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RESEARCH

Poverty Dynamics the Structurally and Stochastically Poor in Vietnam

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Abstract: This paper aims to measure poverty dynamics in Vietnam using the most recent Vietnam Household Living Standard Survey (VHLSS) from 2010. Since there are no panel data between the 2010 VHLSS and the previous studies, this study uses the asset approach to estimate the proportion of structurally and stochastically poor. It is found that the proportion of structurally and stochastically poor is 11.1 percent and 9.6 percent, respectively. Nearly half of the poor are the stochastically poor. The proportion of stochastically non-poor, who are non-poor but vulnerable to poverty, is small, at around 3.7 percent.

Keywords: Poverty dynamics, household survey, Vietnam.

1. Introduction

Measurement of poverty dynamics has long been of interest for both development economists and policy makers. The poor is not an homogeneous group. The poor can include the chronically poor who are very poor for a long period, and the transiently poor who experience both poverty and non-poverty years during that period (Hulme and Shepherd, 2003) [1]. Different poverty alleviation programs should be targeted at different poor groups (Baulch and Hoddinott, 2000) [2]. For example, long-term investment in human capital such as education and healthcare (including cash transfers conditional on child education) should be targeted at the chronically poor. Meanwhile short-term programs such as cash transfers and vocational training should be provided for the transiently poor to help them escape poverty quickly and reduce vulnerability.

Vietnam has achieved great success in poverty reduction during the past two decades. The poverty rate decreased from 58 percent in 1993 to 37 percent in 1998, and continued to decrease to 20 percent in 2010[1]. However,

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[1] Estimates based on the Vietnam Living Standard Surveys in 1993, 1998 and 2010.

recently the speed of poverty reduction has been slow (World Bank, 2012) [3]. Economic growth has been lower in recent years. The annual growth rate of GDP during the period 2008-2011 was approximately 6 percent, while this rate was around 8.2 percent annually during the period 2001-2007. To reduce poverty, the Government of Vietnam has implemented a wide range of poverty reduction programs. Measurement of poverty dynamics can provide important information for policies on poverty reduction in Vietnam.

There are several studies on poverty dynamics in Vietnam using panel data from household surveys. There are a large number of household surveys in Vietnam including Vietnam Living Standard Surveys (VLSS) in 1993 and 1998, and five VHLSSs during the period 2002-2010.[2] Glewwe et al. (2002) [4] and Justino and Litchfield (2003) [5] explain the probability of moving out and in poverty of households in the panel data of VLSS 1993 and 1998 using multinomial logit models. Nguyen et al. (2006) [6] examines chronic poverty using panel data of VHLSSs 2002 and 2004. They find that the percentage of chronically poor people has decreased substantially. Recently, Baulch and Vu (2010) [7] examine the factors correlated with chronic poverty using panel data of VHLSSs 2002, 2004 and 2006. They find that demographic and educational variables play an important role in explaining the chronic poverty.

The transition in and out of poverty at a household level is also analysed using panel data in other developing countries. For example, Alisjahbana (2003) [8], Lohano (2009) [9], Imai et al. (2011) [10] and Joshi et al. (2012) [11] all use panel data to investigate causes for poverty dynamics in Indonesia, Pakistan, China and Nepal, respectively. Almost all studies highlight the importance of education as a means to escape from poverty. Investing in education is a good way for rural households in Pakistan to move out of poverty as pointed out by Lohano (2009) [9]. Similarly, the higher the educational level, or in other words the increase in schooling years of household heads become, the less risk there is that households will fall into poverty (Alisjahbana, 2003 [8]; Joshi et al., 2012) [11].

Landlessness and the lack of assets holdings are other causes for poverty in some countries like China and Indonesia. "Cultivated land provides safety nets for those who rely on out-migration to escape in terms of reducing the chance of re-entry into poverty", was concluded by Imai et al. (2011) [10] for the case of China. "Lack of assets holdings is found to be one of the primary determinants of chronic poverty, and transient poverty as it relates to the ability of households to weather "economic shocks" as it relates to the ability of households to weather "economic shocks" as mentioned by Davis (2007) [12] in his study on Bangladesh.

