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False Positives or Hidden Dimensions

What can monetary and multidimensional measurement tell us about child poverty?

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-Abstract-

A widely used division between poverty measures is that of monetary versus multidimensional measures. This division is based on conceptual and ideological underpinnings as well as empirical and analytical outcomes. Comparisons of the use and outcomes of these methods have shown that they predominantly provide different pictures of poverty in terms of figures of overall levels of poverty as well as groups of poor individuals. This paper adds value to the longstanding and ongoing debate on poverty measurement by comparing the use of a monetary and multidimensional poverty measurement with a special focus on children and extending the empirical analysis beyond conventional methods. In addition to investigating whether overall poverty outcomes or groups of identified poor children differ when using two different poverty measures, we also investigate the drivers underlying these differences. Findings confirm a considerable degree of misidentification when using monetary and multidimensional poverty measurement. Correlation between monetary and multidimensional child poverty is limited and both poverty measures prove to be inadequate to predict poverty in terms of the other poverty measure. An analysis of the groups of poverty suggest that certain demographic groups of children are captured disproportionately by monetary and multidimensional poverty measures and that there are underlying factors that in- or decrease a child's probability to belong to a specific poverty group.

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Introduction

The debate on the definition of poverty and the approaches to conceptualize and measure it is longstanding and remains on-going. What is poverty? How does it manifest itself? And how can it be measured? These are questions that have engaged and still occupy scholars since Rowntree's seminal work in the beginning of the 20th century (Alcock 2006). A division of poverty approaches that is often made within this debate is that of monetary versus multidimensional approaches, each with their own advantages and shortcomings. While some scholars focus the discussion on the theoretical and ideological underpinnings of the approaches, others have investigated the use of different poverty approaches in more empirical or analytical terms. As a result, it is widely established that different approaches do not only differ in terms of

their conceptual foundations (see e.g. Laderchi 1997, Ruggeri Laderchi, Saith and Stewart 2003) but also with respect to empirical outcomes (see e.g. Klasen 2000 Perry 2002, Baulch and Masset 2003, Bradshaw and Finch 2003, Maltzahn and Durrheim 2007, Wagle 2009). Despite the range of evidence on the topic, the majority of empirical studies do not move beyond the notion that the degree of overlap in poverty outcomes is limited and biased towards different groups in society. Little analysis has been undertaken to assess the factors and dynamics underlying this limited degree of overlap.

The issue of child poverty remains a hidden element and under-prioritized despite the wide acknowledgment that child-focused policy analyses are crucial to account for a number of issues (see Ben-Arieh 2000, Minujin et al. 2005, Roelen et al. 2009a). Children hold a special position within the household structure due to their high dependency on others for the distribution of basic needs (e.g. White, Leavy and Masters 2003), which are in turn different from the basic needs of adults (e.g. Waddington 2004). Moreover, poverty often manifests itself as a vicious circle, causing children to be trapped in poverty from birth onwards (e.g. Corak 2006). Despite the wide acknowledgment of the importance of child-focused poverty measurement and analysis and the existing range of literature on the measurement of child poverty using monetary and multidimensional methods, an in-depth analysis of whether and how the use of such two measures leads to different results with respect to child poverty is, to our knowledge, limited[1].

This paper analyzes the use of two distinct poverty approaches with respect to specifically children. We use the Vietnam Household Living Standards Survey (VHLSS) 2006 to investigate the outcomes for child poverty when measuring poverty using a monetary versus multidimensional approach on the basis of a broad set of methods. In addition to considering the degree of overlap or mismatch, we also investigate underlying dynamics that could explain potential differences in outcomes. The remainder of the paper is structured as follows: firstly, we discuss previous comparative research on monetary and multidimensional poverty measures and outline the monetary and multidimensional approaches used in this study. Next, the

[1] Bastos, Fernandes and Passos (2004) find differences in outcomes when using an income or deprivation perspective for the measurement of child poverty in Portugal but do not draw any conclusions with respect to the implications for the academic or policy debate.

data and methodology are described in detail. Thirdly, we compare the use of the monetary and multidimensional approaches in terms of child poverty. This is followed by a more in-depth analysis to gain an understanding of the extent to which one poverty measure could serve as a proxy for the other. In the fifth section, we investigate characteristics and micro-determinants associated with a child's risk to be identified as exclusively monetary or multidimensionally poor or as both. Finally, we draw conclusions on the basis of our findings.

Monetary and Multidimensional Child Poverty

The division between monetary and multidimensional concepts is commonly made within the area of poverty measurement and the analysis of one or both types of approaches has been the subject of numbers previous studies. Whilst some scholars have focused their research on the underlying conceptual and theoretical foundations of poverty measures (see e.g. Sen 1976, 1982, 1993, Nussbaum 1992, 2000, Ravallion 1994, Laderchi 1997, Ruggeri Laderchi, Saith and Stewart 2003, Thorbecke 2008), others have analyzed poverty measurement from an empirical or applied perspective (see e.g. Klasen 2000, Perry 2002, Bourguignon and Chakravarty 2003, Baulch and Masset 2003, Bradshaw and Finch 2003, Bastos, Fernandes and Passos 2004, Wagle 2009), largely focusing on the investigation of similarities or differences of poverty outcomes using different types of poverty measurement. Findings in these studies generally suggest that the use of monetary and multidimensional poverty measures results in different pictures of poverty, pointing towards modest, if not limited, overlap of results (see Laderchi 1997, Klasen 2000, Perry 2002, Baulch and Masset 2003, Sahn and Stifel 2003, Bastos, Fernandes and Passos 2004, Whelan, Layte and Maitre 2004, Wagle 2009). A short account of conceptual and theoretical considerations underlying both approaches is provided below.

Whilst monetary definitions refer to the measurement of poverty on the basis of income or expenditures, multidimensional measurement incorporate a broad base of attributes that are assumed to reflect the state of poverty. Money-metric poverty measurement was and remains the most widely used method for poverty analysis world-wide (Redmond 2008, Ruggeri Laderchi et al. 2003, Layte et al. 2001) and is based on the rationale that individuals with a certain degree of purchasing power are able to fulfill their basic needs (Thorbecke 2008, Tsui 2002). However, there are a

number of drawbacks of the monetary approach, especially in terms of the measurement of child poverty. Its underlying rationale assumes that all attributes for the fulfillment of basic needs can be purchased on markets and expressed in monetary terms. However, in many instances those markets do not exist or function imperfectly (Thorbecke 2008, Bourguignon and Chakravarty 2003, Tsui 2002) and monetary values can not be assigned to specific attributes[2] (Thorbecke 2008, Hulme and McKay 2008). Furthermore, when individuals or households have sufficient income for the purchase of a basic basket of goods, it does not directly imply that it is also spent on this basket of goods (Thorbecke 2008). Also, income or consumption is predominantly measured at one point in time, masking seasonal variability (Sahn and Stifel 2003) or at the household level, not capturing intra-household distribution (Hulme and McKay 2008). Hence, one has to rely on equivalence scale methods to infer conclusions for individuals within the households, including children. Finally, children are not economic actors themselves and therefore not able to generate income to sustain their own livelihood. Monetary indicators would thus not adequately reflect children's state of poverty (White, Leavy and Masters 2003). As a response to these conceptual and technical drawbacks, alternative general poverty approaches have been developed in a multidimensional sphere (Maltzahn and Durrheim 2007). Amartya Sen was one of the first scholars to propose an approach including other aspects than (merely) income that were considered to better reflect the state of poverty (Sen 1976, 1979). Consequently, the field of multidimensional poverty measurement has seen a wide expansion, including Sen's capability approach, basic needs approaches (Streeten 1981, 1984) or social exclusion methods (Marlier, Atkinson, Cantillon and Nolan 2007). Recent child poverty studies have also focused on more multidimensional aspects of poverty (see Gordon et al. 2003, Bradshaw et al. 2006, Noble et al. 2006). Although the development of multidimensional poverty measurement largely resulted from the conceptual and theoretical drawbacks inherent to the monetary poverty approach (Maltzahn and Durrheim 2007), the multidimensional poverty measurement also holds a number of disadvantages. Inherent to the construction of a multidimensional poverty measurement is the translation of concept into an operational measure (Wagle 2009) and thereby choices related to the conceptual framework, domains and indicators (Laderchi 1997, Klasen 2000, Alkire and Foster 2008, Roelen et al. 2009). These choices are often subject to

[2] Consider attributes such as literacy, numeracy, life expectancy, social participation and information.

value judgments and context-specific and implicit choices make multidimensional poverty estimates susceptible to misinterpretation (Roelen et al. 2009) and controversy (Klasen 2000). Other contentious issues that need to be tackled when constructing a multidimensional poverty measure include the weighting scheme for domains and indicators as well as the construction of an aggregate poverty index (see Klasen 2000, Nolan and Whelan 2007, Alkire and Foster 2008).

