DECOMPOSING THE ETHNIC GAP IN LIVING STANDARDS IN RURAL VIETNAM: 1993 TO 2004

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Abstract

This paper examines and decomposes the gap in per capita expenditures between majority and minority ethnic groups in rural Vietnam between 1993 and 2004. Over this period, the expenditure gap between rural Kinh and Chinese headed households and the ethnic minorities increased by 14.6 percent. Approximately two fifths of the mean gap is found to be due to differences in household endowments, and at least half due to difference in returns to these endowments. Differences between majority and minority households' demographic structure are more important than differences in their education levels, while geographic variables explain less than one-fifth of the gap. Over half of the increase in the mean gap is found to be linked to temporal changes in unobservable factors, and less than a quarter to the Kinh and Chinese endowments improving more rapidly than those of the minorities. Broadly similar findings are detected using quantile regression analysis. Our empirical results therefore confirms the finding in the existing literature that most of the ethnic differential in household living standards in rural Vietnam is attributable not to differences in endowments but to returns to those endowments. This raises important questions concerning the drivers of the disadvantage faced by Vietnam's ethnic minorities, which we show cannot simply be attributed to their poorer endowments and residence in remote mountainous areas.

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Introduction

The rapid economic growth experienced in Vietnam during the 1990s and early 2000s resulted in unprecedented poverty reduction. The 54 officially recognized ethnic groups within Vietnam's diverse society have not, however, shared equally from the benefits of this growth. Poverty, life expectancy, nutritional status, and other living standard measures remain stubbornly low among Vietnam's ethnic minorities despite the numerous policies introduced to assist these groups (Swinkels and Turk, 2006).

A set of recent studies for Vietnam (Van de Walle and Gunewardena, 2001; Baulch *et al*. 2004, Hoang *et al.* 2007), using a per capita household expenditure measure, have investigated the gap in living standards between the majority Kinh and Hoa (ethnic Chinese) and the 52 remaining minority groups at specific points in time using mean regression analysis in conjunction with standard Blinder (1972) and Oaxaca (1973) decompositions. The existing studies investigated the average gap through examining differences in endowment (i.e., characteristics) and treatment (i.e., returns to characteristics) effects between the majority (Kinh and Hoa) and the other ethnic minority groups using household welfare measures. The differences in both components are found to favour the Kinh and Hoa (Van de Walle and Gunewardana, 2001; Baulch *et al.*, 2004). Though the poor endowment of the ethnic minority groups can be linked to the fact that most ethnic minorities reside in remote and mountainous areas, this explains only part of the gap. Baulch *et al.* (2004) report that "…[e]ven if ethnic minority households had the same endowments as the Kinh and Hoa (Kinh majority and the Chinese), this would close no more than a third of the gap in their living standards" (p. 274). This suggests that the ethnic minorities secure considerably lower returns to their endowments than the majority.

The existing evidence, however, does not examine the magnitude of the ethnic gap at different points of the expenditure distribution offers and nor does it offer insights into the temporal evolution in the ethnic household welfare gap over time. The primary motivation for the current paper is to fill these lacunae by investigating the factors that drive the change in the ethnic expenditure gap using both mean and quantile regression

frameworks. These decompositions are implemented both in aggregated terms and identifying the contributions of demographics, education, landholdings and community characteristics to the ethnic gap. In addition, we also attempt to shed greater light on the relationship between difference in returns and culture, language and geographical remoteness. As far as we are aware, this is the first application of quantile and temporal decompositions to the gap in ethnic living standards in any country.

The structure of the paper is now outlined. The next section provides a contextualization for our empirical analysis through a review of recent economic events in Vietnam. It also details the nature of Vietnam's ethnic diversity. This is followed by sections outlining the data sources and the econometric methodology used. A subsequent section discusses the empirical results, while a final section that outlines their policy implications and offers some concluding remarks.

Background

The *Doi moi* (economic renovation) reforms of the late 1980s stimulated rapid economic growth in Vietnam over the last two decades and this has impacted strongly on poverty and welfare at the household level. Between 1993 and 2004, Vietnam's national poverty headcount fell from 58.1 to 19.5 percent, while educational enrolments, life expectancy and other measures of human development increased dramatically (VASS, 2007). Though the different groups within Vietnam's ethnically diverse society have reaped rewards from such growth, benefits have generally not been shared equally. For instance, despite numerous policies and programmes designed to assist minority groups, the poverty headcount rate among Vietnam's broadly defined ethnic minorities fell from 86.4 to 60.7 percent between 1993 and 2004 (VASS, 2007). Despite comprising just over one-tenth of the national population, the minorities accounted for about two-fifths percent of the poor in 2004 (VASS, 2007). School enrollments, nutritional indicators and life expectancy also remain low among the minorities.

Vietnam has 54 officially recognized ethnic groups, of which the Kinh (the Việt or mainstream Vietnamese) accounted for 86.7 percent in 1999 (Dang *et al*., 2000). Traditionally the Kinh have inhabited lowland and coastal areas in and around Vietnam's two densely populated deltas (the Red River Delta and the Mekong River Delta). With the exception of the Hoa (who tend to live in urban areas and account for 1.1% of the population), the Khmer (who are concentrated in the Mekong Delta with a 1.2 percent population share) and the Chăm (0.1%, who are located along the southern coast), most other ethnic groups are scattered across Vietnam's upland and highland areas. Within the upland and highland areas, some ethnic groups (in particular, the Tày, Thái, Mường, Nùng – each of which have populations of close to one million) specialize in wet-rice cultivation and usually live in the flat, lower areas along the valley bottoms (the 'midlands'). Other less populous groups (such as the Hmong, Dao and Kho-mu in the Northern Uplands and the Ede, Bana and Hre in the Central Highlands) tend to live in higher, more mountainous areas where rice often cannot be grown. There are also 17 ethnic groups with populations of less than 10,000, some of which are likely to disappear in the absence of dedicated measures to protect them (CEM, 2006). All ethnic groups have their individual identities which embody diverse and unique cultures, with groups in the Central Highlands being more likely to follow matrilineal (uxorial) inheritance practices and, along with the Hmong, the Christian religion.

Poverty among the different ethnic groups varies considerably, with the poverty headcount and gaps for the Kinh in 2004 being 13.8% and 2.7% compared to a headcount off 72.3% and a poverty gap above 25% for the Central Highlands and Other Northern Minorities (Baulch, Pham and Reilly, 2007). While poverty has fallen more quickly among the majority than the minority groups (VASS, 2007), inequality is relatively stable among the majority group but rising among the minorities.[1] Since 1998, a plethora of government policies and programmes, most focused on improving infrastructure and endowments in mountainous areas, have been implemented in an attempt to reverse these

[1] The estimated Gini coefficient for the Kinh and Hoa majority in rural areas, based on the per capita expenditures, is about 0.27 for both 1993 and 2004. In contrast, expenditures within the minorities has become more unequal with the Gini rising from 0.24 in 1993 to 0.286 in 2004. The absolute value of the t-ratio to test for the differential in the Gini point estimates for the minority group across these two years is computed at a statistically significant 3.7.

disparities (Nguyen and Baulch (2007)). However, as the last independent evaluation of the two main programmes concluded, while their scale and breath is clear, the impact of these programs in reducing poverty is less clear (MOLISA-UNDP (2004)).

Previous studies investigating ethnic minority issues in Vietnam (Van de Walle and Gunewardana, 2001; Baulch *et al*., 2004; Hoang *et al*., 2007) have used the household surveys conducted in 1993, 1998 and 2004, and have relied on a simple dichotomy between the Kinh-Hoa and all other ethnic minority groups. These studies results suggest that between one-half and two thirds of the ethnic gap in expenditures is due to differences in returns, with differences in household endowments and community characteristics accounting for the remainder. Other, more qualitative studies, point to the fact that the minorities vary tremendously in terms of their levels of economic and social assimilation, that migration laws have been applied inconsistently, and that the targeting of assistance to poor communes and households only captures some minority groups (World Bank, forthcoming). Furthermore, despite the many educational benefits which ethnic minority pupils and students receive, their lower educational attainments can be traced all the way back to kindergarten (pre-school) while the preferences they receive at the post-secondary level may provide employers with a rationale to prefer Kinh graduates (Vasavakul, 2003; Nguyen and Baulch, 2007). Similarly, many of the land tenure and agricultural extension policies seem more appropriate to the needs of Kinh dominated lowland agriculture rather than the diverse and fragile ecologies of the uplands, in which 70 percent of Vietnam's ethnic minorities live (Jamieson *et al*., 1998; Hoang *et al*., 2004.; Vuong, 2007). Finally, policy-makers rarely understand ethnic minority customs and culture and negative stereotyping and informal discrimination characterize much government discourse (World Bank, 2007). As a consequence of these overlapping disadvantages, many ethnic minority groups are poorly positioned to benefit from the rapid economic growth experienced by the urban and coastal areas of Vietnam, and constitute a growing share of the country's extreme poor.

Data

This paper uses data drawn from household-level surveys conducted for Vietnam in three separate years. These surveys were implemented by Vietnam's General Statistical Office (GSO) under funding and technical support from UNDP, the World Bank and other donors. The Vietnam Living Standards Surveys (VLSS) of 1993 and 1998 are multi-topic surveys patterned after the World Bank's Living Standard Measurement Surveys with nationally representative samples of 4,800 and 6,000 households respectively (see World Bank, 2000; 2001). These surveys were superseded in 2002 and 2004 by a new biennial household survey programme known as the Vietnam Household Living Standards Surveys (VHLSS), which used a rotating core-and-module designed survey with an expanded sample size intended to provide more representative statistics at the provincial level (Phung and Nguyen, 2006). However, given the potential presence of non-sampling errors in the VHLSS 2002 that may have adversely affected the computation of poverty rates, the later VHLSS 2004, which surveyed a total of 9,189 households, is the one used in this study.

