effect model, α_i is uncorrelated with x_{it}. However, Mundlak (1978) and Chamberlain (1984) proved that a correlation can be allowed by assuming a relationship between α and either (i) the average $\overline{x_i}$ of explanatory variables over observed periods or (ii) a combination of lagged and lead values of x_i. The composite error terms $v_{it} = \alpha_i + u_{it}$ will be correlated over time and the correlation between the composite terms in any two different periods will be constant:

$$Corr(v_{it,}v_{ik}) = \frac{\sigma_\alpha^2}{\sigma_\alpha^2 + \sigma_u^2} \qquad t, k = \overline{2,T}, t \neq k$$

One more strong assumption should be considered is about the initial observation y_{i1}, the estimation of a standard random effect model can be used only if y_{i1} is exogenous and independent with α_i. The assumption is extremely strict since there have many household-specific time-invariant factors (e.g. parental background, physical infrastructure, or social capital) could affect the risk of poverty status of household in the initial period. In this case, the estimation of standard random effect model is not appropriate anymore (Steward, 2005).

To solve with the initial condition problem, we follow Heckman's approach (1988) that specified a linearized reduced-form equation for the initial period:

$$y_{i1}^{*} = z_{i1}'\mu + \nu_i \qquad i = \overline{1, N}$$

$$\nu_i = \delta\alpha_i + u_{i1}$$

where z_{i1} is a vector of exogenous instruments (including pre-sample variables and x_{i1}, ν_i is correlated with α_i, but uncorrelated with $u_{it}$for $t \geq 2$, $\delta > 0$, α_i and $u_{i1}$are independent, and u_{i1}has the same distributional assumptions as $u_{it}$for $t = \overline{2, T}$. The equation can be technically estimated by the Stata program $redprob$ (Steward, 2006). In the next session, we are going to discuss about the estimation results using this command.

b. Data Description

In order to analyze the nature of poverty dynamics in Vietnam, we need to use a panel data set that fully covers information about household characteristics including household size, number of children, living area, land ownership, household income, and characteristics of household's members, etc. Fortunately, the Vietnam Access to Resources Household Survey (VARHS) that have been biannually conducted since 2006 by the University of Copenhagen (Denmark), the Centre Institute of Economic Management (CIEM), the Institute for Labor Studies and Social Affairs (ILSSA), and the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD) could provide us all kinds of necessary information. The survey was implemented in rural areas of 12 provinces through seven economic regions of Vietnam including (i) Ha Tay in Red River Delta, (ii) Lao Cai and Phu Tho in Northeast, (iii) Lai Chau and Dien Bien in Northwest, (iv) Nghe An in North Central Coast, (v) Quang Nam and Khanh Hoa in South Central Coast, (vi) Dak Lac, Dak Nong and Lam Dong in Central Highland, and (vii) Long An in Mekong River Delta. In addition, each round of the survey was conducted in June and July of every two year, and the sampling strategy was designed to a certain number of surveyed households was involved in all five waves from 2006 to 2014. As a result, the survey provides a very solid and comprehensive tool to analyze the socio-economic related issues of rural Viet Nam over years. Cleaning the VARHS data to analyze the poverty dynamics in Vietnam, we constructed a strongly balanced five-wave panel data set of 1,947 households in each surveyed years. The descriptive statistics of variables is described in Table 1 as follow.

