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Multidimensional poverty in Vietnam

Evidence from a rural household survey

Hoang Xuan Diem[1] and Tran Van Hoang[2]

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Abstract: For years, the international development community has been considering poverty as a multidimensional phenomenon, which takes into account not only income or consumption of the poor, but also their access to basic needs (education, health, etc.) and resources (credit, social network, etc.). In Vietnam, since 2016, the Government has adopted the multidimensional approach to thoroughly measure poverty. This paper is an attempt to assess the state and evolution of multidimensional poverty in the rural areas of Vietnam, using data from the Vietnam Access to Resources Household Survey 2008–16. Results show remarkable improvement of the living conditions in the rural areas, with a greater pace shown among the ethnic minority groups. However, there need to be more efforts to reduce the gap in poverty headcount ratios among Kinh and non-Kinh groups, households with male and female heads, and among households in different provinces. Some of the main suggestions to reduce multidimensional poverty in Vietnam is to increase households' access to health care services, education, clean water and hygienic latrines, and to improve the presence of such service providers near the households' locations.

Keywords: multidimensional poverty, rural household survey, Vietnam

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[1] Department of Rural Development Policies, Central Institute for Economic Management (CIEM), Hanoi, Viet Nam, corresponding author, email: hxdiem@mpi.gov.vn; [2] Department of Development Economics, Vietnam Institute of Economics (VIE), Hanoi, Viet Nam.

1   Introduction

One of the most remarkable achievements of Viet Nam since *Doi Moi* (1986) should be attributed to poverty reduction. From 1993 to 2008, more than 43 million people in Viet Nam were lifted out of poverty. The depth (poverty gap – measures the average gap between the living standards of the poor and the poverty line) and severity of poverty (squared poverty gap) all dropped sharply during this period (World Bank, 2012). Until 2015, the share of poor population was just around 5 per cent, a dramatic decrease from 58.1 per cent in 1993 (the Government of Viet Nam, 2015; World Bank, 2012). However, there is still much to be done to sustain poverty reduction in Viet Nam. A study using data from the Viet Nam Household Living Standard Survey (VHLSS) shows that the percentage of non-poor households in 2010 falling back into poverty in 2012 accounted for 30 per cent of the total number of poor households in 2012 (Le et al. 2014). The report by the World Bank points out that the poor in Viet Nam are mostly concentrated in rural areas, especially in mountainous provinces and among the ethnic minority (World Bank, 2012). A recent study by Andy McKay and Tarp (2017) shows that, while the overall welfare (in terms of food expenditure, income, and asset ownership) has been improved in rural areas of Viet Nam from 2006–14, many households experienced a worse situation. In addition, the ethnic minorities are facing a lot of disadvantages compared to the Kinh and Hoa people in Viet Nam (World Bank, 2012; Tarp, 2017).

In order to achieve inclusive growth, poverty reduction should still be placed as a policy priority for Viet Nam. Effective intervention measures should be drawn based on an appropriate identification of who is poor, how severe their conditions are, and what obstacles they are facing. The traditional approach measures the poverty rate using monetary indices (either income or expenditure). The rationale for this approach is that 'all the attributes of basic needs can be purchased on markets and expressed in monetary terms' (Roelen, 2010), and it is quite a straightforward measurement. However, not all markets are available (such as some public goods) nor function well for the poor (such as formal credit), especially in rural and remote areas (Thorbecke, 2005). Lack of access to these goods and resources might be the main cause of prolonged poverty in the rural areas and among the ethnic minorities. In addition, many aspects of poverty are ignored—such as health, community participation or security—if one only focuses on things that can be purchased (Alkire and Foster, 2011). For these reasons, the international development community has been considering poverty as a multidimensional phenomenon, as introduced in the 1997 Human Development Report, the 2000/1 World Development Report, and the Millennium Declaration and MDGs since 2000 (Alkire and Foster, 2011). Bourguignon and Chakravarty (2003) identify the poor as 'a short fall from threshold on each dimension of an individual's well-being'.

In Viet Nam, there has been an increasing concern about the multidimensional approach to poverty. Baulch and Masset (2003) use two waves of the Viet Nam Living Standard Surveys (1992/3 and 1997/8) to investigate whether monetary and non-monetary indicators (nutritional poverty and educational poverty) tell the same story about chronic poverty in Viet Nam. The study found that monetary poverty is less persistent than child stunting, adult malnutrition, and educational poverty (primary and lower secondary school enrolments). In addition, the overlap between monetary and non-monetary poverty is quite low.

Roelen (2010) uses VHLSS 2004–08 to calculate multidimensional poverty (MDP) for children. The study found that 16 per cent of all children are chronically poor, and the deprivation of health and child labour contribute highest to MDP. Children in the rural areas, especially in the North West region, and among ethnic minorities face the biggest risks to chronic poverty.

Le et al. (2014) apply the method of Alkire and Foster (2011, 2007) and household data from VHLSS 2010 and 2012 to measure the multidimensional poverty index (MPI). They consider five dimensions of well-being, including health, education, insurance and social support, living conditions, and social participation. The results show that the multidimensional poverty (MP) rate decreased within two years of study and the Mekong River Delta ranked lowest in terms of MP. In addition, the deprivation of 'social insurance and social assistance' contributes the most to the total MPI of Viet Nam.

Tran et al. (2015) also look at the static and dynamic difference between monetary and non-monetary (multidimensional) poverty. The paper applies the Alkire-Foster method to examine MP of 2000 households in Ha Tinh, Thua Thien Hue and Dak Lak in a longitudinal survey conducted in 2007, 2008, and 2009. The results show very low static and dynamic correlations between monetary and multidimensional poverty. Monetary poverty had been reduced much more than multidimensional poverty, and even the income non-poor groups were all facing the risk of being multidimensionally poor.