Following the seminal work in the 1970's by Sen (1976), the poverty debate has seen a "general move […] away from the view of income as the sole measure of poverty […] (Maltzahn and Durrheim 2007). Given a few exceptions (e.g. Maltzahn and Durrheim 2007), previous studies have indicated that monetary poverty is weakly correlated with alternative dimensions of poverty and thus not an appropriate proxy for poverty in multidimensional terms (De Neubourg et al. 2009). Research in empirical terms has focused primarily on the analysis of size and group differences using different poverty approaches. A few examples highlight the main line of findings. Wagle (2009) finds that monetary poverty versus capability approaches point towards differences with respect to the magnitude and demographic profile of poverty in the United States. Findings by Baulch and Masset (2003) suggest that chronic poverty in Vietnam is more persistent in terms of deprivation with respect to malnutrition and education than in terms of monetary poverty. An exploration of poverty and deprivation in South Africa by Klasen (2000), suggests that expenditure versus deprivation-based poverty measures capture different groups in society despite a strong overall correlation between expenditures and deprivation levels. Findings from Bradshaw and Finch (2003) for Britain underscore the limited overlap in poverty groups by concluding that "[…] the people who are defined as living in poverty by different measures of poverty are different". Its far-reaching policy implication is an important reason that this research topic has been the subject of a range of previous work and remains to be of utmost interest and importance is. If different approaches to poverty indeed draw different pictures of poverty and capture different groups of poor, the policy response to poverty is highly respondent to the poverty measure used (Laderchi 1997, Bradshaw and Finch 2003, Sahn and Stifel 2003, De Neubourg et al. 2009). This paper adds value to the debate in two ways. Firstly, it presents a thorough analysis of the overlap and mismatch of monetary and multidimensional child poverty applied to the case of Vietnam, validating previous research and providing new

insights. Secondly, this paper takes the analysis one step further and investigates the drivers of the mismatch between monetary and multidimensional child poverty.

Data and Methodology

Data

The data used for this study is the Vietnam Households Living Standards Survey (VHLSS) from 2006. This household survey is based on the former Vietnam Living Standards Survey (VLSS) but employs a bigger sample size and is to be conducted every other year. The VLSS was conducted in 1993 and 1998 and the VHLSS from 2002 onwards every second year by the Government Statistical Office (GSO), following the World Bank's Living Standards Measurement Survey (LSMS) methodology. The VHLSS survey samples from 2002 to 2010 are drawn from a master sample, which is a random sample of the 1999 Population Census enumeration areas. The VHLSS 2006 contains 9.189 households with 39.071 individuals, including 10.696 children under the age of 16.

Household surveys like the VHLSS provide micro-data at the level of the household and their individual members on a range of issues related to children's well-being and poverty as well as social protection. A number of limitations are also inherent to the use of the VHLSS and similar household surveys. The most notable one is that the sampling method causes a substantial group in the society to be omitted from the sample and subsequent data (Evans and Harkness 2008). The sample for the survey is constructed on the basis of the official lists of registered households in communes and urban wards in Vietnam that have lived in the enumeration area for at least six months (Pincus and Sender 2006). This implies that households or individuals that have recently migrated are not included in the sampling frame (Edmond and Turk 2004). Further, due to the strict the household registration system, or *ho khau* system, many households and individuals do not satisfy the necessary criteria to newly register and stay unregistered (Pincus and Sender 2006). But also migrants that have temporary forms of registration appear to be under represented in the sampling frame (VDR 2008). The omission of these groups in society is not only an important issue to point out because of its suspected significant size but even more so because of the denial of social and public services they experience due to their status. The structural exclusion

of the unregistered migrant group from the data will most likely present us with underestimations for (child) poverty.

Methods of Analysis

As a clear understanding of the child poverty approaches at hand is crucial for a sound and solid poverty analysis and interpretation of results (Ravallion 2004, Roelen et al. 2009), we clearly outline the poverty measures used in this paper for the case of Vietnam. The *monetary poverty* method builds on per capita expenditures [3] as underlying welfare measure. The monetary poverty line in 2006 lies at 2559 VND per day, capturing the cost of a food and non-food basket (VDR 2008)[4]. This poverty line was established by the General Statistical Office (GSO) and the World Bank (WB) and is generally referred to as the official poverty line. The incidence of monetary child poverty is based on the share of children with a per capita income below the poverty line, which is provided by the poverty headcount or incidence rate. The depth of poverty is measured by the average shortfall of income to the poverty line as a percentage of the poverty line, which is represented by the poverty gap ratio. Both measures are part of the FGT-class of poverty measures and can be denoted as follows:

$$P = \frac{1}{N}\sum_{i=1}^{q}\left[\frac{(z - y_i)}{z}\right]^{\alpha} \qquad (1)$$

where N represents the total population, q represents the population below the poverty line, z denotes the poverty and y_i is the individual's income. If α is 0, the equation denotes the poverty headcount ratio and if α is 1, the equation represents the poverty gap ratio (Ravallion 1994)[5].

The *multidimensional poverty* method used in this paper is a child-specific, outcome-focused and country-specific approach that considers non-monetary aspects of deprivation that are especially relevant for children. It was especially developed to

[3] Per capita expenditures have been calculated on the basis of equal weights for each household member, making no assumptions about economics of scale.

[4] The cost component of the food basket is based on a daily intake of 2100 calories per person per day (VDR 2008).

[5] The FGT-class of poverty measures also includes the poverty severity index, which is calculated by assuming α is 2 and thereby giving greater weight to larger shortfalls of income (Ravallion 1994). We do not use this measure in this paper.

identify poverty amongst children in Vietnam. Included items consist of education, health, child labor and water and sanitation, among others. A total of six domains and nine indicators within these domains are selected on the basis of stakeholder discussions, previous research and data availability and they are considered to appropriately reflect the poverty status of children in Vietnam (Roelen et al. 2009)[6]. The aggregation of the indicator and domain poverty rates to arrive at the overall child poverty rate follows a combination of the union and dual cut-off identification strategy (see Roelen et al. 200x). A child is domain deprived if he/she does not meet the threshold of at least one of the indicators within the specific domain, also known as the union approach (Atkinson 2003). The overall poverty headcount is determined by deprivation in at least two domains, also known as the dual cut-off identification strategy (Alkire and Foster 2008). Depth of poverty is measured by the normalized deprivation score, dividing the total number of observed deprivations by the maximum number of observable deprivations per individual child (Roelen et al. 200x). The poverty gap ratio is represented as a percentage of the maximum number of observable deprivations. The calculation of the child poverty depth in this manner is in line with the calculation of the monetary poverty indicators and can thus be used parallel in a comprehensive poverty analysis (Roelen et al. 200x). However, instead of taking the distance to the poverty line as underlying measure, we count the total number of observed indicator deprivations per individual child. The formal notation of the multidimensional child poverty measures are as follows (see Roelen et al. 200x):

The percentage of children falling below the specified threshold per indicator is denoted as the *indicator poverty rate*.

$$IV = \frac{\sum_{i=1}^{n} I_i}{n} \qquad (2)$$

where n stands for all children for which the indicator is observable and I_i represents a dichotomous variable with value 1 if the child is below the indicator threshold and thus vulnerable and value 0 if the child meets the threshold and is not vulnerable. The *domain poverty rate* reflects the rate of children experiencing deprivation within a

[6] Please refer to Annex 1 for a complete overview of the domains and indicators used for the multidimensional child poverty approach for Vietnam.

