

Dang, Trang Huyen; Nguyen, Cuong Viet; Phung, Tung Duc

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Trends and Drivers of Inequality: Recent Evidence from Vietnam

Trang Huyen Dang^a

Cuong Viet Nguyen^b

Tung Duc Phung^c

Abstract

This study provides evidence on the trends and drivers of inequality in Vietnam using Vietnam Household Living Standard Surveys. We find that inequality, regardless of the choice of welfare indicators and inequality measurements, has been stable in Vietnam. Inequality in income or expenditure is remarkably lower than inequality in assets. In 2016, the Gini coefficient of per capita expenditure and per capita income was 0.35 and 0.39, respectively, while the Gini coefficient in electricity consumption and housing value was 0.42 and 0.62, respectively. Using the decomposition analysis, we find that inequality between provinces accounts for 22% of the total inequality, while inequality between ethnic groups accounts for 15% of the total inequality. The regression analysis shows that inequality tends to be higher in provinces with higher initial income and poverty. This implies that high-income people are more likely to benefit from economic growth, especially in better-off provinces.

Keywords: Economic integration, poverty, inequality, Vietnam

JEL codes: F14, F15, I31, I32

^a Mekong Development Research Institute, Hanoi, Vietnam. Email: trangdang@mdri.org.vn

^b Mekong Development Research Institute, Hanoi, Vietnam; and National Economics University, Hanoi, Vietnam. Email: cuongnguyen@mdri.org.vn

^c Mekong Development Research Institute, Hanoi, Vietnam. Email: tungphung@mdri.org.vn

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1. Introduction

There is a broad consensus that inequality is harmful for sustainable development. Kuznets (1955) observed the historical record of growth and inequality in some industrialized countries. As incomes grew, inequality first increased and then decreased after a peak. However, recent studies show that inequality can reduce economic growth and increase poverty, and it is possible that an economy can grow without rising inequality, especially in the early stages (Alesina and Rodrik 1994; Persson and Tabellini 1994; Deininger and Squire 1998; Bourguignon 2003). Inequality can also increase the social conflict and violence (Cramer, 2003; Østby, 2013; Ferrer-i-Carbonell and Ramos, 2014). Inequality is also found to be negatively correlated with happiness and life satisfaction (Dolan et al. 2008; Schneider, 2015; Tran et al., 2018). Understanding the trends and drivers of inequality is, therefore, very important not only for researchers but also policy makers.

In this study, we examine changes in inequality in Vietnam over time and analyse potential drivers of inequality using decomposition and regression methods. Although Vietnam has achieved relatively broad-based economic growth, there is still a large gap in living standards between population subgroups. Thus, in this study we also investigate the gaps in living standards between the Kinh majority and ethnic minorities in Vietnam. Using the richly detailed Vietnam Household Living Standards Surveys (VHLSSs) of 2002 to 2016, we estimate inequality levels and patterns based on different living standards indicators.

Vietnam is an interesting case to look at. Since 1987, the economy of Vietnam has experienced rapid economic growth as well as structural transformation from a centrally planned economy to a market-based economy. As a result of economic growth, poverty has

decreased dramatically with the poverty headcount ratio (using the international poverty line of \$1.25 a day (2005 PPP)) falling from 43.6 per cent in 1993 to 14.3 per cent in 2008 (World Bank, 2013). In 2016, according to the international poverty line of \$3.2 a day (2011 PPP), the rate was around 8.6 per cent (World Bank, 2018). Extreme poverty is almost eliminated, with only 2 per cent of the population living on less than 2011 PPP \$1.9 per day.

Economic growth is not associated with rising inequality in Vietnam. Estimates from VHLSSs show that inequality of expenditure has been very stable in Vietnam. The Gini coefficient of per capita expenditure is estimated at 0.357 in 1993, 0.358 in 2006 and 0.353 in 2016. However, there remains a large gap in living standards between groups, in particular between rural and urban people, poor and non-poor groups, men and women as well as the Kinh/Hoa group and ethnic minority groups. In 2016, per capita consumption of ethnic minorities was 45 per cent less than the Kinh and Hoa, and nearly 45 per cent of the ethnic minorities still live in poverty. Thus, ethnic minorities who make up only 15 per cent of the country's population, constituted 73 per cent of the poor in 2016 (World Bank, 2018). There is still a gap in accessing public services between the ethnic minorities and majority. Even within the poorer areas where the ethnic minorities account for a large proportion of the population, the Kinh majority fares better than the ethnic minorities (Nguyen et al., 2015). Together with economic growth, the number of super-rich people, who have \$30 million and more in assets, have been increasing in Vietnam (Kim, 2017). Considering that the world today, including Vietnam, is facing an unprecedented inequality crisis, inequality has become a problem that needs to be thoroughly studied and seriously addressed (Oxfam, 2017).

There is a considerable literature on inequality in Vietnam. A number of studies explore the income gap among different population subgroups such as between the Kinh and ethnic groups (e.g., Nguyen et al., 2015; Bui et al., 2017; Nguyen et al., 2017). All studies show a large gap in income, consumption and other welfare indicators between the Kinh and ethnic minorities. Few studies discuss the cost of inequality. Nguyen and Pham (2018) shows that high inequality reduces the effect of economic growth on poverty reduction in Vietnam. Nguyen et al. (2010) and Lanjouw et al. (2017) also find that districts with lower initial inequality have been more successful in poverty reduction.

Regarding the drivers of inequality, Nguyen et al. (2007) concludes that welfare disparity between the urban and rural areas was mainly due to change in the returns or differentials based on household characteristics i.e. the dramatic change in the returns to education, and income gaps associated with ethnicity and agricultural activities. Le and Booth (2013) also finds that rural-urban expenditure inequality continued to increase over the years due to growth in covariates as well as returns to those covariates. Benjamin et al. (2017) finds that agricultural opportunities played an important role in dampening inequality-increasing pressures that may arise from rural under-employment, but more importantly, Vietnam's stable inequality levels are attributed to the steady development of wage-labour markets in both urban and rural areas. On the other hand, Nguyen et al. (2018) shows that wages and nonfarm business income are the two main determinants of income inequality. Over the 2004-2014 period, wage income's contribution to total income inequality increased to 50 per cent, while the second largest source of inequality is nonfarm business income, accounting for 30 per cent.

Compared with previous studies, this study has different features. First, it uses VHLSSs from 2002 to the most recent one in 2016 to show the trend in inequality in Vietnam. Second, this study measures welfare by using multiple indicators, including per capita income, expenditure, electricity consumption and housing value. Most studies measure welfare by either expenditure or income. Measuring aggregate income and consumption is associated with measurement errors, since aggregate income and consumption consist of a large number of items. Data for electricity consumption, which draw on records of utility providers, are easier to collect compared to surveys, and less likely to be correlated with measurement errors. It is also more related to the asset level. We use the housing value to explore the inequality in assets in Vietnam. Third, this study uses several decomposition and regression methods to examine the drivers of inequality in Vietnam over time.

This paper is structured into five sections as follows. The second section describes the data set used in this study. The third section presents the analysis method and the fourth section discusses the empirical findings. The fifth section concludes.

2. Data set

The data used in this study comes from the VHLSS series. The VHLSSs have been conducted every two years since 2002 by the General Statistics Office of Vietnam (GSO), with technical support from the World Bank. The latest VHLSS was conducted in 2018, but this survey has not been released. Thus, our analysis covers the period 2002-2016.