Following the approach in the existing literature, we use per capita expenditure as the metric to examine ethnic differences in household welfare in rural Vietnam (see Van de Walle and Gunewardena (2001); Baulch *et al*. (2004); Baulch *et al*. (2007)). Although per capita expenditures are an incomplete measure of welfare, there is considerable evidence to suggest that many of the more commonly used non-monetary measures of well-being are highly correlated with expenditures in Vietnam (see Glewee, Agrawal and Dollar (2004). Our chosen measure is defined as real household per capita expenditure computed on the basis of total household food and non-food consumption over the past 12 months. The living standard variable is expressed in real terms at January 2004 prices using the GSO's monthly CPI price deflators. We restrict our sample to rural areas both because this is where the vast majority of Vietnam's ethnic minorities live and because of well-known problems with the urban sampling frame for the 1998 and 2004 surveys (Poverty Working Group, 1999; Pincus and Sender, 2006; VASS, 2006)

The VLSS surveys for 1993 and 1998 and the VHLSS 2004 include information on, *inter alia*, the household head and their spouse, education and age of all household members, the household's demographic structure, physical assets (particularly access to different types of land), geographical location, the date of interview, and general socio-economic conditions relating to the location or commune within which the households are situated. The survey data thus provide a rich set of variables that can be used to model household welfare. Though the content of the questionnaire has evolved over time, the core information contained within the three surveys facilitates the construction of a set of variables that are compatibly defined across the three relevant years.

The ethnic status of a particular household is determined exclusively by the ethnicity of the household head. As our primary purpose is to investigate empirically the household welfare gaps between the majority and the minority ethnic groups, the ethnic group definitions used in previous studies on Vietnam (Van de Walle and Gunewardena, 2001; Baulch *et al*. 2004) are adhered to in the current paper. Thus, we treat households headed by either Kinh or Hoa as comprising the majority group, and households headed by those from all other ethnic origin as affiliated to a broadly defined minority group. The motivation for merging the Chinese with the Kinh to form the majority group relates to the fact that Chinese-headed households are widely recognized as being relatively well-off and economically integrated in Vietnam, though this phenomenon is strongest in urban areas. Approximately, 14% of households were headed by ethnic minorities in 1993, rising to over 17% by 2004.

Table A1, reported in the appendix to this paper, provides a description of the variables used in our analysis and selected summary statistics. Using the estimates reported in this table, the average annual growth rate in per capita household expenditure for the majority group in rural Vietnam between 1993 and 2004 is estimated at 4.4% compared to 3.2% for the minority group. Over this period, the national poverty headcount fell sharply from 54% to 14% for the majority group while declining from 86% to 61% for the minority group. The more buoyant growth in per capita household expenditure experienced by the majority group partly explains the widening gap in poverty and living standards between

the two groups. This gap, however, is the subject of a more systematic empirical investigation below.

We can establish some further insights on the changes in poverty and welfare over time by plotting the kernel densities for per capita household expenditure for the three years using the dichotomy between the Kinh and Chinese majority, and all other ethnic groups. The plots are reported in Figure 1. The poverty line, using the GSO and World Bank criterion, is also super-imposed on these densities.[2] The unbroken plot represents the Kinh and Chinese and the broken line that of the other ethnic minority groups. In general, the densities for the majority group are strongly right-skewed compared to the minority group. The inter-ethnic differences in headcount poverty rates are also evident from an inspection of these plots. The contraction in headcount poverty is fairly apparent in conducting a direct comparison between 1993 and 2004, though it is also the case that the magnitude of the difference in regard to this improved welfare outcome remains sizeable between the two broadly defined groups.

FIGURES 1 & 2 HERE

Finally, Figure 2 plots the mean per capita expenditure gap between the majority and the minority groups by percentile. It is evident that the gaps in household living standards have widened considerably over time at almost all the non-extreme percentiles of the distribution and that the largest part of the increase occurred between 1998 and 2004. The mean per capita expenditure among the majority group was 47% higher than that of the minority in 1993, and increased to 69% by 2004. Our calculations also suggest that the average minority group's household expenditure has steadily fallen down the rankings within the majority household's actual expenditure distribution (from the 21st percentile in 1993 to the 13th by 2004).

[2] There are two poverty lines in common use within Vietnam: the GSO-World Bank poverty line (which is based on a standard cost-of-basic-needs methodology and estimated from the V(H)LSS) and the MOLISA poverty lines (which are used for targeting and monitoring the number of poor households at the commune level). The 'international' $1 and $2 a day poverty lines are rarely used for poverty analysis within Vietnam due to PPP conversion factor issues.

Methodology

Separate equations describing the determination of log per capita household expenditure are specified for the majority (Kinh-Hoa) and minority groups as follows:

$$\mathbf{y}_m = \mathbf{x}_m'\boldsymbol{\beta}_m + \mathbf{u}_m \quad [1]$$

$$\mathbf{y}_e = \mathbf{x}_e'\boldsymbol{\beta}_e + \mathbf{u}_e \quad [2]$$

where $\mathbf{y}_j$ denotes the per capita household measure expressed in natural logarithms for the j^{th} ethnic group (where j = m or e denoting the majority and minority groups respectively), $\mathbf{x}_j$ is a (k × n) matrix of household characteristics (e.g., household structure, education of members, household landholding) and community characteristics (e.g., infrastructure conditions); $\boldsymbol{\beta}$ is a (k × 1) vector of unknown parameters capturing the effect of the relevant covariates on log per capita expenditure; $\mathbf{u}_j$ is a (n × 1) vector of random error terms for which the standard assumptions apply for estimation by Ordinary Least Squares (OLS). [3]

Using the Blinder-Oaxaca decomposition approach (Blinder, 1973; Oaxaca, 1973), the estimated mean ethnic difference in log per capita household expenditure can be expressed as:

$$\bar{\mathbf{y}}_m - \bar{\mathbf{y}}_e = (\bar{\mathbf{x}}_m - \bar{\mathbf{x}}_e)'\hat{\boldsymbol{\beta}}_m + \bar{\mathbf{x}}_e'(\hat{\boldsymbol{\beta}}_m - \hat{\boldsymbol{\beta}}_e) \quad [3]$$

where the 'bar' denotes mean values and the 'hat' denotes OLS coefficient estimates, and the subscripts m and e denote the majority and ethnic minority groups. This allows the overall average differential in household expenditure between the two ethnic groups to be decomposed into a part attributable to differences in characteristics (known as the 'explained' or 'endowment' component) and a part attributable to differences in the estimated returns to characteristics between majority and minority households (known as

[3] In the mean regression analysis, the effects of clustering and stratification are taken into account in the estimation of the per capita log expenditure equation's coefficient standard errors through exploiting the individual survey's sample design features.

the ‘ ‘treatment’, ‘residual’ or ‘unexplained’ component). The final part of expression [3] is sometimes taken to reflect the degree of unequal treatment or discrimination against ethnic minorities. This approach assumes that in the absence of unequal treatment the majority group’s coefficient structure prevails.[4] Given that these components are (log) linear in the estimated parameters, their sampling variances can be computed with ease. In addition, the overall treatment and endowment components can be decomposed further into sets of characteristics and coefficient differences, to identify the key factors driving the overall components. In the current study, the variables are classified according to household structure (e.g., household size, age structure composition of the household), household education levels, landholding characteristics (e.g., household’s access to different types of land land), and commune characteristics (such as access to electricity, markets, post-offices, post-offices, roads, schools and the geographic region the commune is located in).[5]

The decomposition described in [3] is cast exclusively within the mean regression framework. An exclusive focus on the mean, however, may provide an incomplete account of the nature of ethnic welfare disadvantage in rural Vietnam. The estimation of a set of conditional quantile functions allows for a more detailed portrait of the relationship between the household welfare measure and selected covariates than that provided by mean regression analysis (Deaton, 1997; Koenker and Basset, 1978; Koenker, 2005). The equations are then estimated conditional on a given specification for various percentiles of the residuals (e.g., 10th, 25th, 50th 75th or 90th) by minimizing the sum of absolute deviations of the residuals from the conditional specification (see Chamberlain, 1994). The sampling variances for the quantile regression estimates are obtained in the current application using the bootstrapping procedure with 200 replications.[6]

[4] The minority coefficient structure could be also assumed to prevail in the absence of unequal treatment. This can yield numerically different values for the component parts compared to expression [3] due to a conventional index-number problem.

[5] Coastal, delta, midlands,, low-mountains and high mountains are the geographic types of communes distinguished in the VLSS and VHLSS.

[6] See Brownstone and Valletta (2001) for an accessible discussion of bootstrapping methods in applied econometrics. It should be noted that the quantile approach used here does not incorporate survey design features in the construction of the sampling variances. In addition, the number of estimable parameters that

In the current application, the quantile regression for the majority (m) and minority (e) sub-samples can be defined as:

$$\mathbf{y}_m = \mathbf{x}_m'\boldsymbol{\beta}_{\theta m} + \mathbf{u}_{\theta m} \quad [4]$$

$$\mathbf{y}_e = \mathbf{x}_e'\boldsymbol{\beta}_{\theta e} + \mathbf{u}_{\theta e} \quad [5]$$

If $\mathbf{Q}_\theta(\cdot)$ is taken to denote the conditional θ^{th} quantile operator, then $\mathbf{Q}_\theta(\mathbf{w}_j|\mathbf{x}_j) = \mathbf{x}_j'\boldsymbol{\beta}_{\theta j}$, where $\boldsymbol{\beta}_{\theta j}$ is the unknown parameter vector for the θ^{th} quantile with θ representing the selected quantile of interest (i.e., 0.1, 0.25, 0.5, 0.75 and 0.9 in the current context); $\mathbf{u}_{\theta j}$ denotes the error term, the distribution of which is left unspecified but for which $\mathbf{Q}_\theta(\boldsymbol{\mu}_{\theta j}|\mathbf{x}_j) = \mathbf{0}$ is assumed; and j subscript denotes either the majority or the minority group.

Using equations [4] and [5], the conditional θ^{th} quantile functions for the two groups are expressed as:

$$\mathbf{Q}_\theta(\mathbf{y}_m) = \mathbf{E}(\mathbf{x}_m|\mathbf{y}_m = \mathbf{Q}_\theta(\mathbf{y}_m))'\hat{\boldsymbol{\beta}}_{\theta m} + \mathbf{E}(\boldsymbol{\mu}_{\theta m}|\mathbf{y}_m = \mathbf{Q}_\theta(\mathbf{y}_m)) \quad [6]$$

$$\mathbf{Q}_\theta(\mathbf{y}_e) = \mathbf{E}(\mathbf{x}_e|\mathbf{y}_e = \mathbf{Q}_\theta(\mathbf{y}_e))'\hat{\boldsymbol{\beta}}_{\theta e} + \mathbf{E}(\boldsymbol{\mu}_{\theta e}|\mathbf{y}_e = \mathbf{Q}_\theta(\mathbf{y}_e)) \quad [7]$$

where the circumflexes now denote quantile regression estimates and $\mathbf{E}(\cdot)$ denotes the expectations operator. In expressions [6] and [7], the characteristics are evaluated conditionally at the quantile values for the log household per capita expenditure and not unconditionally as in the mean regression case. The terms $\mathbf{E}(\boldsymbol{\mu}_{\theta j}|\mathbf{w}_j = \mathbf{Q}_\theta(\mathbf{w}_j))$ are thus non-zero. However, these terms tend to be small and can be conveniently ignored if we decompose the ethnic household welfare gap in terms of the predicted rather than actual log household expenditures at selected quantiles. Thus,

$$\hat{\boldsymbol{\Delta}}_\theta = \boldsymbol{\Delta}\boldsymbol{\Omega}_\theta'\hat{\boldsymbol{\beta}}_{\theta m} + \boldsymbol{\Omega}_{\theta e}'\boldsymbol{\Delta}\hat{\boldsymbol{\beta}}_\theta \quad [8]$$

where

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is feasible with this procedure prohibits, in contrast to the OLS procedure, the introduction of a large set of district effects into the empirical analysis.