specific domain as a percentage of children for whom the indicators within that domain are observable. The domain poverty rate is given by

$$DV = \frac{\sum_{i=1}^{n} D_i}{n} \qquad (3)$$

where n represents all children for which the indicators are observable and D_i stands for domain poverty, a dichotomous variable with value 1 if the child suffers deprivation within the specific domain and value 0 if the child does not suffer deprivation. A child is considered to suffer domain poor if it experiences indicator poverty for at least one indicator within that domain:

$$D_i = 1 \qquad \text{if } \sum_{i=1}^{d} I_i \geq 1 \qquad (4)$$

where d stands for the total number of indicators identified per domain. The rates for c*hild poverty* can be written as follows:

$$ChildPov = \frac{\sum_{i=1}^{N} Pov_i}{N} \qquad (5)$$

where N represents the full sample size of children aged 0-15 and Pov_i represents a dichotomous variable with value 1 if a child suffers child poverty:

$$Pov_i = 1 \qquad \text{if } \sum_{i=1}^{D} D_i \geq 2 \qquad (6)$$

where D stands for the total number of domains within the specific approach. The depth of child poverty is consequently calculated by dividing the number of observed indicator poverty by the maximum of observable indicators for each individual child:

$$Gap_i = \frac{\sum_{i=1}^{p} I_i}{\sum_{i=1}^{P} I_i} x100 \qquad (7)$$

where *p* stands for the total number of indicators for which the child is considered to be poor and *P* represents to the maximum of number of observable indicators for the individual child. The aggregate *child poverty gap ratio* can be written as follows:

$$ChildGap = \frac{\sum_{i=1}^{N} Gap_i}{N} \qquad (8)$$

A set of different methods is used in this paper to investigate the main research questions. Cross tabulations and correlation coefficients have previously been used in other comparative studies of poverty measures (see e.g. Klasen 2000) and will also be employed in this study. ROC curves prove a useful tool to further assess the degree to which one approach is capable of predicting poverty in terms of the other poverty measure and as such can serve as a proxy measure. A Receiver Operator Characteristics (ROC) curve is a method to visualize the performance of a test to discriminate between two populations (Minot and Baulch 2004). In terms of our study, it allows for the assessment of targeting efficiency when using the monetary poverty measure to identify children that are multidimensionally poor. The outcomes provide an indication of the extent to which the monetary poverty method would be suitable as a proxy for multidimensional poverty. The application of ROC curves for poverty analysis to date has been fairly limited. Wodon (1997) and Minot and Baulch (2004) are among the few scholars that have used this specific method to assess targeting performance of different poverty indicators. Cross tabulations and Venn diagrams are used to assess and visualize the degree of overlap of children identified as monetary and/or multidimensionally poor. Although cross-tabulations are fairly common for the analysis of overlap or mismatch of poverty measures (see e.g. Klasen 2000, Baulch and Masset 2003, Bastos et al. 2004, Whelan et al. 2004), the use of Venn diagrams is limited. Finally, multinomial regression enables the investigation of underlying drivers or dynamics that cause children to be identified as multidimensional and/or

monetary poor. The identification of child poverty using two distinct poverty measures leads to four mutually exclusive groups in the population, making multinomial regression the appropriate method for analysis (see also Whelan et al. 2004).

Comparing Monetary and Multidimensional Poverty Measurement

A comparative analysis of poverty measurement using monetary and multidimensional approaches consists of two different aspects, namely differences in the magnitude of poverty and differences in groups of poverty. The first refers to overall poverty figures, indicating the size of poverty for different groups in society. The second, however, refers to the question whether the same or different children are captured by the two poverty approaches.

A comparison of the magnitude of child poverty in Vietnam is presented in Table 1. It can be observed that 23 percent of all children below 16 years of age are monetary poor, compared to a poverty incidence rate of 31 percent for multidimensional poverty. These size differences are considerable but can also be considered as largely arbitrary due to their dependence on the level of the poverty line. Although the setting of the poverty line is often the result of a long and thorough process, it remains subjective and open to debate. Rather than the discrepancies in magnitude, possible differences between groups of children captured by the monetary and multidimensional poverty approaches are of greater interest.

Table 1 Monetary and multidimensional poverty

	VHLSS, n=10696	
	Monetary Child Poverty Rate	*Multidimensional Child Poverty Rate*
Total	22.62	30.72

Source: Authors' calculations from VHLSS 2006

In order to focus the remainder of our analysis and discussion on differences arising with respect to the demographic profile and groups of poor children, we remove size differences in poverty by artificially equalizing the monetary and multidimensional poverty rates. The monetary poverty line is raised to such a level of per capita

income[7] so that the monetary approach captures the same proportion of poor children as the multidimensional approach. Table 2 presents an unconditional poverty profile for various demographic groups.

Table 2 Adjusted monetary and multidimensional poverty by demographic groups

	VHLSS, n=10696			
	Monetary Child Poverty Rate	*Monetary Child Poverty Gap Ratio*	*Multidimensional Child Poverty Rate*	*Multidimensional Child Poverty Gap Ratio*
Total	30.7	8.3	30.7	18.5
Gender				
Male	30.1 (1)	8.2 (1)	30.5 (1)	18.5
Female	31.4 (2)	8.4 (2)	31.0 (2)	18.5
Area	***	***	***	***
Urban	8.9 (1)	1.9 (1)	11.3 (1)	8.8 (1)
Rural	37.0 (2)	10.1 (2)	36.3 (2)	21.0 (2)
Region	***	***	***	***
Red River Delta	21.5 (3)	4.2 (3)	9.7 (1)	8.2 (1)
North East	43.5 (5)	12.0 (5)	36.2 (5)	21.0 (6)
North West	69.5 (8)	24.7 (8)	63.1 (8)	38.7 (8)
North Central Coast	47.0 (7)	14.2 (6)	25.8 (4)	14.2 (4)
South Central Coast	26.0 (4)	5.6 (4)	18.5 (2)	11.1 (2)
Central Highlands	45.2 (6)	15.3 (7)	39.3 (6)	20.9 (5)
South East	12.9 (1)	3.4 (1)	20.2 (3)	13.5 (3)
Mekong River Delta	21.3 (2)	4.0 (2)	56.3 (7)	27.3 (7)
Ethnicity	***	***	***	***
Kinh/Chinese ethnicity	22.1 (1)	4.8 (1)	24.1 (1)	13.9 (1)
Other ethnicity	71.8 (2)	24.8 (2)	62.3 (2)	34.1 (2)
Age group	***	***	***	***
0-2	33.5 (4)	10.1 (5)	27.9 (2)	24.0 (5)
3-4	36.7 (6)	10.4 (6)	41.6 (6)	27.0 (6)
5	34.3 (5)	10.0 (4)	38.4 (4)	18.5 (3)
6-10	33.5 (3)	9.3 (3)	25.8 (1)	14.3 (1)
11-14	27.8 (2)	6.8 (2)	29.5 (3)	17.2 (2)
15	21.3 (1)	4.8 (1)	40.4 (5)	20.8 (4)

Source: Authors' calculations from VHLSS 2006
*Note: ***<0.001, significance level chi-squared group equality of means*

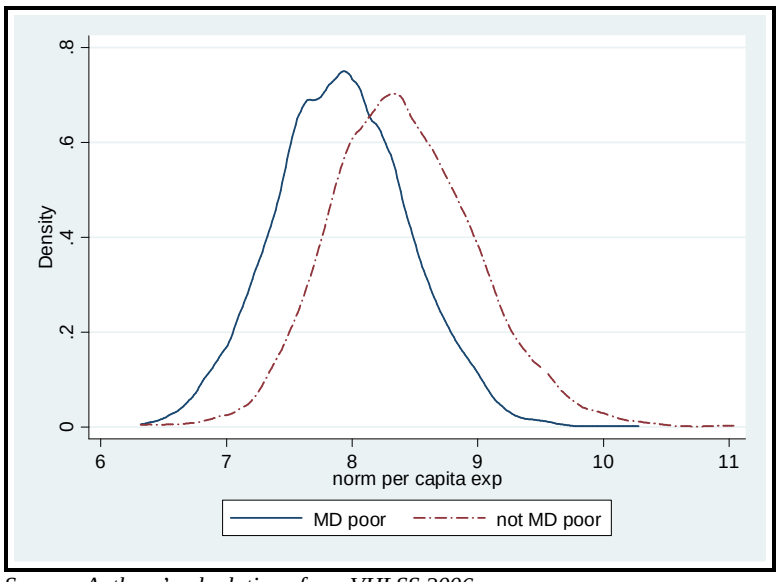
Demographic decomposition shows that both monetary and multidimensional poverty figures do not display a significant degree of gender inequality. Incidence rates and depth ratios do diverge for different areas, regions and age groups in Vietnam. A considerably smaller proportion of children living in urban areas are poor in comparison to rural areas in terms of both monetary and multidimensional poverty. However, the multidimensional method disproportionately captures the urban population compared to the monetary method; the discrepancy between poverty

[7] The original level of the monetary poverty line was 2,559.850 VND; the adjusted monetary poverty line is 2,905.000 VND.

estimates for the urban and rural areas is smaller in case of multidimensional poverty than monetary poverty. Regional poverty estimates indicate that the monetary and multidimensional approaches rank regions differently. Both methods identify the North West region as the region with the highest incidence and depth of child poverty. However, regional rankings differ greatly when considering the other regions. Most notable is the Mekong River Delta, which has the one but lowest poverty incidence in terms of monetary poverty but one but highest poverty incidence and depth in terms of multidimensional poverty. Decomposition of poverty by ethnicity indicates that the ethnic minorities are greatly disadvantaged in terms of both monetary and multidimensional poverty, although the discrepancy is more outspoken with respect to monetary poverty. Poverty figures by age group indicate that children in the oldest age bracket experience least incidence and depth in terms of monetary poverty. The picture with respect to multidimensional poverty is almost reversed, indicating that children in the oldest age bracket are amongst the most deprived. Note that the monetary poverty is purely based on data at the household level while the multidimensional poverty method in part captures individual children's situation. The underlying indicators and the different age groups they capture, form an explanation for these different poverty rates by age groups.