In this study, we will measure poverty dynamics using the most recent VHLSS in 2010. Unlike previous VHLSSs, there is no link between the 2010 VHLSS and a previous VHLSS. It is difficult to measure poverty dynamics using single cross-sectional data, since measurement of poverty dynamics often requires panel data. Jalan and Ravallion (2000) [13] decompose poverty into two components: transient poverty due to the intertemporal variability in consumption, and chronic poverty simply determined by the mean consumption over time using longitudinal data with at least three repeated observations. According to Hulme and Shepherd (2003) [1], a person can be chronically poor if he/she is poor in all the years of interest, while another person can be transiently poor if he/she is poor in some

[2] Until 2010, the VHLSSs were conducted in 2002, 2004, 2006, 2008 and 2010.

years, but non-poor in other years. This definition also requires panel data covering at least two periods.

In this study, a method of poverty dynamics by Carter and May (2001) [14] is applied to decompose poverty into structural and stochastic poverty. This method requires only single cross-sectional data. The paper is structured into four sections as follows. The introduction is followed by the second section, which presents the methodology. Next, the third section presents data and the empirical findings. Finally, the fourth section presents the conclusion.

2. Methodology

Carter and May (1999, 2001) [14, 15] assume that a household i has two time periods. At the time t, the household has asset A_{it} (both physical and human). The household must choose consumption c_{it} and investment I_{it} to maximize their utility, which is a function of consumption. The model is expressed as follows:

$$\max_{\{c_{it}, I_{it}\}} u(c_{it}) \text{ subject to:}$$
$$c_{it} = F(A_{it}, \theta_{it}) - I_{it}$$
$$A_{i(t+1)} = A_{it} + I_{it} - \Theta_{it} \quad (1)$$

There are two main constraints. The first is the budget constraint given by income $F(A_{it}, \theta_{it})$, a function of assets A_{it} and the stochastic income shock θ_{it}. The second constraint shows that the future asset depends on the current asset, investment and shocks Θ_{it}.

The household prefers smoothness rather than fluctuation in consumption over two periods. To smooth consumption, the household can borrow in event of shocks. However, a credit market is not available for the poor, especially in developing countries. Thus, the household has to sell assets to cope with shocks. If a large number of assets are sold, the remaining assets might not be sufficient to generate enough consumption in the next period, and the household can fall into poverty.

Carter and May (1999, 2001) [14, 15] decompose the realized (current) consumption, c_{it} into the three following components:

$$c_{it} = c_{0i} + c(A_{it}) + \varepsilon_{it} \quad (2)$$

The first component c_{0i} is the stable consumption based on permanent income. The second component implies that consumption can depend on the current asset $c(A_{it})$ (the household sell assets in case of shocks and without access to credit), and the third term ε_{it} will become non-zero when the household cannot smooth out shocks (either negative or positive).

A household is defined as poor if its realized consumption is below the money metric poverty line, denoted by C_{PL}. In Carter and May (1999, 2001) [14, 15] , the asset poverty line, A_{PL}, is estimated so that it satisfies the following condition:

$$A_{PL} = \{A \mid \hat{c}(A_{PL}) = C_{PL}\} \quad (3)$$

The asset poverty line A_{PL} is the combination of assets that are expected to yield the level of welfare equal to the poverty line $C_{PL.}$ Once the asset poverty line is estimated, households can be classified into four groups: the structurally poor and the stochastically poor, and the stochastically non-poor and structurally non-poor. Households are defined as structurally poor if their consumption is below the consumption poverty line and their asset level is also below the asset poverty line. Households who are poor in terms of their realized consumption, but have an asset level above the asset poverty line, are defined as stochastically poor. The stochastically non-poor households are those that are non-poor by the consumption poverty line but poor by the asset poverty line. Finally, the structurally non-poor

households are those that are non-poor by both the consumption and asset poverty lines.

