Disparities Between Monetary and Multidimensional Measurements of Poverty

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Abstract

There has been a rapid expansion in the literature on the measurement of multidimensional poverty in recent years. Nevertheless, researchers have paid little attention to the longitudinal aspects of poverty in multidimensional measure. This study will combine the two strands of multidimensional poverty together with monetary poverty in an application to the developing country of Vietnam. Panel household survey data from years 2007, 2008 and 2010 will be employed in the analyses of the prevalence and the dynamics of both measures of poverty. The estimates show that the monetary poor (or non-poor) are not always multidimensionally poor (or non-poor). Additionally, the monetary poverty shows faster progress as well as a higher level of fluctuation than multidimensional poverty. Monetary poverty is also more sensitive to the changes in a household's characteristics than multidimensional poverty. Moreover, improvements in multidimensional poverty are attributed mainly to the reduction in the incidence of poverty rather than the intensity of poverty. The study conveys that the effects of rapid economic growth are greater and more elastic on monetary poverty than on multidimensional poverty.

Keywords: monetary poverty, multidimensional poverty, poverty dynamics.

JEL classification: I31, I32, D31

1.1 Introduction

In the literature, there is increasing discussion of the conceptual and methodological shortcomings of the monetary measurement of poverty and the need for alternative approaches. Following the seminal work by Sen (1979, 1981) on the capabilities approach, there have been extensive investigations on the matter, including theoretical studies by Sen (2000), Tsui (2002), Atkinson (2003), Bourguignon and Chakravarty (2003), Duclos et al. (2006a), and Alkire and Foster (2011) and empirical studies by Klasen (2000), Baulch and Masset (2003), Duclos et al. (2006b), Asselin and Vu (2008), and Günther and Klasen

(2009). They argue that “human lives are battered and diminished in all kinds of different ways” (Sen, 2000: 18), and that “all the issues around poverty are interconnected and demand crosscutting solutions” (UN, 2001: 3). In addition, markets do not exist or function imperfectly (Tsui, 2002; Bourguignon and Chakravarty, 2003; Thorbecke, 2008) and monetary values cannot be assigned to specific attributes (Hulme and McKay, 2008; Thorbecke, 2008). In any case, having sufficient income for the purchase of a basic basket of goods does not directly imply that it is also spent on this basket of goods (Thorbecke, 2008). Moreover, income and consumption might not be good measures of poverty dynamics since they are highly variable over short periods of time and thus tend to report much higher levels of dynamics than do stocks such as health, education, and physical assets (Clark and Hulme, 2005). Furthermore, the measurement of household income or consumption might not be accurate because of data collection and estimation errors (see Deaton, 1997; Dercon and Krishnan, 2000). Hulme et al. (2001) also argue that the multidimensionality and severity of poverty are likely to reinforce one another. From the capability perspective, the improvement in outcomes, or human development, is more important than the changes in inputs, such as income or consumption. Therefore, the analysis of poverty and of poverty dynamics has focused more on assets, stocks and outcomes rather than on flows or inputs (Clark and Hulme, 2005; Hulme and Shepherd, 2003; Carter and Barrett, 2006) and uses non-monetary indicators more extensively (Baulch and Masset, 2003; McKay and Lawson, 2003, Günther and Klasen, 2009).

There is limited but growing amount of literature on the dynamics of poverty over several dimensions of human development. In a study from African countries, Sahn and Stifel (2000) find a declining trend in poverty as measured by a household's wealth, especially in rural areas, which is due to economic openness and the removal of distortions that discriminate against rural areas. A shortcoming of this study is that it has no comparison with the improvement in incomes because of data constraints. In another study, Harttgen, Klasen and Vollmer (2013) compare income growth and assets growth as measured by asset indices in Africa and show that the relationship between the two measures is extremely weak. Comparing income poverty with malnutrition and education deprivations in Vietnam in the 1990s, Baulch and Masset (2003) find that non-monetary indicators generally report higher levels of poverty persistence than do monetary indicators. Additionally, there is more correlation within the same measure of poverty over time than between different measures of poverty in the same time period. Günther and Klasen (2009) find that nutrition and education deprivations in Vietnam show much smaller improvements than income poverty does. They note that there is high heterogeneity in intra-household non-income poverty

dynamics, which would not normally be captured by income poverty measures. A further examination of the disparities between the monetary and multidimensional measurement of poverty is therefore an important contribution to the literature on the many dimensions of poverty as well as for making effective poverty-alleviating policies. This study aims to identify which sub-groups of the population are poor in one or both measures of poverty, which measure of poverty shows faster progress in poverty reduction over time, and what drives the dynamics in both measures of poverty.

This study finds the answers to the research questions in the context of Vietnam although we believe that the approach is applicable to other developing countries. Vietnam has been extremely successful in sustaining a high economic growth rate of more than seven percent per annum during the last two decades. It has also been successful in translating the results of economic growth into poverty reduction by lifting some 35 million people out of poverty since the implementation of a renovation programme. Along with the economic achievements, there have been significant improvements in human capital such as health and education. The country has already attained five out of eight Millennium Development Goal targets including MDG1, MDG2, MDG3, MDG5, and MDG6 and is well on its way to reaching two more targets MDG4 and MDG8 by 2015 (UNICEF, 2012). As is evident from the previous literature and the context of fast economic growth in Vietnam, this study proposes a hypothesis that there are mismatches between monetary and multidimensional measures of poverty in identifying the poor. It is also based on a hypothesis that the monetary poverty has made faster progress over time since economic growth is transferred more directly to the reduction of income poverty. Additionally, it proposes that monetary poverty is more sensitive to the changes in macroeconomic conditions as well as to the changes in a household's assets.

The analyses of multidimensional poverty are based on the Alkire-Foster method and panel data from more than 2000 households in Vietnam collected in 2007, 2008 and 2010 to identify which sub-groups of the population are monetary poor and/or multidimensionally poor and to analyse the dynamics of those two measures of poverty over time. An advantage of this rare data set is that it allows for the analysis of both monetary poverty and multidimensional poverty in the same time period and over time.

This chapter is organised as follows: the introduction is followed by Section 1.2 which presents the data source and analytical strategy. Section 1.3 shows the multidimensional poverty profile across different sub-groups of the population and discusses the mismatch between monetary and multidimensional poverty by sub-groups of the population. After that, Section 1.4 finds the mismatch between the two measures of poverty over time and

Section 1.5 reveals the drivers of poverty dynamics. Section 1.6 discusses the reasoning of the multidimensional measurement of poverty. Lastly, Section 1.7 concludes with the key messages of this study.

1.2 Data and analytical strategy

1.2.1 Data

This study employs panel household data from 2007, 2008 and 2010 collected from the provinces of Ha Tinh, Thua Thien Hue, and Dak Lak in Vietnam in the context of the research project "Vulnerability in Southeast Asia" being run by a consortium of German universities and local research institutes in Thailand and Vietnam (see Klasen and Waibel, 2012). The Vulnerability Surveys cover more than 2000 households located in coastal, plain and mountainous areas. It contains information on household demographics, health, education, economic activities, shocks and risks, employment, financial market access, public transfer, household consumption, assets, and housing conditions.

There have been a number of household surveys in Vietnam including the Multiple Indicator Cluster Surveys (MICS) since 2000, the Demographic and Health Survey (DHS) 2002, and the Vietnam Living Standard Surveys (VLSS) from the 1990s and 2000s. However, these surveys are in the form of either repeated cross-sections such as the MICSs or pseudo-panel such as the VLSSs making them ineffective in analysing the changes of households' and individuals' poverty statuses over time. Furthermore, there is no information on income or consumption in the MICSs and DHSs and little information regarding nutrition in the VLSSs. Therefore, the Vulnerability Surveys provide good data for the analyses in this study.

1.2.2 Analytical strategy

In order to find answers to the research questions, this study first identifies the monetary poor using household consumption levels and then applies the newly proposed Alkire-Foster method (see Alkire and Foster, 2011) to identify the multidimensional poor. It then compares the two measures of poverty across sub-groups of the population using statistical and empirical probit models to find if the two measures identify the same poor group. The dynamics of both measures of poverty are then compared via transition matrices to find which measure recorded that faster progress was being made over time. Subsequently, the study finds the key drivers of poverty dynamics in both measures by estimating probit models and by decomposing the components of the Multidimensional Poverty Index.

1.2.2.1 Identification of the monetary poor

Although households' aggregate income and consumption are available in the data set, this study is based on consumption because it is believed to be a better measure than income (see Coudouel et al., 2002: 30) and poverty lines at the national and international levels are usually set on the basis of consumption. Vietnam's national poverty line is approximately $1.67 a day, or 280 thousand VND per month, which is estimated by the World Bank and General Statistics Office of Vietnam using the Vietnam Living Standard Survey 2008. In addition, we also refer to the international poverty line of $1.25, $2.0 and $2.5 a day as references in some analyses.