The poverty estimates in Table 2 point towards differences in the demographic profiles of the poor children using a monetary and multidimensional poverty approach. Further comparative analysis of both child poverty approaches analyses the extent to which one approach is able to differentiate poverty in terms of the other approach. Clearly, if the theoretical and conceptual differences between both approaches would not translate in different outcomes, we could simply use one poverty approach (Laderchi 1997). However, previous research leads to the suspicion that this is not the case. Figure 1 displays the distribution of income for children being identified as multidimensionally poor as well as children who are not identified as such.

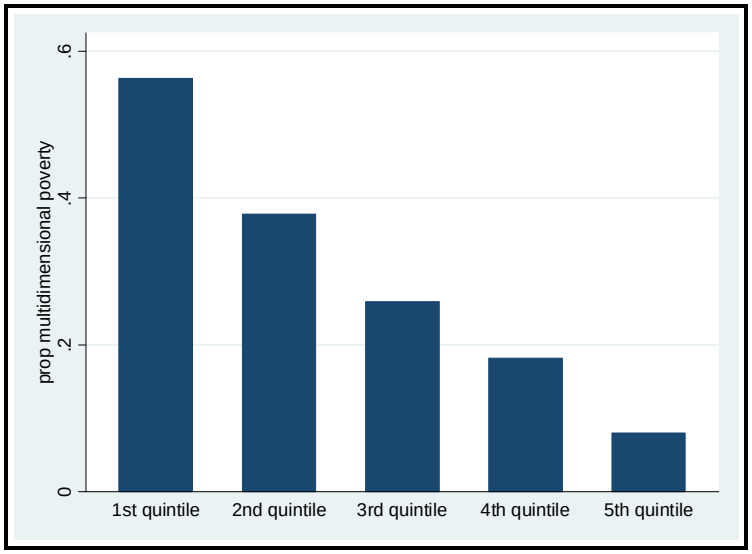
Figure 1 Distribution of normalized income for multidimensionally poor and non-poor



Source: Authors' calculations from VHLSS 2006

Both groups face a normal distribution with respect to their normalized income but at a lower level of income for children that are multidimensionally poor. On the basis of this figure, it is tempting to report that the difference between multidimensionally poor and non-poor can be captured by income and to assume that both measures are highly correlated. Further analysis, however, points towards a more diversified picture. The proportion of multidimensionally poor children by income quintile is presented in Figure 2.

Figure 2 Proportion of multidimensionally poor children by income quintile



Source: Authors' calculations from VHLSS 2006

Although the first quintile holds the largest proportion of children that are multidimensionally poor, we can also observe that 8 and 17 percent of all children in the top two income quintiles are multidimensionally poor. In other words, income is not able to fully differentiate between children being multidimensionally poor or not. Correlation coefficients in Table 3 underline these findings by displaying a limited degree of association between monetary and multidimensional poverty.

Table 3 Correlation monetary and multidimensional poverty

	Monetary poverty	Per capita expenditures
Multidimensional poverty	0.316*	
Multidimensional normalized poverty score		-0.362*
Education poverty	0.169*	
Health poverty	0.134*	
Shelter poverty	0.269*	
Water and Sanitation poverty	0.361*	
Labor poverty	0.142*	
Social Inclusion and Protection poverty	0.032*	

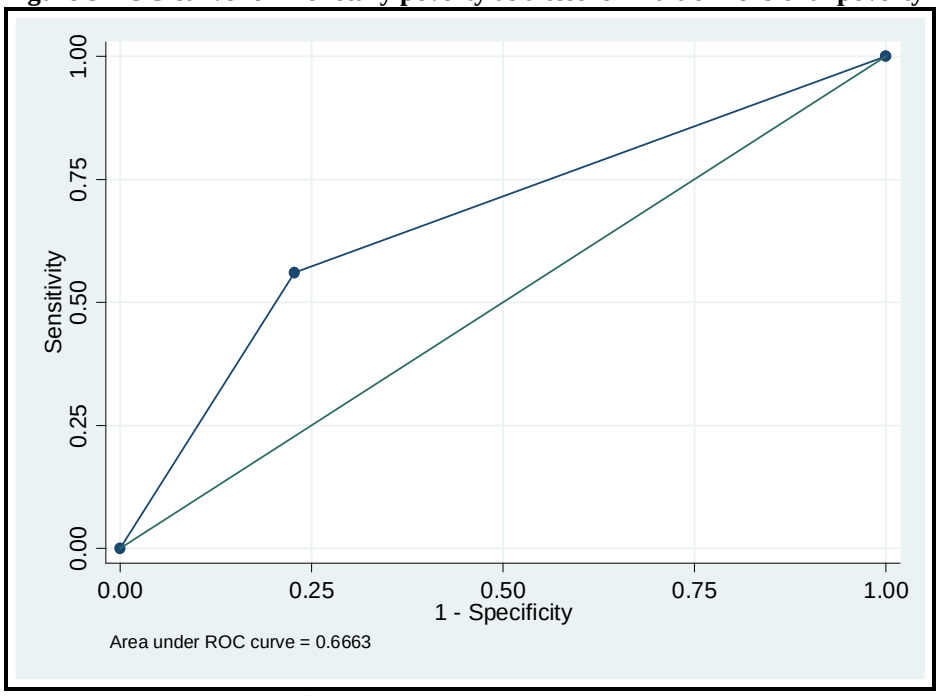
Source: Authors' calculations from VHLSS 2006
Notes: The correlation between per capita expenditures and multidimensional poverty score is calculated by means of the Pearson correlation coefficient; the correlation between monetary poverty and multidimensional poverty as well as domain poverty is calculated using the Phi correlation coefficient. Correlation coefficients referring to domain poverty are calculated for the sample of children for which the specific domain poverty was also observable.

Correlation coefficients between various indicators of monetary and multidimensional poverty are all significant but at fairly low levels of correlation. The correlation between monetary and multidimensional poverty status and size of poverty measures display similar levels with coefficients between 0.316 and 0.362 (as the

multidimensional normalized poverty score is an inverse poverty indicator compared to per capita expenditures, the correlation coefficients holds a negative sign). Considering the correlation between monetary poverty status and poverty in specific domains, the association is strongest between poverty in the water and sanitation and shelter domains. However, with coefficients between 0.269 and 0.361, this is rather modest. The limited degree of correlation between monetary and multidimensional poverty indicators has also become evident from previous studies. Klasen (2000) finds limited correlation between income and deprivation measures in South Africa. Furthermore, in a review of different poverty studies in OECD countries, Perry (2002) as well as Layte et al. (2001) also conclude that the association between poverty and another measure of deprivation is much looser than is often assumed.

In addition to these non-parametric tools, we explore the explanatory power of the monetary poverty method to assess multidimensional poverty through ROC curves. ROC curves graphically depict the performance of a test to discriminate between two populations (Minot and Baulch 2004). The X-axis of an ROC graph depicts the "false positives" (1-specificity) or the inclusion error (Wodon 1997). In this specific case, this refers to the identification of children that are not multidimensionally poor as monetary poor. The Y-axis depicts the "true positives" (sensitivity) or correct identification (Wodon 1997), this referring to multidimensionally poor children also being identified as monetary poor. The false positives and true positives are depicted along a continuum of probability cut-offs, which refers to poverty risks or the probability to be poor in this case. An ROC curve that is depicted by a 45 degree line indicates a model with no explanatory power, i.e. the chances of being identified or not as monetary poor are equal regardless of the actual probability to be multidimensionally poor. An ROC curve bowed towards the upper left corner of the graph indicates a model with larger predictive power as the rate of true positives increases at a relatively higher rate than the rate of false positives. The area under the ROC curve indicates the efficiency of the diagnostic test An area with value 1 indicates a perfect test, while an area of 0.5 points to a model without any predictive value (the 45 degree line). Figure 3 presents an ROC curve for the use of the monetary poverty measure to explain multidimensional child poverty.