	2006			2008			2010			2012			2014		
VARIABLES	**N**	**Mean**	**Sd**	**N**	**Mean**	**Sd**	**N**	**Mean**	**Sd**	**N**	**Mean**	**Sd**	**N**	**Mean**	**Sd**
Head characteristics															
Male (dummy)	1,947	0.81	0.39	1,947	0.79	0.41	1,945	0.79	0.41	1,947	0.78	0.41	1,947	0.76	0.43
Marital status (dummy)	1,947	0.83	0.37	1,947	0.82	0.38	1,945	0.82	0.38	1,947	0.8	0.4	1,947	0.78	0.41
Age	1,947	50.31	13.66	1,946	51.63	13.61	1,945	52.99	13.19	1,947	54.55	13.09	1,947	56.13	13.03
Ethnicity (dummy)	1,947	0.81	0.39	1,947	0.8	0.4	1,947	0.81	0.39	1,947	0.81	0.39	1,947	0.81	0.39
Cannot read and write (dummy)	1,946	0.1	0.3	1,947	0.01	0.11	1,945	0.02	0.13	1,947	0.01	0.11	1,946	0.01	0.11
Can read and write but never went to school (dummy)	1,946	0.23	0.42	1,947	0.11	0.32	1,945	0.09	0.28	1,947	0.09	0.29	1,946	0.11	0.32
Completed Primary School (dummy)	1,946	0.23	0.42	1,947	0.27	0.44	1,945	0.27	0.44	1,947	0.26	0.44	1,946	0.2	0.4
Completed Secondary School (dummy)	1,946	0.32	0.47	1,947	0.45	0.5	1,945	0.45	0.5	1,947	0.46	0.5	1,946	0.48	0.5
Completed High School (dummy)	1,946	0.12	0.32	1,947	0.16	0.36	1,945	0.18	0.39	1,947	0.18	0.38	1,946	0.2	0.4
Working for a wage/salary (dummy)	1,947	0.33	0.47	1,908	0.3	0.46	1,864	0.33	0.47	1,825	0.31	0.46	1,784	0.33	0.47
Participating in agriculture (dummy)	1,947	0.81	0.39	1,908	0.78	0.42	1,864	0.78	0.41	1,825	0.74	0.44	1,784	0.74	0.44
Doing in services(dummy)	1,947	0.2	0.4	1,908	0.17	0.38	1,864	0.17	0.37	1,825	0.17	0.37	1,784	0.15	0.36
Household characteristics															
Number of children below 5	1,947	0.32	0.61	1,947	0.29	0.56	1,947	0.25	0.53	1,947	0.26	0.55	1,947	0.28	0.57
Size	1,947	4.59	1.72	1,947	4.56	1.73	1,947	4.31	1.7	1,947	4.23	1.77	1,947	4.13	1.79
No. of plots household has use rights and operates	1,947	4.94	3.3	1,947	4.81	3.13	1,947	4.48	3.03	1,947	4.35	2.88	1,947	3.94	2.7
No. of plots household has use rights, operates and lends out	1,947	5.19	3.3	1,947	5.13	3.11	1,947	4.89	3.02	1,947	4.81	2.93	1,947	4.42	2.71
No. of plots household lends out and rents	1,947	5.53	3.41	1,947	5.52	3.31	1,947	5.21	3.15	1,947	5.11	3.05	1,947	4.65	2.8
Urban (dummy)	1,944	0.01	0.08	1,947	0.01	0.08	1,947	0.03	0.17	1,947	0.03	0.18	1,947	0.03	0.18
Red River Delta(dummy)	1,947	0.22	0.42	1,947	0.22	0.42	1,947	0.22	0.42	1,947	0.22	0.42	1,947	0.22	0.42
North East (dummy)	1,947	0.17	0.38	1,947	0.17	0.38	1,947	0.17	0.38	1,947	0.17	0.38	1,947	0.17	0.38
North West (dummy)	1,947	0.1	0.3	1,947	0.1	0.3	1,947	0.1	0.3	1,947	0.1	0.3	1,947	0.1	0.3
North Central Coast (dummy)	1,947	0.09	0.29	1,947	0.09	0.29	1,947	0.09	0.29	1,947	0.09	0.29	1,947	0.09	0.29
South Central Coast (dummy)	1,947	0.15	0.36	1,947	0.15	0.36	1,947	0.15	0.36	1,947	0.15	0.36	1,947	0.15	0.36
Central Highlands (dummy)	1,947	0.13	0.34	1,947	0.13	0.34	1,947	0.13	0.34	1,947	0.13	0.34	1,947	0.13	0.34
Mekong River Delta (dummy)	1,947	0.13	0.33	1,947	0.13	0.33	1,947	0.13	0.33	1,947	0.13	0.33	1,947	0.13	0.33
Interpreter used for interview(dummy)	1,948	0.06	0.24	1,948	0.04	0.2	1,948	0.03	0.18	1,948	0.02	0.13	1,948	0.02	0.15
Head and her/his spouse born in this commune (dummy)	1,948	0.8	0.4	1,948	0.81	0.39	1,948	0.81	0.39	1,948	0.85	0.36	1,948	0.83	0.37