$\hat{\Delta}_{\theta}$ denotes the differences in predicted expenditures at the θ^{th} quantile; $\Delta\hat{\beta}_{\theta} = (\hat{\beta}_{\theta m} - \hat{\beta}_{\theta e})$; and $\Delta\Omega_{\theta} = \Omega_{\theta m} - \Omega_{\theta e}$ with $\Omega_{\theta m} = E(x_m | w_m = Q_{\theta}(w_m))$ and $\Omega_{\theta e} = E(x_e | w_e = Q_{\theta}(w_e))$. The first and second expressions on the right-hand side of equation [8] are the quantile regression analogues respectively to the differences in characteristics and differences in returns components reported for the conventional mean-based decomposition described in [3] above.

In the computation of expression [8] it is necessary to use realizations of the characteristics that accurately reflect the relevant points on the conditional household expenditure distribution. In order to address this issue, we use an approach originally suggested by Machado and Mata (2005) to derive the realizations for the relevant characteristics at different quantiles of the conditional household expenditure distribution. The procedure involves drawing 100 observations at random and with replacement from each of the majority and minority sub-samples. Each observation once ranked comprises a percentile point on the log per capita household expenditure distribution. The full set of household-level and other characteristics for the observation at the θ^{th} expenditure quantile is then retrieved. This process is then replicated 500 times to obtain 500 observations at the selected θ^{th} quantile. The mean characteristics of these observations at each quantile are then used to construct the realizations for $\Omega_{\theta m}$ and $\Omega_{\theta e}$ used in expression [8].

An important theme of the current research is to investigate the temporal evolution of the ethnic welfare gap. In the context of mean regression, Juhn, Murphy and Pierce (1991) developed a framework that allows the decomposition of the change in the average gap across two points in time. Following Reilly (1999), the procedure used here only requires the OLS estimation of the majority group's household expenditure equation for each year of interest. If we denote the mean difference in the ethnic household welfare gap in year t as $\bar{d}_t$, the differential in the average ethnic welfare gap between any two years (labelled with subscripts 1 and 0) can then be decomposed as:

$$\bar{\mathbf{d}}_1 - \bar{\mathbf{d}}_0 = [\Delta\bar{\mathbf{x}}_1 - \Delta\bar{\mathbf{x}}_0]'\hat{\boldsymbol{\beta}}_{m1} + \Delta\bar{\mathbf{x}}_0'[\hat{\boldsymbol{\beta}}_{m1} - \hat{\boldsymbol{\beta}}_{m0}] + \sigma_{m1}[\Delta\bar{\boldsymbol{\mu}}_{m1} - \Delta\bar{\boldsymbol{\mu}}_{m0}] + \Delta\bar{\boldsymbol{\mu}}_{m0}[\sigma_{m1} - \sigma_{m0}] \quad [9]$$

where σ_{mt} is the residual (or regression) standard error from the majority group's household expenditure equations at time t (t = 0,1 where 1 is the most recent year), and $\bar{\boldsymbol{\mu}}_{mt}$ is the standardized residual, which has a mean of 0 and a standard deviation of 1 for the majority group; $\Delta\bar{\boldsymbol{\mu}}_{mt}$ is computed as $\Delta\bar{\boldsymbol{\mu}}_{mt} = -[\bar{\mathbf{y}}_{et} - \bar{\mathbf{x}}_{et}'\hat{\boldsymbol{\beta}}_{mt}]/\sigma_{mt}$ while $\Delta\bar{\mathbf{x}}_t = (\bar{\mathbf{x}}_{mt} - \bar{\mathbf{x}}_{et})$

The first term on the right-hand side of [4] captures the effect of changes in differences in (observable) characteristics between the majority and minority groups over time on the ethnic gap in household welfare. The second term captures the effect of changes in returns to characteristics for the majority group. The third term captures the 'gap effect', which measures the impact of changes in the relative position of the average ethnic minority households within the majority group's residual household expenditure distribution. The fourth term reflects changes in residual dispersion of living standards of the majority group. This term can be taken to reflect the role of temporal changes in the unobservable coefficient structure. Note that the first and third terms measure ethnic specific factors, while the second and fourth capture the effects respectively of changing observed and unobserved coefficient structures.

In the context of the quantile regression approach, the most appropriate method to decompose gaps over time is not entirely transparent. There are a number of different ways that the temporal change in the predicted gap at selected quantiles can be decomposed. The approach adopted here requires separate estimation of both majority and minority regression models at the selected quantiles. This decomposition approach is relatively easy to estimate, and yields four components that are amenable to straight-forward interpretation. Using this approach, the predicted ethnic welfare gap at selected quantiles between year 1 and year 0 can be expressed as follows:

$$\begin{aligned}\hat{\boldsymbol{\Delta}}_{\theta,1} - \hat{\boldsymbol{\Delta}}_{\theta,0} &= (\Delta\boldsymbol{\Omega}_{\theta,1} - \Delta\boldsymbol{\Omega}_{\theta,0})'\hat{\boldsymbol{\beta}}_{\theta m,1} + (\boldsymbol{\Omega}_{\theta e,1} - \boldsymbol{\Omega}_{\theta e,0})'\Delta\hat{\boldsymbol{\beta}}_{\theta,1} \\ &+ \Delta\boldsymbol{\Omega}_{\theta,0}'(\hat{\boldsymbol{\beta}}_{\theta m,1} - \hat{\boldsymbol{\beta}}_{\theta m,0}) + \boldsymbol{\Omega}_{\theta e,0}'(\Delta\hat{\boldsymbol{\beta}}_{\theta,1} - \Delta\hat{\boldsymbol{\beta}}_{\theta,0})\end{aligned} \quad [10]$$

Thus, the overall change in the ethnic gap in living standards between two years at the θ^{th} quantile can be decomposed into four parts. The first part is attributable to the change over time in the (observable) characteristics between the majority and minority groups at the θ^{th} quantile of the conditional expenditure distribution evaluated using the majority group's coefficients. The second part is attributable to the change over time in the (observable) characteristics of the minority group at the θ^{th} quantile of the conditional distribution. The third part is attributable to the temporal change in the majority group's returns to characteristics at the θ^{th} quantile. The fourth term is attributable to the change over time in differences in returns between the majority and minority groups at the θ^{th} quantile of the conditional distribution. The final term offers the potential for insight into the role of temporally changing ethnically motivated unequal treatment.[7]

Empirical Results

Mean Regression Decomposition Analysis

Table A2 of the appendix reports the mean regression estimates for the two ethnic groups over the three years. These estimates are not the subject of discussion here to conserve space. However, the estimates are generally signed in accordance with priors and have plausible magnitudes. The 'goodness-of-fit' measures are satisfactory by cross-sectional standards, which is an important requirement given the decomposition analysis undertaken in this study.

As shown in Figure 2, the raw mean ethnic gap in per capita household expenditures has risen by 14.6 percent (0.137 log points) between 1993 and 2004, with the computed absolute t-ratio of 4.4 corresponding to this point estimate being comfortably significant. Most of this increase occurred over the shorter time period between 1998 and 2004, during which time the ethnic gap increased by 12 percent (0.113 log points). The decomposition estimates reported in table 1 use expression [3], which assumes the

[7] It is acknowledged that this approach is also subject to the conventional index number problem.

majority coefficient structure prevails in the absence of unequal treatment.[8] Using the specification containing commune characteristics (see note (b) to table 1), approximately two-fifths of the gap in all three years is attributable to endowment differentials. This is consonant with the findings reported in the existing literature (see Van de Walle and Gunewardena (2001); Baulch *et al*. (2004); Hoang *et al.* (2007)). There is no statistical evidence that the endowment differentials have widened over time with the absolute t-ratio for a test of the difference between the initial and terminal years computed at a statistically insignificant 0.63.

Unlike previous studies, table 1 also attempts to isolate the relative contributions of demographic factors, education, landholding patterns, and community characteristics to the ethnic expenditure gap. The contributions of differentials in household demographic structure and education levels account to the overall endowment effect are broadly similar, while differences in community characteristics account for a smaller portion of the ethnic gap and declines over time. However, different land-holding patterns between the majority and minority groups are found to narrow the endowment differential. The negative signs on the landholding variables for the mean decompositions possibly reflect the greater experience and knowledge that ethnic minority peoples have in farming upland areas.

The part of the gap due to differences in returns reported in table 1 has widened by a statistically significant amount over time. The overall effect has risen by just over 12 percent (0.11 log points) between the initial and terminal years, with the estimated t-ratio computed at 2.6 in absolute terms. Thus, by 2004, almost two-thirds of the household welfare gap was attributable to differential treatment. In contrast to the factors identified as influencing the differences in characteristics, the key drivers responsible for the treatment differentials are less transparent. However, in both 1993 and 1998, commune

[8] We also decomposed the ethnic household expenditure gaps assuming the minority coefficients prevailed in the absence of unequal treatment. The results, which are available from the corresponding author upon request, suggest relatively modest evidence of the 'index number' problem. Furthermore, as the Kinh and Hoa majority group accounts for about 85% of the total sample, it is reasonable to assume the majority coefficient structure is the relevant benchmark in the absence of unequal treatment. We therefore focus on the decomposition results using expression [3] in this paper.

characteristics accounted for a sizeable proportion of the treatment differential in total per capita expenditures.[9] By 2004, a sizeable role for the differential treatment effects associated with the set of demographic structure variables is detected.