Figure 3 ROC curve for monetary poverty as a test for multidimensional poverty



Source: Authors' calculations from VHLSS 2006

The ROC curve in Figure 3 points towards limited power of the monetary poverty measure to predict or proxy multidimensional poverty. The area under the ROC curve is 0.67, suggesting little explanatory power. The bowed ROC curve is split up into two segments, the lower part capturing the children that are identified by monetary poverty and the upper segment representing all others. Considering the values of the X- and Y-axes at the point where the curvature changes, it can be observed that monetary poverty captures approximately 20 percent false positives and 55 percent true positives. In other words, if the monetary poverty measure was used to predict multidimensional child poverty, the probability to be rightly identified as such by the monetary approach would be around 55 percent. By the same token, there is a chance of approximately 20 percent to be identified as poor by the monetary poverty approach when not multidimensionally poor. Results are similar when testing the use of the multidimensional poverty measure as a proxy for monetary poverty. The area under the ROC curve is also 0.67, indicating that the multidimensional poverty measure is not well able to differentiate between children that are monetary poor or not. Less than half of all children that are monetary poor are identified as poor using the multidimensional poverty measure while a considerable proportion of children that are not monetary poor would be identified as poor. Based on the results from the ROC analysis as well as the findings above, it is evident that monetary and

multidimensional child poverty is not closely related and one poverty measure is not adequately able to differentiate child poverty in terms of the other measure.

Groups of Poverty

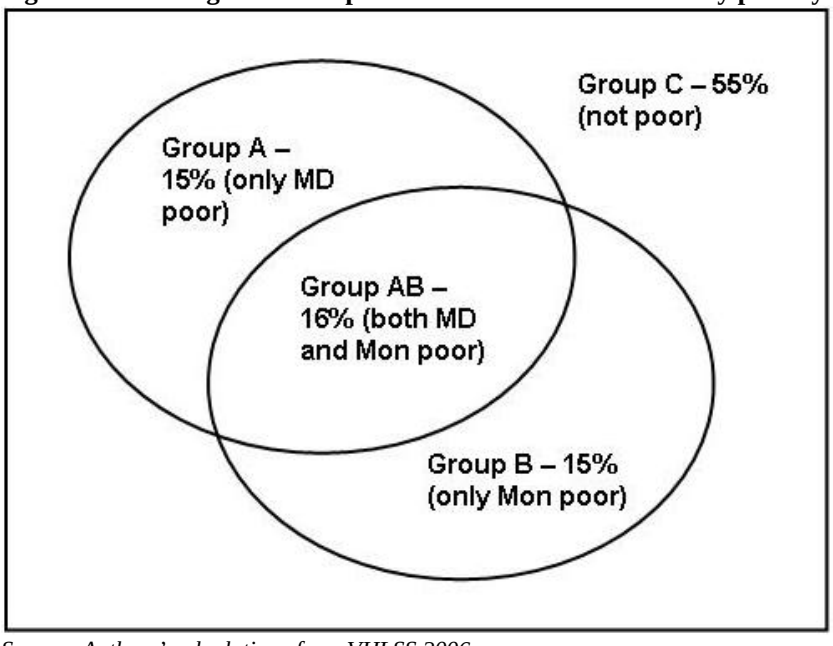
An analysis of the groups of children identified to be poor by the monetary and multidimensional poverty approach provides insight into the extent to which the poverty measures capture the same or different groups of children. Table 4 presents the percentages of children identified by the monetary and/or multidimensional poverty approach for different levels of the monetary poverty line. Figure 4 presents a Venn diagram that displays the figures from Table 4 in a graphical manner. Such an analysis of the overlap of monetary and multidimensional child poverty identifies four so-called "poverty groups". Group A consists of those children only identified as poor by multidimensional poverty, group B contains those children that are only monetary poor, group AB are those children that are identified as being poor by both approaches and group C are the non-poor children.

Table 4 Cross tabulations of multidimensional and monetary poverty

		Monetary poor	
		Yes	*No*
Multi-dimensional poor	*Yes*	**16 (*AB*)**	**15 (*A*)**
	No	**15 (*B*)**	**55 (C)**

Source: Authors' calculations from VHLSS 2006

Figure 4 Venn diagram overlap multidimensional and monetary poverty



Source: Authors' calculations from VHLSS 2006

Results in Table 4 and Figure 3 indicate that the degree of overlap between children identified as poor in monetary and multidimensional terms is limited. It can be observed that more than 40 percent of all children have been identified as poor by the multidimensional and/or the monetary poverty approach but only 13 percent of all children is captured by both approaches. Whilst 18 percent of all children is only identified as multidimensionally poor, 10 percent is considered only to be poor according to the monetary approach. Results for different levels of the monetary poverty line further indicate that the lack of overlap is not a matter of statistical coincidence. Raising or lowering the monetary poverty line by 5 percentage point increments does not disproportionately nor significantly change the proportions of children in the various poverty groups. In other words, the multidimensional and monetary poverty methods capture different groups of children in Vietnam. Similar analyses in previous studies have reached conclusions along the same lines. Bastos et al. (2004) find that there is limited overlap between quartiles of children identified as poor using a monetary child poverty index and multidimensional child deprivation index. Similarly, Klasen (2000) finds a large degree of misidentification of the poor, with considerable groups of people that are only identified by either the monetary or multidimensional poverty measures.

Table 5 provides information about the demographic composition of these poverty groups. The unconditional poverty profile in Table 2 indicated rankings of sub-groups of poor children on the basis of monetary and multidimensional poverty are similar (except for decomposition by region and age), suggesting that findings of both poverty measures are mutually supporting (Perry 2002). However, previous research has indicated that there is a considerable degree of mismatch at the level of the individual when both measures are used for the identification of poverty (see Klasen 2000, Perry 2002). Estimates in Table 5 examine which demographic sub-groups are particularly affected by the misidentification of the monetary and multidimensional poverty.

Table 5 Poverty rates for demographic characteristics as a proportion of children in specific poverty group

	Group A Only multi-dimensionally poor	**Group B Only monetary poor**	**Group AB Multidimensionally and monetary poor**	**Group C Non-poor**
	Poverty rate	*Poverty rate*	*Poverty rate*	*non-poor*
Total	14.7	14.7	16.0	54.5
Gender				
Male	14.6 (1)	14.2 (1)	15.8 (1)	55.3 (2)
Female	14.8 (2)	15.3 (2)	16.2 (2)	53.8 (1)
Area	***	***	***	***
Urban	8.2 (1)	5.8 (1)	3.1 (1)	83.0 (2)
Rural	16.6 (2)	17.3 (2)	19.7 (2)	46.3 (1)
Region	***	***	***	***
Red River Delta	4.8 (1)	16.6 (4)	4.9 (1)	73.7 (2)
North East	11.7 (4)	19.1 (7)	24.4 (6)	44.7 (5)
North West	12.4 (6)	18.8 (5)	50.7 (8)	18.1 (8)
North Central Coast	8.1 (2)	29.3 (8)	17.7 (4)	44.9 (4)
South Central Coast	8.4 (3)	15.9 (3)	10.1 (3)	65.6 (3)
Central Highlands	12.9 (7)	18.8 (6)	26.5 (7)	41.9 (6)
South East	11.9 (5)	4.6 (2)	8.4 (2)	75.2 (1)
Mekong River Delta	38.5 (8)	3.5 (1)	17.9 (5)	40.2 (7)
Ethnicity	***	***	***	***
Kinh/Chinese ethnicity	14.9 (2)	12.9 (1)	9.2 (1)	63.0 (1)
Other ethnicity	14.0 (1)	23.5 (2)	48.3 (2)	14.2 (2)
Age group	***	***	***	***
0-2	11.6 (2)	17.3 (5)	16.3 (4)	54.9 (3)
3-4	18.7 (4)	13.8 (3)	22.9 (6)	44.6 (6)
5	19.4 (5)	15.3 (4)	19.0 (5)	46.3 (5)
6-10	11.0 (1)	18.7 (6)	14.7 (2)	55.5 (2)
11-14	14.7 (3)	13.1 (2)	14.7 (1)	57.5 (1)
15	24.5 (6)	5.4 (1)	16.0 (3)	54.2 (4)

Source: Authors' calculations from VHLSS 2006
*Note: ***<0.001, significance level chi-squared group equality of means*
Per demographic group, the shares of the four poverty groups are presented as percentages of the total demographic group and figures sum to 100% in each row. The figures in parentheses reflect the share of the demographic group as a percentage of the total poverty group and sum to 100% in each row.