Saurabh and Ulrik (2017) assessed the disadvantages of non-Kinh groups, using data from the Viet Nam Access to Resources Household Survey (VARHS) 2008–14. Their analyses show that the ethnic minorities of Viet Nam are lagging behind the Kinh people not only in terms of income and consumption, but also in other indicators of living conditions, such as access to clean water, hygienic latrines and asset ownership. The minority groups, on average, hold arable lands of lower quality and less legally registered. They also face more difficulties in commercializing their agriculture output and in accessing credit.

Since 2016, the government of Viet Nam decided to apply the multidimensional approach to monitor poverty situation (Decision no. 59/2015/QD-TTg). Five dimensions consisting of 2 indicators in each domain are identified reflecting households' access to services, including: education, health care, housing, clean water and sanitation, and information. However, both income and MPI are chosen to determine poor households in Viet Nam since 2016. For example, in the rural areas, poor households are those that either: (1) have per capita a monthly income equal to or less than VND700,000 or; (2) have per capita a monthly income from above VND 700,000 to VND 1,000,000 and be deprived of 03/10 indicators in the MPI measurement. The new approach requires the statistics office to supplement more questions to their annual living standard surveys to identify poor households based on new criteria.

This paper aims at contributing to studies on poverty in Viet Nam by measuring multidimensional poverty of the rural areas of Viet Nam, using data from VARHS 2008–16. The survey provides a unique panel data covering not only income and expenditure of rural households, but also other issues like health, education, access to resources (credit, land, insurance, social network). However, the primary purposes of VARHS do not target to measure MP of Viet Nam. Therefore, the information provided in VARHS does not neatly suit to measure MPI following international indicators or Vietnamese indicators. In this situation, we need to make such modifications to some specific indicators whilst trying to pursue compatibility with international and national standards. The first part of this paper will calculate the MPI of twelve rural provinces in VARHS, following the Alkire and Foster (2011) methodology. The paper will compare changes in the MPI and changes in monetary poverty over the course of the period. The third part of this paper attempts to find a correlation among different variables and the probability of being multidimensionally poor.

2   Methodology

2.1   MPI measurement

This paper follows the methodology suggested by Alkire and Foster (2011) to measure MP of Viet Nam. Let n be the number of households (HHs) in the sample and $d \geq 2$ be the number of dimensions under consideration. These dimensions reflect basic needs of people such as education, health, living condition, insurance and social assistance, among others. Let z_j be the deprivation cut-off in dimension j (a HH is considered to be deprived in dimension j if its attribute in this dimension is bellow z level). Let w_j denote the weight of indicator j so that $0 < w_j < 1$ and $\sum_{j=1}^{d} w_j = 1$. Let $y = [y_{ij}]$ denote the nxd matrix of achievements, in which a component y_{ij} is the achievement of a person i in dimension j. For any given y , let $g^o = [g^o_{ij}]$ denotes the nxd matrix of deprivation associated with y, $g^o_{ij} = w_j$ when $y_{ij} < z_j$, and $g^o_{ij} = 0$ otherwise.

From the matrix g°, we will construct a column vector c in which $c_i = \sum_{j=1}^{d} g^o_{ij}$ is the sum of weighted deprivations suffered by HH i. Let $0 < k < 1$ be the poverty cut-off level. A HH is considered to be poor if its weighted deprivation count (c_i) is greater than or equal to k. Let ρ_k denote the poverty situation of a HH, in which $\rho_k = 1$ if $c_i \geq k$ and $\rho_k = 0$ if $c_i < k$. A HH is poor ($\rho_k = 1$) when the number of dimensions in which that HH is deprived is at least k or greater than k; and a HH is non-poor if the number of dimensions it is deprived is smaller than k.

The multi-dimensional poverty headcount ratio, which represents the incidence of poverty in the sample, is the ratio of the total number of multi-dimensionally poor HHs over the total number of the HHs in the sample. Accordingly, H is measured as:

$$H = \frac{\sum_{i=1}^{N} \rho_k}{N} = \frac{q}{N}$$

in which q is the number of poor HHs. However, H index alone does not reflect the number of dimensions that a HH is deprived of. For example, H does not change when some HHs become deprived in one more dimensions. Another index A could help to measure the deprivation of poverty, which takes into account the number of dimensions that each HH is deprived of. First matrix $g^o(k)$ is constructed by replacing its ith row of matrix g^o with a row vector of zeros whenever $\rho_k = 0$. This matrix contains the weighted deprivations of all HH that are identified as poor and exclude deprivations of the non-poor. Based on this matrix, we construct a censored vector of deprivation counts $c(k)$ which differs from vector c in that it counts zero deprivations for those not identified as multidimensionally poor. Then A is calculated as the ratio between the number of deprivations faced by the poor HHs, $|g^0(k)|$ and the number of poor HHs:

$$A = \frac{|g^0(k)|}{q}$$

According to Alkire and Foster, M_0 is defined as the adjusted multidimensional headcount ratio, or the multidimensional poverty index (MPI). M_0 is calculated as:

$$M_0 = HxA$$

The MPI index takes into account not only the share of the poor HHs but also the intensity of poverty experienced by them.

2.2 Dimensions, indicators, deprivation cut-offs, and weights

This section constructs the MPI index following the international approach, which was presented in the *Human development report 2010*. However, certain indicators might be modified to suit the available information in our dataset. Three dimensions are taken into account: education, health, and living conditions.