3. Empirical results

3.1. Data set

The study relies on data from the most recent VHLSS made in 2010. The survey was conducted by the General Statistics Office of Vietnam (GSO). The survey covered 9,399 households. The sample is representative for the whole country, rural and urban areas, and six geographic regions. The survey contains detailed data on household living standards including basic demography, employment and labor force participation, education, health, income, expenditure, housing, fixed assets and durable goods, and participation of households in poverty alleviation programs.

In this paper, a household is classified as poor if its per capita expenditure is below the poverty line. This poverty line is constructed by the GSO and the WB and is equal to 7863 thousand VND/person/year[3].

3.2. Model estimation

To estimate the stochastic and structural poverty, we have to estimate the asset level and the asset poverty line. This is challenging since there can be a large number of asset items, and many human assets such as education and demography cannot be measured. Equation (3) suggests that we use the predicted expenditure, given observed asset variables, to predict the asset level. More specifically, the first step is to run regression of per capita expenditure on asset variables, which are expected to generate income for the households in the long-term. In the second step, the predicted expenditure per capita is estimated for each household in the sample. This expected expenditure can be regarded as the long-term expenditure which depends on the asset level. Thus it can be a proxy for the asset level of households. The expenditure poverty line can be used as the asset poverty line, since the predicted expenditure is used as the predictor of assets.

Based on the predicted and observed expenditure, households with both the predicted expenditure and observed expenditure below the expenditure poverty line are defined as structurally poor. Households who have a predicted expenditure above the poverty line, but the observed expenditure below the poverty line are classified as stochastically poor. Households who are non-poor by the observed expenditure, but poor by the predicted expenditure, are the stochastically non-poor. The last group of households that have both a predicted and observed expenditure above the poverty line is the structurally non-poor.

Table 1 presents the regression results of expenditure per capita on asset variables. We select important assets, both human and physical, that tend to be unchanged in the short-run. The explanatory variables include geography (regional dummy variables), basic demography, education, land and housing variables. The model is estimated separately for urban and rural areas, since the expenditure pattern is different between the urban and rural areas[4].

[3] The poverty lines are calculated taking account of regional price differences and monthly price changes over the survey period.

[4] Chow-test (F test = 70) rejects the hypothesis that coefficients in the expenditure equation are the same for urban and rural areas.

Table 1: Regression of log of per capita expenditure

Explanatory variables	Urban households			Rural households		
	Coef.	Std. Err.	P > t	Coef.	Std. Err.	P > t
Red River Delta	Based					
Northern Mountains	-0.1821	0.0598	0.002	-0.1811	0.0472	0.000
Central Coast	-0.1202	0.0589	0.042	-0.1203	0.0440	0.006
Central Highlands	-0.0467	0.0592	0.431	-0.0860	0.0501	0.086
Southeast	0.1009	0.0620	0.104	0.1073	0.0627	0.087
Mekong Delta	-0.1363	0.0628	0.030	-0.0059	0.0450	0.895
Gender of head (male = 1)	-0.0458	0.0303	0.131	-0.0652	0.0214	0.002
Age of head	0.0021	0.0012	0.077	0.0006	0.0007	0.380
Household size	-0.0368	0.0083	0.000	-0.0160	0.0054	0.003
Proportion of children (below 15)	-0.3485	0.0597	0.000	-0.4065	0.0363	0.000
Proportion of elderly (above 60)	-0.2132	0.0658	0.001	-0.3053	0.0352	0.000
Ethnic minorities (yes = 1)	-0.3033	0.0538	0.000	-0.3572	0.0259	0.000
Head without education degree	Based					
Head with primary school	0.1282	0.0321	0.000	0.0976	0.0151	0.000
Head with lower-secondary	0.1963	0.0394	0.000	0.1453	0.0206	0.000
Head with upper-secondary	0.3113	0.0456	0.000	0.2078	0.0278	0.000
Head with technical degree	0.3306	0.0419	0.000	0.3295	0.0282	0.000
Head with post-secondary	0.5329	0.0478	0.000	0.4406	0.0423	0.000
Head without spouse	Based					
Spouse without education degree	-0.0614	0.0413	0.138	0.0352	0.0287	0.219
Spouse with primary school	-0.0197	0.0441	0.655	0.1025	0.0296	0.001
Spouse with lower-secondary	0.0037	0.0456	0.935	0.1052	0.0277	0.000
Spouse with upper-secondary	0.0478	0.0529	0.367	0.1975	0.0415	0.000
Spouse with technical degree	0.1113	0.0470	0.018	0.2902	0.0389	0.000
Spouse with post-secondary	0.2611	0.0627	0.000	0.4657	0.0510	0.000
Per capita annual crop land (1000 m^2)				0.0079	0.0042	0.063
Per capita perennial crop land (1000 m^2)				0.0145	0.0037	0.000
Per capita living area (m^2)	0.3129	0.0266	0.000	0.3424	0.0163	0.000
Solid house	Based					
Semi-solid house	-0.3260	0.0298	0.000	-0.0796	0.0221	0.000
Temporary house	-0.4165	0.0516	0.000	-0.1844	0.0249	0.000
Constant	9.1517	0.1215	0.000	8.5993	0.0945	0.000
R-squared		0.564			0.545	
Number of observations		2649			6750	