The VHLSSs are sampled from around 3,000 communes throughout the country. Officially, Vietnam is divided into 3 administrative tiers: provinces, districts and communes. In 2020, there are 63 provinces, 707 districts and 10,614 communes. The 1999 Population

and Housing Census is used as the sampling frame for the VHLSSs from 2002 to 2008, while the sampling frame for the VHLSSs since 2010 references the 2009 Population and Housing Census. The 2002 VHLSS, with almost 30,000 households sampled, was designed to be representative at the provincial level, while the other VHLSSs, with about 9,200 to 9,400 households, are representative at the regional and urban/rural levels.¹

The VHLSSs contain very detailed data on individuals, households and communes. Household data include durables, assets, production, income and expenditures, and participation in government programs. Income and expenditure details are also collected through the questionnaire, as well as information on the demographics, education, employment, health, and migration of individuals within the households.

3. Estimation methods

3.1. Measuring inequality

Income or expenditure inequality is often measured by the three most common indices: Gini, Theil L, and Theil T. The Gini coefficient, which is based on the Lorenz curve, is most widely used to measure inequality due to its straightforward calculation, flexibility across different population groups and independence from sample size and scale of the economy. The Gini coefficient is estimated by the difference between the distribution of income and the uniform distribution that represents equality (Deaton, 1997):

$$G = \frac{n+1}{n-1} - \frac{2}{n(n-1)\bar{Y}} \sum_{i=1}^n \rho_i Y_i, \quad (1)$$

where ρ_i is the rank of individual i by their income. ρ_i is equal to 1 for the richest and increase for individuals with lower income. The Gini coefficient lies in the range of 0 to 1, with a higher Gini coefficient representing greater income inequality.

The Theil L index of inequality is calculated as follows:

$$Theil_L = \frac{1}{n} \sum_{i=1}^n \ln \left(\frac{\bar{Y}}{Y_i} \right), \quad (2)$$

The Theil L index ranges from 0 to infinity. A higher value of Theil L indicates more inequality.

The Theil T index of inequality is calculated as:

$$Theil_T = \frac{1}{n} \sum_{i=1}^n \frac{Y_i}{\bar{Y}} \ln \left(\frac{Y_i}{\bar{Y}} \right) \quad (3)$$

The Theil T index ranges from 0 (lowest inequality) to $\ln(N)$ (highest inequality).

3.2. Inequality decomposition

The overall inequality which is measured by the Theil indexes can be decomposed into inequality within groups (e.g. urban and rural areas, or Kinh and ethnic minorities) and inequality between groups. For example, the Theil T index can be decomposed as follows:

$$Theil_T = \sum_{i=1}^m s_i T_i + \sum_{i=1}^m s_i \ln \left(\frac{\bar{Y}_i}{\bar{Y}} \right) \text{ with } s_i = \frac{n_i \bar{Y}_i}{n \bar{Y}}. \quad (4)$$

T_i is the Theil index of within inequality of group i , n_i is the population size and \bar{Y}_i is the mean income or expenditure of group i .

Although the Gini index cannot be decomposed into within- and between-inequality components like the Theil index, it can be decomposed into inequality components of income sources (Shorrocks, 1982; Stark et al., 1986; L'opez-Feldman, 2006). The Gini index of total income or expenditure can be written as the weighted average of Gini of different income sources:

$$G = \sum_{k=1}^K s_k G_k R_k , \quad (5)$$

where s_k is the share of income from source k in the total income, G_k is the Gini index of income from source k , and R_k is the Gini correlation of income from source k with the distribution of the total income.²

Lerman and Yitzhaki (1985) estimates the elasticity of the total Gini to a change in income source k as follows:

$$\frac{\partial G / e}{G} = \frac{s_k G_k R_k}{G} - s_k . \quad (6)$$

This measures the percent change in total inequality resulting from a small percent change in income from source k .

Using the above two decomposition methods we can understand the drivers of inequality in income and expenditure in Vietnam.

3.3. Regression analysis

In order to understand the variables that affect inequality, we use the VHLSSs to estimate the provincial-level inequality indexes and other explanatory variables, and estimate the following standard model that explains the variation in inequality across provinces:

$$\mathbf{Inequality}_{i,t} = \alpha + \beta \mathbf{Log}(Y_{i,t-1}) + \gamma \mathbf{Poverty}_{i,t-1} + \mathbf{X}'_{i,t-1} \boldsymbol{\delta} + \boldsymbol{\theta} T_t + \mathbf{u}_i + \mathbf{v}_{i,t}, \quad (7)$$

where $\mathbf{Inequality}_{i,t}$ is the inequality index of province i in year t . $Y_{i,t-1}$ is the lag of per capita income, $P_{i,t}$ is a poverty index, $\mathbf{X}'_{i,t-1}$ is a vector of explanatory variables including high school completion rates, shares of the ethnic and the rural population, and different types of investments, T_t is a year dummy variable. The unobserved variables are decomposed into time-variant ($\mathbf{v}_{i,t}$) and time-invariant components (\mathbf{u}_i).

We estimate equation 7 using GMM estimators. OLS estimates can be biased. We address this selection bias as follows. First, we use lagged explanatory variables to avoid reverse causality. Second, we estimate the model of first-differenced variables, and the first difference transformation removes the time-invariant unobserved effect (\mathbf{u}_i). The Arellano–Bond test for zero autocorrelation of the first order and second order in first-differenced errors shows no evidence of model misspecification. Third, we apply the GMM estimator which were developed by Holtz-Eakin, Newey and Rosen (1988) and Arellano and Bond (1991). The GMM-type instruments for the log of lagged per capita expenditure are higher order lags of the per capita expenditure variables. Although the exogeneity of these instruments may be questionable, we can perform the overidentification test to test the validation of the instruments. The Sargan test concludes that the null hypothesis that overidentifying restrictions are valid is not rejected.

4. Empirical results

4.1. Trends in inequality

As mentioned above, we measure living standards by several indicators. The most popular indicators used to analyse inequality and poverty are income and expenditure. Table 1 reports estimates of per capita income and expenditure over time using the VHLSSs. We adjust all the variables to the price of January 2016 for comparison. Income per capita and expenditure per capita both increased over time. During the 2014-2016 period, per capita income and expenditure increased by nearly 7 per cent annually. In 2016, per capita income and expenditure was VND35,943 thousand and VND32,538 thousand, respectively.³ The spending on electricity is around 2.7 per cent of the total expenditure.

The VHLSS has undergone some change in content over time, which affect the data series. It should be noted that there is a gap in expenditure between 2008 and 2010 because of changes in the sampling frame and questionnaires. The VHLSSs of 2002 to 2008 record food consumption for the whole year; from 2010 onwards, food consumption amounts are obtained for month prior to the sampling, then annualised. As a result, per capita expenditure was remarkably higher in 2010 than in 2008. Additionally, since the VHLSS 2010, there are data on the housing value of households. A real estate boom in 2009 raised housing prices in 2010. In 2016, the average per capita housing value was around VND220 million.

Table 1. Vietnam living standards indicators: per capita income and expenditure, and housing value (2002-2016).