In the *education dimension*, we use two indicators: (1) child education; and (2) adult education. A HH is considered to be deprived in child education if there is at least one child aged from 7 to 15 not attending school at the time of the survey. For adult education, since 2001, the Vietnamese Government issued Decree no. 88/2001/ND-CP to implement universal lower high school education on a national scale.[1] Benefiting from this policy, students do not have to pay tuition fees until they finish lower high school. Besides, there are also many other short-term and long-term vocational training programs for people to get some training for the labour market. Therefore, we consider a HH to be deprived of adult education if all adult members (older than 15) are not currently attending school, not finished 9 years of education (or finish secondary school), and do not have any diploma (or vocational training). In other words, a HH is considered not to be deprived of adult education if there is at least one adult member who is currently attending school, or has finished 9 years of education, or has a diploma.

In the *health dimension*, we use two indicators: (1) access to health services; and (2) health functioning. A HH is considered to have access to health services if at least one member over 6 years old has health insurance (this also includes free health insurance for the poor). We do not count free health insurance for children.[2] The international approach examines nutrition of HH members (a HH is deprived of this indicator if any adult or child for whom there is nutritional information is malnourished). However, as we do not have that information in VARHS, following Tran et al. (2015), we consider a HH is deprived of health functioning if at least one of its adult members had any disease or injury during the 12 months prior to the survey and was unable to perform normal activities for more than 4 weeks.[3] Selection of this indicator is based on our presumption that if the HH provides good nutrition and other living conditions to its members, and if the HH received good health care services during the time, then they are less likely of being sick or/and they are more likely to recover more quickly and have shorter time being affected than the poorer.

In the *living condition dimension*: we look at the housing conditions (materials to construct wall, roof, and floor) and the average area of the house per member; access to clean water and sanitation;

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[1] http://www.moj.gov.vn/vbpq/lists/vn%20bn%20php%20lut/view_detail.aspx?itemid=22998 (accessed on 20 September 2018).

[2] In Viet Nam, children from 6 years old and younger are provided free health insurance. This was first implemented since 2006.

[3] The VARHS does not collect this information for members aged 6 years or younger.

access to information (whether the HH owns one of the assets to access to information like TV or radio); whether the HH have access to ICT services – have a phone (mobile or land) or have access to internet (either at home, at the office or from an internet café); transportation (whether the HH owns any means of transportation like bicycle or motorbike); energy for cooking (whether the household cooks with good and clean fuels).

A detailed explanation of the indicators and their weights is presented in Table 1. For the overall deprivation cut-off, we apply the same cut-off levels as OPHI (2014) and Viet Nam: a HH is considered to be poor if it is deprived of at least 1/3 of the indicators (or k=0.33).

3   Data

The paper exploits VARHS data from 2008–16. More than 2,000 HHs are surveyed repeatedly in each round in the rural areas of twelve provinces (Dak Lak, Dak Nong, Dien Bien, Ha Tay, Khanh Hoa, Lai Chau, Lam Dong, Lao Cai, Long An, Nghe An, Phu Tho and Quang Nam). Our paper only considers the HHs that appear in all five survey rounds, and after dropping all the missing observations, we have a balanced panel data of 2,131 HHs.

Figure 1: Locations of the sampled households
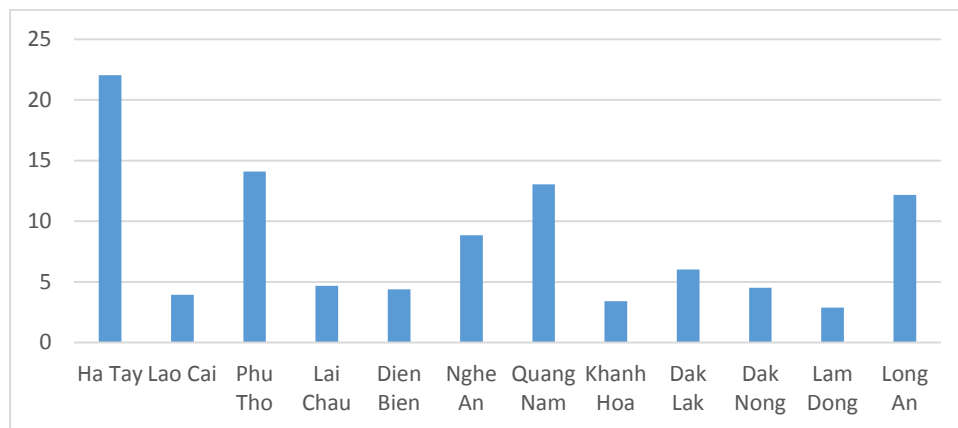
Source: VARHS 2008–16.

As shown in Figure 1, a higher proportion of HHs is located in such provinces like Ha Tay (22.03 per cent), Phu Tho (14.9 per cent), Quang Nam (13.04 per cent) and Long An (12.17 per cent). These provinces, to some extent, have better living conditions than other provinces in the mountainous areas like Lao Cai, Lai Chau, and Dien Bien; or the central high land (Dak Lak, Dak Nong, Lam Dong) (Tarp, 2016).