If we use the district-level dummies rather than the commune controls in the per capita household expenditure equations, the interpretational narrative detailed above is not materially altered. However, the overall endowment effects are magnified slightly and the treatment differentials attenuated. Indeed, the estimated difference in these effects between 1993 and 2004 is now statistically indistinguishable from zero at a conventional level ($|t| = 0.81$). Nevertheless, even allowing for the introduction of a large array of district effects, a sizeable treatment effect, roughly comprising about one-half of the raw difference, remains for each year. This tentatively suggests that the disadvantaged position of Vietnam's rural ethnic minority groups cannot be attributed exclusively to the role of geography and the concentration of ethnic minorities within the more remote parts of the country.

We now turn to a discussion of the decompositions computed at selected points of the conditional log per capita household expenditure distribution using expression [8].[10] The estimates for this exercise are reported for the three years in tables 2 to 4. For all cases, the point estimates for the raw ethnic gap in household welfare exhibit an increase between the 10^{th} and 90^{th} percentiles, though the evolution of the increase is not monotonic for any of the three years. The portion of the mean gap accounted for by endowment differences is fairly stable across the selected percentiles and comprises between one-fifth and two-fifths of the relevant total raw gap in each of the three years. The roles exerted by household demographic structure, education, and commune characteristics in determining the overall endowment effects are similar to the findings obtained using the mean regression analysis for all years. In a direct comparison between 1993 and 2004, the estimated differences in the magnitudes of the endowment and

[9] The declining importance of commune characteristics in accounting for both endowment and treatment differentials between 1998 and 2004 may reflect the impact of the geographically targeted infrastructure investments under Programmes 133 and 135 in ethnic minority areas,

[10] The full set of quantile regression estimates are not reported in Appendix A3.1 to A3.3.

treatment effects were only found to be statistically significant in a couple of cases for each of the two component parts. The estimated endowment effect rose by a statistically significant 0.16 log points at the 25th percentile (|t|=3.57) and by 0.097 log points at the median (|t|=2.86). In regard to the treatment component, this rose by 0.20 log points at the median (|t|=3.98) and by 0.10 log points at the 75th percentile (|t|=2.01).[11]

TABLES 2, 3 & 4 HERE

The Juhn, Murphy and Pierce (1991) decomposition is now exploited to investigate the evolution of the mean gap in per capita expenditures between the majority and minority groups over time. In order to ensure that the temporal comparisons are conducted on a compatible basis with the quantile regression analysis, only the expenditure equations with commune controls are used in this exercise. The analysis is undertaken separately for 1993 and 2004 and for 1998 and 2004. The results are reported in table 5 and 6, which decomposes changes in the ethnic gap into the four component parts described in expression [9].

Approximately 70% of the 0.137 log points increase in the ethnic gap between 1993 and 2004is attributable to changes in unobservable characteristics and around one-fifth is associated with changes in observable characteristics (table 6). Changes in the observed coefficient structure account for most of the remaining differential.

Recall that the first component of the Juhn, Murphy and Pierce decomposition captures the contribution of changes in observed characteristics in explaining the changes in the ethnic gap. This accounts for one-fifth of the overall change in the ethnic gap over the period 1983 and 2004, and one-quarter for the shorter period 1998 and 2004. As reported in table 5, the most important sub-set of characteristics relates to ethnic differentials in household demographic structure variables followed by changes in ethnic differences in

[11] Note that the median estimate of the raw differential is materially different from the mean estimate in only the first year of our analysis, suggesting a large role for outliers in this particular year. This haa implications for the mean estimate of the treatment effect, which is over 50% higher than the median based effect. The mean decompositions thus appear to understate by a magnitude of about one-half the increase in the ethnic disadvantage for a median household between 1993 and 2004.

education. In contrast, changes in ethnic differences with respect to land-holdings serve to narrow the temporal change in the household welfare gap. The second component of the decomposition, the temporal changes in the majority group's coefficient structure, are found to account for a modest part of the increase. Moreover, the estimated effect is not found to be significant at a conventional level.[12] The third component ascribes about 70% of the overall temporal change is ascribed to changes in unobservable characteristics. This component reflects the sharp decline in the percentile rankings of the average minority household within the majority group's residual welfare distribution. Just over 60% of this change occurred between 1998 and 2004. The final component of the decomposition reveals that changes in the residual dispersion of the welfare measure account for little of the rising ethnic gap in household welfare.

Overall, the ethnic specific factors relating to observable and unobservable characteristics account for over 80% of the increase in the ethnic expenditure gap. There appears a more negligible role for changes in coefficient structure either observed (i.e., changes in the estimated coefficients over time) or unobserved (i.e., changes in the residual expenditure dispersion over time). That around two-thirds of the increase in the ethnic gap between these two years is attributable to unobserved factors is noteworthy and could be linked to either greater unobserved heterogeneity and/or an increasingly unequal treatment of the ethnic minorities within Vietnam over recent times (see the following sections).

TABLE 5 HERE

The analysis of the temporal changes in ethnic household welfare gaps at selected quantiles is implemented using expression [10]. The results of this exercise are reported in tables 6 and 7, and are again based on comparisons conducted between 1993 and 2004, and 1998 and 2004 respectively. For the longer period (table 6), the differentials in the temporal change in the overall predicted raw gaps are found to be statistically significant at all selected quantiles, with the lowest gaps at the two extreme percentile points used in

[12] Note that temporal differences in the estimated landholding effects in the majority equations are statistically significant from zero, and exert a widening effect on the observed change in the per capita household welfare gap.

our analysis. At the median, the predicted gap has risen by approximately 0.30 log points between 1993 and 2004. About one-third of this change is attributable to temporal changes in the characteristics of the minority group with changes in household structure and educational levels being the most important sub-set of variables. Approximately one-half of the increase in the ethnic disadvantage at the median is attributable to a widening of the gap between majority and minority returns to included characteristics.[13]

The results reported in table 7 for 1998 to 2004 are broadly congruent with the findings of table 6. However, the share of the change in the ethnic gap accounted for by changes in the difference in returns at the median rises to almost three-fifths, while that accounted for by changes in observable ethnic differentials declines to one-twentieth. However, none of the sub-sets of variables is statistically significantly from zero in this case, underlining the need for further interrogation of the two unobserved components of the decomposition within the most recent six year period. In contrast, the sub-sets of variables for household structure, education and landholdings explain most of the change in observable ethnic differences that have occurred over the same period.

TABLES 6 & 7 HERE

Auxiliary Regression Analysis

To further interrogate the possible reasons for the widening of differences in returns between the majority and minority groups, we followed an approach suggested by Pham and Reilly (2008) for investigating wage inequality in Vietnam. This involved estimating a series of auxiliary weighted least squares (WLS) regressions, using the individual treatment effects for each household as the dependent variable, and a number of additional variables reflecting cultural, geographic and language variables together with greater disaggregation of the ethnic minority groups as the explanatory variables. As most of these variables used in the auxiliary regression were only collected in some

[13] This finding is not detected at the extremes of the distribution where the estimated change in treatment effects is found to be poorly determined. The imprecisely estimated effect at the 90th percentile, for example, may be due to the low density of data points in the minority equations at this particular quantile.

rounds of the VLSS and VHLSS, they could not have been included as explanatory variables in the mean and quantile regressions underlying our main decomposition analysis. For example, information on religion affiliation and whether or not a household lives in a minority only commune is only available for the 1993 and 1998 surveys, while distances to the commune and district centre were only included in the 1998 and 2004 surveys. In addition, while information of whether the survey interview was conducted in Vietnamese or via an interpreter is available for al three surveys, the questions on language and interpretation differed between survey questionnaires.

The WLS regression models were therefore estimated separately for each year using the treatment effects computed from the mean and quantile regression models report above as the dependent variable. Two auxiliary models were estimated, one with a common set of explanatory variables and another with additional explanatory variables, which differ depending on their availability in different survey years. The weights used in these auxiliary regressions are the inverse of the standard errors of the treatment effects, and therefore assign most weight to the most precisely estimates effects. The results (not shown) suggest that membership of the Central Highlands minorities and distance to the commune and district centres increase the size of the treatment effect while membership of the Khmer and Cham ethnic groups or being a Christian diminished it. However, these effects are not consistently significant or particularly well-determined across all three survey years and must be treated with caution. The point estimates for poor competence in Vietnamese (as proxied by the need for survey interpretation) were always positive but only achieved statistical significance for one quantile in one year. The variables for matrilineal practice, Buddhism and the other religions, and membership of the Northern Uplands Minorities do not have statistically significant effects on the size of the treatment effects.

The influence of these variables on the growth of differences in returns of the ethnic minorities in Vietnam, and their possible association with discrimination, will be investigated further in a follow-up paper.

Summary and Conclusions

In 1946, Ho Chi Minh famously asserted that:

> 'As people born from the same womb, whether Kinh or Tho, Muong or Man, Gia Rai or Ede, Xedang or Bana, or any other ethnic minority, all of us are the children of Vietnam, all of us are brothers and sisters. We live and die together, share happiness and sorrow together, [and] whether hungry or full, we help each other.'

It is now over thirty years since the re-unification of Vietnam and almost twenty since the *doi moi* economic reforms were first initiated. The rapid economic growth experienced since the early 1990s has certainly been of central importance in poverty reduction and improving the well-being of the Vietnamese people across a broad range of dimensions. However, on the basis of the empirical analysis reported in this paper, it is clear that the ethnic minorities have not benefitted from this process to the same extent as the Kinh-Hoa majority. There remains a sizeable ethnic gap in per capita expenditures in rural Vietnam, which has widened considerably since 1998. The ethnic expenditure gap in rural areas has, however, been relatively constant across the expenditure distribution with little evidence that it has widened more among either the richer or the poorer households.

In line with the existing literature, this study found that the larger portion of the ethnic gap in household welfare levels is attributable to differences in returns to endowments (treatment effects) rather than the differences in endowments themselves. Previous studies using mean regression analysis have found this to be a persistent feature over time in the mean expenditure gap, but we show it is also the case at selected quantiles of the conditional household expenditure distribution. The factors underlying the overall treatment differentials are difficult to unpack but in numerical terms, the estimated differences in returns due to household demographic structure were found to be important in both the mean and median regression analysis for most years. The characteristics driving the endowment differentials were more clear-cut and comprised, in order of importance, ethnic differences in household demographic structure, education levels and commune characteristics.

As ethnic minorities in Vietnam tend to be live in higher, more mountainous and more remote areas than the majority, a failure to control for spatial heterogeneity may bias, among other things, the estimated treatment effects. We therefore introduced controls for a large number of districts. An important finding of the current study is that, even allowing for the introduction of such a large array of district effects, a sizeable treatment effect remains in all years. This finding supports the view that the disadvantaged position of Vietnam's rural ethnic minority groups cannot be entirely ascribed to the role of geography and the concentration of ethnic minorities within the remoter parts of the country.