The demographic figures show that the participation in the poverty groups is not biased towards either boys or girls. The proportions of boys and girls over the various poverty groups do not display significant differences, regardless of the poverty method used. However, the decomposition by area shows that children living in rural areas are disproportionately poorer than children living in urban areas in all poverty groups. Whilst 83 percent of all children in urban areas are not poor (group C), more than half of those in rural areas belong to one of the poverty groups. The overlap of poverty in rural areas in limited; one out of five children in rural areas are both multidimensionally and monetary poor (group AB) but 17 percent of all rural children are only multidimensionally poor (group A) and another 17 percent is only monetary poor (group B). The equal shares of rural children in groups A and B does not suggest that either the monetary or multidimensional approach is more prone to capture

children in rural areas. The regional decomposition of the shares of children in the various poverty groups does, however, point towards a certain bias of the poverty approaches. The Mekong River Delta and North Central Coast regions are appropriate examples to illustrate that the monetary and multidimensional approaches capture different groups of children. Only 8 percent of all children in the North Central Coast are exclusively multidimensionally poor (group A) , ranking second best of all regions, but 29 percent of all children in this region are exclusively monetary poor (group B), ranking lowest of all regions. At the other end of the scale, children in the Mekong River Delta are faring well with respect to monetary poverty; only 4 percent of all children are exclusively monetary poor (group B). However, they seem extremely prone to multidimensional poverty as 39 percent of all children are exclusively multidimensionally poor (group A). A large degree of misidentification can also be observed with respect to ethnicity. The large majority of children of ethnic minority belong to one of the poverty groups A, B or AB. However, the shares of children exclusively multidimensionally poor (group A) are similar for both ethnic groups, whilst there are great discrepancies with respect to the other poverty groups. At 48 percent, the share of children of ethnic minority that are poor with respect to both poverty approaches (group AB) is 5 times higher than the share of children of Kinh/Chinese majority, suggesting that almost half of all children of ethnic minority are highly impoverished. Decomposition of poverty groups by age brackets indicates that the children in the oldest age bracket are prone to be captured by the multidimensional approach but not so by the monetary approach

The notion that monetary and multidimensional poverty measurement capture different groups of the population in a disproportionate manner is important in both academic as well as policy terms. In terms of the academic debate, it becomes evident that the different theoretical underpinnings of poverty approaches also result in different outcomes of poverty. The way in which poverty is understood and conceptualized also translates in the identification of different groups of people in society as being poor (Laderchi 1997), also in terms of child poverty. In other words, the conceptual debate about poverty not only a theoretical exercise but one with far-reaching empirical implications. With respect to policy, the misidentification of the poor is especially relevant in terms of targeting (e.g. Klasen 2000, Sahn and Stifel 2003) as well as design (Laderchi 1997). If either a monetary or multidimensional

poverty measure is used for the targeting of policies, a considerable group in society would be excluded despite its poverty status in terms of the other poverty measure. Furthermore, specific demographic groups in society would be more prone to be identified as poor and be targeted while others run a greater risk of not being identified as such and to be excluded from the policy under consideration. The design of policy measures to respond to the issue of poverty will also differ when using different poverty approaches. Whilst the creation of employment opportunities for adults to increase income might appear most relevant in case of a lack of monetary means, the improvement of access and/or quality of basic services might be more appropriate in case of deprivation in alternative dimensions poverty (Laderchi 1997).

Drivers of Poverty Mismatch

Although these notions on the basis of the findings and analysis above provide a valuable contribution to the ongoing debate on poverty measurement, especially in terms of child poverty, the findings also give rise to another question. Namely, what are the drivers for these differences? Can we consider those groups of children that are captured by only one of the poverty measures to be "false positives"? Or do they have specific characteristics and represent a vulnerable group in society that requires careful attention? Furthermore, can the children identified to be poor by both measure considered to be the "ultra-poor" or are their characteristics too divergent to make any such inferences about this group? In this section, we attempt to gain a more detailed insight of the specific situation of the poverty groups and the underlying dynamics that drive them.

In order to gain further insight into the characteristics of the specific poverty groups, we consider the differences in underlying poverty indicators. Table 6 presents the proportion of children in each poverty group that suffer poverty in each domain[8].

Table 6 Domain poverty rates by poverty group

	Group A - Only multi-dimensionally poor	**Group B - Only monetary poor**	**Group AB - Multidimensionally and monetary poor**	**Group C - Non-poor**
	Domain Poverty rate	*Domain Poverty*	*Domain Poverty rate*	*non-poor*

[8] Note that the percentages in the column for Group B add up to 100% as children in this group can theoretically only suffer deprivation in one domain or no domain; if they suffered deprivation in more domains, they would have been identified as multidimensionally poor. The percentages in the columns for group A and AB do not add up to 100% as children in these groups can suffer deprivation in multiple domains.

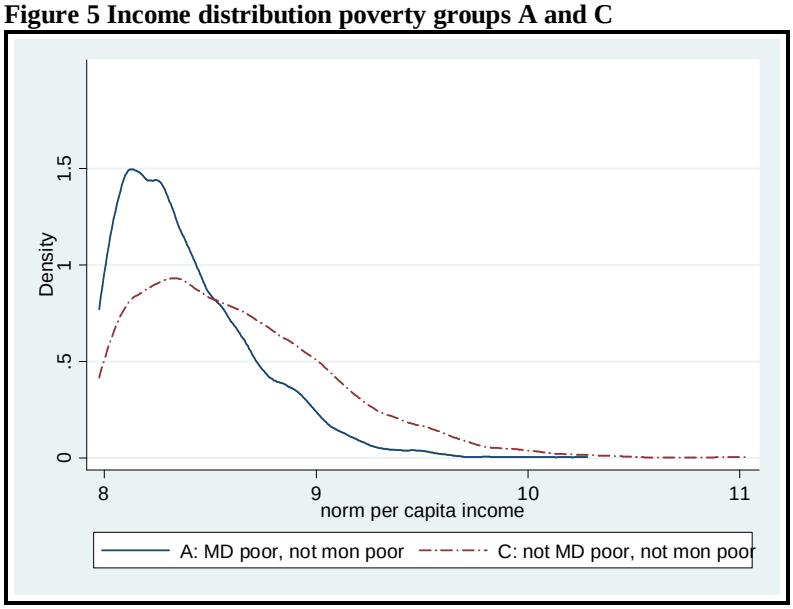
		rate		
Total	14.7	14.7	16.0	54.5
Domains				
Education	35.9	4.1	36.7	na
Health	12.1	3.6	13.6	na
Shelter	58.5	3.1	67.2	na
Water and sanitation	88.7	55.9	95.8	na
Child labor	18.1	0.9	18.7	na
Social Inclusion and Protection	16.9	3.2	10.6	na
No domain (only monetary poor)	na	29.3	na	na

Source: Authors' calculations from VHLSS 2006

Estimates for group B reveals that more than 70 percent of all children in this group suffer poverty in one domain in addition to being monetary poor. Poverty in the water and sanitation domain is most prevalent for all poverty groups. The large majority of group A and group AB children suffer poverty in this domain while this amounts to 56 percent for children in group B. The domain with the second largest incidence rates in groups A and AB is shelter with incidence rates between 59 and 67 percent. Remarkably, estimates indicate that only a small proportion of group B children, 3 percent, suffer from poverty with respect to shelter. Poverty incidence rates for other domains hover around the same percentage with the exception of child labor, which amounts to only 1 percent. This relatively low percentage of children suffering child labor in group B is intuitively appealing as child labor might be a source of income and inversely related to monetary poverty. The proportions of domain poverty incidence for groups A and AB do not display diverging trends that can be thought to specifically "drive" the group's poverty status, although incidence rates are generally at a higher level for group AB.

In addition to considering the degree of domain poverty by poverty group, we also assess their distributions of income. Figure 5 presents the distribution of normalized income for poverty group A. Children in group A are identified as poor by the multidimensional approach but have a level of income that is above the monetary poverty line.

Figure 5 Income distribution poverty groups A and C

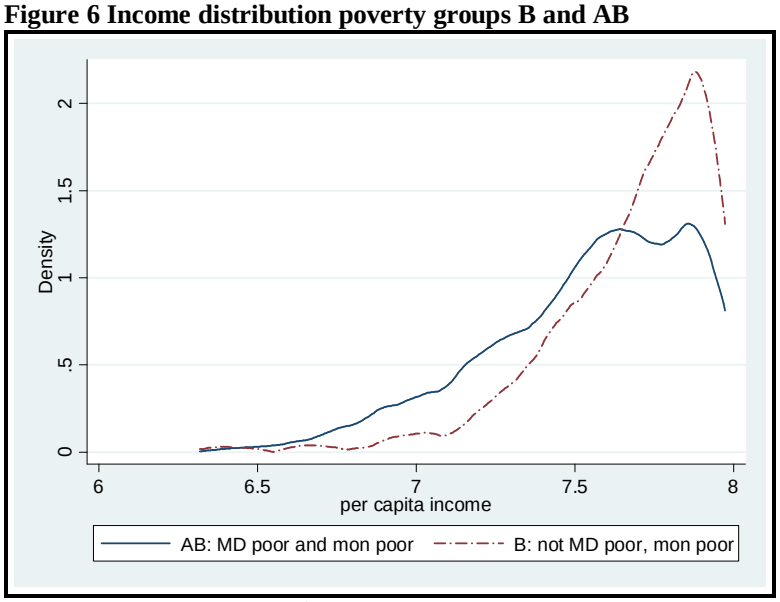


Source: Authors' calculations from VHLSS 2006

Figure 5 indicates that normalized per capita income is skewed towards the poverty line for group A children, especially in comparison to the non-poor C. This finding is also in line with the bar graph in Figure 2, which indicated that the majority of the children in the lowest poverty quintiles are multidimensionally poor. This result bears the question of the specific factors at play that weaken the "power" or ability to provide for multidimensional issues, despite a level of income above the poverty line. Such factors could include low educated or low-skilled parents.