In the sample, the HHs belonging to Kinh ethnicity account for almost 80 per cent of the total households. As many reports have pointed out, Kinh people are much better off than the non-Kinh in several aspects of living conditions and access to services. Therefore, in our paper, we will compare the MPI between Kinh and non-Kinh group. In rural Viet Nam, most of the HHs are headed by a man (nearly 80 per cent), and have a mean size of 4.2 members per household (median size is 4 people) (see Figure 2 and Figure 3).
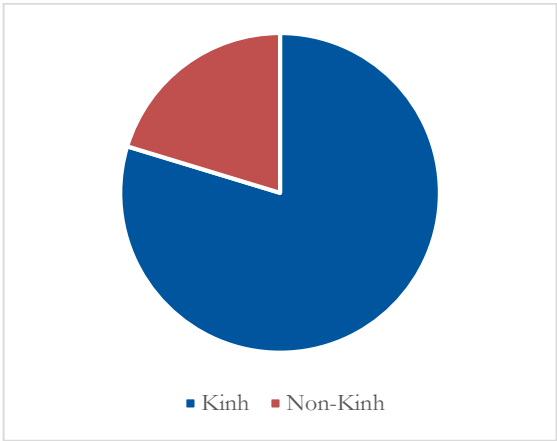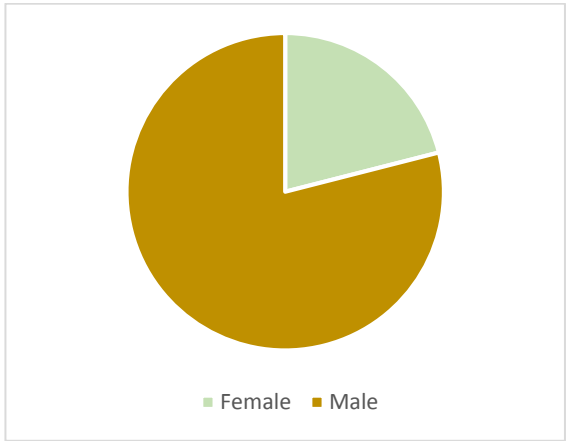
Figure 2: Share of Kinh households   Figure 3: Gender of the household head

Kinh ■ Non-Kinh

Female ■ Male

Source for both figures: VARHS 2008–16.

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Table 1: Dimensions, indicators, cut-offs and weights

Dimensions	Indicators	Deprived if…	Weight
Health	Health insurance	No family members older than 6 have health insurance	1/6
	Health functioning	At least one adult member is sick or has injuries and is not able to perform normal activities for at least 4 weeks (during the last 12 months)	1/6
Education	Child education	At least one child in the household, aging from 7 to 15, is not attending school	1/6
	Adult education	No household members (older than 15) are attending school/have finished lower high school/have a diploma	1/6
Living condition	Housing quality	At least 2/3 parts of the house (roof, floor, wall) are made from impermanent materials[1]	1/24
	Housing area	The average housing area per person is less than 8m2[2]	1/24
	Clean water	The household does not have access to clean water/ or has access to clean water but it takes more than 30 minutes for a round trip from the house to get clean water[3]	1/24
	Sanitary	The household does not have a hygienic latrine[4]	1/24
	Assets to get information	The household does not have TV (color or black and white) or radio	1/24
	Phone	The household does not own phones (mobile/land)	1/24
	Cooking fuel	The household still cooks with wood or other sources of energy (not electricity, kerosene, coal or natural gas)	1/24
	Transportation	The household own no means of transportation like bicycles, motorbikes, cars	1/24

Notes:

(1) Un-permanent roof materials include: straw, leaves, wood, canvas, tar paper, panels and others (apart from Galvanized iron, tile, concrete and cement). Un-permanent wall materials include: leaves, branches, bamboo, wood, galvanized iron, earth and others (apart from unfired brick, fired brick, stone, concrete). Un-permanent floor materials include: bamboo, wood, earth, lime and ash.

(2) VARHS questionnaire asks the square meters of the household, including bedrooms, dining rooms, living rooms and study rooms (excludes bathrooms, toilets, kitchens, storage rooms, rooms used primarily for business activity). The threshold of 8m2/person is adopted by the Vietnamese instruction on how to calculate MPI for Viet Nam (Decision no. 59/2015/QD-TTg, 19/11/2015).

(3) Unsafe water comes from these sources: water from hand-dug, non-reinforced and uncovered wells; water tank; spring water; river, lake, pond, rain water and others.

(4) Hygienic latrines include these types of latrines: toilet directly over the water, no toilet, or others (apart from flush toilet with septic tank/sewage pipes; suilabh (squat toilet); double vault compose latrine).
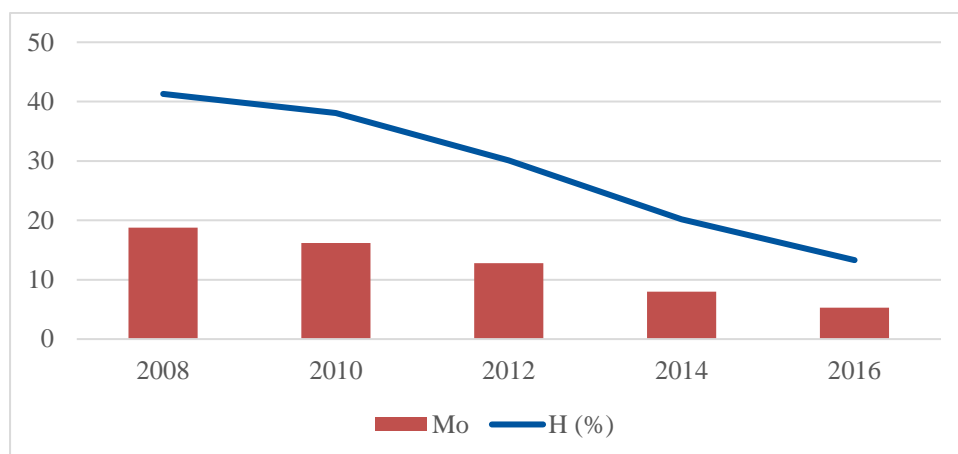
Source: Authors' own.