1.2.2.2 Identification of the multidimensionally poor

Notation

To identify the multidimensionally poor using the Alkire-Foster method, the first step is to choose dimensions, indicators and weights that will be used in the multidimensional poverty index (MPI). The second step is to set indicator cutoffs and then create deprivation vectors of each indicator and individual. Suppose there are N_t individuals and D indicators in time period t. A person n is deprived in indicator d if his/her attainment is not higher than the indicator deprivation cutoff ($x_{nd} \leq z_d$), x_{nd} ($\in$ R). The weighted sum of deprivations of person n is then counted as:

$$c_n^t = \sum_{d=1}^{D} w_d I(x_{nd}^t \leq z_d) \quad (1.1)$$

where w_d ($\in$ R$_+$) is the weight assigned to indicator d and $\sum_d^D w_d = 1$. The third step is to set a multidimensional poverty cutoff (k); a person is identified as multidimensionally poor if he or she is deprived in at least k dimensions ($c^t_n \geq k$). Thus, the multidimensional headcount ratio, or the incidence of poverty, in period t is now defined as:

$$H^t \equiv \frac{1}{N^t} \sum_{n=1}^{N^t} I(c_n^t \geq k) \quad (1.2)$$

The multidimensional headcount ratio measures the percentage of the population that is multidimensionally poor. Another important measure is the average number of deprivations among the poor, or the intensity of poverty, A^t, which is defined as:

$$A^t \equiv \frac{1}{N^t H^t D} \sum_{n=1}^{N^t} I(c_n^t \geq k) c_n^t \quad (1.3)$$

The multidimensional poverty index (adjusted-headcount ratio), M_0, is then defined as:

$$M_0^t \equiv H^t \times A^t = \frac{1}{N^t D} \sum_{n=1}^{N^t} I(c_n^t \geq k) c_n^t \quad (1.4)$$

which quantifies the weighted average number of deprivations across the population, but censors the deprivations of those who are multidimensionally non-poor.

Dimensions, indicators, deprivation cutoffs and weights

The multidimensional poverty index in this study is constructed with reference to the international MPI that was presented in the Human Development Report 2010. Since people usually live in households and share common resources, it is reasonable identify deprivations and poverty at the household level. If a household is deprived in an indicator then all of its members are considered to be deprived in that indicator as well. Likewise, if a household is multidimensionally poor then all of its members are considered to be multidimensionally poor.

Table 1.1 Dimensions, indicators, cutoffs and weights

Dimensions Indicators	Deprived if…	Relative weight
Health		
Nutrition	Any adult (16 years old or older) has BMI of less than 17	16.7%
Health functioning	Any member suffering serious disease/injury and unable to pursue main occupation for at least four weeks	16.7%
Education		
Schooling	No household member has completed five years of schooling	16.7%
Child enrolment	Any school-aged child is not attending school in years 1 to 8	16.7%
Standard of living		
Cooking fuel	The household cooks with dung, wood, rice leaf or charcoal	5.6%
Sanitation	The household's sanitation facility is not improved, or it is improved but shared with other households	5.6%
Drinking water	The household does not have access to clean drinking water	5.6%
Electricity	The household has no electricity	5.6%
Housing	The walls are of metal/clay/canvas/bamboo and/or the roof is of straw/wood	5.6%
Assets	The household does not own more than one of: radio, television, telephone, bike, motorbike or refrigerator, and does not own a car or tractor	5.6%

Source: Normative choice by authors with reference to MDGs and Human Development Report 2010.

Nutrition and health functioning are chosen as the two indicators of the health dimension. Unlike the MICSs and DHSs used in the Human Development Report 2010, the height and weight of household members are not measured in the Vulnerability Surveys but are subjectively reported by a respondent. In addition, age is not measured in months for children but in years. Therefore, this study focuses on the body mass index (BMI) of adults who are 16 years old or older to identify the deprivation in nutrition instead of using the weight-for-age for children as in the Human Development Report 2010. A household is

deprived in nutrition if any adult has a BMI of less than 17. This lower cutoff, as compared to the cutoff of 18 in UNDP (2010), was proposed by James et al. (1988) and Himes (2000) and applied by Baulch and Masset (2003) and is reasonable for the case of Vietnam where people have lower BMIs in general. Health functioning is used as another indicator of the health dimension because the Vulnerability Surveys have no information on child mortality. A household is deprived in health functioning if any member had any disease or injury during the 12 month reference period and was unable to pursue his or her main occupation for more than four weeks (see Table 1.1).

The education indicators and their cutoffs are the same as those in the Human Development Report 2010. A household is deprived in schooling if none of its member has at least five years of schooling. A household is deprived in child enrollment if any 6 to 14 year old child in the household is not attending school for years one to eight (see Table 1.1).

The six indicators of living standards and their cutoffs are similar to the ones in the Human Development Report 2010. A household is deprived in cooking fuel if its main cooking fuel is dung, wood, rice leaf or charcoal. It is deprived in sanitation if it has no flushing toilet or if it has a flushing toilet but must share it with another household. A household is deemed as being deprived in drinking water if it has no access to clean (tap, purified or rain) drinking water. Since no information is recorded on a household's distance from a water source, this indicator is slightly different from that in the Human Development Report 2010. A household is deprived in electricity if the main lighting fuel is not electricity. This study also focuses on housing conditions instead of flooring because the Vulnerability Surveys have better information on the former. A household is deprived in housing if the main walls of the main house[1] are made from metal, clay, canvas, or bamboo or if the roof of the main house is made from straw or wood. Lastly, a household is deprived in assets if it does not own more than one of the following: radio, television, telephone, bike, motorbike, or refrigerator, and if the household does not own a car or tractor.

The three dimensions are assigned equal weights of 33.3 percent each, and indicators of the same dimension are then assigned equal weights (see Table 1.1). Hence, the two health indicators have weights of 16.7 percent each, the two education indicators also have weights of 16.7 percent, and the six indicators showing the standard of living have weights of 5.6 percent each.

Association among indicators

[1] A household might have more than a house. This study focuses on the main house only.

Generally, dimensions of a household's well-being are correlated with one another. For instance, education is believed to be correlated with health (see Ross and Wu, 1995; Cutler and Lleras-Muney, 2006) and with income (see Becker, 1994; Farrell and Fuchs, 1982; Berger and Leigh, 1989), and income and consumption can sometimes be correlated with dwelling conditions, physical assets, etc. Table 1.14 shows the results of contingency tables, the Cramer's V values, which show the correlation between every two indicators.

In general, correlations between one indicator and another turn out to be quite weak. Nutrition is found to be weakly correlated with other indicators (see Table 1.14) because a person's body mass index depends not only on the household wealth and characteristics at the present moment but, also on their genes, early childhood mental and physical conditions, household health practices, and environmental conditions, i.e. climate, pollution, availability of food stores, etc. (see Powell et al., 2007; Gonzalez et al. 2012). Health functioning is also weakly correlated with other indicators of well-being (see Table 1.14) since it is measured by a proxy of diseases and injuries which is correlated not only with household covariates such as wealth and characteristics but also with exogenous factors such as environment conditions and health shocks, etc. Schooling is moderately correlated with most other indicators; this is in line with Becker's (1994) discussion. However, child enrollment is weakly correlated with other indicators because it has a low deprivation ratio (see Raw headcount ratios in Table 1.12), which is thanks to the universal primary education programme that was started in the 1990s. Among the six indicators of living standard, cooking fuel, sanitation and drinking water all have high deprivation ratios so they are moderately correlated with one another (see Table 1.14). Three other dimensions, namely electricity, housing, and assets are loosely correlated with one another (see Table 1.14), which might be the result of the fact that they have very low deprivation ratios (see Raw headcount ratios in Table 1.12). Since most of the households have access to electricity yet use non-improved cooking fuel and non-improved sanitation facilities there is a negative correlation between electricity, cooking fuel and sanitation (see Table 1.14).

By and large, most indicators are not strongly correlated with one another. However, they are vital dimensions of human development. These dimensions are also mentioned in the Millennium Development Goals (MDGs), such as MDG2 - education, MDG4 and MDG5 - health, and MDG7 - environment, and are also included in the Human Development Index, i.e. education and health. Therefore, it is reasonable to include the ten indictors in the MPI.

Setting a multidimensional poverty cutoff

The 2011 Human Development Report defines a person as being vulnerable to poverty if he or she is deprived of between 20 and 33 percent of the dimensions. This range of cutoff has its logical reasoning as it is believed that if a household is deprived in one or two indicators, i.e. being deprived in 10 or 20 percent of the dimensions, it is able to improve those indicators. Even if the improvement in those indicators is impossible, it is still not bad for overall human development. This study defines a person as being multidimensionally poor if he or she is deprived in at least 30 percent of the dimensions. The poverty rate at this cutoff is approximately equal to the poverty rate measured by consumption at $2.00 in 2007. In addition, the poverty rate at $1.67, as measured by consumption at the national poverty line is approximately equal to the poverty rate measured by the multidimensional method at the cutoff of 38 percent in 2008 (see Table 1.2). Hence, this study will use these two pairs of cutoffs for some of the comparisons.