Similarly, the income distributions of normalized per capita income for groups B and AB are presented in Figure 6. This allows for the comparison between income distributions between those children that are only identified to be monetary poor but not multidimensionally poor and those children that have been identified as poor by both approaches.

Figure 6 Income distribution poverty groups B and AB

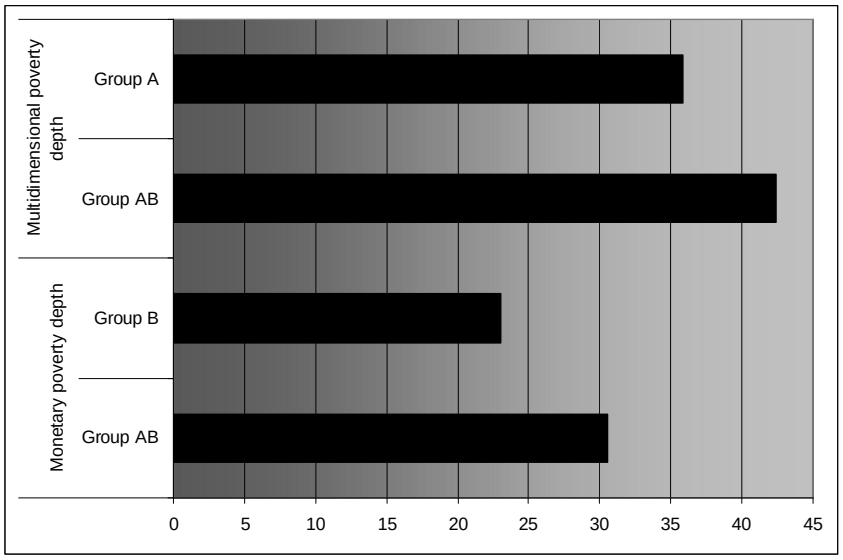


Source: Authors' calculations from VHLSS 2006

The distribution plots in Figure 6 display that the income of group B children is skewed towards the poverty line in comparison to those children that are in group AB. Hence, the level of income of children identified as poor by both approaches is generally lower than that of children in group B, who are captured by the monetary poverty but not multidimensional poverty. This finding suggests that children in group B have some sort of mechanism to cushion the effects of low income to be able to prevent themselves from falling into multidimensional terms. Factors contributing to such mechanisms might include the head of household to be female or well-educated.

After having established that children in groups A and B have incomes skewed towards the monetary poverty line, suggesting that there might be specific factors in place that prevent or cause children to be multidimensionally poor despite or in spite their level of income, we also consider the poverty situation of group AB. Children in this group are captured by both poverty measures and estimates in Table 5 and Figure 6 also indicated that domain poverty incidence is higher while income is generally lower than in respectively poverty groups A and B. For a more detailed insight into the degree of poverty of group AB, we consider the depth of poverty. Figure 7 compares the depth of multidimensional poverty for groups A and AB as well as monetary poverty for groups B and AB.

Figure 7 Monetary and multidimensional poverty depth by poverty group



Source: Authors' calculations from VHLSS 2006

The bar graph clearly indicates that children in group AB are poorer in monetary as well multidimensional terms than children that are identified as poor by only one poverty measure. As such, these children can be considered as "ultra-poor". They have little means to cope and experience more as well as deeper poverty in terms of both income and domain poverty.

The question of specific factors in- or decreasing children's chances to be identified as poor by none, one or both poverty measures remains. What are the underlying drivers that cause children with levels of income just above the poverty line to fall into multidimensional poverty and, by the same token, children with an income just below the monetary poverty line to prevent themselves from falling into multidimensional poverty? Furthermore, what are determinants causing children to be ultra-poor? Characteristics of the household head or household that the child lives may result in a specific family life strategy that is able to either mitigate the effects of low income on children and prevent a child from being multidimensionally poor despite being monetary poor (Bastos et al. 2004). By the same token, specific living conditions of the child might increase his or her risk to be poor in multidimensional terms despite not being identified as monetary poor or cause him or her to be ultra-poor. Multinomial regression is used to further analyze the impact of characteristics of the individual child, household head, household and locations on the probability for a child to belong to either one of these poverty groups, controlling for the other characteristics. Table 7 reports the relative risks of belonging the either poverty

groups AB, A or B in reference to group C (non-poor). If the reported relative risk for a certain poverty group is larger than one, the specific characteristic increases the probability for a child to belong to that poverty group rather than to be non-poor and belong to reference group C.

Table 7 Multinomial regression poverty groups

	Multinomial Model		
	AB b/se	**A** b/se	**B** b/se
Child Characteristics			
Child is female	1.1045	1.0156	1.0636
	(0.0730)	(0.0640)	(0.0677)
Age of child	0.9867	1.0476***	0.9424***
	(0.0095)	(0.0105)	(0.0086)
Household Head Characteristics			
Hh head is female	0.4800***	0.5803***	0.5845***
	(0.0637)	(0.0667)	(0.0738)
Age of hh head	0.9961	0.9930	10.071
	(0.0037)	(0.0036)	(0.0038)
Hh head is single	6.8513***	2.6343**	3.5046***
	-23.625	(0.9754)	-11.904
Hh head is widowed	13.233	1.4449*	0.9978
	(0.2203)	(0.2145)	(0.1684)
Hh head is divorced	2.1841*	0.6391	0.7080
	(0.7613)	(0.2813)	(0.3117)
Hh head is separated	12.818	3.2453**	4.2990***
	(0.7473)	-12.680	-16.828
Hh head has no educ	2.4341***	1.2053*	1.6026***
	(0.2100)	(0.1041)	(0.1453)
Hh head has secondary educ	0.4256***	0.6931***	0.4812***
	(0.0403)	(0.0581)	(0.0387)
Hh head has post sec educ	0.1229***	0.4873***	0.1154***
	(0.0273)	(0.0629)	(0.0224)
Hh head is unemployed or retired	2.8740***	4.0829***	0.6134**
	(0.4170)	(0.5301)	(0.1061)
Hh head is gov/defense staff	0.3505**	0.6977	0.2409***
	(0.1135)	(0.1674)	(0.0869)
Hh head is skilled professional	0.3912***	0.8406*	0.6434***
	(0.0453)	(0.0708)	(0.0561)
Household Characteristics			
Hh belongs to ethnic minority	0.0784***	0.2721***	0.1700***
	(0.0082)	(0.0299)	(0.0184)
Presence of hh members in ill-health in working age (16-59)	10.199	1.2244***	0.9360
	(0.0508)	(0.0547)	(0.0477)
Presence of children 5-	0.7207*	0.7322*	11.788

11 years			
	(0.1051)	(0.0998)	(0.1705)
Presence of children >11 years	0.7947	0.6627**	13.077
	(0.1267)	(0.1027)	(0.2050)
<25%	0.6261**	0.6906**	0.6953*
	(0.0897)	(0.0799)	(0.0987)
40-50%	1.5260***	10.188	1.4788***
	(0.1743)	(0.1080)	(0.1642)
>50%	2.4724***	1.2840**	1.8754***
	(0.2303)	(0.1075)	(0.1711)
Locational Characteristics			
Household is located in rural area	5.5023***	3.0361***	2.3204***
	(0.7301)	(0.2816)	(0.2465)
Red River Delta	0.7408	0.5401***	1.4598**
	(0.1279)	(0.0891)	(0.1761)
North East	1.4187*	1.5871**	10.958
	(0.2243)	(0.2488)	(0.1506)
North West	3.5652***	2.8400***	14.012
	(0.7379)	(0.6247)	(0.2872)
North Central Coast	2.4682***	12.128	2.6514***
	(0.3804)	(0.1965)	(0.3260)
Central Highlands	1.8978***	1.9933***	12.180
	(0.3091)	(0.3212)	(0.1736)
South East	0.7919	1.4535*	0.2881***
	(0.1292)	(0.2143)	(0.0464)
Mekong River Delta	2.5359***	6.6252***	0.3079***
	(0.3660)	(0.8730)	(0.0500)
Pseudo R-Square	0.2508		
chi2	6.6e+03		
p	0.0000		

Source: Authors' calculations from VHLSS 2006
Note: reference categories are: Hh head is married, Hh head has primary education, Hh head is unskilled worker, 25-39% proportion of children in household, region is South Central Coast