4 Results

4.1 Evolution of MPI from 2008–16

Figure 4 presents the head count ratio (H) and multidimensional poverty index (M) using balanced panel data of VARHS from 2008–2016. Overall, it can be seen that there is substantial improvement in the living conditions in the rural areas of Viet Nam during the course of the study as the poverty headcount ratio and MPI were both on a decreasing trend. The poverty headcount ratio of the whole sample decreased from 41.3 per cent in 2008 to 13.3 per cent in 2016. The MPI also decreased steadily from 18.8 in 2008 to 5.3 in 2016. These figures imply that the A index remained quite stable during the period. Therefore, though the percentage of multi-dimensionally poor HH is falling, the depth of deprivation has not been improved much. In other words, there is a progress in lifting households out of poverty but the conditions of the poor HHs still remain unchanged.

Figure 4: Evolution of H and MPI over time, 2008–16

Source: Authors' calculations.

Taking into account the ethnicity of the HH's heads, we get the result that the Kinh group have much better living conditions and access to basic needs than the non-Kinh group. This result reconfirms findings from other studies that the Kinh group are much better off than the non-Kinh group in Viet Nam. The percentage of Kinh HHs being multi-dimensionally poor decreased from 33.2 per cent in 2008 to 12 per cent in 2006. The non-Kinh group, though started with much worse conditions, experienced more spectacular improvement in their living conditions. Their poverty rate fell sharply from 72.8 per cent in 2008 to 18.5 per cent in 2016. Over the whole period, it can be seen that the gap between the Kinh and non-Kinh groups was being narrowed. The MPI of the Kinh HHs was also going down from 14.7 in 2008 to 4.8 in 2016. Meanwhile, the MPI of the non-Kinh HHs decreased from 34.5 to 7.3. The closing gap between Kinh and non-Kinh groups, to some extent, shows effects of targeted programs launched by the Vietnamese government to eliminate poverty in the remote, mountainous, and disadvantaged areas where the majority of the ethnic minorities live. The similar pattern in the downward trend of H and MPI between the two groups, and the relative gaps among them, show that the severity of poverty (represented in A index) is quite similar among the two groups.

It is interesting to compare our results with other studies on multi-dimensional poverty of Viet Nam. Le et al. (2014) use five dimensions to calculate MPI for the VHLSS 2010–12, and with the cut-off level k=0.33, get a headcount ratio of 52 per cent in 2010 and 49 per cent in 2012 for the

whole country. Tran et al. (2015), using a three-dimensional approach (though the individual indicators are different from ours), with data from a survey in 3 provinces (Ha Tinh, Thua Thien Hue and Dak Lak) in 2007, 2008 and 2010, get the poverty headcount ratio (cut-off $k=0.3$) of 35.8 per cent in 2008 and 32.7 per cent in 2010, which is quite similar to our results. However, any comparison is not completely reasonable as each study uses different data sets with different indicators, dimensions and weights. It only shows that there is a general improvement in the living standards of the HHs of Viet Nam.

Figure 5: Evolution of H and MPI by ethnicity, 2008–16
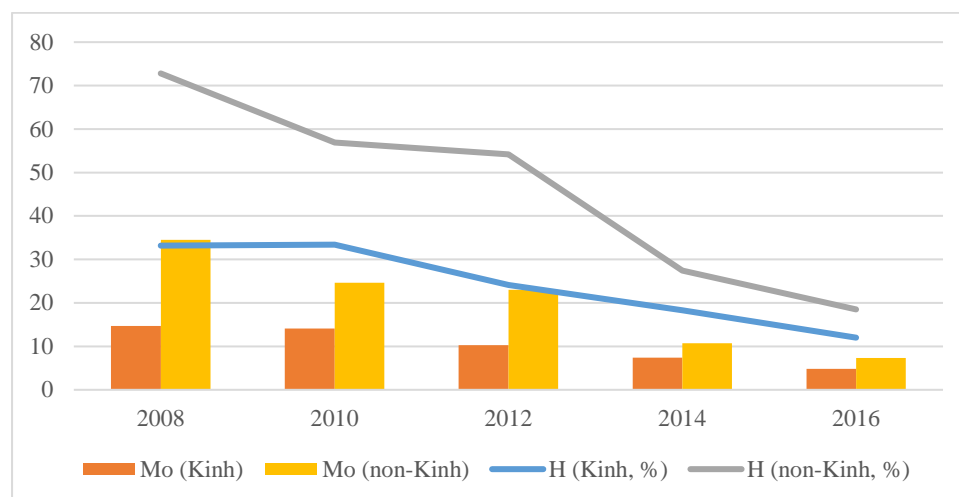
Source: Authors' calculations.

Figure 6 provides information about changes in poverty headcount ratio in each province during period 2008–16. It can be seen that all provinces experienced significant progress in poverty reduction from 2008–16. Among these provinces, Ha Tay and Quang Nam have the lowest percentage of poor HHs during the whole period. Quang Nam, since 2010, has seen a significant drop in MPI from 15.1 to 4.1. However, the most remarkable improvement is recorded in Lai Chau, where the poverty ratio was highest in 2008 (88.8 per cent), then fell dramatically to 15.9 per cent in 2016. In addition, it can be seen that, provinces that have quite high poverty rates are Dien Bien, Lai Chau, Lam Dong and Long An (poverty rates in 2016 of these provinces are all greater than 15 per cent).