The widening in the mean ethnic household expenditure gap over the eleven year interval we analysed was dramatic and was concentrated in the second half of this period. The rise was not restricted to the mean but occurred at most points of the conditional household expenditure distribution. Our temporal decomposition analysis shows that at least half of this increase in the ethnic welfare gap is attributable to changes in unobservable characteristics with less than a quarter due to changes in the observable ethnic differences in characteristics. Temporal changes in coefficient structure, either observed or unobserved, accounted for a negligible part of the increase. This finding appears to be invariant to the use of mean or quantile regression analysis.

This study also attempted, using auxiliary regression models estimated by weighted least squares to identify additional cultural, geographic and language variables that could explain the variation in the estimated treatment effects across the minority groups. The point estimates obtained suggest that membership of the Central Highlands minorities, lack of ability in the Vietnamese language, and distance to the commune and district centres amplified the treatment effects, while membership of the Khmer and Chăm ethnic groups or being a Christian diminished them. However, these estimated effects were generally not found to be well-determined across all three survey years and any inferences must be treated with a great deal of interpretational caution. We are thus left to conjecture that the source of these unexplained differences may be partially rooted in: (i) negative stereo-typing and poor understanding of ethnic minority customs and

cultures; and, (ii) unobserved variations in household-level endowments (e.g., education, distance from the commune centre, and land quality). Unfortunately, the data available to us do not permit an empirical distinction between these two, probably reinforcing and complementary, explanations.

This paper's empirical results do suggest that the geographically targeted and infrastructure focused interventions that have been implemented in Vietnam's ethnic minority areas since 1998, have not been able to counteract the widening gap in majority-minority living standards. Policies and programmes are also required to enhance the lower returns that the ethnic minorities obtain from their endowments.[14] These and other measures that reduce and dismantle the multiple barriers which restrict most ethnic minorities from participating fully in the growth process are urgently required. By doing this, Ho Chi Minh's vision of equality and mutual interdependence among all Vietnam's ethnic groups can be furthered.

[14] The priority areas that are likely to achieve this include, *inter alia*, improving agricultural extension, marketing services and the quality of education in mountainous areas, improved access to wage employment, and the improvement of Vietnamese language skills among some ethnic minority groups.

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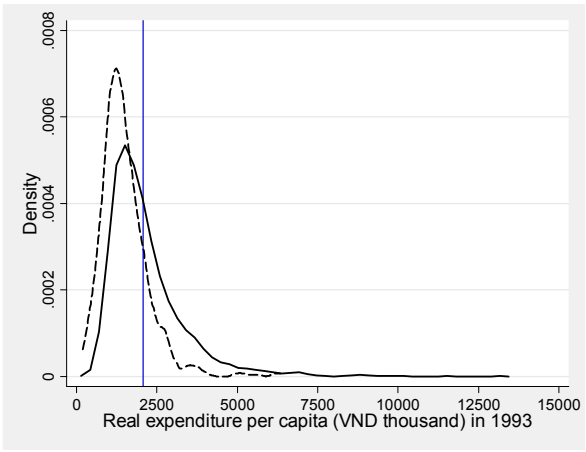
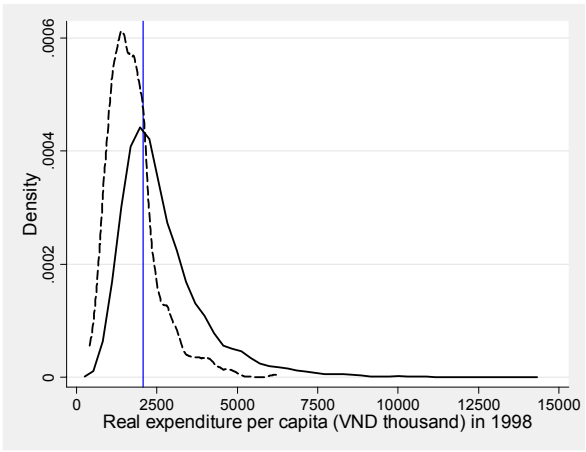
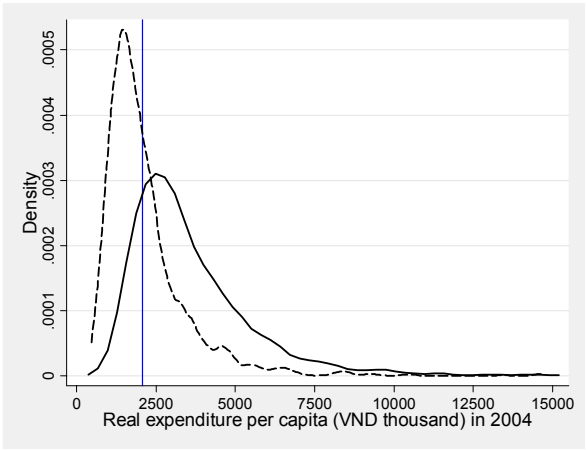
Figure 1: Kernel Density Plots of the Majority/Minority Expenditure per Capita, 1993-2004



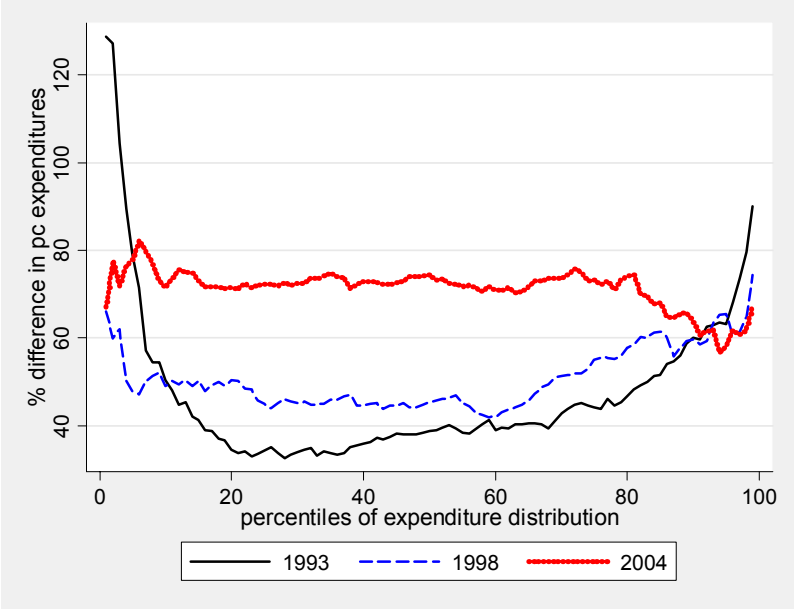




Source: drawn from the VLSS 19993 and 1998, and the VHLSS 2004

Notes: Expenditures per capita are given in Jan 2004 prices; the solid line represents the kernel density of the per capita household expenditures for the Kinh and Chinese; the dash EDline represents that of the other ethnic minority groups.

Figure 2: The Majority-Minority Gap in Per Capita Expenditures in Rural Areas, 1993-2004



Source: Source: drawn from the VLSS 19993 and 1998, and the VHLSS 2004

Table 1: Decomposition of the Ethnic Differential in Household Expenditures at the Mean, 1993-2004

	(1) With commune controls			(2) With district effects		
	1993	**1998**	**2004**	**1993**	**1998**	**2004**
Total differential	**0.3876*** **	**0.4112*** **	**0.5241*** **	**0.3876*** **	**0.4112*** **	**0.5241*** **
	(0.025)	**(0.029)**	**(0.016)**	**(0.025)**	**(0.001)**	**(0.016)**
Due to differences in	**0.1651*** **	**0.1585*** **	**0.187*** **	**0.1909*** **	**0.2126*** **	**0.2705*** **
Characteristics	**(0.026)**	**(0.035)**	**(0.023)**	**(0.03)**	**(0.008)**	**(0.064)**
Of Which:						
− Household structure	0.0675***	0.0671***	0.1029***	0.0744***	0.0695***	0.1179***
	(0.014)	(0.005)	(0.007)	(0.016)	(0.003)	(0.006)
− Education	0.0654***	0.072***	0.0762***	0.0796***	0.0827***	0.0925***
	(0.010)	(0.006)	(0.004)	(0.011)	(0.005)	(0.004)
− Landholding	-0.0263**	-0.0398***	-0.034***	-0.0106	-0.027***	-0.0311***
	(0.012)	(0.011)	(0.008)	(0.01)	(0.007)	(0.008)
− Commune or district effects	0.0585***	0.0592*	0.0419*	0.0475*	0.0873***	0.0911
	(0.020)	(0.032)	(0.024)	(0.027)	(0.006)	(0.063)
Of Which:						
Due to differences due in returns	**0.2224*** **	**0.2527*** **	**0.3371*** **	**0.1967*** **	**0.1986*** **	**0.2555*** **
	(0.033)	**(0.045)**	**(0.028)**	**(0.034)**	**(0.008)**	**(0.064)**
− Household structure	0.1112	0.2296	0.3923**	-0.0379	0.0465	0.1939
	(0.266)	(0.226)	(0.202)	(0.249)	(0.228)	(0.18)
− Education	0.0440	0.0019	-0.0217	0.0728**	0.0608***	0.0108
	(0.030)	(0.031)	(0.020)	(0.029)	(0.024)	(0.016)
− Landholding	-0.0180	-0.0365	-0.0130	-0.0669*	-0.0729**	-0.0597***
	(0.042)	(0.031)	(0.020)	(0.037)	(0.03)	(0.017)
− Commune or district effects	0.1960**	0.3090**	0.1220	0.1838**	0.1263***	0.0408
	(0.079)	(0.138)	(0.121)	(0.088)	(0.023)	(0.099)
− Constant term effect	-0.1108	-0.2513	-0.1426	0.0449	0.038	0.0696
	(0.281)	(0.268)	(0.24)	(0.266)	(0.232)	(0.235)

Notes:

(a) The decomposition in this table uses the set of majority coefficients as the reference group for unequal treatment; see expression [3] in the text.

(b) For (1) the log of per capita household expenditure is regressed on a set of household characteristics and a set of commune characteristics (including geographical type of communes, access to road, public transport, post office, daily market, electricity, and having factories located within 10km);

(c) For (2) the set of commune characteristics in (1) is replaced by a set of district dummies. The number of district effects included was 120, 150 and 574 in 1993, 1998, and 2004 respectively.