As shown in the section of literature review, the household poverty status has been often determined by using absolute and relative value of household income. In this paper, to classify the "poverty status" of households, we design three measures using information in VARHS. The first definition of poor household was classified following the definition of MOLISA and is collected from the question "Is your household currently classified as poor by the authorities (MOLISA)?" in the survey. The second measure is considered as a definition of absolute poor and created by comparing the income per capita of each household reported in the data set with the poverty line of Vietnamese government and World Bank in the period 2006 – 2010 and the period 2011 - 2015[4]. Finally, we create the relative poor definition by considering the 25% of households which earn lowest total income as poor every year. The percentage of poor household classified by three measures is shown in Table 2.

	2006	2008	2010	2012	2014	Total
Poor (defined by MOLISA)	23.04	19.93	13.69	16.95	12.75	17.26
Absolute poor	26.59	9.59	1.68	6.86	3.11	9.57
Relative poor	24.91	19.24	22.59	21.36	21.02	21.83

It could be seen that the share of households classified as absolute poor is extremely low in compare with the share of poor households defined by MOLISA in every surveyed year except 2006. In other words, the nominated income of Vietnamese household has increased through years and been considerably higher than the poverty line defined by Vietnamese government and the World Bank. The poverty lines was defined at the early stage of each five-year period, therefore, it could not well capture the fluctuation of socio-economic development. We could see that the rate of absolute poor in early years of each period (2006, 2008 and 2012) is higher than its rate in the late years (2010 and 2014). The development in the late of each five-year period required an adjusted poverty line that could reflect the real poverty situation. In addition, since not all surveyed households was re-interviewed in later waves, the share of relative poor in the panel data set is not exactly 25% but slightly lower.

		2006 vs. 2008		2008 vs. 2010		2010 vs. 2012		2012 vs. 2014	
		Non-poor	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor	Poor
Poor (defined by MOLISA)	Non-poor	92.12	7.88	94.16	5.84	90.27	9.73	94.83	5.17
	Poor	39.1	60.9	56.04	43.96	38.93	61.07	53.09	46.91
Absolute poor	Non-poor	94.7	5.3	98.75	1.25	93.48	6.52	98.02	1.98
	Poor	79.38	20.62	95.6	4.4	86.67	13.33	82.95	17.05
Relative poor	Non-poor	88.22	11.78	85.24	14.76	87.12	12.88	87.52	12.48
	Poor	59.17	40.83	45.53	54.47	50.69	49.31	47.43	52.57

[4] See http://www.moj.gov.vn/vbpq/Lists/Vn%20bn%20php%20lut/View_Detail.aspx?ItemID=18067 and http://vanban.chinhphu.vn/portal/page/portal/chinhphu/hethongvanban%3Fclass_id%3D1%26_page%3D37%26mode%3Ddetail%26document_id%3D98923

The Table 3 presents the poverty transition probability matrices through years. A poverty transition probability matrix shows the probability of households entering and escaping poverty between the two periods. Considering the relative poor and the poor definition of MOLISA, the difference between probabilities of becoming poor escapers and poor remainders are not significant. By contrast, the probability of becoming escaper using absolute poor classification is extremely high of more than 80%. The poor households in case of using absolute poor classification could be considered the poorest households of the country.