Table 1.2 Poverty rates at different cutoffs by measure of poverty and year, percent

Monetary poverty					Multidimensional poverty				
cutoff ($)	2007	2008	2010	2007-10	2007	2008	2010	2007-10	cutoff (%)
2.50	57.8	43.3	43.4	-14.4	56.6	51.3	51.6	-5.0	20
2.00	41.9	26.9	27.9	-14.0	41.6	35.8	32.7	-8.9	30
1.67	30.1	16.3	18.9	-11.2	22.0	16.0	17.1	-4.9	38
1.25	13.3	5.6	6.8	-6.5	16.2	11.9	13.2	-3.0	40

Source: Author's calculations based on Vulnerability Surveys in Vietnam

1.3 Disparities between monetary and multidimensional poverty across groups

In order to find if the two measures identify the same poor group, this section will compare the monetary with the multidimensional poverty across sub-groups of the population. The comparison will be supported by statistical evidence at the individual level and by empirical probit models at the household level. For simplicity, monetary poverty is set at the cutoff of $1.67 a day and multidimensional poverty is set at the cutoff of 38 percent, where both measures show poverty headcounts of approximately 16 percent in 2008 (see Table 1.2). Sub-groups of the population are classified by household size, ethnicity, head's education attainment, consumption quintiles, ecological zones, and provincial location. Probit models are defined as:

$$Pr(Y_{it}=1) = \alpha_{it} + \beta_{it}X_{it} + \varepsilon_{it}\,, \qquad (1.5)$$

where $Pr(Y_{it}=1)$ is the probability of being monetary or multidimensionally poor of household i at time period t. X_{it} captures household covariates, α_{it} and β_{it} are parameters that need to be estimated and ε_{it} is the error term. The time period refers to the three survey years

of 2007, 2008 and 2010. Likelihood-ratio tests show that all probit models are significant at the 95 percent level, which mean the hypotheses that "all coefficients in the probit models equal to zero" are rejected. Pseudo R2 of the probit models for being monetary poor are not that small, however those for multidimensional poverty are rather small indicating that the effects of the household and head's characteristics on being multidimensionally poor are less important than those effects on being monetary poor (see Table 1.4).

Table 1.3 The incidence of monetary and multidimensional poverty in 2008, percent

	MN poor	MD non, MN poor	Both	MD poor, MN non	MD poor	Average dep. share	Population share
Household size							
1	11.1	0.0	11.1	32.7	43.8	48.9	0.6
2	9.5	2.2	7.4	25.9	33.3	49.5	6.3
3	9.2	4.1	5.1	10.0	15.1	44.3	10.7
4	9.2	5.7	3.6	8.2	11.8	46.5	24.3
5	15.8	11.7	4.0	7.4	11.4	48.6	25.0
6	21.4	14.9	6.5	8.7	15.3	49.2	16.4
7 +	30.1	21.2	9.0	14.3	23.3	50.3	16.7
Head's education							
None	30.3	13.6	16.6	17.2	33.9	49.5	12.8
Primary	19.0	10.8	8.2	14.2	22.4	49.1	23.6
Middle	14.9	12.1	2.8	8.3	11.1	47.4	43.4
Secondary	9.8	8.3	1.5	7.9	9.5	47.1	15.4
Tertiary	0.0	0.0	0.0	4.0	4.0	43.9	4.9
Head's ethnicity							
Minority groups	34.4	22.9	11.3	11.7	22.7	49.1	19.5
Kinh (majority)	11.9	7.9	4.1	10.3	14.5	48.2	80.5
Income quintile							
First (poorest)	87.6	58.1	29.5	4.3	33.7	49.7	18.7
Second	0.0	0.0	0.0	16.4	16.4	49.1	19.9
Third	0.0	0.0	0.0	15.8	15.8	46.1	20.5
Fourth	0.0	0.0	0.0	8.9	8.9	48.7	20.1
Fifth (richest)	0.0	0.0	0.0	7.0	7.0	46.5	20.8
Province							
Ha Tinh	18.7	13.8	4.9	10.9	15.8°	48.6	35.4
Thua Thien Hue	13.9°	6.7	7.2	11.6	18.8°	49.1	22.2
Dak Lak	15.5°	10.5	5.0°	9.7	14.8	47.8	42.4
Ecological zone							
Coastal	16.1	9.0	7.0	11.7	18.7	49.5	26.4
Plain	15.5	10.0	5.5	10.1	15.6	48.1	36.7
Mountainous	17.2	12.9	4.3	10.2	14.5	47.9	36.8
Average	16.3	10.8	5.5	10.6	16.0	48.4	

Notes: MN poor refers to monetary poor and is based on the threshold of $1.67 a day, MD poor refers to multidimensionally poor and is based on the threshold of 38 percent, non refers to non-poor, Average dep. share refers to average deprivation share and is related to MPI only, ° refers to insignificant difference. Population shares in each column category sum to 100 percent.

Household size has a negative relationship with monetary poverty but a convex relationship with multidimensional poverty. Particularly, people from households of more than five

members have a higher risk of being monetary poor than their peers. People from households of less than three or more than six members have a higher risk of being multidimensionally poor than their counterparts. Consequently, people from middle sized households, having from three to five members, have a lower risk of being poor in both measures (see Table 1.3). These figures are confirmed by empirical results from the probit models, which show that household size has a positive and relatively strong effect on monetary poverty but negative and insignificant effect on multidimensional poverty (see Table 1.4). Additionally, these households experience a lower intensity of multidimensional poverty than their counterparts. This evidence tells us that monetary poor families usually have more members because they have many children and they tend to live together to share their limited resources. Another fact is that monetary poverty in this study is identified on the basis of per capita consumption, which is more likely to indentify people from large sized families as being poorer because it ignores the economies of scale in household consumption (see Deaton and Paxson, 1998). Conversely, small sized families are usually home to single old men or women or old couples who are often deprived in health, education, and some other living standards that makes them have a higher risk of being multidimensionally poor.

The literature argues that the education of household members, especially of the head, has positive spillover effects on other members and hence on overall household's well-being (see Becker, 1967). This study also finds that people from a less educated background, i.e. the head of the household has no schooling or attains primary education only, are more likely to be poor in both measures of poverty. They also have a higher intensity of poverty (see Table 1.3). The poverty rates in both measures and the intensity of multidimensional poverty decrease substantially as the head attains higher education levels. Only four percent of individuals from households where the heads attained tertiary education is multidimensionally poor (see Table 1.3). These figures are also confirmed by the empirical results from the probit models that show that the education attainments of household heads have a strong, highly significant, and negative impact on being poor in all measures of poverty. The effects become much stronger when the head attains higher levels of education (see Table 1.4).

There are gaps between the risks of being poor in each measures of poverty across ethnic groups. Ethnic minority groups account for 16 percent of the three provinces' population and usually live in mountainous and remote areas where the infrastructure is in poor conditions. They also have less access to education, health care services, and markets, thus they are more likely to be poor in each measure of poverty as well as have a higher intensity

of multidimensional poverty (see Table 1.3). Additionally, there are gaps in the risks of being poor in the two measures of poverty in each group. A person from the Kinh background is more likely to be multidimensionally poor than monetary poor. In contrast, a person from one of the ethnic minority groups has a lower risk of being multidimensionally poor than monetary poor (see Table 1.3). These facts are in line with the empirical results from probit models, which show that in each year households from ethnic minority groups have higher probabilities of being multidimensionally poor and much higher probabilities of being monetary poor than their counterparts (see Table 1.4).

Table 1.4 Marginal effects from probit models of being monetary or multidimensionally poor

	2007		2008		2010	
	MN poor	MD poor	MN poor	MD poor	MN poor	MD poor
Household size	0.0513***	-0.00155	0.0310***	-0.0117**	0.0326***	-0.00590
	(0.00634)	(0.00566)	(0.00453)	(0.00499)	(0.00481)	(0.00499)
Minority groups	0.431***	0.113***	0.372***	0.0940***	0.413***	0.0807***
	(0.0352)	(0.0327)	(0.0388)	(0.0299)	(0.0389)	(0.0293)
Primary school	-0.0667**	-0.0929***	-0.0498**	-0.0793***	-0.0727***	-0.0607***
	(0.0310)	(0.0250)	(0.0202)	(0.0208)	(0.0208)	(0.0225)
Middle school	-0.199***	-0.303***	-0.135***	-0.254***	-0.227***	-0.244***
	(0.0331)	(0.0301)	(0.0259)	(0.0275)	(0.0288)	(0.0289)
Secondary+	-0.252***	-0.223***	(omitted)	-0.166***	-0.149***	-0.148***
	(0.0159)	(0.0125)		(0.0113)	(0.0111)	(0.0140)
Coastal	-0.0477	0.0405	0.0141	0.0283	-0.0623***	-0.0105
	(0.0296)	(0.0297)	(0.0239)	(0.0262)	(0.0208)	(0.0242)
Plain	0.0335	0.0133	-0.00368	0.00105	-0.0443**	-0.0373*
	(0.0278)	(0.0252)	(0.0210)	(0.0221)	(0.0202)	(0.0206)
Dak Lak	-0.141***	-0.0212	-0.121***	-0.0572***	-0.166***	-0.00696
	(0.0255)	(0.0255)	(0.0174)	(0.0209)	(0.0177)	(0.0226)
Ha Tinh	0.220***	0.109***	0.127***	0.0441*	0.178***	0.108***
	(0.0308)	(0.0281)	(0.0256)	(0.0242)	(0.0268)	(0.0259)
Observations	1,865	1,865	1,761	1,866	1,866	1,866
Pseudo R2	0.18	0.10	0.19	0.10	0.26	0.09
LR chi2(2)	127.8***	22.6***	93.5***	15.7***	169.9***	24.1***