Years	Per capita income (thousand VND)	Per capita total expenditure (thousand VND)	Per capita expenditure on electricity (thousand VND)	Housing value per capita (thousand VND)
2002	13,626	10,374	273	n.a.
2004	15,924	11,966	345	n.a.
2006	18,433	14,051	381	n.a.
2008	19,144	14,258	391	n.a.
2010	25,897	25,427	510	211,888
2012	28,890	26,568	577	203,939
2014	31,641	28,609	734	210,147
2016	35,943	32,538	865	219,997

Note: The variables are measured in Jan 2016 price. There are no data on house value before the 2010 VHLSS.

Source: Authors' estimation from VHLSSs.

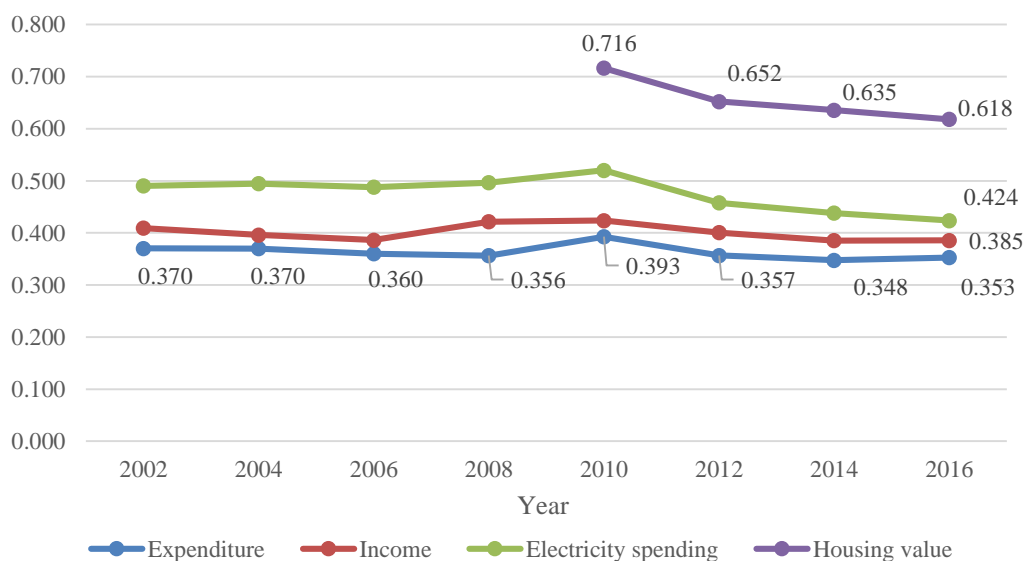
Gini coefficients of four living standard indicators over time show a general stability over 2002-2010, and downward trends in the 2010-2016 interval (Figure 1). Inequality in expenditure was lower than inequality in income. In 2016, the Gini coefficient of per capita expenditure was 0.353, while the Gini coefficient of per capita income was 0.385. Housing is even more unequally distributed, with the Gini coefficient at 0.618. As expected, inequality in this asset is much higher than inequality in income or consumption, particularly due to the capacity for high-end property prices to inflate markets are buoyant, coupled with zero property ownership of a segment of the population at the bottom end.

Figure 1 also shows a peak in inequality in 2010, especially in per capita expenditure and housing value. One reason is that there was a large increase in housing price in 2010 in big cities. The Gini coefficient in housing value was very high in 2010, hence the subsequent

decline is quite expected. The per capita expenditure includes rent paid by tenants or imputed rent of owner-occupied houses, which in turn derives from the value of the property. Thus, disproportionate increases in housing value, between low expenditure and high expenditure households, can impact on overall inequality in expenditure as captured in the Gini.

Inequality in electricity consumption adds further insight. The Gini coefficient in electricity spending, at 0.424 in 2016, is higher than that of income and overall expenditure which were, respectively, 0.385 and 0.353. These differentials in the level of inequality, together with the parallel downtrend of inequality in electricity consumption and housing value, concur with expectations that this particular item in household budgets moves in tandem with house size and lifestyle. Larger homes and more lavish lifestyles consume more electricity; middle class expansion may contribute to the decline in the electricity consumption Gini.

Figure 1. Gini coefficient over time, income, expenditure and housing value (2002 – 2016)



Source: Authors' estimation from VHLSSs.

Income remains an important outcome, and the vital link between economic activity, consumption and living standards. The stability of income inequality in Vietnam is of importance and interest, and can be explained by several reasons. First, poor people can also benefit from economic growth. As mentioned in Benjamin et al. (2017), the increase in agricultural production played an important role in dampening inequality-increasing pressures. The movement from agriculture to non-farm sectors can also help the poor to increase their income. Second, the government has implemented a large number of anti-poverty programs, which can help to reduce inequality (e.g., Nguyen et al., 2015). Third, VHLSSs cannot capture super-rich households. The number of super-rich people, who have \$30 million and more, have been increasing in Vietnam (Kim, 2017). However, these people are not sampled in the VHLSSs. Thus, actual inequality might be higher than inequality observed from household surveys.

We also examine the sensitivity of the measurement of inequality to different inequality indices. Table 2 reports the inequality indices of per capita expenditure. The inequality indexes of other indicators of living standards (income, electricity consumption and housing value) are presented in Appendix Tables A.1 to A.3. The results show that inequality measured by the Theil indexes and the ratio of 90th to 10th percentiles were stable over time – and all also recorded a peak in 2010. However, the ratio of 95th to 5th percentiles has increased slightly, from below 8.0 in 2006-2008 to 8.1-8.3 in 2014-2016.

Table 2. Inequality measures of per capita expenditure

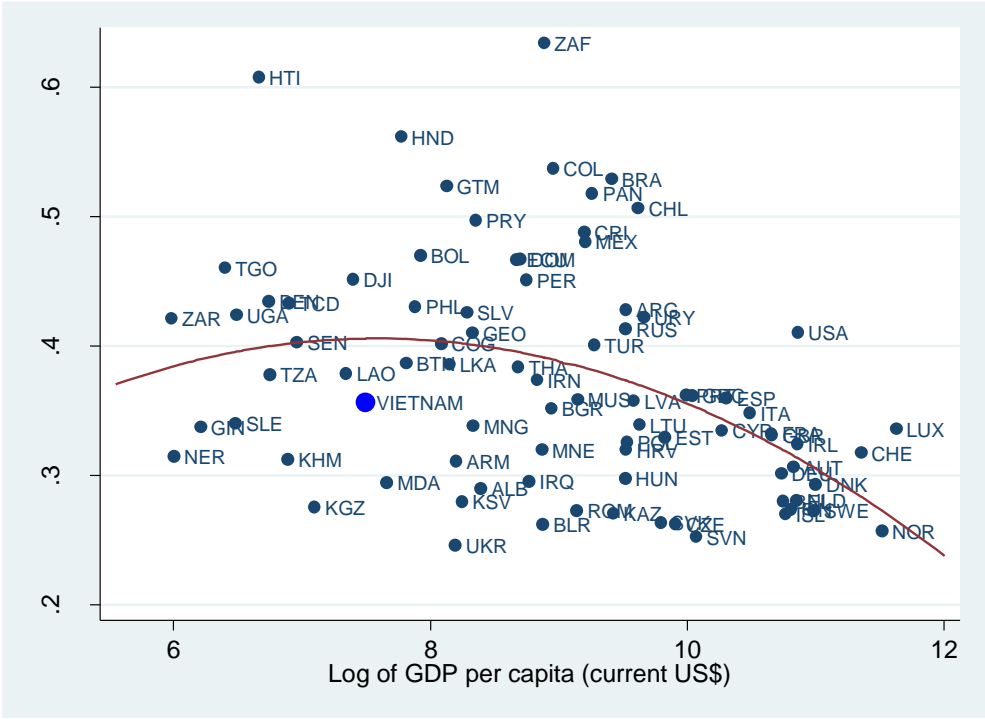
Year	Gini	Theil's L	Theil's T	Ratio	Ratio
				90th/10th	95th/5th
2002	0.37	0.22	0.25	4.9	7.9
2004	0.37	0.22	0.24	5.1	8.4
2006	0.36	0.21	0.23	4.9	7.8
2008	0.36	0.21	0.23	4.8	7.6
2010	0.39	0.26	0.29	5.5	9.4
2012	0.36	0.21	0.23	4.9	8.0
2014	0.35	0.21	0.22	4.8	8.1
2016	0.35	0.21	0.22	4.9	8.3

Source: estimation from VHLSSs.