(d) Standard errors are reported in parentheses. The survey design effects of clustering and stratification are taken into account in the computation of these standard errors.

(e) ***, **, and * denotes statistically significant at the 0.01, 0.05 and 0.1 levels respectively;

Table 2: Decomposition of the Ethnic Differential in Household Expenditure at Selected Quantiles, 1993

	10th	25th	50th	75th	90th
Total differential	**0.3767*** **	**0.3085*** **	**0.2949*** **	**0.4113*** **	**0.4716*** **
	(0.035)	**(0.036)**	**(0.029)**	**(0.028)**	**(0.042)**
Due to differences in characteristics	**0.1336*** **	**0.0834** **	**0.1484*** **	**0.1576*** **	**0.1975*** **
	(0.047)	**(0.036)**	**(0.025)**	**(0.027)**	**(0.051)**
Of Which:					
− Household structure	0.0485***	0.0388***	0.0562***	0.0859***	0.0665***
	(0.01)	(0.006)	(0.008)	(0.006)	(0.009)
− Education	0.0509***	0.0370***	0.0669***	0.0538***	0.1190***
	(0.011)	(0.007)	(0.009)	(0.008)	(0.027)
− Landholding	-0.018	-0.0484	-0.0268***	-0.0459***	-0.0389***
	(0.025)	(0.032)	(0.011)	(0.009)	(0.014)
− Commune characteristics	0.0523	0.0560**	0.0521***	0.0637**	0.0509
	(0.042)	(0.024)	(0.019)	(0.028)	(0.044)
Of Which:					
Due to differences in returns	**0.2431*** **	**0.2251*** **	**0.1465*** **	**0.2538*** **	**0.2742*** **
	(0.061)	**(0.051)**	**(0.039)**	**(0.038)**	**(0.061)**
− Household structure	-0.2349	0.3282	0.6667*	0.4858	-0.0516
	(0.438)	(0.411)	(0.367)	(0.365)	(0.376)
− Education	0.0091	0.0371	0.0453	0.0141	0.0299
	(0.062)	(0.043)	(0.035)	(0.038)	(0.071)
− Landholding	-0.0035	-0.0001	-0.066*	0.0116	-0.0358
	(0.058)	(0.057)	(0.037)	(0.045)	(0.056)
− Commune characteristics	0.1623	0.2953	0.1791*	0.1118	0.0425
	(0.187)	(0.146)	(0.115)	(0.102)	(0.124)
− Constant term effect	0.3102	-0.4354	-0.6785*	-0.3695	0.2891
	(0.469)	(0.449)	(0.393)	(0.364)	(0.413)

Notes:

(a) The decomposition in this table uses the set of majority coefficients as the reference group for unequal treatment; see expression [8] in the text.

(b) The log per capita household expenditure is regressed on a set of household characteristics and a set of commune characteristics (including geographical types of communes, access to road, public transport, post office, daily market, electricity, and having factories located within 10km);

(c) ***, **, and * denotes statistically significant at the 0.01, 0.05 and 0.1 levels respectively;

(d) Standard errors are reported in parentheses and are based on bootstrapping with 200 replications.

Table 3: Decomposition of the Ethnic Differential in Household Expenditure at Selected Quantiles, 1998

	10th	25th	50th	75th	90th
Total differential	**0.4049*** **	**0.4773*** **	**0.4084*** **	**0.5367*** **	**0.6151*** **
	(0.031)	**(0.024)**	**(0.024)**	**(0.026)**	**(0.043)**
Due to differences in characteristics	**0.1713*** **	**0.1991*** **	**0.1807*** **	**0.1909*** **	**0.2152*** **
	(0.025)	**(0.028)**	**(0.029)**	**(0.029)**	**(0.063)**
Of Which:					
− Household structures	0.1146***	0.0662***	0.0879***	0.062***	0.1134***
	(0.01)	(0.005)	(0.005)	(0.006)	(0.013)
− Education	0.0536***	0.0749***	0.0577***	0.1038***	0.0734***
	(0.008)	(0.016)	(0.004)	(0.01)	(0.012)
− Landholding	-0.0278**	-0.0231**	-0.0884***	-0.0271	-0.055
	(0.012)	(0.011)	(0.023)	(0.018)	(0.048)
− Commune characteristics	0.031**	0.0811***	0.1235***	0.0522	0.0834**
	(0.016)	(0.02)	(0.025)	(0.021)	(0.04)
Due to differences in returns	**0.2336*** **	**0.2782*** **	**0.2277*** **	**0.3458*** **	**0.3998*** **
	(0.037)	**(0.035)**	**(0.041)**	**(0.037)**	**(0.08)**
Of Which:					
− Household structures	0.0005	0.2265	0.4696*	0.6987**	0.1285
	(0.356)	(0.294)	(0.263)	(0.328)	(0.4)
− Education	-0.0308	-0.0243	-0.0191	-0.0069	-0.0196
	(0.045)	(0.037)	(0.035)	(0.035)	(0.044)
− Landholding	-0.0864**	-0.0531*	-0.0108	-0.0197	-0.0512
	(0.044)	(0.034)	(0.05)	(0.043)	(0.069)
− Commune characteristics	0.1205	0.2864**	0.2968**	0.4097***	0.4588***
	(0.143)	(0.119)	(0.108)	(0.117)	(0.144)
− Constant term effect	0.2298	-0.1572	-0.5088*	-0.7361**	-0.1168
	(0.353)	(0.314)	(0.283)	(0.336)	(0.401)

Notes: See notes to table 2.

Table 4: Decomposition of the Ethnic Differential in Household Expenditure at Selected Quantiles, 2004

	10th	25th	50th	75th	90th
Total differential	**0.482*** **	**0.5865*** **	**0.5941*** **	**0.5524*** **	**0.5485*** **
	(0.024)	**(0.019)**	**(0.022)**	**(0.026)**	**(0.024)**
Due to differences in characteristics	**0.207*** **	**0.2438*** **	**0.2471*** **	**0.1973*** **	**0.200*** **
	(0.026)	**(0.027)**	**(0.024)**	**(0.027)**	**(0.039)**
Of Which:					
− Household structures	0.0706***	0.1309***	0.1166***	0.1083***	0.1417***
	(0.008)	(0.01)	(0.007)	(0.009)	(0.012)
− Education	0.0766***	0.0817***	0.1136***	0.0879***	0.0486***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.004)
− Landholding	-0.0308***	-0.0412***	-0.0597***	-0.03***	-0.0236
	(0.011)	(0.01)	(0.008)	(0.01)	(0.022)
− Commune characteristics	0.0907***	0.0724***	0.0766***	0.0312	0.0334
	(0.023)	(0.024)	(0.023)	(0.024)	(0.032)
Due to differences in returns	**0.275*** **	**0.3427*** **	**0.347*** **	**0.3551*** **	**0.3485*** **
	(0.038)	**(0.033)**	**(0.032)**	**(0.033)**	**(0.047)**
Of Which:					
− Household structures	0.4179	0.4024	0.3005	0.3264	0.0219
	(0.301)	(0.272)	(0.22)	(0.25)	(0.429)
− Education	-0.0109	-0.0075	-0.0106	-0.0157	-0.0988***
	(0.027)	(0.023)	(0.028)	(0.03)	(0.034)
− Landholding	0.0103	0.0033	-0.0068	-0.0323	-0.0248
	(0.031)	(0.026)	(0.023)	(0.024)	(0.032)
− Commune characteristics	0.1358	0.2569***	0.1887*	0.0443	-0.0226
	(0.177)	(0.144)	(0.115)	(0.122)	(0.175)
− Constant term effect	-0.2781	-0.3125	-0.1249	0.0324	0.4728
	(0.359)	(0.299)	(0.248)	(0.281)	(0.475)

Notes: See notes to table 2.

Table 5: Temporal Decomposition of the Ethnic Differential in Household Expenditures at the Mean

	2004 - 1993	2004 - 1998
Change in the differential	**0.1371*** **	**0.1129*** **
	(0.024)	**(0.033)**
Due to changes in observed characteristics	**0.0249**	**0.0277** **
	(0.017)	**(0.011)**
Of which:		
− Household structure	0.0329***	0.0369***
	(0.002)	(0.003)
− Education	0.0142***	0.0027**
	(0.001)	(0.001)
− Landholding	-0.0176***	-0.0211***
	(0.004)	(0.006)
− Commune characteristics	-0.0046	0.0092
	(0.017)	(0.01)
Due to changes in observed coefficient structure	**0.0093**	**0.0010**
	(0.034)	**(0.041)**
Of which:		
− Household structure	0.0012	-0.0012
	(0.008)	(0.007)
− Education	-0.0029	0.0016
	(0.009)	(0.007)
− Landholding	0.0252***	0.0288**
	(0.009)	(0.013)
− Commune characteristics	-0.0141	-0.0281
	(0.034)	(0.039)
Due to changes in unobserved characteristics	**0.0963***	**0.0689***
	(0.053)	**(0.045)**
Due to changes in unobserved coefficient structure	**0.0066*** **	**0.0153*** **
	(0.0005)	**(0.0008)**

Notes:

(a) See expression [9] in the text for a description of the decomposition.

(b) ***, **, and * denotes statistically significant at the 0.01, 0.05 and 0.1 levels respectively;

(c) Standard errors are reported in parentheses;

(d) Standard errors for the final two entries are calculated using bootstrapping (using the minority sub-sample of households) with 1000 replications.