Source: Estimated from the 2010 VHLSS

The estimations show that per capita expenditure differs substantially across regions even after the observed variables are controlled for. South East is the region with the highest per capita expenditure, followed by the Red River Delta. Northern Mountains is the region with the lowest per capita expenditure. Compared with households in the Red River Delta, which is the base region in the regression, households in Northern Mountains have a per capita expenditure that is 18 per cent lower than that in the Red River Delta.

Household demographic variables have the expected sign. Our finding on dependency ratio and household size is similar to many studies in

developing countries such as Nepal, Bangladesh and Indonesia: higher dependency ratio and large household size is strongly associated with higher probability of poverty of the household (Alisjahbana, 2003 [8]; Davis, 2007; and Joshi et al., 2012 [11]).

Education is an important factor in increasing per capita expenditure. Households with a higher education of the head and the head's spouse are more likely to have higher per capita expenditure.

Empirical studies on the role of agricultural production on poverty in developing countries are quite diverse. Agricultural production, on the one hand, plays "the central role in helping the chronically poor" in China to escape from poverty as emphasized by Imai et al. (2011) [10]. The reliance on agriculture, on the other hand, is the main cause for chronic poverty in Nepal (Joshi et al., 2012; Davis, 2007). In addition, other researchers urge for the need of non-farm employment as one way out of poverty (Lohano, 2009 [9]; Joshi et al., 2012 [11]). In our case of Vietnam, cropland is still positively associated with per capita expenditure of rural households, albeit at a small magnitude. More specifically, an increase of 1000m^2 in per capita annual cropland or per capita perennial cropland is associated with an increase of 0.8 percent or 1.5 percent in the per capita expenditure of rural households, respectively.

3.3. Poverty estimates

Table 2 presents the estimation of the incidence of different poor and non-poor groups in 2010. The poverty rate is 20.7 percent. The proportion of the structurally and stochastically poor is 11.1 percent and 9.6 percent, respectively (the poverty rate is equal to sum of the structural poverty rate and the stochastic poverty rate). The stochastically poor account for 46.4 percent of the poor. The proportion of stochastically non-poor is 3.7 percent. These people have low asset levels, but have a higher consumption than the poverty line. Because of a low asset level, these people are more likely to fall into poverty than other non-poor people with higher asset levels.

Among the regions, Northern Mountains has the highest poverty rate. Most of the poor are structurally poor (or chronically poor). There are also 8.8 percent of people who are found to be stochastically non-poor. Central Highlands is the second poorest region with a large proportion of the structurally poor. Northern Mountains and Central Highlands are regions with high concentration of ethnic minorities. In contrast, South East and the Red River Delta are the richest regions with a low poverty rate and a low stochastic non-poor rate. In these regions, most of the poor are stochastically poor.

Compared with the Kinh majority, people of ethnic minorities have a very high poverty rate. Only 10 percent of the ethnic minority poor is stochastically poor. This means that 90 percent of the ethnic minority poor is structurally poor. There is also a large proportion of stochastically non-poor that is more vulnerable to poverty.