For a snapshot of the inequality level to income relationship, we compare the GDP per capita and Gini coefficient of countries with both these variables in 2012, using World Bank's World Development Indicators, and also observe Vietnam's location on this plot. Overall, the correlation is weak – reflecting the complexity of the income-inequality relationship – but the fitted line points to an inverted-U shaped, mainly negative correlation between inequality and GDP per capita. Countries with higher income per capita tend to have lower inequality, while the highest inequality tends to be found in middle and upper middle income countries. Vietnam's Gini coefficient is lower compared with countries at similar economic levels. In other words, Vietnam's position below the curve indicates that its inequality is below that expected based on its income level and the income to inequality relationship observed around the world. Two reasons are worth mentioning here. First, Vietnam has achieved broad-based economic growth. Both poor and non-poor have experienced growth of income and expenditure (Nguyen and Pham, 2018). Second, Vietnam

has implemented a large number of poverty reduction programs, which could help the poor to increase their income, consequently reducing inequality.

Figure 2. Gini coefficient and GDP of countries in 2012



Source: preparation using the World Development Indicators data

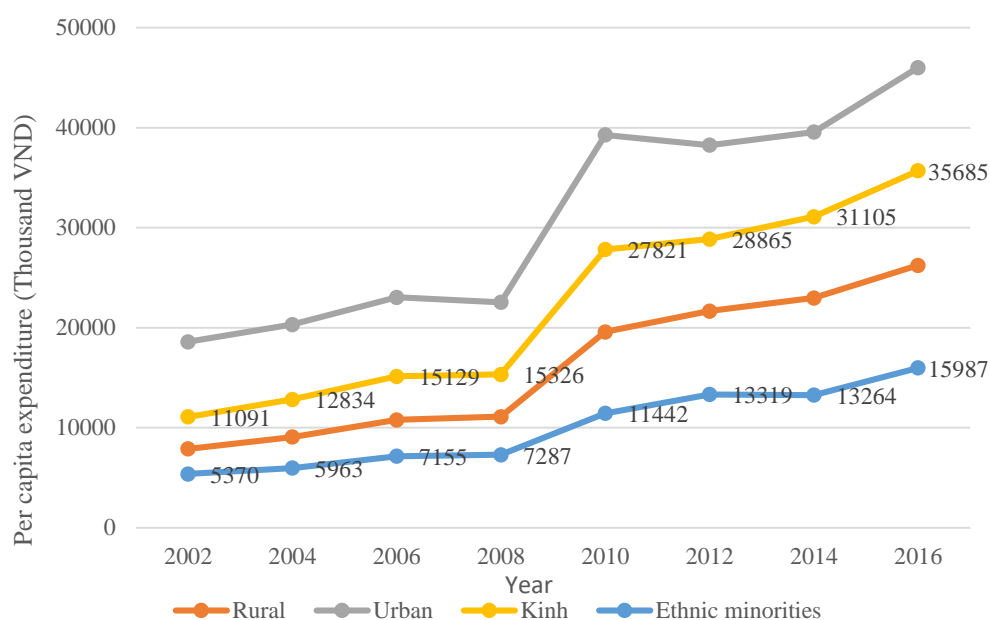
4.2. Inequality between the Kinh and ethnic minorities *****

Vietnam has 54 ethnic groups, of which the Kinh majority accounts for 85 per cent of the total population. Ethnic minorities live in mountains and highlands, while the Kinh tend to live in delta and coastal areas. Vietnam has achieved remarkable success in economic growth and poverty reduction during the past decades. However, there is still a large gap in living standards between the Kinh and ethnic minority groups (Bui et al., 2017). Figure 3 shows that the absolute gap in per capita expenditure between the Kinh and ethnic minorities has been widening over time. Figure 3 also shows a gap in living standards between urban and

rural areas. However, this gap is smaller than the gap between the Kinh and ethnic minorities. Thus, in this study, we focus on the gap between the Kinh and ethnic minorities.

As mentioned above, the sampling frame and questionnaires of VHLSSs before 2010 and those since 2010 are different. This can explain why there is a large difference in per capita expenditure between 2008 and 2010.

Figure 3. Per capita expenditure of Kinh and ethnic minorities



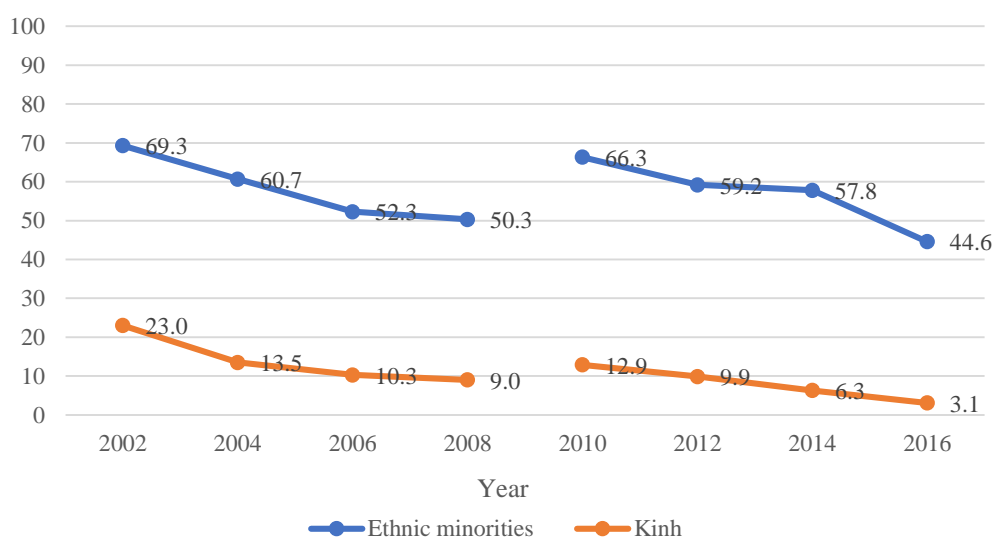
Note: The variables are measured in Jan 2016 price.

Source: estimation from VHLSSs.

Vietnam has achieved a great success in poverty reduction. Figure 4 shows the expenditure poverty rates of the Kinh and ethnic minorities over time. We used the expenditure poverty lines, which are estimated by the World Bank (WB) and GSO of Vietnam. It should be noted that the real poverty line increased in 2010. As a result, the poverty rates increased between 2008 and 2010.⁴

Although both the Kinh and ethnic minorities have experienced poverty reduction, the poverty rates were much higher for ethnic minorities than the Kinh group. The poverty rate of the whole country in 2016 was 9.8 per cent. The poverty rate of the Kinh was 3.1 per cent, while nearly 45 per cent of ethnic minorities still live in poverty (Figure 4). Thus, ethnic minorities who make up only 15 per cent of the country's population, constituted 73 per cent of the poor in 2016.