The association found between a number of micro-determinants and their impact on a child's risk to belong to a specific poverty group can provide an indication of the underlying drivers for participation in the specific poverty groups. Children that face the highest risk to be both monetary and multidimensionally poor are those living in households headed by single or uneducated individuals, living in households with a large proportion of children, rural areas and mountainous regions. As children characterized by these factors are identified as poor by both poverty measures, they could be considered to be the "ultra-poor" and the most vulnerable group of society. Their situation provides them with little options for mitigating the effects of poverty and could be considered a special focus group in terms of targeting of poverty reduction policies. Findings also point towards factors that increase a child's risk to be identified as multidimensionally poor but do not impact or even decrease the

probability to be identified as monetary poor and vice versa. Whilst children in households with widowed heads are especially prone to experience only multidimensional poverty, children in households with separated heads have a relatively higher risk of being only monetary poor. Widowed heads of households seem thus to be better equipped to protect their child from monetary poverty rather than multidimensional poverty. An underlying explanation for this difference could be monetary social welfare schemes that provide benefits to widows that make children in households headed by widows less vulnerable to poverty in monetary terms but not with respect to other areas of well-being. But also cultural attitudes towards lone-parent households resulting from widowhood or separation and the degree of social acceptance of these situations might play a role. Specific monetary welfare schemes might also explain the relatively higher multidimensional poverty risk for children living in households headed by unemployed or retired workers, whilst they experience a smaller chance to be monetary poor. Findings also have implications in terms of regional identification of poverty, especially with respect to the Mekong River Delta. Results clearly show that children living in this region have lower risk to be only monetary poor than not to be poor at all. However, the risk to being only multidimensionally poor is 6 times higher than not being poor. Clearly, geographical issues are an important factor causing children to be prone to experience multidimensional poverty despite income levels above the monetary poverty line.

Conclusion

This paper aimed to investigate whether the use of monetary and multidimensional poverty measures results in different outcomes with respect to child poverty in Vietnam. We compared the magnitude of poverty as well as groups of poverty when using two poverty measures that each has a distinct conceptual and theoretical foundation. Furthermore, we attempted to investigate the factors and underlying drivers that cause children to be captured by none, one or both of the poverty measures. The study's findings have implications for the academic field of poverty measurement as well as policy arena. Generally, findings suggest that monetary and multidimensional poverty methods geared towards the measurement of child poverty draw a different picture, leading to diverging conclusions about the situation of children in Vietnam and appropriate policies to respond. The notion that monetary and multidimensional poverty measures provide different outcomes in terms of the

size as well as groups of poverty is not new and has been established in previous research. Nevertheless, such an analysis has not yet been conducted with a special reference to children and with the current set of methods used. Nor have previous studies attempted to move beyond the finding that there is a mismatch of poverty and to extend the analysis to gain an understanding of underlying factors that drive this mismatch.

The analysis in this paper clearly points towards differences in poverty outcomes when using a monetary versus multidimensional approach. The case study of Vietnam reveals that demographic profiles on the basis of either one of the poverty measures is different. Various tests of the capability of one poverty approach to differentiate poverty in terms of the other approach lead to the conclusion that the monetary poverty approach can not serve as a proxy for multidimensional poverty and vice versa. The degree of correlation between monetary and multidimensional poverty as well as monetary poverty and poverty in separate domains proves to be limited. An ROC analysis underlines these findings and indicates that the monetary child poverty measure is a poor predictor of multidimensional child poverty and conversely. Furthermore, we find that the mismatch in the identification of child poverty using both approaches is considerable with the existence of a large group of children exclusively identified as multidimensionally poor and a group of children that is only captured by the monetary measure.

The attempt to gain an understanding of the underlying drivers of the mismatch of poverty is what moves the current analysis beyond existing research. We find that, despite low levels of correlation, the income of children that are identified as poor by only one poverty measure is skewed towards the poverty line. The majority of children that are only monetary poor suffer poverty in one domain of the multidimensional poverty measure and have an income just below the monetary poverty line. By the same token, children that are only multidimensionally poor have the highest domain poverty incidence rates and have levels of income skewed towards the poverty line. Children that are identified as both monetary and multidimensionally poor can be considered to be the ultra-poor as their depth of monetary and multidimensional poverty is larger than the poverty depth of children identified by only one of the poverty measures. Analysis of the mutually exclusive groups as

formed by the monetary and multidimensional approaches allows for the identification of specific factors that increase a child's risk to be identified as exclusively multidimensionally poor, exclusively monetary poor or both.

The general finding that there is a considerable mismatch of poverty and that different groups of society are affected differently by this mismatch has important implications for the academic and policy debate. With respect to academia, this paper illustrates that the underlying conceptual and theoretical differences between poverty approaches are matched by diverging empirical outcomes, also in the case of child poverty. The use of a specific poverty measure for any type of analysis referring to children requires careful consideration with awareness that outcomes are likely to diverge when a different measure is applied. The value of this paper with respect to the policy debate is two-fold. On the one hand, findings suggest that policy monitoring and evaluation efforts can provide different pictures when based on just one of the child poverty measures. The choice of a specific poverty measure could be used to the advantage of a specific policy and bias results in favor of the policy under consideration and vice versa. On the other hand, the analysis points out that targeting on the basis of one poverty measure has perverse effects for those identified as poor by the other poverty measure and vice versa. Targeting on the basis of a single poverty measure automatically implies that those individuals only identified as poor by another measure are excluded. Furthermore, findings suggest that specific demographic groups in society are more or less prone to be identified as poor by only one or both of the approaches, implying that policies targeted on a single measure of poverty are biased towards specific demographic groups of children. This paper's attempt to gain a deeper understanding of the factors underlying the risks to be more or less likely to belong to a specific poverty group indicated that there are indeed a number of underlying characteristics that influence poverty group participation. Knowledge and awareness of these underlying factors is another important issue in terms of policy design as it might prevent unintended consequences of targeting on the basis of a specific poverty measure. An in-depth analysis of the characteristics impacting the probability to be identified by either one or more poverty measures provides a more detailed understanding of the demographic groups at risk and underlying processes contributing to that risk. Further research is necessary to investigate these underlying processes and their effect on the most vulnerable groups

in society. Moreover, further research efforts should be directed towards the consolidation of monetary and multidimensional approaches in such a way that they provide consistent and coherent outcomes.

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Annex 1 Domains and indicators multidimensional child poverty approach for Vietnam

Domain	**Indicators**	**Definition of indicator**	**Definition of threshold and remarks on indicator definition**
Education poverty	Enrollment poverty rate	children in age 5 not attending pre-school as a percentage of all children in age 5	Age definition used for calculating net enrollment rate per level of schooling: taking into account birth date and start of school year, including over-achieving children that are in a higher grade than appropriate for their age
		children in age 6-10 not attending primary school as a percentage of all children in age 6-10	
		children in age 11-15 not attending lower primary school as a percentage of all children in age 11-15	
	Completion poverty rate	children in age 11-15 that have not completed primary education as a percentage of all children 11-15	All children aged 11-15 at the time of interview are considered vulnerable when they have not completed primary school
Health poverty	Health visit poverty rate	Children in age 2-4 not having visited a professional	Professional health facilities include village health center,

		health facility in the last 12 months as a percentage of all children aged 2-4	commune health center, regional general clinics, district hospital, provincial hospital, central hospital, other state-owned hospital, private hospital, other hospital and private clinics. Traditional herb doctors and other health centers are excluded
Shelter poverty	Electricity poverty rate	children living in a dwelling without electricity as a percentage of all children in age 0-15	-
	Housing poverty rate	children not living in proper housing as a percentage of all children in age 0-15	Proper dwellings include villas, strong houses with private and shared facilities and semi-permanent houses. Shift-made or other houses are considered improper dwellings
Water and Sanitation poverty	Sanitation poverty rate	children living in a dwelling without a hygienic sanitation facility as a percentage of all children in age 0-15	Hygienic sanitation includes flush toilet, suilabh and double vault compost latrine. Toilets directly over water, other facilities or no toilet are considered unhygienic.
	Water poverty rate	children not drinking safe drinking water as a percentage of all children in age 0-15	Safe drinking water sources include private tap water from inside and outside the house, deep drill wells, hand-dug and reinforced wells, hand-dug, non-reinforced and covered wells, protected springs, rain water and bought water Unsafe drinking water includes unprotected springs, small water tank, water tank, rivers, lakes and ponds and others
Child work	Child work rate	children age 6-15 that have worked for an employer or in household production in the last 12 months as a percentage of all children in age 6-15	Child work includes having worked for wage/salary, household production or trading or business for the household regardless of the number of hours or days worked
Social Inclusion and Protection poverty	Caregiver poverty rate	children in age 0-15 living in households with heads that do not work due to disablement or old age, age 0-4	Includes heads of household that can not work due to disablement, old age/retirement.

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