Poverty estimates can be sensitive to the selection of asset variables in the regression of per capita expenditure. To examine this sensitivity, we run two additional models: the first model uses a small set of explanatory variables (only regional dummies, demography and education variables), and the second models use a large set of explanatory variables (using the same explanatory variables as in Table 1, but plus dummy variables of

ownership of television, motorbike, television and electric fan). The poverty estimates based on these models are presented in Tables A.2 and A.3 in the Appendix. Overall, the poverty estimates are very similar to those based on the model reported in Table 1.

Tables 3 and 4 present the poverty estimates for urban and rural households. The poverty rate and the stochastic non-poor rate in urban areas are much lower than those in rural areas. In rural areas the poor are more likely to be structurally poor, while in the urban areas the poor are more likely to be stochastically poor. Rural Northern Mountain and rural Central Highland are areas having the highest structural poverty rates. The non-poor households in these areas are more vulnerable to poverty due to a lack of assets.

4. Conclusion

Poverty dynamics have long been the interest of researchers as well as policy makers, especially in developing countries such as China, India, Indonesia, and Vietnam in the Asia Pacific region and Malawi and Ethiopia in Africa, where the process of poverty reduction and its sustainable results have been at the top of their agenda for a long time. Panel data are often used for analysis of poverty dynamics. In Vietnam, there are several studies on poverty dynamics using panel data from VLSSs and VHLSSs. This paper investigates the poverty dynamics in Vietnam using the recent VHLSS from 2010. Since, there are no panel data between the 2010 VHLSS and the previous studies, this study uses the asset approach of Carter and May (1999, 2001) [14, 15] to estimate the proportion of structurally and stochastically poor.

Table 2: Distribution of population by poverty statuses in 2010 (%)

	Structurally Poor	Stochastic-ally Poor	Stochastic-ally Non-Poor	Structurally Non-Poor	Total	Ratio of stochastically poor over the total poor (%)
Regions						
Red River Delta	1.1	10.8	1.1	87.0	100	90.5
	(0.3)	(0.6)	(0.2)	(0.8)		
Northern Mountains	37.1	7.8	8.8	46.4	100	17.3
	(1.4)	(0.7)	(0.7)	(1.4)		
Central Coast	12.8	10.9	4.7	71.6	100	46.1
	(0.7)	(0.6)	(0.4)	(1.0)		
Central Highlands	25.3	7.4	5.5	61.8	100	22.6
	(1.9)	(1.0)	(1.0)	(2.0)		
Southeast	1.3	5.7	0.9	92.1	100	81.5
	(0.4)	(0.7)	(0.3)	(0.9)		
Mekong Delta	7.0	11.7	4.2	77.1	100	62.7
	(0.7)	(0.6)	(0.5)	(1.0)		
Ethnic minorities						
Kinh majority	2.8	10.1	1.8	85.2	100	78.2
	(0.2)	(0.3)	(0.2)	(0.4)		
Ethnic minorities	59.7	6.7	14.8	18.9	100	10.0
	(1.6)	(0.8)	(0.9)	(1.3)		
Total	11.1	9.6	3.7	75.5	100	46.4
	(0.4)	(0.3)	(0.2)	(0.5)		

Source: Estimated from the 2010 VHLSS. Standard errors are in parentheses.
Standard errors are estimated using bootstrap with 500 replications

Table 3: Distribution of urban population by poverty statuses in 2010 (%)