Figure 4. Expenditure poverty rates of Kinh and ethnic minorities



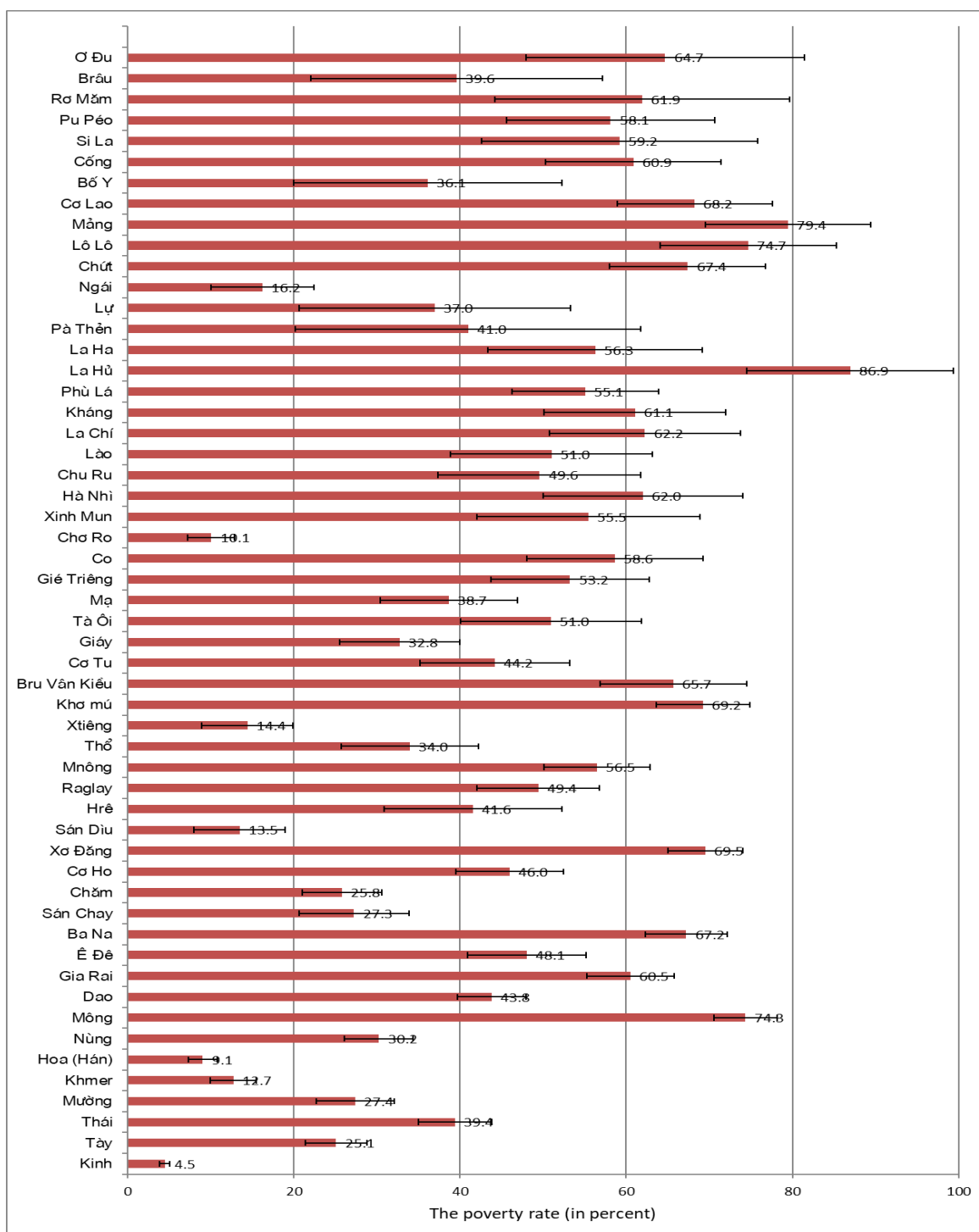
Source: Authors' estimation from VHLSSs.

Using the poverty estimate in 2009, Lanjouw et al., (2017) finds that even within the poorer areas where ethnic minorities account for a large proportion of the population, the Kinh majority fares better than the ethnic minorities. In this study, we estimate the poverty rate of districts for rural areas in 2016. We employ the small area estimation method from Elbers et al. (2002, 2003) and combine data from the 2016 Fishery, Agricultural and Rural Census and data from the 2016 VHLSS to estimate the poverty rate of all 54 ethnic minorities and the poverty rate of districts in rural areas for 2016.

Since we predict the poverty rate using the small area estimation, we also compute relative standard errors associated with the estimates, from which we can report 90 per cent confidence intervals. We find that all groups are poorer than the Kinh, and poverty among the Hoa (Chinese) is also low. However, poverty rates vary widely between the groups, and some differences are statistically insignificant. Additionally, small ethnic groups with population less than one million tend to have higher poverty rates than large ethnic groups. Ethnic groups such as La Hu, Mang and Lo Lo have very high poverty rates at around 80 per cent. The Mong constitute a special case, as a large ethnic group that also has a very high poverty rate.

Along with higher poverty rates, Vietnam's ethnic groups also attain lower levels – compared with the Kinh and Hoa – in the basic human development categories of education and health (see eg., Le et al., 2014; Bui et al., 2016; Nguyen et al., 2015; 2017). Although Vietnam has achieved universal primary education, there is great variation in the quality of primary education. MDRI (2016) found that the scores of literature and math test of students at grades 3 and 5 were significantly lower in areas with high concentration of ethnic minorities than other areas. Inequalities in education quality between schools and within schools are also noteworthy. In a report by Dang and Glewwe (2017), there was evidence that the variation within schools contributed 60 per cent of the overall variation in students' test scores, while the variation across schools and provinces accounted for the other 40 per cent, which implied the effect of 'special' classes on disparities in education quality within schools.

Figure 5. Poverty rate of ethnic groups, with 90 per cent confidence interval, 2016

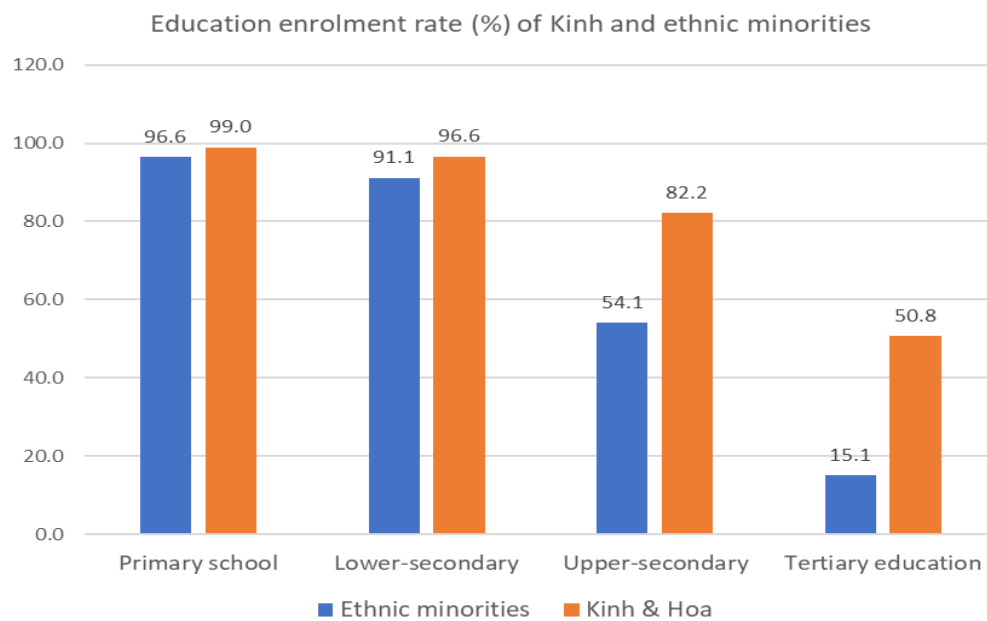


Source: Authors' estimation using small area estimation of the 2016 VHLSS and the 2016

Fishery, Agricultural and Rural Census of Vietnam.