Table 6: Temporal Decomposition of the Ethnic Gap in Household Expenditures at Selected Quantiles, (2004 – 1993)

	10th	25th	Median	75th	90th
Change in total differential	**0.1053****	**0.2779*****	**0.2992*****	**0.1411*****	**0.0769***
	(0.049)	**(0.038)**	**(0.039)**	**(0.036)**	**(0.047)**
Change in observable characteristics	**0.0249**	**-0.0472**	**0.05**	**0.0362**	**0.0017**
(between majority and minority groups)	**(0.089)**	**(0.064)**	**(0.072)**	**(0.066)**	**(0.116)**
Of which:					
− Household structure	-0.0053	0.019	-0.0193	-0.0003	-0.019
	(0.018)	(0.015)	(0.018)	(0.019)	(0.033)
− Education	0.0173	0.0261**	0.0154	0.013	0.001
	(0.014)	(0.011)	(0.01)	(0.011)	(0.011)
− Landholding	-0.016	-0.0243*	-0.0005	-0.0086	0.0009
	(0.022)	(0.015)	(0.014)	(0.016)	(0.018)
− Commune characteristics	0.0289	-0.068	0.0544	0.0321	0.0188
	(0.084)	(0.057)	(0.065)	(0.061)	(0.109)
Change in observable ethnic differences	**0.0285**	**0.1969*****	**0.1011*****	**-0.0254**	**-0.0071**
of the minority group	**(0.036)**	**(0.026)**	**(0.02)**	**(0.024)**	**(0.046)**
Of which:					
− Household structure	0.0214***	0.1113***	0.0743***	0.0086	0.0699***
	(0.007)	(0.008)	(0.005)	(0.006)	(0.012)
− Education	0.0289***	0.0597***	0.0536***	0.0379***	-0.0377***
	(0.003)	(0.004)	(0.005)	(0.004)	(0.01)
− Landholding	-0.0078	0.0077	-0.0438***	-0.0181***	-0.0074
	(0.011)	(0.01)	(0.007)	(0.007)	(0.014)
− Commune characteristics	-0.014	0.0182	0.0169	-0.0537**	-0.0319
	(0.034)	(0.02)	(0.02)	(0.022)	(0.04)
Change in the majority group's returns					
to characteristics	**0.0449**	**-0.0366**	**-0.0023**	**0.0652**	**0.0096**
	(0.067)	**(0.046)**	**(0.038)**	**(0.044)**	**(0.079)**
Of which:					
− Household structure	0.0007	-0.0193**	-0.0139	0.0138*	0.0053
	(0.013)	(0.01)	(0.01)	(0.009)	(0.012)
− Education	-0.0032	-0.0151**	-0.007	-0.0038	-0.0327
	(0.013)	(0.008)	(0.009)	(0.01)	(0.034)
− Landholding	-0.005	-0.0005	0.0109	0.034***	0.0226
	(0.025)	(0.03)	(0.011)	(0.01)	(0.015)
− Commune characteristics	0.0523	-0.0017	0.0076	0.0212	0.0144
	(0.063)	(0.037)	(0.037)	(0.044)	(0.073)
Change in differences in returns	**0.007**	**0.1647****	**0.1505***	**0.0651**	**0.0727**
(between majority and minority groups)	**(0.118)**	**(0.084)**	**(0.086)**	**(0.085)**	**(0.137)**
Of which:					
− Household structure	0.658	0.0552	-0.3468	-0.1591	0.0926
	(0.582)	(0.492)	(0.4)	(0.4)	(0.525)
− Education	-0.0371	-0.0706	-0.0713*	-0.0427	-0.1298*
	(0.073)	(0.052)	(0.045)	(0.043)	(0.082)
− Landholding	0.0298	0.0278	0.0597	-0.0353	0.0101
	(0.063)	(0.063)	(0.042)	(0.041)	(0.059)
− Commune characteristics	-0.0555	0.0295	-0.0448	-0.0996	-0.0839
	(0.275)	(0.216)	(0.149)	(0.148)	(0.182)
− Constant term effect	-0.5882	0.1229	0.5537	0.4019	0.1836
	(0.616)	(0.513)	(0.444)	(0.419)	(0.598)

Notes:

(a) See expression [10] in the text.

(b) ***, **, and * denotes statistically significant at the 0.01, 0.05 and 0.1 levels respectively;

(c) Standard errors are reported in parentheses.

Table 7: Temporal Decomposition of the Ethnic Gap in Household Expenditures at Selected Quantiles, (2004 – 1998)

	10th	25th	Median	75th	90th
Change in total differential	**0.0771****	**0.1092*****	**0.1853*****	**0.0157**	**-0.0666**
	(0.038)	**(0.031)**	**(0.033)**	**(0.033)**	**(0.051)**
Change in observable characteristics (between majority and minority groups)	**0.0103**	**-0.0269**	**0.0099**	**0.0101**	**-0.0805**
	(0.045)	**(0.05)**	**(0.041)**	**(0.03)**	**(0.061)**
Of which:					
− Household structure	-0.0145	0.0124	-0.0227	-0.0253**	-0.0252
	(0.019)	(0.013)	(0.015)	(0.011)	(0.02)
− Education	0.0149	0.0142	0.0295**	0.0185*	0.0032
	(0.011)	(0.011)	(0.012)	(0.01)	(0.012)
− Landholding	-0.0181	-0.038**	-0.0188	-0.028**	-0.0416*
	(0.017)	(0.017)	(0.013)	(0.013)	(0.026)
− Commune characteristics	0.0279	-0.0155	0.0219	0.045***	-0.017
	(0.035)	(0.04)	(0.031)	(0.017)	(0.043)
Change in observable ethnic differences of the minority group	**-0.0123**	**0.0608*****	**0.044****	**0.0044**	**0.0121**
	(0.028)	**(0.02)**	**(0.019)**	**(0.011)**	**(0.04)**
Of which:					
− Household structure	-0.0376***	0.0712***	0.0268***	0.0435***	-0.0052
	(0.008)	(0.007)	(0.007)	(0.006)	(0.009)
− Education	0.0096***	-0.0019	0.0561***	-0.0036	-0.0034
	(0.002)	(0.005)	(0.005)	(0.003)	(0.006)
− Landholding	0.0151	-0.007	-0.0207***	-0.025***	0.0192
	(0.012)	(0.01)	(0.007)	(0.006)	(0.02)
− Commune characteristics	0.0007	-0.0016	-0.0182	-0.0105*	0.0015
	(0.025)	(0.014)	(0.017)	(0.006)	(0.03)
Change in the majority group's returns to characteristics	**0.0479**	**-0.0161**	**0.0219**	**0.0021**	**-0.0273**
	(0.044)	**(0.042)**	**(0.04)**	**(0.037)**	**(0.072)**
Of which:					
− Household structure	-0.0064	-0.0066	0.0016	0.0028	0.0334**
	(0.014)	(0.006)	(0.008)	(0.01)	(0.017)
− Education	0.0134	0.0087	-0.0004	-0.0123	-0.0214
	(0.01)	(0.015)	(0.005)	(0.012)	(0.016)
− Landholding	-0.0181	-0.011	0.0494**	0.0222	0.0122
	(0.016)	(0.012)	(0.023)	(0.017)	(0.042)
− Commune characteristics	0.059	-0.0071	-0.0287	-0.0106	-0.0516
	(0.041)	(0.035)	(0.036)	(0.03)	(0.058)
Change in differences in returns (between majority and minority groups)	**0.0312**	**0.0914**	**0.1095****	**-0.0009**	**0.0292**
	(0.067)	**(0.07)**	**(0.057)**	**(0.053)**	**(0.1)**
Of which:					
− Household structure	0.4318	0.1635	-0.1421	-0.347	-0.0814
	(0.474)	(0.399)	(0.355)	(0.413)	(0.515)
− Education	0.005	0.0026	-0.0206	-0.0273	-0.0825*
	(0.06)	(0.045)	(0.041)	(0.045)	(0.052)
− Landholding	0.1148**	0.0944**	0.0228	0.0153	0.068
	(0.05)	(0.043)	(0.05)	(0.046)	(0.066)
− Commune characteristics	-0.0126	-0.014	-0.13	-0.4104***	-0.4645**
	(0.202)	(0.179)	(0.139)	(0.162)	(0.223)
− Constant term effect	-0.5078	-0.1553	0.3793	0.7684*	0.5896
	(0.498)	(0.448)	(0.38)	(0.437)	(0.556)

Notes: See notes (a), (b) and (c) of table 6.

Appendix

Table A1: Description of Variables and Summary Statistics

Brief Description of Variables	1993		1998		2004	
	(1)	(2)	(1)	(2)	(1)	(2)
Real per capita expenditure in 2004 price (VND 000s)	1,870	1,269	2,401	1,591	3,149	1,861
	(1,309)	(674)	(1,490)	(786)	(2,130)	(1,339)
Household size	5.7894	6.6303	5.4423	6.1065	4.8589	6.0208
	(2.141)	(3.245)	(1.871)	(1.98)	(1.648)	(2.307)
Proportion of children aged 6 years and less	0.1729	0.2152	0.1200	0.1546	0.0857	0.1218
	(0.176)	(0.177)	(0.154)	(0.154)	(0.133)	(0.147)
Proportion of children aged from 7 to 16 years	0.2621	0.2590	0.2727	0.2917	0.2374	0.2741
	(0.205)	(0.196)	(0.206)	(0.203)	(0.202)	(0.19)
Proportion of male adults	0.2616	0.2511	0.2848	0.2640	0.3286	0.2978
	(0.144)	(0.126)	(0.151)	(0.138)	(0.168)	(0.14)
Proportion of female adults	0.3033	0.2748	0.3225	0.2898	0.3483	0.3063
	(0.154)	(0.133)	(0.159)	(0.135)	(0.158)	(0.13)
Household type 1: head or head and spouse	0.0213	0.0079	0.0302	0.0105	0.0376	0.0093
Household type 2: parents and one child	0.0687	0.0507	0.0551	0.0256	0.0902	0.0490
Household type 3: parents and two children	0.1394	0.0886	0.1670	0.1192	0.2547	0.1687
Household type 4: parents with > three children	0.4559	0.4507	0.4319	0.4153	0.3206	0.3736
Household type 5: three-generation household	0.0623	0.0639	0.0667	0.0947	0.1570	0.1860
Household type 6: other household structures	0.2523	0.3381	0.2490	0.3347	0.1399	0.2134
Age of household head	45.232	42.512	46.727	44.048	48.986	44.837
	(13.7)	(13.92)	(12.87)	(12.35)	(13.61)	(12.62)
Squared age of household head (divided by 100)	22.335	20.008	23.489	20.926	25.848	21.695
	(13.52)	(13.19)	(13.11)	(12.04)	(14.84)	(12.7)
Household head is female	0.1898	0.1311	0.1749	0.1391	0.1759	0.0881
Most educated member: no schooling	0.0104	0.1021	0.0070	0.0529	0.0570	0.1479
Most educated member: primary education	0.1684	0.3183	0.1262	0.3046	0.2224	0.3525
Most educated member: lower secondary	0.4917	0.3720	0.4724	0.4268	0.3534	0.2931
Most educated member: upper secondary	0.2016	0.1031	0.2631	0.1661	0.1885	0.1011
Most educated member: vocational/technical	0.1033	0.0932	0.0838	0.0363	0.1296	0.0876
Most educated member: college/university	0.0247	0.0112	0.0475	0.0133	0.0490	0.0178
Irrigated annual crop land (1000 m^2)	2.2991	1.1163	3.2703	2.8278	3.1155	3.4043
	(3.976)	(2.657)	(5.436)	(5.339)	(5.837)	(5.489)
Non-irrigated annual crop land (1000 m^2)	2.2674	5.0890	1.1552	2.2371	0.6610	4.5853
	(5.491)	(5.179)	(4.756)	(3.328)	(3.882)	(8.801)
Perennial land (1000 m^2)	0.8112	1.1147	1.3668	1.6475	1.0749	1.9043
	(2.50)	(2.614)	(6.151)	(4.156)	(6.559)	(8.683)
Forest plot (1000 m^2)	0.2077	1.1450	0.5316	4.4410	0.6710	5.0642
	(1.689)	(3.769)	(4.345)	(10.83)	(7.62)	(2.726)
Water surface (1000 m^2)	0.1516	0.0623	1.5131	0.0799	0.4684	0.1287
	(1.51)	(0.214)	(4.033)	(0.346)	(3.246)	(1.447)
Other cultivated lands (1000 m^2)	0.1899	0.8025	0.5546	1.5364	0.5509	0.9630
	(1.955)	(2.976)	(2.552)	(3.904)	(1.701)	(3.062)
Geographical types of commune: rural coastal	0.0891	0.0603	0.0743	0.0453	0.0866	0.0122
Geographical types of commune: rural inland delta	0.6401	0.0949	0.6060	0.0966	0.6356	0.0820
Geographical types of commune: rural midlands	0.0585	n/a	0.0755	0.0006	0.0711	0.0140
Geographical types of commune: rural low mountain	0.1494	0.3041	0.1795	0.3608	0.1411	0.2519
Geographical types of commune: rural high mountain	0.0629	0.5407	0.0648	0.4968	0.0656	0.6398