Besides the variable of interest – poverty status of households, we also consider a number of potential determinants of poor including household characteristics and characteristics of household head. Regarding household characteristics, we consider size of household, the number of children below 5, living areas of household: either they live in rural or urban areas, and in which economic regions household is living, and the number of land plot in use of household. In VARHS survey, there are three types of land plots are considered including (i) the land plots that household has the use right (the land use right certificate LURC) and are exploring/using, (ii) the land plots that household is renting/borrowing and does not have the LURC, and (iii) the land plots that household has the LURC is lending out. Based on these information, we create three variables of land: (a) the number of land plots that household has the LURC and are directly exploring/using (i), (b) the number of land plots that that household are directly exploring/ using, despite of having LURC or not ((i) and (ii)), and (c) the number of all land plots that household owns and are renting/borrowing ((i), (ii), and (iii)). Besides the poverty status in the previous periods, we also consider the impact of land as a main property of household on its poverty status since literature review showed that certain asset variables reveal a negatively correlation with poverty status.[5] Regarding **characteristics of household head,** we focus on age, marital status, ethnicity, highest education level, and occupation. There are three main economic activities household heads involve in, including working for a salary, working in agriculture sector, and doing their own business. In Vietnam, a people, especially people in rural area often participate in all those activities at a same time. Hence, in our paper, three dummy variables of business activities are not eliminate each other and cannot create the multi-collinearity problem.

To deal with the initial condition problem, besides the control variable set of characteristics of household and household head, we put two dummy variables of (i) whether household need to use the interpreters during the survey time, and (ii) whether head or her/his spouse born in the surveyed commune in the z_{i1} is a vector of exogenous instruments.

4. Results and Discussions

Main estimation

Considering three poverty classifications and three types of land plots, we have nine models presented in Table 4. In general, poverty status in previous period has significantly impact on current poverty status of household (at 1% level of significance). The impact of lagged value of poverty status defined by

[5] https://blds.ids.ac.uk/files/dmfile/Wp79.pdf

MOLISA is largest, followed by of the relative poor. Fortunately all the estimators are less than 1, hence, the effect of poverty status in previous periods will be weaker in the long-term (i.e. after K period, the effect of lagged values of poverty status is equal to $\gamma^K \to 0$). This outcome raises other research questions: 'After how many years could poor households successfully become escapers?' and 'Which intervention is useful to shorten the escape process?'. Since the estimator of lagged value in case of absolute poor is smallest, the time a poor household needs in order to pass the poverty line is shortest in comparison with other poor standards (following the classification of MOLISA and the relative poor classification), when other things equal. The poverty lines of Vietnam government and the World Bank set to two five-year periods are considered extremely low, in the context of a high development economic growth rates during the surveyed period, all households improve their earnings, and in a short term the poor could pass by all these fixed poverty lines. However, the economic growth rate of rich is always bigger than of poor, it is extremely difficult for poor households to significantly increase their income in order to escape out of the 25% of the poorest ones.

It could be said that the poverty lines of Vietnam government and the World Bank are not good enough to classify poor and non-poor households. The poverty lines, indeed, classify only extremely poor, on which many potential factors cannot have any influence. The intervention designed toward the extremely poor group, hence, should be different from less poor group. For example, the regression results show that while the number of land plots could increase living standards of poor households, and help them to be escapers; it is not true in case of extremely poor group. The estimators of three types of land plots are significantly negative with the poor probability in model of relative poor and poor defined by MOLISA (Models 1,3, 4, 6, 7, and 9), but insignificantly in case of absolute poor (Models 2, 5, and 8). Similarly, there are some characteristics of household head including marital status and highest educational level cannot have any influence on extremely poor group. These extremely poor households often concentrate in rural areas; the estimators of dummy variable of urban area are also insignificant in our models.

Considering other control variables in our models, we have several major conclusions as follow. First, Kinh group are often richer than other minorities groups. Second, doing services activities and working for salary could bring considerable income for household and help them escape of the poverty status. By contrast, having children is considered a main barrier preventing the process of poverty reduction. Among seven economic regions, Mekong Delta is the richest region, followed by Central Highlands. The poorest regions are South Central Coast, North West, and North Central Coast.