There is also a large gap in higher education between the Kinh and ethnic minorities. Figure 6 shows the proportion of tertiary education of the Kinh aged 18-23 is more than three times higher than that of ethnic minorities. Nguyen-Hoa et al. (2017) concludes that difficulty in the Vietnamese language is one of the obstacles for ethnic minorities to have higher education and better employment opportunities.

Figure 6. Education enrolment rate in 2016



Source: Authors' estimation from VHLSSs.

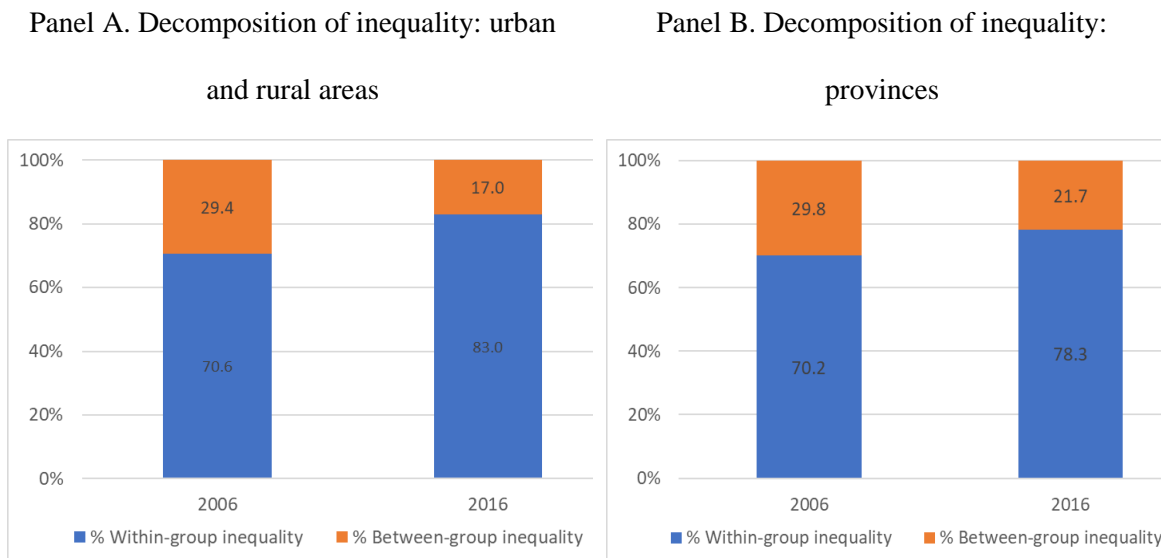
4.3. Decomposition of inequality by population categories

To understand the drivers or sources of inequality, we conduct decomposition analyses of inequality to estimate how much of the total inequality can be attributed to inequality within categories, and how much is due to inequality between categories (using the formula in equation 4). This exercise assigns all categories the same mean household expenditure while

computing inequality within the categories separately – a different Theil index for each category. This is the basis for the “within-category” contribution. We then assign equal levels of inequality across the board – the same Theil index to each category – while varying the mean household expenditure between categories, thus obtaining the “between-category” contribution.

A first round of decompositions uses spatial categories: urban / rural areas and provinces (Figure 7). We report the decomposition of the Theil's L index. The results from the decomposition of the Theil's T index are very similar and therefore not presented. Panel A of Figure 7 shows that the main contribution to total inequality is the inequality within urban or rural areas instead of the inequality between urban and rural areas. The within-category inequality accounted for 70.6 per cent of the total inequality in 2006, and its contribution increased to 83 per cent in 2016. There is a large variation in the per capita expenditure within urban areas as well as within rural areas. Panel B of Figure 10 also shows a large contribution of inequality within provinces towards total inequality.

Figure 7. Decomposition of expenditure inequality by urban/rural areas and provinces,
2006 and 2016 (Theil-L index)

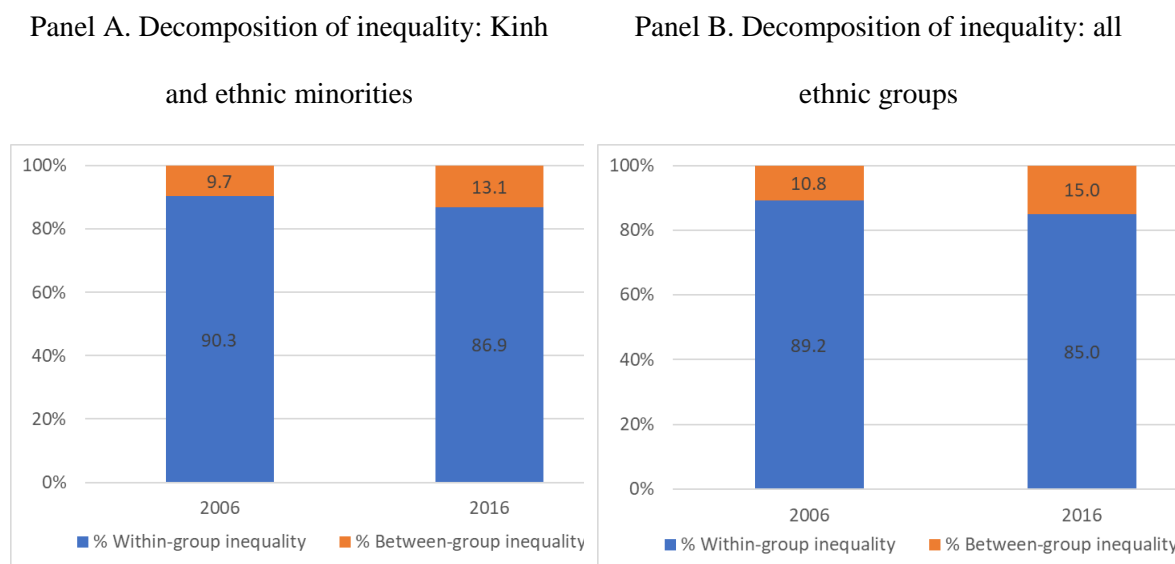


Source: Authors' estimation from VHLSSs.