Figure 6: Evolution of H, by Province, 2008–16
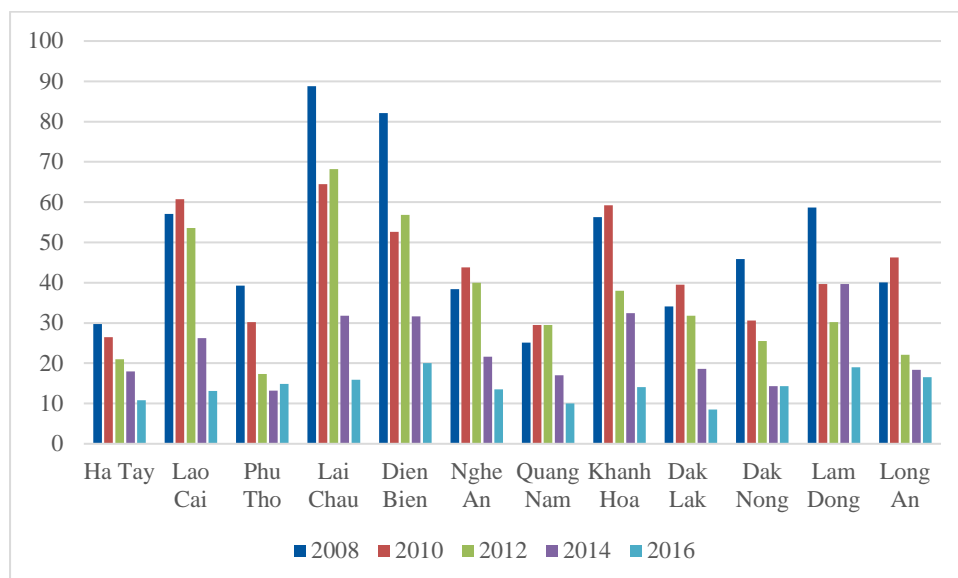
4.2   Contribution to MPI

Figure 7 provides information on the contribution of each dimension to the overall MPI. It can be seen that the health dimension contributes more than 50 per cent while education contributes the least to MPI. Further breakdown of the contribution of each indicators in these dimensions will reveal which ones are responsible to such contribution of each dimension:

Figure 7. Contribution of each domain to MPI, %
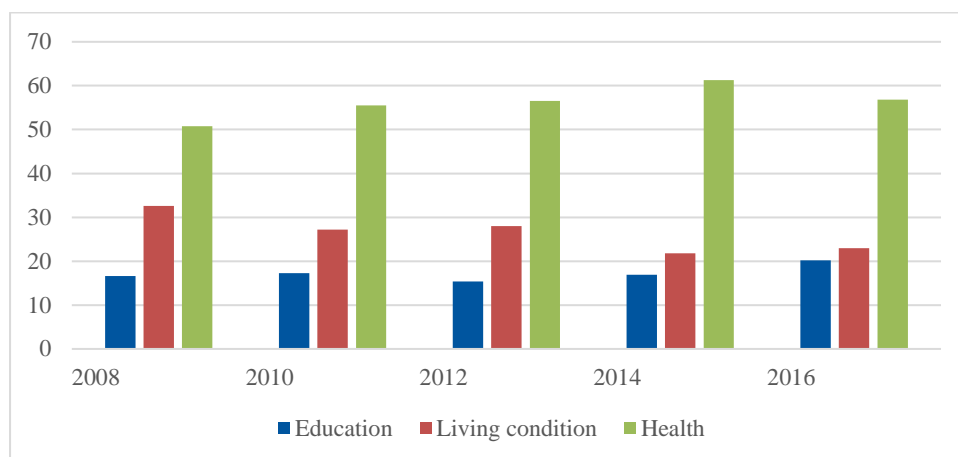
Table 2: Contribution of each indicator to MPI, %

	2008	2010	2012	2014	2016
Adult education	11.1	12.3	12	12.7	15.6
Child education	5.5	5.0	3.4	4.2	4.7
Housing area	2.1	1.6	1.5	1.1	1.0
Housing quality	3.7	2.9	3.1	2.4	2.4
Clean water	3.2	3.1	3.7	2.7	3.1
Hygiene Sanitary	5.7	4.7	4.9	3.5	3.5
Asset to get information	1.5	1.2	1.4	0.9	1.6
ICT services	6.3	4.3	3.5	2.3	2.4
Means of transports	2.0	1.9	2.4	2.1	2.9
Cooking fuel	8.3	7.6	7.7	6.8	6.1
Health insurance	33.4	35.4	36.0	37.2	30.4
Health functioning	17.4	20	20.5	24.2	26.4

Source: Authors' calculations.

Table 2 shows that the highest contribution to MPI belongs to the health insurance indicator, which is always higher than 30 per cent. In the education dimension, the deprivation rate in adult education is higher than that in child education, leading to a higher contribution of adult education to MPI. In the living condition dimension, HH's accesses to lean water, hygienic latrines, and quality of cooking fuels are worst compared with other indicators. Table 3 provides more information about the deprivation rates of these indicators over time. Overall improvements are seen in almost all indicators. The percentage of HHs that are classified as poor in terms of adult education decreased from 14.17 per cent in 2008 to 5.25 per cent in 2016. This might be explained by the fact that some adult members of the HHs have managed to have some education (at least a diploma or vocational training). On the other hand, the increase in the deprivation rate might be due to a household unit split, as the adult children of the household heads, who often have better education than their parents, get married and become another independent HH unit or are simply moving. In the living condition dimension, the percentage of HHs that do not have access to clean water, hygienic latrines, or using good cooking fuels are still quite high. Until 2016, 34.87 per cent of the HHs still used poor cooking fuels, 20.13 per cent of them do not have access to clean water and 16.52 per cent still using un-hygienic latrines. In the health dimension, the percentage of HHs that do not have health insurance (not taking into account free health insurance for children under 6) were quite high in period 2008–14 (more than 60 per cent), but the condition was much improved in 2016 (which decreased to 36.41 per cent). The percentage of HHs that have at least one member being sick, who could not perform normal activities for more than 4 weeks, also decreased from 25.57 per cent in 2008 to 17.08 per cent in 2016.