	(1) Poor (MOLISA)	(2) Absolute poor	(3) Relative poor	(4) Poor (MOLISA)	(5) Absolute poor	(6) Relative poor	(7) Poor (MOLISA)	(8) Absolute poor	(9) Relative poor
Main estimation									
Lagged poor (MOLISA)	0.759***			0.756***			0.756***		
	(0.077)			(0.077)			(0.077)		
Lagged absolute poor		0.183**			0.184**			0.183**	
		(0.090)			(0.090)			(0.090)	
Lagged relative poor			0.292***			0.286***			0.286***
			(0.068)			(0.068)			(0.068)
Male	-0.013	-0.009	0.124	-0.004	-0.008	0.129	-0.01	-0.01	0.127
	(0.099)	(0.121)	(0.087)	(0.099)	(0.120)	(0.088)	(0.099)	(0.121)	(0.088)
Marital status	-0.501***	-0.096	-0.350***	-0.501***	-0.094	-0.350***	-0.500***	-0.094	-0.351***
	(0.104)	(0.130)	(0.092)	(0.104)	(0.130)	(0.092)	(0.104)	(0.131)	(0.092)
Age	-0.002	-0.004	0.002	-0.001	-0.004	0.002	-0.002	-0.004	0.002
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)
Ethnicity	-0.686***	-0.406***	-0.442***	-0.687***	-0.406***	-0.446***	-0.675***	-0.399***	-0.440***
	(0.098)	(0.105)	(0.088)	(0.098)	(0.105)	(0.088)	(0.098)	(0.105)	(0.088)
Can read and write but never went to school	0.198	0.358	-0.008	0.196	0.356	-0.01	0.199	0.359	0.009
	(0.193)	(0.241)	(0.177)	(0.193)	(0.240)	(0.177)	(0.193)	(0.241)	(0.177)
Completed Primary School	-0.012	0.01	-0.347**	-0.011	0.01	-0.347**	-0.011	0.01	-0.339***
	(0.187)	(0.237)	(0.170)	(0.187)	(0.237)	(0.171)	(0.187)	(0.237)	(0.081)
Completed Secondary School	-0.372*	-0.23	-0.599***	-0.369*	-0.23	-0.599***	-0.369*	-0.23	-0.588***
	(0.190)	(0.239)	(0.172)	(0.190)	(0.239)	(0.173)	(0.190)	(0.239)	(0.086)
Completed High School	-0.633***	-0.268	-0.893***	-0.629***	-0.266	-0.891***	-0.628***	-0.265	-0.880***
	(0.204)	(0.253)	(0.183)	(0.204)	(0.253)	(0.183)	(0.204)	(0.253)	(0.106)
Working for a wage/salary	0.067	-0.263***	-0.149***	0.061	-0.265***	-0.152***	0.066	-0.262***	-0.152***
	(0.060)	(0.076)	(0.055)	(0.060)	(0.076)	(0.055)	(0.060)	(0.076)	(0.055)
Participating in agriculture	0.036	0.137	0.177***	0.035	0.135	0.174***	0.032	0.133	0.177***
	(0.069)	(0.089)	(0.064)	(0.068)	(0.088)	(0.063)	(0.068)	(0.088)	(0.064)
Doing in services	-0.225***	-0.273***	-0.410***	-0.222***	-0.269***	-0.406***	-0.224***	-0.269***	-0.409***
	(0.080)	(0.101)	(0.073)	(0.080)	(0.101)	(0.073)	(0.080)	(0.101)	(0.073)
No. of children below 5	0.064	0.118**	0.108**	0.061	0.117**	0.107**	0.062	0.118**	0.106**
	(0.052)	(0.055)	(0.052)	(0.052)	(0.055)	(0.052)	(0.052)	(0.055)	(0.052)
Household size	-0.02	0.116*	-0.644***	-0.017	0.115*	-0.649***	-0.018	0.114*	-0.647***
	(0.055)	(0.064)	(0.053)	(0.054)	(0.064)	(0.053)	(0.054)	(0.064)	(0.053)