We repeat this decomposition exercise with reference to ethnic groups (Figure 8). We first divide the population into two groups – Kinh and all other ethnic minorities. Panel A shows that the inequality within the Kinh and within ethnic minorities accounted for 86.9 per cent of the total inequality in 2016. Inequality between Kinh and ethnic minorities accounted for only 13.1 per cent. However, this share increased over the 2006-2016 periods, which implies that the gap between Kinh and ethnic minorities tended to increase over this period. Panel B presents estimates of the same decomposition using all 54 ethnic groups. The Kinh remain as one group, but instead of the minorities being combined into one group as in Panel A, we incorporate every minority as a group on their own. The inequality within each group is still the main contribution to the total inequality. However, the inequality between ethnic

groups tended to contribute more to total inequality between 2006 and 2016. So, the gap between the ethnic groups increased over time.

Figure 8. Decomposition of expenditure inequality by ethnic groups, 2006 and 2016 (Theil-L index)

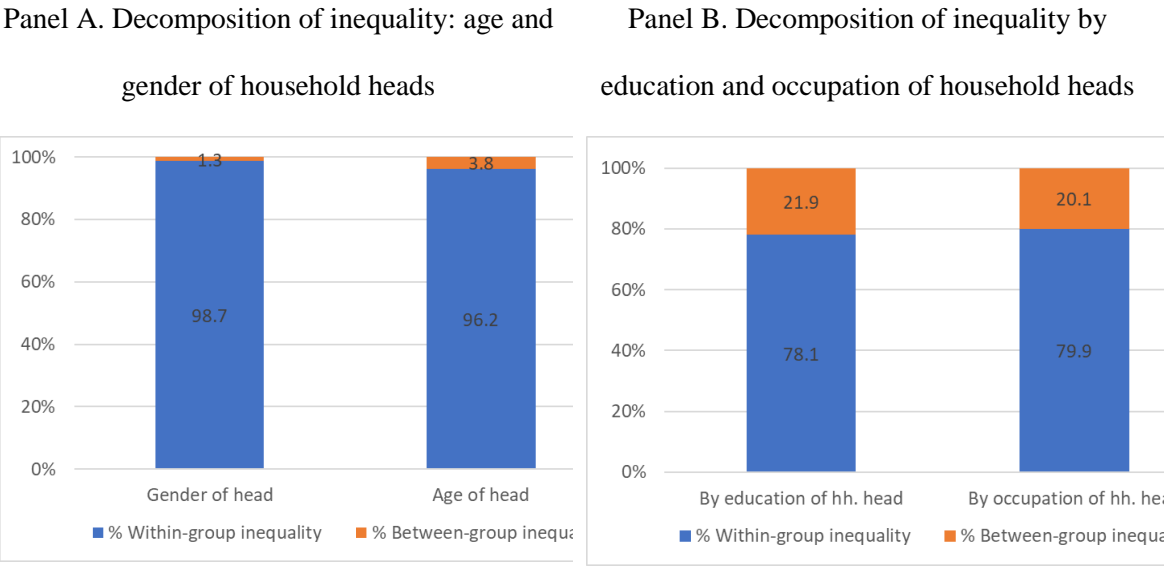


Source: Authors' estimation from VHLSSs

We then decompose total inequality in 2016, with households are categorized by head of household characteristics (Figure 9). Inequality between households with heads of different age and gender contributes little to the total inequality (Panel A). It means that age and gender of household heads have minimal impact on household expenditure. Almost all of total inequality derives from inequality within the categories, which is in turn due to other factors besides gender and age. Education and occupation are more important in determining household expenditure. The inequality components due to the differences in occupation and education contribute larger to total inequality (Panel B of Figure 9). Specifically, the between-education level inequality and the between-occupation inequality contribute 21.9

per cent and 20.1 per cent to the total inequality, respectively. It should be noted that these decompositions are based on household expenditure; if income is used instead of expenditure, these head of household characteristics will most likely show up as more important determinants accounting for a larger share of between-category inequality to total inequality.

Figure 9. Decomposition of expenditure inequality by head of household characteristics, 2016 (Theil-L index)



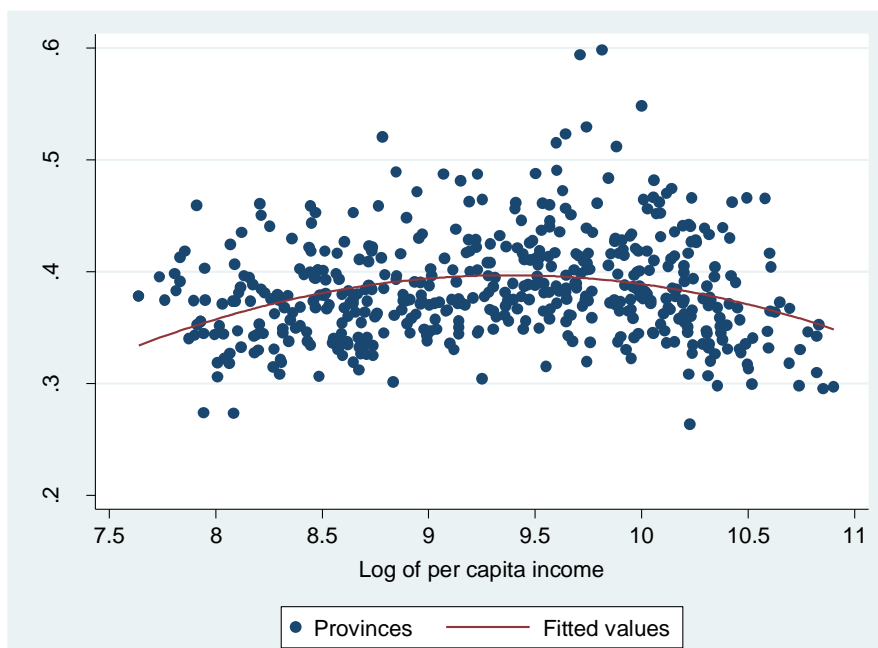
Source: Authors' estimation from VHLSSs

4.5. Regression analysis of provincial income level – income inequality

We now apply the province as the unit of analysis, and examine relationships between income level and income inequality. Figure 10 presents the correlation between the Gini coefficient of income and log of per capita income of provinces, based on provincial-level inequality and per capita income that we compute from the VHLSSs.⁵ It does not suggest any distinct relationship between income level and income inequality, although a fitted line traces out an

inverted-U shaped relationship. As the income level rises, inequality also rises, and after achieving a peak inequality tends to decrease while income increases further.

Figure 10: Income inequality and per capita income



Source: Authors' estimation from VHLSSs.

Finally, we use regressions to examine the association between inequality and several socio-economic variables. The observations are provinces over the period 2002-2016. The dependent variables are inequality indices of per capita income. We use two models: a small model with lagged log of per capita income, lagged poverty rate, year and province dummies, and a large model with additional explanatory variables. In the GMM models, the endogenous variables are lagged log of per capita income, lagged poverty rate, while the instruments are lagged variables of these endogenous variables. We use lags of explanatory variables to avoid reverse causality, i.e. the effect of inequality on the explanatory variables.

Table 3 shows that provinces with high initial income level and poverty rate tend to subsequently have higher inequality.⁶ It is plausible that, in provinces with high initial income level, higher income households may enjoy higher income growth. As a result, inequality within provinces increase as provinces grow richer. At the same time, provinces with a high poverty rate have a higher share of poor people, which is associated with higher inequality levels. On the whole, these two possible dynamics move inequality in different directions: as incomes grow and poverty declines, inequality also declines; income growth may also disproportionately boost higher income households and raise inequality. The net effect derives from the balance of these counteracting trends – among other factors, of course, due to the complexity of inequality determinants. In the context of this growth-poverty-inequality relationship, though, Vietnam’s record of declining inequality indicates that robust income growth among lower income households is a greater driving force than income growth of rich households.