Notes: MN poor refers to monetary poor and is based on the threshold of $1.67, MD poor refers to multidimensionally poor and is based on the threshold of 38 percent. Omitted categories: the head is the majority (Kinh), the head has no schooling, mountainous area, Thua Thien Hue. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

In addition, the risk of being poor varies substantially across measures of poverty for the same income quintile as well as across income quintiles. A nearly 88 percent of the individuals from the poorest quintile are monetary poor while only about 34 percent of them are multidimensionally poor. People from the second poorest quintile have no risk of being monetary poor but more than 16 percent of them are multidimensionally poor. This pattern is similar to those in the third and fourth quintiles. The richest quintile still has a rather high rate of multidimensional poverty, at 7 percent (see Table 1.3). The fact is that the Vietnamese are still generally poor, more than two fifths of the population live on less than

$2 a day and the whole population lives on an average of $4 a day. Hence, they have a high risk of being deprived in one or several dimensions of human development. The disparity in the poverty profiles suggests that being poor in the monetary measure is not necessary attributed to being poor in the multidimensional measure, and vice versa being poor in the multidimensional measure is not necessary attributed to being poor in monetary measure.

People from different provinces and ecological zones have slightly different risks of being poor in each measure of poverty. Since these differences are statistically insignificant in Table 1.3, the discussion focuses more on the econometric results in Table 1.4. Ha Tinh households have the highest risk of being poor in both measures because the province generally has less advantages than its two peers in economic activities and land fertility, as well as suffers from more natural disasters. Dak Lak households have the lowest risk of being monetary poor since economic activities are more dynamic there than in the other two, which is in part thanks to the coffee industry. However, they do not significantly have a lower risk of being multidimensionally poor than Thua Thien Hue households because the latter group benefited from the development of education, health care, science, and tourism services in the provincial town (see Table 1.4). The insignificant differences in the risk of being poor across provinces in Table 1.3 could be attributed to the differences across ecological zones. Thua Thien Hue households have the lowest risk of being monetary poor, but a number of households in this province are located in coastal areas, particularly the Tam Giang lagoon, that are usually poor in the money dimension as well as in multidimensional measure (see Table 1.3).

In summary, the headcount ratios in both measures of poverty varies significantly across sub-groups of the population, yet there is little variation in the intensity of multidimensional poverty. There is also a high level of mismatch between the two measures of poverty in general as well as across sub-groups. Among those who are monetary poor (16.3 percent of the population), only a third is also multidimensionally poor (5.5 percent of the population). The other two thirds (10.6 percent of the population) are non-poor in the multidimensional measure (see Table 1.3). This matching is smaller than that noted by a review of the literature on poverty by Perry (2002), which finds the matching to be between 40 and 50 percent. Nevertheless, it is bigger than the matching between income poverty and nutrition deprivation found in Vietnam by Günther and Klasen (2009), at 30 percent and 14.5 percent in 1992 and 1997 respectively; these numbers between income poverty and educational poverty are 31 percent and 17 percent respectively. The low matching between the two measures of poverty suggests that being poor in one measure is not necessary attributed to being poor in another. This is in line with the argument that having sufficient income for the

purchase of a basic basket of goods does not imply that it is also spent on this basket of goods (Thorbecke, 2008) and that the measurement of households' income or consumption might not be accurate (Deaton, 1997; Dercon and Krishnan, 2000).

1.4 Disparities between monetary and multidimensional poverty over time

1.4.1 Disparities in the trends of poverty

The poverty rates measured by the monetary and multidimensional methods have in general decreased over time at different cutoffs. Monetary poverty made particularly fast progress over the three year period. At the cutoff of 38 percent for instance, the multidimensional poverty rate decreased by nearly five percentage points while the monetary poverty ratio fell by more than 11 percentage points (see Table 1.2). Poverty reduction in the three provinces was in line with the reduction in poverty at the national level where poverty fell from 16.0 percent to 14.5 percent and to 14.2[2] percent over years 2006, 2008 and 2010 (see GSO, 2009; GSO, 2011a). However, poverty rates in the three provinces were higher than that of the entire country because the three provinces are located in the second and third poorest regions of Vietnam. In studies from Vietnam from the 1990s, Baulch and Masset (2003) and Günther and Klasen (2009) also find faster progress in income poverty reduction than in non-income poverty reduction. These are also consistent with the argument of Clark and Hulme (2005) that flows are more time variant than stocks.

However, there are slight differences in the trends of the two measures of poverty in the first period (2007-2008) and second period (2008-2010), specifically at several poverty thresholds. Monetary poverty at cutoffs of $2.00 a day and below showed a sharp reduction in the first period but a slight increase in the second period (see Table 1.2). The fast reduction in the poverty rate in the first period can be explained by the fast increase in per capita consumption of more than 20 percent. Consumption still grows at the rate of 0.3 percent in the second period yet the poverty rate increased. The fast increase in consumption in the first period could be blamed in part on the high inflation rate of more than 30 percent. Conversely, the slow increase in consumption in the second period could be the result of a lower inflation rate and the economic recession that started in late 2008 that caused a high rate of unemployment and reverse migration. Deflation factors are applied when converting household consumption but they might not have captured all the price changes to household consumption because Vietnamese households spend a large share, nearly 40 percent, of their income on food and food prices increased at a higher rate

[2] These poverty rates are referred to national poverty line estimated by the World Bank and General Statistics Office of Vietnam

than the overall consumer price index did in those years. Poverty rates in that period at the national level showed a lower level of fluctuation. This might be the result of a better measurement of household income and consumption in national surveys, or households in the entire country were affected less by the macroeconomics fluctuation during the period. Additionally, the fast reduction in poverty in the first period and slight increase in the second period in the three provinces are also found in the multidimensional measure at higher cutoffs of 38 percent or more. The discussion of these changes will be presented in Section 1.5.2.

1.4.2 Disparities in the mobility of monetary and multidimensional poverty

The disparities in the mobility of the two measures of poverty are compared via transition matrices over each period of time. The left panel of Table 1.5 shows the transitions of monetary poverty at different cutoffs between 2007 and 2008. The rows show what share of the population was extremely poor, moderately poor, and non-poor in 2007. The columns also show the share of the population belonging to those three ranges. The extremely poor classified in this matrix refers to those who lived on less than $1.48 a day, the moderately poor are those who lived on between $1.48 and $2.46 a day, and the non-poor are those who lived on more than $2.46 a day. Note that these cutoffs refer to the national poverty line of $1.67 and the international poverty line of $2.50 and have been slightly adjusted to match with the multidimensional poverty rate for ease of comparison. The values in the diagonal of this matrix show the shares of the population that stayed in the same poverty statuses over the first period. Similarly, the right panel of Table 1.5 shows the transitions of multidimensional poverty at different cutoffs between 2007 and 2008. For the sake of comparison, poverty cutoffs in this panel should show the same poverty rates as the ones at the cutoffs in the left panel. Hence, the two panels show the same population share in each row.

Table 1.5 Transitions of monetary and multidimensional poverty 2007-2008, percent

MN poor	Monetary poor 2008				Multidimensionally poor 2008				MD poor
2007	Ext.	Mod.	Non.	Total	Ext.	Mod.	Non.	Total	2007
Ext.	7.8	10.3	3.7	21.8	9.7	9.2	3.1	22.0	Ext.
Mod.	2.8	15.0	17.2	34.9	4.5	15.6	14.4	34.6	Mod.
Non.	0.5	5.7	37.1	43.3	1.8	10.5	31.1	43.4	Non.
Total	11.0	31.0	58.0	100.0	16.0	35.3	48.7	100.0	Total

Notes: MN poor refers to monetary poor, MD poor refers to multidimensionally poor. Ext. refers to extremely poor, which refers to the thresholds of $1.48 a day in monetary measure and 31 percent in multidimensional measure. Mod. refers to moderately poor, which refers to the range of $1.48-$2.46 in monetary measure and 23-36 percent in multidimensional measure. Non. refers to non-poor, which refers to $2.46 monetary measure and 19 percent in measure.