Squared household size	0	-0.002	0.037***	0	-0.002	0.038***	0	-0.002	0.038***
	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)
No. of plots household has use rights and operates	-0.022**	-0.013	-0.021**						
	(0.011)	(0.012)	(0.010)						
No. of plots household has use rights, operates and lends out				-0.031***	-0.016	-0.025***			
				(0.011)	(0.012)	(0.010)			
No. of plots household has use rights and borrows							-0.025**	-0.011	-0.025***
							(0.011)	(0.012)	(0.009)
urban	-0.409**	-0.148	-0.457***	-0.411**	-0.15	-0.463***	-0.406**	-0.145	-0.456***
	(0.198)	(0.223)	(0.170)	(0.197)	(0.222)	(0.170)	(0.198)	(0.222)	(0.170)
Red River Delta	-0.18	-0.207	-0.563***	-0.17	-0.447***	-0.376***	-0.073	-0.446***	-0.548***
	(0.118)	(0.147)	(0.120)	(0.118)	(0.146)	(0.104)	(0.129)	(0.146)	(0.120)
North East	-0.066	0.195	-0.253**	-0.047	-0.041	-0.061	0.042	-0.044	-0.237**
	(0.119)	(0.137)	(0.103)	(0.119)	(0.110)	(0.102)	(0.112)	(0.110)	(0.104)
North West	-0.094	0.243		-0.09		0.182			
	(0.140)	(0.154)		(0.140)		(0.126)			
South Central Coast	0.167	0.345**	0.236**	0.157	0.099	0.414***	0.255**	0.103	0.238**
	(0.118)	(0.138)	(0.117)	(0.118)	(0.134)	(0.103)	(0.129)	(0.134)	(0.117)
Central Highlands	-0.299**	-0.461***	-0.618***	-0.316**	-0.709***	-0.448***	-0.212*	-0.700***	-0.628***
	(0.129)	(0.164)	(0.116)	(0.129)	(0.140)	(0.116)	(0.123)	(0.140)	(0.117)
Mekong River Delta	-0.695***	-0.243	-0.727***	-0.717***	-0.494***	-0.560***	-0.613***	-0.485***	-0.738***
	(0.144)	(0.162)	(0.131)	(0.145)	(0.161)	(0.118)	(0.152)	(0.162)	(0.132)
North Central Coast			-0.183		-0.244		0.097	-0.24	-0.175
			(0.126)		(0.154)		(0.140)	(0.154)	(0.126)
_cons	0.023	-1.676***	2.092***	0.063	-1.418***	1.943***	-0.052	-1.436***	2.113***
	(0.335)	(0.396)	(0.294)	(0.336)	(0.375)	(0.309)	(0.318)	(0.375)	(0.252)