According to the large model of Gini coefficient, higher investments tend to increase inequality. Provinces with a higher share of urban population as well as a higher share of ethnic minority population are more likely to have higher inequality than others. Interestingly, provinces with a higher share of wages have lower inequality, while provinces with a high share of non-farm income have higher inequality.

Table 3. GMM regressions of income inequality indexes

Explanatory variables	Gini		Theil's L		Theil's T	
	Small model	Large model	Small model	Large model	Small model	Large model
Lagged log of per capita income	0.0572*** (0.013)	0.0334** (0.017)	0.0549** (0.023)	0.0606** (0.030)	0.1387** (0.060)	0.1113 (0.082)
Lagged poverty rate	0.2269*** (0.024)	0.1529*** (0.030)	0.2611*** (0.043)	0.1674*** (0.054)	0.4109*** (0.115)	0.3197** (0.145)
Lagged log of other State spending		0.0003 (0.001)		0.0002 (0.002)		-0.0018 (0.005)
Lagged log of investment spending		0.0055* (0.003)		0.0082 (0.005)		0.0094 (0.014)
Lagged log of population density		0.0006 (0.003)		-0.0077 (0.005)		0.0030 (0.014)
Lagged share of urban population		0.0004** (0.000)		0.0001 (0.000)		0.0005 (0.001)
Lagged share of population with high-school diploma		-0.0002 (0.000)		-0.0003 (0.000)		-0.0007 (0.001)
Lagged share of ethnic minority population		0.0005*** (0.000)		0.0008*** (0.000)		0.0010* (0.001)
Lagged share of wage income		-0.0663** (0.030)		-0.0803 (0.053)		-0.1950 (0.143)
Lagged share of non-farm income		0.0689* (0.041)		0.1796** (0.074)		0.3867* (0.198)
Lagged share of other non-farm income		0.0059 (0.050)		0.0158 (0.090)		-0.0599 (0.243)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.1637 (0.117)	-0.0044 (0.158)	-0.2715 (0.209)	-0.4091 (0.285)	-1.0166* (0.558)	-0.7500 (0.769)
Observations	441	441	441	441	441	441
Number of provinces	63	63	63	63	63	63

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion

Vietnam has been very successful in economic growth and poverty reduction, and maintaining steady income distribution. This study examines inequality in Vietnam over the 2002-2016 period using data from the VHLSSs. Consistent with previous studies on inequality in Vietnam, which also use data from the VHLSSs, we find that inequality in

income and expenditure have remained stable, with a downward trend in some aspects. Compared with other countries at similar economic level, Vietnam has lower inequality.

Vietnam has achieved pro-poor economic growth (Nguyen and Pham, 2018). Income and expenditure have been increasing for all population sub-groups. In addition, the government has carried out a large number of programs providing the poor, ethnic minorities and other disadvantaged groups with support on infrastructure, education, health and production activities. However, large gaps in living standards between ethnic groups remain. The Kinh and Hoa have the lowest poverty, while small ethnic groups have very high poverty. Poverty varies across ethnic groups as well as geographical areas. At the same time, inequality within groups and provinces are substantial. Inequality between provinces accounts for 22 per cent of total inequality, while inequality between ethnic groups accounts for 15 per cent of total inequality. Our regression analysis shows that inequality tends to be higher in provinces with higher income level and higher poverty.

There are concerns about high and possibly rising inequality, particularly in terms of wealth. The number of super-rich people have been increasing (Kim 2017). Inequality in assets, measured by housing value, is significantly higher than inequality in income or expenditure. The VHLSSs capture the effects of a housing bubble around 2010; inequality in housing value has declined since. However, due to the inherent volatility of property markets, there remains the possibility of housing inequality increasing again.

To reduce poverty and foster equitable distribution, Vietnam must expand and enhance its inclusive growth policies. The poor as well as ethnic minorities often work in the agricultural sector and informal sector with low wages. The government should have policies

to promote agricultural productivity, while facilitating a vibrant private sector and FDI, which can attract labour from rural and ethnic minority areas. Inequality can only be reduced if the poor achieve an economic growth proportionally more than the rich. In addition, income-redistribution policies can reduce poverty and promote income growth in the lower- and middle-income segments, thereby decreasing inequality.

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Appendix

Table A.1. Income inequality measures

Year	Gini	Theil's L	Theil's T	Ratio 90th/10th	Ratio 95th/5th
2002	0.409	0.279	0.340	5.6	9.6
2004	0.396	0.262	0.290	5.7	9.9
2006	0.386	0.248	0.281	5.5	8.8
2008	0.421	0.299	0.365	6.0	10.8
2010	0.424	0.312	0.388	6.6	11.0
2012	0.401	0.279	0.313	6.6	11.0
2014	0.385	0.262	0.266	6.5	11.2
2016	0.385	0.264	0.267	6.4	11.1

Source: Authors' estimation from VHLSSs

Table A.2. Electricity consumption inequality measures

Year	Gini	Theil's L	Theil's T	Ratio 90th/10th	Ratio 95th/5th
2002	0.49	0.42	0.47	8.8	17.1
2004	0.49	0.43	0.47	10.0	19.7
2006	0.49	0.42	0.46	9.0	17.6
2008	0.50	0.43	0.48	9.2	19.1
2010	0.52	0.49	0.50	11.7	22.5
2012	0.46	0.38	0.37	9.6	18.8
2014	0.44	0.36	0.33	9.1	18.2
2016	0.42	0.34	0.31	9.0	19.6

Source: Authors' estimation from VHLSSs

Table A.3. Housing-value inequality measures

Year	Gini	Theil's L	Theil's T	Ratio 90th/10th	Ratio 95th/5th
2010	0.716	1.117	1.117	46.7	120.0
2012	0.652	0.881	0.841	31.9	80.0
2014	0.635	0.823	0.823	29.2	74.3
2016	0.618	0.769	0.781	25.0	60.0

Source: Authors' estimation from VHLSSs

¹ The sample sizes of each VHLSS 2002 are as follows: 29,530 households with 132,376 household members (2002); 9,188 households with 40,437 household members (2004); 9,189 households with 39,071 household members (2006); 9,189 households with 38,253 household members (2008); 9,399 households with 36,999 household members (2010); 9,399 households with 36,655 household members (2012); 9,399 households with 36,077 household members (2014); 9,399 households with 35,788 household members (2016).

² $R_k = Cov[y_k, F(y)] / Cov[y_k, F(y_k)]$, with $F(y)$ and $F(y_k)$ being the cumulative distributions of total income and income from source k .

³ In January 2016, USD1 was equivalent to VND22,300.

⁴ The poverty line for the 2002-2008 period is equivalent to the expenditure level that allows for food consumption securing 2,100 calories per day per person and some essential non-food consumption. From 2010 onward, minimum calories used to construct the poverty line was increased to 2,230 per day per person. The consumption basket is also updated since the 2010 VHLSS.

⁵ The sample of households with income data in VHLSS is representative at the provincial level, while the sample of households with expenditure data is representative at the regional level. Thus, we estimate the income inequality but not expenditure inequality at the provincial level.

⁶ It should be noted that we tried to include the squared log of per capita income to examine whether there is a quadratic relation between inequality and income. However, the squared log is not statistically significant, and we do not include this variable in the final model.