The results show that among those who were extremely poor in 2007, accounting for nearly 22 percent of the population, almost 8 percent (in absolute terms) stayed the same and more than 10 percent (in absolute terms) moved up to moderately poor. The numbers for multidimensional poverty are bigger, nearly 10 percent and over 9 percent respectively. Similarly, among those who were moderately monetary poor in 2007, accounting for over a third of the population, 15 percent (in absolute terms) stayed the same in 2008 and more than 17 percent (in absolute terms) escaped poverty. Among those who were moderately poor in multidimensional measure, nearly 16 percent stayed the same in 2008 and more than 14 percent escaped poverty. In addition, more than 37 percent of the population was non-poor in the money dimension but only 31 percent of the population was non-poor in multidimensional measure over that period. Conversely, the share of the population who stayed non-poor in the monetary dimension is larger than that in multidimensional measure, and the share of the population who fell into monetary poverty is smaller than that in multidimensional poverty. These numbers suggest that in that period the poor had a higher mobility while the wealthy had a lower mobility in monetary poverty than in multidimensional poverty. Additionally, there were more people who fell into multidimensional poverty than into monetary poverty.

Table 1.6 Transitions of monetary and multidimensional poverty 2008-2010, percent

MN poor	Monetary poor 2010				Multidimensionally poor 2010				MD poor
2008	Ext.	Mod.	Non.	Total	Ext.	Mod.	Non.	Total	2008
Ext.	9.8	4.2	2.3	16.3	7.6	4.4	4.1	16.0	Ext.
Mod.	6.2	11.7	9.9	27.9	5.9	11.0	11.3	28.2	Mod.
Non.	2.9	9.8	43.2	55.8	3.6	11.0	41.2	55.8	Non.
Total	18.9	25.7	55.5	100.0	17.1	26.3	56.6	100.0	Total

Notes: MN poor refers to monetary poor, MD poor refers to multidimensionally poor. Ext. refers to extremely poor, which refers to the thresholds of $1.67 a day in monetary measure and 36 percent in multidimensional measure. Mod. refers to moderately poor, which refers to the range of $1.67-$2.53 in monetary measure and 23-36 percent in multidimensional measure. Non. refers to non-poor, which refers to the thresholds of $2.53 in monetary measure and 23 percent in multidimensional measure.

In a similar vein, Table 1.6 shows the transition matrix of monetary poverty and multidimensional poverty between 2008 and 2010. Note that the poverty cutoffs in this table are not the same as the ones in Table 1.5, but they are still rather close. The shares of the population who stayed in the same poverty statuses in the monetary measure were larger than the shares of the population who stayed at the same poverty statuses in the multidimensional measure. In addition, the shares of the population who moved forward in the monetary measure were larger among the poor but were smaller among the wealthy. These results suggest that there was a slightly higher forward mobility in the multidimensional than in the monetary measure.

Like the other two counterparts, Table 1.7 compares the mobility of the two measures of poverty for the whole three-year period. It shows that the mobility in monetary poverty was higher among the poor but lower among the wealthy, or the non-poor. This finding is in line with those in Günther and Klasen (2009). Additionally, multidimensional poverty showed a slightly higher downward mobility as compared with the monetary measure.

Table 1.7 Transitions of monetary and multidimensional poverty 2007-2010, percent

MN poor	Monetary poor 2010				Multidimensionally poor 2010				MD poor
2007	Ext.	Mod.	Non.	Total	Ext.	Mod.	Non.	Total	2007
Ext.	8.1	9.8	3.9	21.8	9.0	8.7	4.4	22.0	Ext.
Mod.	3.3	13.7	17.9	34.9	6.0	13.8	14.9	34.6	Mod.
Non.	1.1	6.1	36.1	43.3	2.1	12.1	29.2	43.4	Non.
Total	12.5	29.6	57.9	100.0	17.1	34.5	48.4	100.0	Total

Notes: MN poor refers to monetary poor, MD poor refers to multidimensionally poor. Ext. refers to extremely poor, which refers to the thresholds of $1.48 a day in monetary dimension and 31 percent in multidimensional measure. Mod. refers to moderately poor, which refers to the range of $1.48-$2.46 in monetary measure and 19-31 percent in multidimensional measure. Non. refers to non-poor, which refers to $2.46 in monetary measure and 19 percent in multidimensional measure.

On the whole, the two measures of poverty show different levels of mobility across sub-groups of the population as well as over time. The poor had a higher mobility in monetary poverty in the first and the whole periods but a slower mobility in the second. On the contrary, the wealthy, or the non-poor, had higher mobility in multidimensional poverty. Additionally, all groups showed a more downward mobility in the multidimensional than in monetary measure. The disparities in the mobility between the two measures of poverty reflect the fact that non-monetary indicators usually have slower changes than monetary indicators. Additionally, a high inflation in late 2007 and the economic recession that started in 2008 (see Section 1.5.2) could partly explain the fast improvements in monetary indicators in the first period but their slow improvements in the second. The fast increase in consumption could also explain the more forward mobility in monetary poverty than in multidimensional poverty.

1.4.3 Disparities between the measures of poverty over time

As discussed in Section 1.3, there are disparities between the two measures of poverty in the same time period. This section will discuss the disparities between them over time using transition matrices.

Reverse transitions between the two measures of poverty

The matrix in the upper panel of Table 1.8 (excluding the last two columns) shows whether the transitions in monetary poverty are accompanied by the same transitions in

multidimensional poverty in the period 2007-2008. Likewise, the matrix in the lower panel (excluding the last two columns) shows their companion in the period 2008-2010. The first row of the upper matrix reveals that there was about two thirds of the population that stayed non-poor in the monetary dimension in the first period. Among them, nearly 81 percent stayed non-poor in multidimensional measure, while another 9 percent moved out of it. However, nearly 6 percent fell into multidimensional poverty and more than 4 percent stayed poor in multidimensional measure in 2007-2008. The remaining rows in the table are interpreted in a similar fashion.

Table 1.8 The dynamics of monetary and multidimensional poverty, percent

Monetary poverty trajectory	Population share	Multidimensional poverty trajectory				MPI	ΔMPI
		Non-poor	Rising	Falling	Staying		
1st period (07-08)						2007	(2007-08)
Non-poor	65.9	80.7	9.0	5.6	4.6	0.505	-0.009
Rising	17.8	61.6	16.9	5.2	16.3	0.517	-0.036***
Falling	4.0	58.9	20.6	5.7	14.9	0.501	-0.031***
Staying poor	12.3	41.4	20.6	12.2	25.8	0.504	-0.007
Average		71.6	12.3	6.3	9.7	0.508	-0.012***
2nd period (08-10)						2008	(2008-10)
Non-poor	74.7	81.0	6.5	7.9	4.7	0.481	-0.007
Rising	6.5	61.4	15.9	11.5	11.2	0.510	-0.051***
Falling	9.1	63.4	9.9	12.3	14.4	0.500	-0.010
Staying poor	9.8	43.4	17.3	18.6	20.7	0.508	0.015*
Average		74.4	8.5	9.5	7.6	0.496	-0.004

Notes: Monetary poverty refers to the threshold of $1.67, multidimensional poverty refers to the threshold of 38 percent. Population shares of the same period sum to 100. Values showing four multidimensional poverty trajectories of the same raw sum to 100. The upper matrix: Cramér's V = 0.19 and is significant at 99 percent, the lower matrix: Cramér's V = 0.17 and is significant at 99 percent.

The high values of nearly 81 percent in the first cells of the first rows in the two panels (see Table 1.8) suggest that there was a strong correlation between the transitions of the two measures of poverty over time among the wealthy or the non-poor. Conversely, among those who rose in the monetary dimension, only about 17 percent also rose in multidimensional measure while more than 5 percent fell in the first period. Interestingly, more than 16 percent stayed poor while 62 percent stayed non-poor in multidimensional measure. These dynamics in the second period show a similar pattern to the first. Similarly, among those who fell into monetary poverty, only less than 6 percent also fell in multidimensional poverty while more than 20 percent rose out of it in the first period. These numbers in the second period were around 12 and 14 percent respectively, showing a higher matching between the two transitions. The numbers from these two groups of rising and falling suggest that the transitions out of and into monetary poverty are not usually

accompanied by the same transitions in the multidimensional poverty. The two measures of poverty tended to have a better companion at the bottom, when the companion of the two measures reached 26 percent in the first period and 21 percent in the second period (see Table 1.8).

On the whole, there was a high level of disparity between the dynamics of the two measures of poverty, which also varied across sub-groups of the population. The two measures tended to show the same poverty transitions of an individual if he or she is at the top (is non-poor) or at the bottom (is chronically poor). The correlation between the two dynamics was highest for the wealthy group then came the chronically poor group, after which the correlation was rather low for those who escaped or fell into monetary poverty (see Table 1.8). This suggests that the transitions in monetary poverty do not necessary result in the same transitions in multidimensional poverty and vice versa. This finding is not in line with the argument by Hulme et al. (2001) that the multidimensionality and the severity of poverty are likely to reinforce one another. The disparities in the transitions of the two measures could be the result of the high level of fluctuation in consumption over the period, this is in line with the argument made by Clark and Hulme (2005) that money might not be a good measure of poverty dynamics since it is highly variable over short periods of time. The disparities could also be the result of the variations in the health dimension, which will be discussed in Section 1.5.2.