	(1) Poor (MOLISA)	(2) Absolute poor	(3) Relative poor	(4) Poor (MOLISA)	(5) Absolute poor	(6) Relative poor	(7) Poor (MOLISA)	(8) Absolute poor	(9) Relative poor
rfper1									
Male	0.029	0.233	0.131	0.045	0.242	0.14	0.043	0.235	0.133
	(0.190)	(0.222)	(0.157)	(0.193)	(0.223)	(0.157)	(0.193)	(0.220)	(0.157)
Marital status	-0.699***	-0.499*	-0.335**	-0.706***	-0.498*	-0.334**	-0.705***	-0.495*	-0.333**
	(0.215)	(0.281)	(0.169)	(0.218)	(0.282)	(0.168)	(0.217)	(0.277)	(0.169)
Age	-0.020***	-0.016**	-0.014***	-0.020***	-0.016**	-0.014***	-0.020***	-0.016**	-0.014***
	(0.006)	(0.008)	(0.004)	(0.006)	(0.008)	(0.004)	(0.006)	(0.008)	(0.004)
Ethnicity	-0.704***	-0.480*	-0.356**	-0.688***	-0.487*	-0.367**	-0.684***	-0.482*	-0.363**
	(0.242)	(0.260)	(0.164)	(0.196)	(0.263)	(0.163)	(0.196)	(0.257)	(0.163)
Can read and write but never went to school	1.430***	1.401**	1.020***	1.524***	1.399**	1.012***	1.523***	1.393***	1.016***
	(0.276)	(0.550)	(0.238)	(0.289)	(0.555)	(0.237)	(0.289)	(0.539)	(0.237)
Completed Primary School	1.024***	1.326***	0.959***	1.038***	1.330***	0.960***	1.037***	1.322***	0.960***
	(0.233)	(0.507)	(0.199)	(0.236)	(0.514)	(0.199)	(0.235)	(0.498)	(0.198)
Completed Secondary School	0.675***	1.335***	0.949***	0.675***	1.341***	0.950***	0.675***	1.331***	0.948***
	(0.220)	(0.503)	(0.193)	(0.222)	(0.510)	(0.192)	(0.222)	(0.493)	(0.192)
Completed High School	0.255	0.626**	0.435**	0.248	0.636**	0.445**	0.248	0.626**	0.437**
	(0.208)	(0.319)	(0.182)	(0.210)	(0.323)	(0.181)	(0.210)	(0.315)	(0.182)
Working for a wage/salary	0.091	-0.228	-0.376***	0.089	-0.233	-0.381***	0.089	-0.23	-0.378***
	(0.125)	(0.160)	(0.110)	(0.126)	(0.161)	(0.110)	(0.126)	(0.159)	(0.109)
Participating in agriculture	0.306*	0.589**	0.214	0.297*	0.611**	0.240*	0.294*	0.595**	0.224*
	(0.161)	(0.266)	(0.134)	(0.162)	(0.273)	(0.133)	(0.162)	(0.264)	(0.133)
Doing in services	-0.591***	-1.260***	-1.007***	-0.594***	-1.272***	-1.014***	-0.591***	-1.259***	-1.009***
	(0.157)	(0.449)	(0.143)	(0.158)	(0.459)	(0.142)	(0.158)	(0.441)	(0.142)
No. of children below 5	0.103	0.300**	0.156*	0.107	0.295**	0.148*	0.107	0.296**	0.153*
	(0.091)	(0.139)	(0.080)	(0.091)	(0.139)	(0.079)	(0.091)	(0.137)	(0.079)
hhsize	-0.295***	0.086	-0.675***	-0.298***	0.096	-0.660***	-0.298***	0.09	-0.668***
	(0.114)	(0.132)	(0.102)	(0.116)	(0.133)	(0.101)	(0.115)	(0.132)	(0.101)