	Structurally Poor	Stochastic-ally Poor	Stochastic-ally Non-Poor	Structurally Non-Poor	Total	Ratio of sto. poor over the total poor (%)
Regions						
Red River Delta	0.0	4.0	0.3	95.7	100	100.0
	(0.1)	(0.8)	(0.2)	(0.9)		
Northern Mountains	4.7	6.3	2.9	86.1	100	56.9
	(1.3)	(1.4)	(0.9)	(2.1)		
Central Coast	2.3	5.6	0.9	91.2	100	71.0
	(0.6)	(0.9)	(0.4)	(1.2)		
Central Highlands	2.2	5.9	0.7	91.2	100	72.9
	(1.0)	(1.5)	(0.6)	(1.9)		
Southeast	0.0	3.0	0.0	97.0	100	100.0
	(0.3)	(0.8)	(0.1)	(0.8)		
Mekong Delta	2.9	6.9	2.1	88.0	100	70.5
	(0.8)	(1.0)	(0.8)	(1.5)		
Ethnic minorities						
Kinh majority	0.5	4.3	0.6	94.7	100	89.1
	(0.2)	(0.4)	(0.2)	(0.5)		
Ethnic minorities	20.8	15.7	6.8	56.7	100	43.0
	(3.9)	(2.5)	(2.3)	(4.7)		
Total	1.3	4.7	0.8	93.1	100	78.0
	(0.3)	(0.4)	(0.2)	(0.6)		

Source: Estimated from the 2010 VHLSS.

Standard errors are in parentheses. Standard errors are estimated using bootstrap with 500 replications

Table 4: Distribution of rural population by poverty statuses in 2010 (%)

	Structurally Poor	Stochastic-ally Poor	Stochastic-ally Non-Poor	Structurally Non-Poor	Total	Ratio of sto. poor over the total poor (%)
Regions						
Red River Delta	1.6	13.8	1.4	83.2	100	89.4
	(0.4)	(0.9)	(0.3)	(1.1)		
Northern Mountains	43.7	8.1	10.0	38.3	100	15.6
	(1.5)	(0.8)	(0.9)	(1.5)		
Central Coast	16.2	12.7	5.9	65.1	100	43.9
	(1.0)	(0.8)	(0.6)	(1.4)		
Central Highlands	34.5	8.0	7.4	50.1	100	18.9
	(2.5)	(1.3)	(1.3)	(2.6)		
Southeast	3.0	9.2	1.9	86.0	100	75.6
	(0.7)	(1.1)	(0.7)	(1.5)		
Mekong Delta	8.2	13.2	4.8	73.9	100	61.7
	(0.8)	(0.8)	(0.5)	(1.2)		
Ethnic minorities						
Kinh majority	4.0	13.1	2.5	80.5	100	76.8
	(0.3)	(0.4)	(0.2)	(0.6)		
Ethnic minorities	63.1	5.9	15.5	15.6	100	8.5
	(1.6)	(0.8)	(1.0)	(1.3)		
Total	15.3	11.7	5.0	68.1	100	43.4
	(0.5)	(0.4)	(0.3)	(0.6)		

Source: Estimated from the 2010 VHLSS.

Standard errors are in parentheses. Standard errors are estimated using bootstrap with 500 replications

The study found that the proportion of structurally and stochastically poor is 11.1 percent and 9.6 percent, respectively. Nearly half of the poor are stochastically poor. The proportion of the stochastically non-poor is small, at around 3.7 percent. In the rich regions including the South East and Red River Delta, a large proportion of the poor are stochastically poor. However, in the poorest regions including the Northern Mountains and Central Highlands, most of the poor in these regions are structurally poor. In these regions, there is also a high probability to fall into poverty for the non-poor households. The stochastically non-poor also account for a large proportion in these regions. The findings are also similar for the Kinh majority and ethnic minorities, and urban and rural households. The Kinh poor and urban poor tend to be stochastic, while the ethnic minority poor and rural poor tend to be structural.

This finding shows that poor households can be a heterogeneous group. The proportion of stochastically and structurally poor differs for different geographical areas and different demographical groups in Vietnam. This is also true for other developing countries, especially for some developing Asian countries, such as the Philippines, Indonesia, Laos, and Cambodia, with a similar economic structure as Vietnam where the poor is not an homogeneous group, and different poverty alleviation programs should be targeted at different poor groups.