Table 1.9 Correlation across and within measures of poverty over time

	MD poor 2007	MD poor 2008	MD poor 2010	MN poor 2007	MN poor 2008	MN poor 2010
MD poor 2007	1.00*					
MD poor 2008	0.40*	1.00*				
MD poor 2010	0.33*	0.35*	1.00*			
MN poor 2007	0.26*	0.22*	0.21*	1.00*		
MN poor 2008	0.23*	0.22*	0.18*	0.43*	1.00*	
MN poor 2010	0.25*	0.21*	0.21*	0.41*	0.47*	1.00*

Notes: MN poor refers to monetary poor and is based on the threshold of $1.67. MD poor refers to multidimensionally poor and is based on the threshold of 38 percent, * refers to 99% significant.

The correlation between the dynamics of the two measures of poverty for the poor groups are lower than the correlation between the two measures of poverty in the same time period. This correlation is lower than that found by Whelan et al. (2004) in European countries, which is more than 40 percent. It is even smaller than the correlations between the dynamics of income and non-income indicators, i.e. nutrition and education, found by Günther and Klasen (2009), being rather high for the chronically poor and non-poor groups, which are above 65 percent, and fairly low for the transient poor group, which are in the

range of 15 to 39 percent. Nevertheless, the correlations found in this study are higher than that between the monetary chronic poverty and malnutrition chronic poverty found by Baulch and Masset (2003), which is less than 14 percent. This suggests that the similarity between the two measures of poverty over time is lower than the similarity in the same time period.

This finding is confirmed by correlation tests between the two measures of poverty in the same time period as well as within a measure of poverty over time. There is a strong correlation within both multidimensional poverty and monetary poverty from one year to another. The correlation within multidimensional poverty between 2007 and 2008 is stronger than that of 2008 and 2010 as well as 2007 and 2010. This is in line with the finding from the previous section that there was a higher level of fluctuation in multidimensional poverty in the second period than in the first. The correlation within monetary poverty between 2008 and 2010 was stronger than that between 2007 and 2008 (see Table 1.9). This is explained by the massive change in consumption in the first period and the small change in the second period.

The correlation between monetary and multidimensional poverty in the same time periods is weak and has a declining trend. It is fairly level in 2007 where the Cramer's V[3] is 0.26 and became weaker over 2008 and 2010 with the Cramer's Vs of 0.22 and 0.21 respectively. These numbers suggest that the two measures of poverty are more likely to tell similar stories about poverty in 2007 while they are less likely to do so in the following years. Moreover, the correlation between being monetary poor in one year and being multidimensionally poor in another year also becomes weaker over time. The correlation between being monetary poor in 2007 and being multidimensionally poor 2010 is smaller than that between 2007 and 2008, and they are both smaller than that in the same year of 2007. Similarly, the correlation between being monetary poor in 2008 and being multidimensionally poor in the years 2008 and 2010 show the same pattern (see Table 1.9).

Reverse improvements between monetary poverty and multidimensional poverty

The aim of this sub-section is to find if well-being is still improved when an individual's monetary poverty fluctuates up, down or horizontally. To simplify the comparison, we focus on those who stayed poor in multidimensional poverty in two sub-periods only. The last two columns of Table 1.8 show the MPI in the base year and the change in the MPI over each period for those who stayed poor in multidimensional measure in different monetary poverty trajectories. Note that these are the individuals who stayed poor in the

[3] The Cramer's V is calculated from a contingency table

multidimensional measure so there is no change in the incidence of poverty, thus any change in the MPI is attributed to the change in the intensity of poverty.

In general, most groups make progress in the MPI regardless of whether they are rising, falling or staying in the same status in the monetary dimension. However, the progress is not enough to lift them out of multidimensional poverty. The improvements in the first period are more likely to be significant than those in the second period. This is in line with the fast decrease of the poverty rate in the first period and the slight increase in the second period. In exceptional cases, those who stayed poor in both multidimensional and in the monetary measures experienced a decline in the MPI in the second period. This implies that the poor in both measures of poverty are the major victims of the bad performance of income and in well-being in this period. This also implies that changes in income in the short-term do not necessary positively affect other dimensions.

1.5 Drivers of poverty transitions

1.5.1 Drivers of monetary and multidimensional poverty transitions

The dynamics of monetary and multidimensional poverty might be driven differently by different factors. This hypothesis will be tested by probit models at the household level which are defined as:

$$Pr(Y_{it}=1) = \alpha_{it} + \beta_{it}X_{it} + \varepsilon_{it}\,, \qquad (1.6)$$

where $Pr(Y_i=1)$ is the probability of entry (or exit from) poverty of household i in period t. X_{it} captures the household covariates, α_{it} and β_{it} are the parameters need to be estimated and ε_{it} is the error term. The time periods in this case are 2007-2008 and 2008-2010. Household covariates include the head's ethnicity, and head's education attainment; ecological zones and provincial location are controlled variables. The likelihood-ratio tests show that all probit models are significant at the 90 percent of confidence or higher levels, thus the null hypotheses that “all coefficients in the probit models are zero” are rejected. The pseudo R2 of the probit models for entry and exit from monetary poverty are not very small, however those for multidimensional poverty are small indicating that the effects of the head's characteristics on multidimensional poverty transitions are less important than their effects on monetary poverty (see Table 1.10).

The marginal effects from the probit models show that the dynamics of poverty are correlated with household and head characteristics. Large sized households have a higher probability of falling into monetary poverty and lower probability of moving out of it. They also have a higher probability of falling into multidimensional poverty and their probability

of escaping it is insignificant (see Table 1.10). These are in line with the discussion in Section 1.3 that household size has a negative relationship with monetary poverty but a non-linear relationship with multidimensional poverty.

Old households, or households with older heads, have a lower probability of falling into monetary poverty but a higher probability of falling into multidimensional poverty. In addition, they have a higher probability of escaping monetary poverty but a lower probability of escaping multidimensional poverty (see Table 1.10). Older heads usually have more experience and have had enough time to accumulate assets, which enable them to generate higher incomes. Nonetheless, older heads are less likely to be aware of certain living standards such as particular sanitation practices and the importance of clean water. In addition, the older they get the more health problem they are likely to develop.

Male headed households had a higher probability of falling into poverty between 2008 and 2010 than their counterparts but there is no difference in the advancement between these two groups in the other period (see Table 1.10). Male headed households usually have a larger size which causes them to have a higher risk of being deprived in the health dimension because the deprivation cutoffs of two health indicators are set on the basis of health status of all household members. In addition, in the period of economic recession, increasing livestock diseases, and increasing extreme weather conditions, people might have more health problems.

Ethnic minority households find it harder to escape poverty and have a higher probability of falling into both measures of poverty as when compared with Kinh households. Particularly, the probabilities of the ethnic households' moving out and falling into monetary poverty are larger and at higher levels of significance. Additionally, those probabilities in the first period are higher and at higher levels of significance than those in the second (see Table 1.10). Since the ethnic groups have fewer advantages than the Kinh in accessing education, health care services, and markets, their income and non-income indicators consequently improve slower. Moreover, the Kinh have better access to markets, which enables them to benefit more from economic growth than the ethnic groups, but their improvements in non-income indicators might be not as fast as in income. Lastly, the consequences of the high inflation in 2008 and the start of the economic recession explain for the slower and smaller changes in the second period.

Households with educated heads, i.e. the head attains at least primary school, find it easier to rise from poverty and have a lower risk of falling into poverty than their peers. The effect is even stronger if the head attains middle or secondary school. The differences in the

effects of middle school and secondary school are small and vary across groups and over time. That being said, education is one of the important determinants of a household's well-being (see Becker, 1967), and the higher the education the head attains the more access he or she has to public services, labour and other markets. Therefore, education has positive effects on improvements and prevents households from falling into monetary as well as into multidimensional poverty.