hhsize_sqrd	0.019*	0.004	0.034***	0.019*	0.003	0.033***	0.019*	0.003	0.034***
	(0.010)	(0.012)	(0.009)	(0.010)	(0.012)	(0.009)	(0.010)	(0.012)	(0.009)
No. of plots household has use rights and operates	-0.009	0.014	0.018						
	(0.019)	(0.021)	(0.015)						
No. of plots household has use rights, operates and lends out				-0.009	0	0.001			
				(0.019)	(0.020)	(0.015)			
No. of plots household has use rights and borrows							-0.007	0.009	0.012
							(0.018)	(0.020)	(0.015)
urban	-0.422	0.412	-0.341	-0.459	0.434	-0.298	-0.466	0.41	-0.343
	(0.681)	(0.716)	(0.584)	(0.692)	(0.720)	(0.579)	(0.692)	(0.713)	(0.585)
Red River Delta	-0.254	0.912**	0.660***	0.670***	0.948**	0.694***	-0.301	0.307	0.323
	(0.268)	(0.374)	(0.173)	(0.242)	(0.388)	(0.173)	(0.263)	(0.296)	(0.220)
North East	0.389	0.439	0.455**	1.319***	0.491	0.508***	0.344	-0.157	0.127
	(0.245)	(0.295)	(0.191)	(0.273)	(0.306)	(0.192)	(0.233)	(0.262)	(0.205)
North Central Coast	0.263	1.278***	1.168***	1.185***	1.303**	1.187***	0.217	0.667*	0.824***
	(0.281)	(0.496)	(0.206)	(0.288)	(0.509)	(0.205)	(0.278)	(0.366)	(0.233)
South Central Coast	0.514*	1.246***	0.943***	1.437***	1.267***	0.961***	0.470*	0.636*	0.604***
	(0.274)	(0.468)	(0.179)	(0.259)	(0.480)	(0.178)	(0.266)	(0.354)	(0.229)
Central Highlands	0.053	0.092	0.087	0.992***	0.092	0.085	0.026	-0.519	-0.261
	(0.255)	(0.291)	(0.227)	(0.296)	(0.292)	(0.226)	(0.251)	(0.325)	(0.224)
Mekong River Delta	-0.905***						-0.962***	-0.61	-0.344
	(0.317)						(0.313)	(0.371)	(0.244)
North West		0.598	0.331	0.973***	0.638*	0.368			
		(0.374)	(0.246)	(0.315)	(0.383)	(0.245)			
born	0.206	-0.012	-0.009	0.212	-0.006	-0.002	0.209	-0.013	-0.013
	(0.172)	(0.184)	(0.142)	(0.173)	(0.184)	(0.142)	(0.173)	(0.183)	(0.142)
interpreter	0.092	0.649*	0.278	-0.34	0.648*	0.276	-0.34	0.644*	0.276
	(0.251)	(0.346)	(0.210)	(0.239)	(0.348)	(0.210)	(0.239)	(0.341)	(0.210)
_cons	0.687	-2.284**	1.235**	-0.148	-2.308**	1.210**	0.815	-1.672**	1.568***
	(0.587)	(1.033)	(0.531)	(0.637)	(1.048)	(0.529)	(0.598)	(0.852)	(0.503)

Instrument variables

To solve with the initial condition problem, we use a vector of exogenous instruments including pre-sample information such as whether household need to use the interpreters during the survey time, and whether head or her/his spouse born in the surveyed commune and vector of control variables. In this sub-session, we discuss about some major findings related to determinants of poverty status at the initial period. First, age of household head mattered, poor households had younger heads. Second, we found that higher educational level of household increased the probability of becoming poor. Third, the number of land plot did not affect poverty status of households. Last but not least, we put two pre-sample variables in to our models at the beginning period. The results confirms that the poorest households were in ethnic minority groups who even could not communicate in Vietnamese and need to rely on interpreter when participating in the survey. These households own different characteristics from other poor households and therefore, require distinctive intervention to escape from the poverty.

5. Conclusion

Our paper examined the poverty dynamics as well as the determinants of poverty in the case of Vietnam. In order to deal with the initial problem, that causes bias estimator, we use a methodology suggested by Heckman (1988) that estimate the poverty probability at the beginning through a set of exogenous instruments including control variable in the main model and other pre-sample information. The estimators could be obtained through using command redprob in Stata (Steward, 2006). Our paper considers three measures of poor: (i) MOLISA poverty classification, (ii) absolute poverty determined by poverty lines of Vietnam government and the World Bank, and (iii) relative poverty including 25% of poorest households in our sample.

The estimation results, first, show that the poverty lines of Vietnam government and the World Bank has just captured a small poorest group including minority people who cannot communicate in Vietnamese and live in rural area but not reflected the real poverty problem that Vietnam is currently dealing with. Second, the poverty status of a household significantly depends on its poverty status in the past. However, the estimator of lagged poverty status is smaller than zero, the effect of poverty status in previous periods, thus, will be weaker in the long-term and give opportunities for household successfully to escape from the poverty. Third, we also confirm that land as property that could reduce poverty in Vietnam, especially in the rural area where almost people work in agriculture sector.

The poor households in Vietnam are not identical, and therefore, government and other stakeholders should design specific policy for each group in order to obtain successful achievements in poverty reduction process. In addition, since the effect of poverty history will be weak over times, our research results raise another research questions that need to be explored such as ‘After how many years could poor households successfully become escapers?’ and ‘Which intervention is useful to shorten the escape process?’.

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