APPENDIX

Table A.1: Summary statistics of variables

Variable	Type	Urban households		Rural households	
		Mean	Std. Dev.	Mean	Std. Dev.
Red River Delta	Binary	0.214	0.410	0.211	0.408
Northern Mountains	Binary	0.126	0.332	0.197	0.398
Central Coast	Binary	0.219	0.413	0.220	0.415
Central Highlands	Binary	0.075	0.263	0.067	0.250
Southeast	Binary	0.197	0.398	0.089	0.285
Mekong Delta	Binary	0.170	0.376	0.216	0.411
Gender of head (male = 1)	Binary	0.653	0.476	0.792	0.406
Age of head	Discrete	49.73	14.07	47.80	14.27
Household size	Discrete	3.820	1.464	3.982	1.602
Proportion of children (below 15)	Continuous	0.194	0.197	0.223	0.215
Proportion of elderly (above 60)	Continuous	0.124	0.251	0.120	0.259
Ethnic minorities (yes = 1)	Binary	0.061	0.239	0.213	0.410
Head without education degree	Binary	0.156	0.363	0.296	0.457
Head with primary school	Binary	0.195	0.396	0.275	0.446
Head with lower-secondary	Binary	0.193	0.395	0.256	0.436
Head with upper-secondary	Binary	0.099	0.298	0.064	0.245
Head with technical degree	Binary	0.194	0.395	0.083	0.275
Head with post-secondary	Binary	0.164	0.371	0.026	0.159
Head without spouse	Binary	0.236	0.425	0.191	0.393
Spouse without education degree	Binary	0.108	0.310	0.263	0.440
Spouse with primary school	Binary	0.160	0.367	0.233	0.423

Variable	Type	Urban households		Rural households	
		Mean	Std. Dev.	Mean	Std. Dev.
Spouse with lower-secondary	Binary	0.164	0.371	0.216	0.412
Spouse with upper-secondary	Binary	0.086	0.280	0.041	0.197
Spouse with technical degree	Binary	0.133	0.340	0.036	0.186
Spouse with post-secondary	Binary	0.113	0.316	0.020	0.142
Per capita annual crop land (1000 m^2)	Continuous	0.212	0.928	0.874	1.626
Per capita perennial crop land (1000 m^2)	Continuous	0.159	1.167	0.375	2.482
Per capita living area (m^2)	Continuous	2.924	0.695	2.749	0.593
Solid house	Binary	0.442	0.497	0.222	0.416
Semi-solid house	Binary	0.510	0.500	0.631	0.483
Temporary house	Binary	0.048	0.214	0.147	0.355
Number of observations		2649		6750	

Source: Estimated from the 2010 VHLSS.

Table A.2: Distribution of population by poverty statuses in 2010 (%) - A small set of explanatory variables

	Structurally Poor	Stochastically Poor	Stochastically Non-Poor	Structurally Non-Poor	Total
Regions					
Red River Delta	0.7	11.2	0.0	88.0	100
Northern Mountains	36.3	8.6	10.3	44.8	100
Central Coast	10.1	13.7	4.2	72.1	100
Central Highlands	24.3	8.5	5.1	62.2	100
Southeast	0.7	6.4	0.6	92.3	100
Mekong Delta	3.2	15.5	1.7	79.6	100
Ethnicity					
Kinh majority	0.9	12.1	0.8	86.2	100
Ethnic minorities	59.4	6.9	16.0	17.8	100
Total	9.4	11.3	3.0	76.2	100

Source: Estimated from the 2010 VHLSS.

Table A.3: Distribution of population by poverty statuses in 2010 (%) - A large set of explanatory variables

	Structurally Poor	Stochastically Poor	Stochastically Non-Poor	Structurally Non-Poor	Total
Regions					
Red River Delta	1.2	10.8	1.0	87.1	100
Northern Mountains	36.4	8.5	7.8	47.3	100
Central Coast	13.1	10.6	4.3	71.9	100
Central Highlands	25.9	6.9	5.9	61.4	100
Southeast	1.5	5.5	0.9	92.1	100
Mekong Delta	7.6	11.1	3.4	77.9	100
Ethnicity					
Kinh majority	3.1	9.8	1.8	85.3	100
Ethnic minorities	59.0	7.3	12.9	20.8	100
Total	11.3	9.5	3.4	75.9	100

Source: Estimated from the 2010 VHLSS.

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