Table 3: Deprivation rates of some selected indicators, %, 2008–16

|	adult education	child education	water	sanitary	cooking fuel	health insurance	health functioning
2008	14.17	6.24	22.15	40.21	75.6	66.35	25.57
2010	12.81	4.97	20.60	33.74	64.57	78.13	22.95
2012	11.07	2.82	20.84	28.25	56.36	63.59	23.42
2014	7.79	2.11	16.47	18.44	49.84	66.92	17.13
2016	8.26	2.06	20.13	16.52	34.87	36.41	17.08

Source: Authors' calculations.

4.3 MPI and income poverty

All the declines in headcount ratio and MPI of each province and ethnicity group in the sample show evidence of the economic development of Viet Nam. This is in line with the progress that Viet Nam has attained during the last decades in terms of income poverty reduction. Nguyen (2016), calculating the rate of income poverty of Viet Nam, using VHLSS data, shows that the overall poverty rate of Viet Nam had decreased from 28.9 per cent in 2002 to 8.4 per cent in 2014. In the meantime, the poverty rate of the rural areas had decreased from 35.6 per cent to 10.29 per cent. We also try to see changes in the income poverty rate using VARHS 2008–16. However, as all monetary variables have been adjusted to the price levels in 2016, we use the poverty line of Viet Nam in 2016 for the whole period to make a consistent comparison, though the figures we get might differ quite a lot with official figures of income poverty calculated by the Ministry of Labour, Invalids and Social Affairs of Viet Nam. In Viet Nam, the Government determines the income poverty line for each 5-year period, so the standards for period 2011–15 and 2016–20 are different[4]. But as one standard is used for 5 years without adjusting to price changes, the poverty rate of Viet Nam often has a 'serration shape', declining in 5 years, then increased suddenly and decreased gradually in the next 5-year period. In this paper, we use the thresholds that a HH is classified as poor if its average income per person per month is less than VND700,000 per month.

Figure 8 illustrates the evolution of income poverty rate from 2008 to 2016. Of the whole sample, it had decreased substantially from 35.19 per cent in 2008 to 10.04 per cent in 2016. However, the Kinh group, on average, appears to have a much higher average income than the non-Kinh group. The poverty rate of the Kinh group was reduced from 28.47 per cent in 2008 to 5.72 per cent in 2016. However, the relevant rate of the non-Kinh group was much higher, and during the same period, it fell from 60.67 per cent in 2008 to 26.77 per cent in 2016. It can be seen that the Kinh group has a higher multi-dimensional headcount poverty rate than the income poverty rate, while it is vice-versa for the non-Kinh group. This inconsistency might imply that income should not fully determine the living standards of the population. Hence, examining the HH's access to basic services are necessary to have a more thorough understanding of the quality of life of the population.

Figure 8. Evolution of income poverty, 2008–16
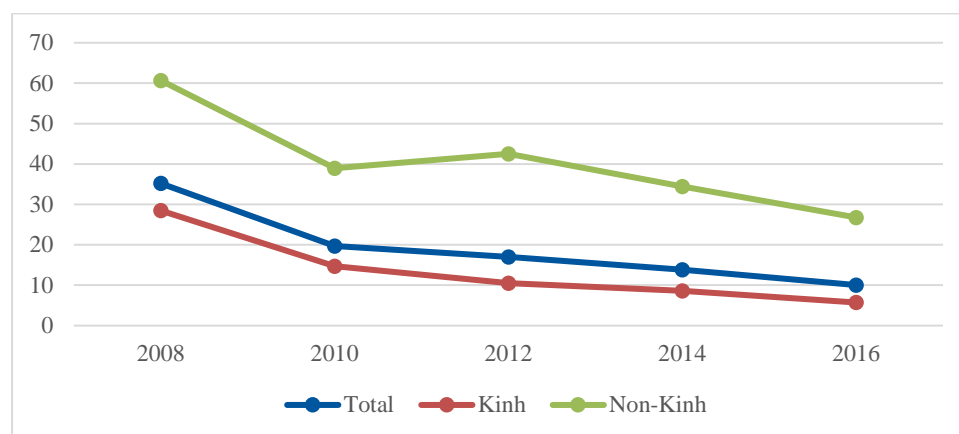
Source: Authors' calculations.

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[4] Poverty line for period 2011–15: average income per person per month in the rural areas is equal or less than VND400,000; For period 2016–20: is equal or less than VND700,000 for the rural areas.

Table 4: Multidimensional and income poverty, 2008, 2016

		2008				
		Non-poor	MP	Income	Both	
2016	Non-poor	845	312	241	281	**1,679**
	MP	73	68	23	74	**238**
	Income	30	35	27	77	169
	Both	7	11	3	24	45
		955	426	294	456	

Note: (i) non-poor: HHs that are not multidimensional or income poor; (ii) MP: HHs that are multidimensionally poor but not poor in terms of income; (iii) income: HHs that are poor in terms of income but not multidimensionally poor; (iv) both: HHs that are both multidimensionally poor and poor in terms of income.

Source: Authors' calculations.

Table 4 provides information about the poverty status of the sample HHs in 2008 and 2016. It can be seen that, after 8 years, the number of non-poor HHs have increased from 955 to 1,679 HHs. At the same time, the number of HHs that are poor either in terms of multidimensional measurement or income measurement or in both measurements have been decreasing significantly. However, within each category, there are still changes in reverse directions. For example, there are HHs that are non-poor in 2008 but falling into MP, income or both in 2016. There are also HHs that are MP in 2008, then manage to escape from this situation but fall into income poverty, and some even become both MP and income poor. This reflects somewhat the unstable conditions of these HHs over time. Hence, the target of sustainable poverty reduction should still be given appropriate concern and effort.