Table 1.10 Marginal effects of monetary and multidimensional poverty transitions

	Monetary poverty				Multidimensional poverty			
	2007-2008		2008-2010		2007-2008		2008-2010	
	Entry	Exit	Entry	Exit	Entry	Exit	Entry	Exit
Household size	0.00762**	-0.0425***	-0.00120	-0.0186	0.00466	0.0232	0.00770*	0.0227
	(0.00320)	(0.0138)	(0.00433)	(0.0177)	(0.00438)	(0.0144)	(0.00466)	(0.0164)
Head's age	-0.000542	0.000244	-0.000518	0.00167	0.00148***	-0.00239	0.00220***	0.000302
	(0.000419)	(0.00164)	(0.000533)	(0.00221)	(0.000556)	(0.00188)	(0.000619)	(0.00201)
Minority groups	0.179***	-0.366***	0.314***	-0.290***	0.0707**	0.00728	0.0454*	-0.153*
	(0.0470)	(0.0732)	(0.0461)	(0.104)	(0.0281)	(0.0800)	(0.0275)	(0.0822)
Head is male	0.0125	0.0193	-0.00547	0.0253	0.00717	0.0495	0.00748	-0.00464
	(0.0128)	(0.0698)	(0.0201)	(0.0906)	(0.0204)	(0.0699)	(0.0215)	(0.0763)
Primary school	-0.0197	0.0283	-0.0343*	0.0827	-0.0370**	0.118*	-0.00474	-0.00304
	(0.0123)	(0.0629)	(0.0183)	(0.0872)	(0.0179)	(0.0671)	(0.0251)	(0.0774)
Middle school	-0.0721***	0.0889	-0.111***	0.280***	-0.0881***	0.287***	-0.0776***	0.185**
	(0.0253)	(0.0635)	(0.0268)	(0.0883)	(0.0281)	(0.0698)	(0.0294)	(0.0846)
Secondary+	(omitted)	(omitted)	-0.0782***	(omitted)	-0.0651***	0.0715	-0.0518**	-0.286
			(0.0120)		(0.0154)	(0.270)	(0.0248)	(0.192)
Non-agriculture	-0.00984	-0.184**	-0.0503***	0.0971	-0.0409**	0.191**	-0.0400**	0.132
	(0.0126)	(0.0867)	(0.0153)	(0.114)	(0.0165)	(0.0923)	(0.0187)	(0.106)
Land area	-0.000306	0.110***	6.08e-05	0.0195	-0.000553	0.0356	-0.00306	-0.00491
	(0.00344)	(0.0347)	(0.000799)	(0.0224)	(0.00449)	(0.0278)	(0.00669)	(0.00739)
Coastal	-0.00549	-0.128*	-0.0320*	0.204**	0.00803	-0.0360	-0.00219	0.0454
	(0.0135)	(0.0714)	(0.0175)	(0.0970)	(0.0218)	(0.0758)	(0.0219)	(0.0818)
Plain	-0.00414	0.0288	-0.0156	0.134	0.000884	0.0123	-0.0370**	-0.00171
	(0.0131)	(0.0603)	(0.0173)	(0.0871)	(0.0179)	(0.0676)	(0.0175)	(0.0737)
Dak Lak	-0.0483***	0.156***	-0.109***	0.176*	-0.0394**	0.0872	0.0227	0.0728
	(0.0121)	(0.0597)	(0.0155)	(0.0957)	(0.0163)	(0.0675)	(0.0219)	(0.0766)
Ha Tinh	0.0509***	-0.0640	0.0613***	-0.276***	-0.0189	-0.0228	0.0632***	-0.126
	(0.0188)	(0.0701)	(0.0210)	(0.0805)	(0.0185)	(0.0727)	(0.0245)	(0.0792)
Observations	1,209	513	1,518	289	1,390	415	1,486	321
Pseudo R2	0.15	0.09	0.18	0.12	0.08	0.09	0.07	0.05
LR chi2(2)	33.5***	8.9***	71.8***	14.7***	5.2*	2.2*	7.72**	4.71*

Notes: Monetary poverty refers to the threshold of $1.67, multidimensional poverty refers to the threshold of 38 percent. Omitted categories: the head is the majority (Kinh), the head is female, the head has no schooling, the head engages in agricultural activities, mountainous area, Thua Thien Hue. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Households from a non-agricultural background where the household head is engaged in non-agricultural activities, generally have both a higher probability of rising out of and a lower probability of falling into poverty. People engaged in non-agricultural activities usually have a better education and higher incomes and thus make faster progress. The effect of the head's labour market participation on exiting monetary poverty in the first

period is unexpectedly negative. This could be attributed to the massive consumption growth in that period, which crowds out the effect of occupation that is considered to be *per se* small because the earning gap between the two job categories is small as well.

Physical assets as measured by land area also play a role in the improvement of households' wealth. It helps households escape poverty more easily in both measures and prevents them from falling into poverty. However, the effects appear to be insignificant in most of the probit models except for the rising out of monetary poverty in the first period. In fact, in some mountainous areas in Ha Tinh and Thua Thien Hue, households in the forest margins are usually poor and are allocated forest from local governments. Yet, forest is still a low value added activity in Vietnam so households there are land rich but wealth poor.

The two provinces of Thua Thien Hue and Ha Tinh are on the coastline and frequently suffer from extreme weather conditions such as storms, floods, and heat waves. However, being located in the highland, Dak Lak households suffers frequent droughts, which usually come slowly and are thus much less destructive and less likely to cause multiple losses than the short duration events of storms and floods. In addition, economic activities are more dynamic in Dak Lak which is due in part to the coffee industry and also in part to the fact that a large share of the population in Dak Lak are immigrants who have greater incentives to move forward than their peers in other two provinces. Compared to Ha Tinh, economic activities in Thua Thien Hue are more dynamic owing to the development of the tourism sector and industrial parks which create job opportunities for a number of people. Therefore, Dak Lak households have the highest probabilities of escaping both types of poverty, then come Thua Thien Hue households, while Ha Tinh households come in last. The probabilities of moving out of poverty also show the same pattern for the three provinces (see Table 1.10).

1.5.2 Drivers of multidimensional poverty transitions

Incidence and intensity drivers

The changes in multidimensional poverty will be decomposed to find out what the contribution they had on the incidence and intensity of poverty. As an extension of the Alkire-Forster method, the percentage change in the MPI, or M_0, over the period of time from *t-a* to *t* is defined as $\Delta\%M_0^t \equiv (M_0^t - M_0^{t-a})/M_0^{t-a}$, as are the percentage changes in the incidence and intensity of poverty (see Apablaza and Yalonezky, 2011; Roche, 2013). Then we have:

$$\Delta\%_a M_0^t = \Delta\%_a H^t + \Delta\%_a A^t + \Delta\%_a H^t \cdot \Delta\%_a A^t \quad (1.7)$$

A percentage change in the MPI can be decomposed into the percentage change in the number of multidimensionally poor, the percentage change in the average number of deprivation of the multidimensionally poor, and a multiplicative effect.

Table 1.11 shows the changes in the incidence of poverty, the intensity of poverty, and in the MPI over the two sub-periods 2007-2008 and 2008-2010 and for the whole period. It also shows how the incidence and intensity contribute to the changes in the MPI at the cutoff of 38 percent. There were strong improvement made in the incidence of poverty and in the MPI over the first period but the incidence of poverty increased slightly over the second period. Despite this fact, there was still an improvement in the intensity of poverty in both sub-periods, albeit a slow one. The changes in the MPI in both sub-periods and the whole period were mainly attributed to the change in the incidence of poverty, at nearly 92 percent, while only 8 percent was attributed to the change in the intensity of poverty. The results suggest that there was a reduction of the number of multidimensionally poor in Vietnam over the three years but little improvement was made among those who stayed poor. The reason why there is a reverse trend in poverty in the second period and changes in the dimensions of the MPI will be discussed in the following section.

Table 1.11 Changes in incidence and intensity of poverty

Year	Absolute value			Period	Contribution to the changes in MPI				
					Absolute contribution			Relative con.	
	H (%)	A (%)	MPI		ΔH	ΔA	ΔMPI	H (%)	A (%)
2007	22.0	48.9	0.108	2007-08	-0.029	-0.001	-0.030	97.1	2.9
2008	16.0	48.4	0.078	2008-10	0.005	-0.001	0.004	125.9	-25.9
2010	17.1	47.8	0.082	2007-10	-0.024	-0.002	-0.026	91.9	8.1

Note: Multidimensional poverty refers to the threshold of 38 percent

Dimensional drivers

Apparently, the dynamics of multidimensional poverty are attributed to the changes in deprivations of the indicators. Raw headcount ratios[4] show in general that nutrition, health functioning, and the three living standards of cooking fuel, sanitation, and drinking water had the highest deprivation ratios while education and the three remaining living standards showed remarkable achievements. There were also improvements in most indicators, especially in cooking fuel, sanitation and drinking water. However, fluctuations were found in health functioning and particularly in nutrition, the deprivation ratios increase slightly over the two sub-periods. This makes a slight increase in the multidimensional poverty rate between 2008 and 2010 because nutrition contributes a large share (nearly a fourth) to the

[4] Raw headcount ratio refer to the share of the population being deprived in an indicator

MPI (see Table 1.12). Since cooking fuel, sanitation and drinking water have high deprivation ratios, and the two health indicators are assigned high weights, these five indicators contribute a big share of nearly 84 percent to the overall MPI.

Table 1.12 Indicator deprivations and their changes, percent

Indicator	Raw headcount ratio (%)			Contribution to MPI	Change in raw head count ratio 2007-2008		2008-2010	
	2007	2008	2010	(in 2010)	Entry	Exit	Entry	Exit
Nutrition	27.4	28.1	29.6	24.6	-28.1	45.6	-45.6	51.5
Functioning	30.3	21.7	26.0	23.1	-57.9	53.9	-60.0	64.1
Schooling	11.1	10.2	8.8	8.2	-10.5	9.8	-7.0	0.9
Child enrollment	5.1	4.9	5.1	4.9	-12.9	17.6	-7.3	11.2
Cooking fuel	82.8	80.0	68.3	12.6	-0.6	1.1	-9.5	-4.8
Sanitation	79.2	76.8	66.3	11.8	-5.7	0.3	-13.1	-8.7
Drink water	81.1	75.8	69.7	11.7	-8.2	3.1	-18.1	-1.4
Electricity	2.2	1.1	1.1	0.1	-1.9	0.0	-0.8	1.3
Housing	7.2	6.0	5.7	1.1	-9.6	5.3	-5.1	1.1
Asset	12.4	9.3	6.6	1.9	-18.2	3.6	-11.6	3.4
Population share					12.9	6.2	8.6	9.6

Notes: Functioning refers to health functioning. Values in the same column "Contribution to MPI" sum to 100

Table 1.12 displays raw headcount ratios for the entire population by indicator and year in the first three columns, the contribution of each indicator to the overall MPI in 2010 for the entire population in the fourth column, and the differences in raw headcount ratios between the end and beginning of each period for those who entered and those who exited poverty by indicator in the last four columns. Among the ten indicators, nutrition and health functioning are the two key drivers of multidimensional poverty transitions. Among those who entered poverty in the first period, more than 28 percent fell into deprivation of nutrition and nearly 58 percent fell into deprivation of health functioning. For those who exited poverty in the second period, nearly 46 percent escaped deprivation of nutrition and almost 52 percent escaped deprivation of functioning. Similar changes are also found in the second period, except in the case of cooking fuel, sanitation, and drink water, which still show strong improvements despite the overall MPI showing a fall into poverty.

1.6 The robustness of the MPI

In order to support the discussion of the robustness of the current version of the MPI (MPI-1), this version is compared with four other versions of the MPI as well as with monetary poverty. In the second version, MPI-2, health functioning is replaced by health feeling. A household is indentified as being deprived in health feeling if any member was sick in the reference period of 12 months. All the indicators of MPI-3 are the same as MPI-1 but are

assigned equal weights, 10 percent each. Two health indicators are excluded from MPI-4 and two remaining dimensions are given a weight of 50 percent each. The MPI-5 replaces the health dimension by monetary poverty at the threshold of $1.67 a day (see Table 1.13). Each additional version of the MPI is then tested for its correlation with MPI-1 and monetary poverty.

Thus, the health dimension has a smaller weight in MPI-3 and MPI-4 than in MPI-1, consequently making poverty rates measured by MPI-3 and MPI-4 smaller than the poverty rate measured by MPI-1 (see Table 1.13). In addition, the correlation tests show that all the Pearson's chi-square values are significant at the 99 percent of confidence level. This implies that each version of the MPI is correlated with MPI-1 and with monetary poverty. Cramer's Vs show MPI-1 is weakly correlated with monetary poverty, so are MPI-2, MPI-3 and MPI-4, with the exception of MPI-5 which is strongly correlated with monetary poverty because consumption poverty is included as a dimension. MPI-2 and MPI-3 have a strong correlation with MPI-1 but MPI-4 and MPI-5 do not (see Table 1.13). These results suggest that any multidimensional measure of poverty has a low matching with the monetary measure regardless of how the MPI is measured. Differently put, being poor in the monetary dimension is not always correlated with being poor multidimensionally. Among the five versions of the MPI, the MPI-1 is the most reasonable because the three vital dimensions of human development are assigned equal weights and the monetary dimension is not included because the main purpose of the MPI is to double check with the monetary measure of poverty.

1.7 Conclusion

This study uses panel household data from three provinces in Vietnam applied to the Alkire-Foster method to investigate the achievements in human development in the monetary measure as well as multidimensional measure. The two measures of poverty are compared in the same time period to find if they identify the same poor groups. They are also analysed over time to find which measure shows faster progress and the reasons behind that by examining the drivers of the poverty transitions.

The results show that there is much disparity between the monetary and multidimensional measures of poverty. Also, the disparity varies across sub-groups of the population depending on households' characteristics and their access to markets. Those who have better access to markets and public services benefit more from economic growth and perform better in the monetary dimension. However, their performance in the multidimensional measure has a tendency to be less impressive. These facts imply that the results of economic

growth are transferred more directly to the reduction in income poverty during the early years of development. The increase in income is necessary but not sufficient for the improvements in non-income indicators, which usually require a longer amount of time and additional efforts. These findings confirm the arguments made by Tsui (2002), Thorbecke (2008), Deaton (1997), and Dercon and Krishnan (2000) that monetary is not a good measure of poverty.

Although both the monetary dimension and multidimensional measure of well-being have made good progress over time, the former has made faster progress than the latter. Particularly, the poor have made faster progress but with more fluctuations in the monetary dimension than in multidimensional measure. Conversely, the non-poor show more fluctuations and more downward mobility in the multidimensional poverty as compared to the monetary poverty. These disparities tell us that incomes of the poor are highly variable with changes in macroeconomic conditions while non-income indicators of the wealthy have a tendency to become worse in the context of poor economic performance. Additionally, during the period of economic recession and the consequence of high inflation in the first sub-period, health became worse in the second sub-period. These results have some agreement with Clark and Hulme (2005) that income is highly variable over short periods of time.

Furthermore, monetary poverty is more sensitive to the differences in household characteristics than the multidimensional one is. This suggests that moving out of monetary poverty is easier than out of multidimensional poverty, and that being successful in escaping monetary poverty does not necessary mean that success in multidimensional poverty will follow. Moreover, the transitions in the MPI are driven more by the change in the incidence rather than by the intensity of poverty. They are also driven more by the changes in deprivation of the two health indicators nutrition and health functioning. These facts suggest that there has been little improvement in the non-income indicators among the poor community.

The findings from this study suggest that poverty alleviating policies should pay more attention to the improvement in the non-income indicators which have shown slower progress during the last years. The policies should particularly pay attention to the improvements in the health indicators of income poor households, whose multidimensional index has changed little during the last years. However, this does not mean that little attention should be paid to the monetary non-poor since they have a rather high risk of being multidimensionally poor.

This study investigates the disparities between the two measures of poverty over a short period of time in a small sample of three provinces. Embarking from the notion that non-income indicators usually take time to improve, further study on this issue might extend to a wider range of time and apply to a larger sample size and might include more indicators such as employment and access to financial markets to the MPI.

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Appendix

Table 1.13 Different versions of MPI

	MPI-1	MPI-2	MPI-3	MPI-4	MPI-5
Indicators and weights					
Monetary poor	0	0	0	0	33.3
Health feeling	0	16.7	0	0	0
Nutrition	16.7	16.7	10	0	0
Health functioning	16.7	0	10	0	0
Schooling	16.7	16.7	10	25	16.7
Child enrollment	16.7	16.7	10	25	16.7
Cooking fuel	5.6	5.6	10	8.3	5.6
Sanitation	5.6	5.6	10	8.3	5.6
Drink water	5.6	5.6	10	8.3	5.6
Electricity	5.6	5.6	10	8.3	5.6
Housing	5.6	5.6	10	8.3	5.6
Assets	5.6	5.6	10	8.3	5.6
Poverty rate in 2008 at cutoff of 38 %	17.1	13.4	12.0	8.2	14.4
Correlation with					
MPI-1		0.67*	0.71*	0.39*	0.25*
Monetary poor	0.21*	0.21*	0.26*	0.32*	0.97*

Notes: Values in the first and second panels are in percent, Cramer's Vs are in the third panel, * refers to 99% significant.

Table 1.14 Associations between indicators, 2010

	Nutrition	Functioning	Schooling	Child enrollment	Cooking fuel	Sanitation	Drink water	Electricity	Housing	Asset
Nutrition	1.00									
Functioning	0.13	1.00								
Schooling	-0.03	-0.03	1.00							
Enrollment	-0.01	0.02	0.11	1.00						
Cooking fuel	0.11	0.14	0.13	0.10	1.00					
Sanitation	0.03	0.03	0.10	0.08	0.39	1.00				
Drink water	0.03	0.04	0.02	0.00	0.12	0.26	1.00			
Electricity	0.01	-0.01	0.03	-0.02	-0.07	-0.05	0.01	1.00		
Housing	0.03	0.00	0.08	0.02	0.09	0.13	0.03	0.04	1.00	
Asset	0.03	0.01	0.32	0.08	0.14	0.15	0.05	-0.01	0.18	1.00
MN poor	0.09	0.03	0.18	0.15	0.28	0.25	0.06	0.00	0.16	0.24

Notes: Functioning refers to health functioning, enrollment refers to child enrollment. MN poor refers to monetary poor and is set at the threshold of $1.67 a day. Values in this table are Cramer's Vs, and are significant at 99 percent of confidence.