4.4 Correlation between poverty and other factors

In this section, we would like to find correlation between some household characteristics, location of the household, province and year-fixed effects and their poverty status. In order to do it, we run a linear probability regression on a pool data set of VARHS 2008–16. In this regression, the dependent variable is the poverty status of the household ((i) equal to 1 if the household is multidimensionally poor and equal to 0 if otherwise; (ii) equal to 1 if the household is poor in terms of income and equal to 0 if otherwise). The right-hand side of the regression consists of a list of variables, such as the average income per person of the household, gender of the household head, age of the household head, the distance from the household to the Commune People's Committee, to the main road, to the public clinic centre, to the primary and secondary schools, and year and province dummy variables.

$$\Pr(Y_{it} = 1) = \alpha + \beta X_{it} + i.province + i.year + \varepsilon_{it}$$

Table 5: Correlation between poverty and other factors

	MP (1)	Income poverty (2)
HH characteristics		
HH average real income	**-.000(0.000)***	NA
age of HH head	.001 (.001)	.000 (.000)
gender of HH head	-.061 (.012)***	-.029 (.009)***
HH size	-.017 (.003)***	.021 (.002)***
HH head ethnicity	.160 (.016)***	.170 (.014)***
distance to the People's committee	.002 (.003)	-.000 (.001)
distance to the main road	.004 (.002)**	.003 (.001)***
distance to nearest public clinic/centre	.002 (.003)	.004 (.003)
distance to primary school	.003 (.002)	.002 (.002)
distance to secondary school	.004 (.002)**	.003 (.002)
year		
10	-.026 (.014)*	-.148 (.013)***
12	-.106 (.014)***	-.171 (.012)***
14	-.205 (.014)***	-.200 (.012)***
16	-.275 (.014)***	-.236 (.012)***
province		
Lao Cai	.066 (.027)**	.141 (.025)***
Phu Tho	-.026 (.014)*	.051 (.011)***
Lai Chau	.177 (.025)***	.177 (.024)***
Dien Bien	.117 (.027)***	.187 (.025)***
Nghe An	.072 (.017)***	.0778 (.014)***
Quang Nam	-.024 (.014)*	.153 (.013)***
Khanh Hoa	.161 (.026)	.008 (.018)
Dak Lak	.009 (.019)	.014 (.016)
Dak Nong	.021 (.021)	-.012 (.017)
Lam Dong	.100 (.028)***	-.048 (.020)**
Long An	.049 (.015)***	-.018 (.011)*
_cons	.419 (.049)***	.157 (.020)***

Notes: N=10,655

numbers in brackets are standard errors.

***, **, * indicate the statistical significance at 10%, 5% and 1% level, respectively.

Source: Authors' calculations.

The results presented in Table 5 reaffirm the results from previous sections about correlation of poverty and some other factors. In the first model, characteristics of the HHs, such as income, ethnicity, age, gender, and size are statistically important. HH with higher income has lower probability of being MP, though the marginal effect is very tiny. HHs with male heads and HHs with larger size have lower probability of being MP. On the other hand, HH belonging to an ethnicity group have higher probability of being MP. These are quite similar compared to model (2). The age of the HH heads is not significant in both models. In addition, HHs with more members are more likely to be poor in terms of income than the smaller ones.

Regarding location of the HHs, we expect that the closer the HHs are located to the centre area (where information and service providers like the people's committee, road, hospital, primary and

secondary school are concentrated), the less likely that they are poor (as they get more information and enjoy lower transaction costs to access public services). However, results of model (1) show that such variables as distance to the people's committee, hospital, and secondary school are not significant. But HHs living further from the main road and primary school are more likely to be MP. Model (2) shows a similar pattern as HHs located more distantly from the road are more likely to be poor in terms of income.

The year effects show that poverty is reduced more progressively over time. All coefficients of the years since 2010 have a negative effect with larger scale over time and are statistically important at 1 per cent level. For province effects, comparing to Ha Tay, other provinces in the north of Viet Nam show a higher probability of being MP or income poor. The differences are unnoticeable when it comes to provinces in the central and south of Viet Nam as coefficients of these provinces are not statistically significant.

5   Conclusion

This paper is an attempt to measure multi-dimensional poverty of the rural areas of Viet Nam, using a balanced panel data set of VARHS 2008–16. Figures show that the proportion of households that are multi-dimensionally poor has decreased significantly during the whole period. A three-dimensional approach shows a reduction from 41.3 per cent in 2008 to 13.3 per cent in 2016. At the same time, the income poverty rate fell from 32.2 per cent to 10.4 per cent.

The overall picture is very positive, reconfirming economic achievement of Viet Nam in improving its people's living standards. However, disaggregating figures by subgroups, there arises some considerable gaps. The ethnic minority is worse-off than the Kinh group, though they experienced greater improvement during the period. Comparing among provinces, more disadvantaged provinces such as Lao Cai, Lai Chau, Dien Bien, Lam Dong, Dak Nong and Khanh Hoa have higher multi-dimensional poverty indices. Therefore, more social and economic support should be directed to the ethnic minorities and to these provinces. In addition, HHs with female heads also have a higher probability of being multi-dimensionally poor than HHs headed by males. This, to some extent, indicates the presence of gender inequality in the rural areas of Viet Nam.

The component that contributes the most to multi-dimensional poverty is the health dimension, whereas the proportion of households not holding health insurance for adult members remain high, and the percentage of households having serious health problems are also high (compared to other indicators). There should also be support for households to have hygienic latrines, access to clean water, and to find other sources of cooking energy than wood or char coal.

Income of the households does play some role in improving the living standards of the households. Moreover, as households' access to services also depends on the supply side, simple regression shows that location of the household does matter. The further the household resides from the hospital, the main road and primary school, the higher the probability that they are multi-dimensionally poor. Therefore, it is important to increase the presence of these facilities around the households' locations.

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