Commune having access to road that car can travel	0.8254	0.9295	0.8222	0.9310	0.9563	0.9664
Commune having access to public transport	0.5121	0.5756	0.5794	0.4840	0.5229	0.3693
Commune having access to post office	0.3419	0.3522	0.2292	0.2532	0.3063	0.2463
Commune having access to daily market	0.5903	0.2471	0.5279	0.3368	0.3210	0.1387
Commune having access to electricity	0.5011	0.0534	0.9385	0.6970	0.9836	0.8639
Commune having factories located within 10km	0.4710	0.3196	0.5756	0.4857	0.6993	0.4308
Cham and Khmer	≠	0.1413	≠	0.1265	≠	0.0792
Tay, Thai, Muong, Nung	≠	0.5450	≠	0.4794	≠	0.5747
Other Northern Uplands Minorities	≠	0.1266	≠	0.1118	≠	0.1747
Central Highlands Minorities	≠	0.0954	≠	0.2250	≠	0.1559
Other Minority Groups	≠	0.0917	≠	0.0574	≠	0.0155
Not speaking Vietnamese	≠	0.5450	≠	0.2647	≠	0.3061
Distance to commune center (km)	≠	2.9651	≠	3.0749	≠	2.1890
	≠	(3.561)	≠	(2.436)	≠	(3.583)
Distance to district center (km)	≠	11.295	≠	14.999	≠	17.039
	≠	(7.735)	≠	(12.93)	≠	(15.82)
Distance to major cities (km)	≠	n/a	≠	n/a	≠	225.91
	≠		≠		≠	(187.0)
Matrilineal practice	≠	n/a	≠	0.0632	≠	0.0865
Minority-only commune	≠	0.2936	≠	0.2765	≠	n/a
No religions	≠	0.6862	≠	0.7309	≠	n/a
Number of observations	3,294	545	3,590	680	5,531	1,181

Sources: The VLSS 1992/93, VLSS 1997/98, and VHLSS 2004.

Notes:

(a) (1) and (2) represents the sample average values for the characteristics of the majority and minority groups, respectively;

(b) 'n/a' stands for 'not available'.

(c) ≠ denotes 'not applicable' as these variables are only constructed for the auxiliary regressions for the minority households;

(d) Standard deviations of the continuous variables are reported in parentheses.

Table A2. OLS Estimates for Log per Capita Household Expenditure Regression Models of the Majority and Minority Groups, 1993-2004

	1993		1998		2004	
	Majority	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**
Household size	-0.0482***	-0.0201**	-0.0577***	-0.0692***	-0.0483***	-0.0574***
	(0.008)	(0.01)	(0.01)	(0.012)	(0.008)	(0.011)
Proportion of children aged from 7 to 16 years	0.4595***	0.2599**	0.397***	0.5735***	0.2818***	0.474***
	(0.059)	(0.122)	(0.066)	(0.124)	(0.059)	(0.108)
Proportion of male adults	0.5642***	0.7623***	0.5968***	0.4642***	0.7953***	0.7265***
	(0.078)	(0.165)	(0.09)	(0.101)	(0.07)	(0.154)
Proportion of female adults	0.5359***	0.7197***	0.4769***	0.5092***	0.6711***	0.5904***
	(0.08)	(0.181)	(0.082)	(0.164)	(0.073)	(0.156)
Household type 2: parents and one child	-0.0125	-0.0344	-0.0446	-0.0808	-0.0372	-0.0497
	(0.042)	(0.167)	(0.042)	(0.102)	(0.034)	(0.101)
Household type 3: parents and two children	-0.0362	-0.0719	-0.1009**	-0.1164	-0.0209	-0.1609*
	(0.044)	(0.168)	(0.043)	(0.105)	(0.036)	(0.093)
Household type 4: parents + > three children	-0.0898*	-0.1462	-0.1512***	-0.2228**	-0.0996**	-0.2196**
	(0.048)	(0.17)	(0.049)	(0.103)	(0.043)	(0.099)
Household type 5: three-generation household	-0.0967*	-0.3031*	-0.1093*	-0.1999**	-0.0878**	-0.1437
	(0.057)	(0.178)	(0.058)	(0.098)	(0.044)	(0.104)
Household type 6: other household structures	-0.0659	-0.14	-0.1468***	-0.1612*	-0.046	-0.1905*
	(0.05)	(0.167)	(0.052)	(0.096)	(0.045)	(0.104)
Age of household head	0.0071*	-0.003	0.007	0.0013	0.0005	-0.0078
	(0.004)	(0.01)	(0.005)	(0.006)	(0.004)	(0.008)
Age of head squared (divided by 100)	-0.0079*	-0.0002	-0.0068	-0.0009	-0.0017	0.0048
	(0.004)	(0.01)	(0.004)	(0.007)	(0.003)	(0.007)
Household head is female	0.0004	-0.0151	-0.005	-0.0782***	0.0281	0.0098
	(0.024)	(0.055)	(0.024)	(0.026)	(0.02)	(0.05)
Most educated member: primary education	-0.1649**	-0.4217***	-0.1265**	-0.1199*	-0.1805***	-0.1952***
	(0.073)	(0.079)	(0.058)	(0.068)	(0.029)	(0.04)
Most educated member: lower secondary	0.1289***	0.146***	0.126***	0.1142**	0.0844***	0.1354***
	(0.022)	(0.041)	(0.023)	(0.048)	(0.017)	(0.029)
Most educated member: upper secondary	0.2555***	0.1388**	0.2725***	0.29***	0.2399***	0.3374***
	(0.028)	(0.058)	(0.027)	(0.048)	(0.022)	(0.053)
Most educated member: vocational/technical	0.2925***	0.1958***	0.3057***	0.3453***	0.3543***	0.3422***
	(0.032)	(0.056)	(0.032)	(0.07)	(0.023)	(0.055)
Most educated member: college/university	0.5011***	0.2212	0.5696***	0.4527***	0.6234***	0.605***
	(0.062)	(0.199)	(0.038)	(0.148)	(0.032)	(0.105)
Irrigated annual crop land (1000 m^2)	0.016***	0.0295*	0.0064***	0.0146***	0.0093***	0.0103***

	(0.002)	(0.018)	(0.002)	(0.004)	(0.001)	(0.003)
Non-irrigated annual crop land (1000 m^2)	0.0145***	0.0059*	0.0028	0.0047	0.0039***	0.0081***
	(0.003)	(0.004)	(0.002)	(0.007)	(0.001)	(0.002)
Perennial land (1000 m^2)	0.0218***	0.0307***	0.0124***	0.0251***	0.0053	0.0093***
	(0.005)	(0.007)	(0.001)	(0.006)	(0.003)	(0.002)
Forest plot (1000 m^2)	-0.0023	0.0152***	0.0076***	0.0044**	0.0011*	0.0002
	(0.004)	(0.004)	(0.003)	(0.002)	(0.001)	(0)
Water surface (1000 m^2)	0.0147	0.1522**	0.000*	0.0101	0.011***	0.025*
	(0.01)	(0.076)	(0.00)	(0.030)	(0.002)	(0.015)
Other cultivated lands (1000 m^2)	0.0019	0.0121***	0.0065***	0.0074	0.0231***	0.0078
	(0.004)	(0.005)	(0.002)	(0.005)	(0.004)	(0.006)
Geographical types: rural coastal	0.0385	-0.2551**	0.0021	-0.4104***	-0.0062	0.0011
	(0.034)	(0.13)	(0.06)	(0.135)	(0.031)	(0.158)
Geographical types: rural midlands	-0.0885***	n/a	-0.0407	-0.4875***	0.0175	0.0639
	(0.032)	n/a	(0.095)	(0.16)	(0.03)	(0.158)
Geographical types: rural low mountain	-0.0967***	-0.2239*	-0.1224**	-0.2617**	-0.0338	-0.1644**
	(0.023)	(0.126)	(0.05)	(0.121)	(0.021)	(0.06)
Geographical types: rural high mountain	0.0153	-0.3567***	0.0016	-0.2968***	0.0234	-0.2618***
	(0.036)	(0.126)	(0.07)	(0.101)	(0.041)	(0.059)
Commune having access to road that car can travel	-0.2266***	-0.0989	0.0355	0.0114	0.0032	0.0762
	(0.027)	(0.14)	(0.051)	(0.072)	(0.043)	(0.091)
Commune having access to public transport	0.191***	0.1158**	0.0538	-0.0466	0.0585***	0.0514
	(0.021)	(0.049)	(0.045)	(0.073)	(0.016)	(0.032)
Commune having access to post office	-0.1264***	0.0446	0.0563	0.1086	0.0456***	-0.0418
	(0.02)	(0.057)	(0.045)	(0.094)	(0.018)	(0.035)
Commune having access to daily market	0.1219***	-0.0934	0.0849**	-0.0269	0.0988***	0.1572***
	(0.018)	(0.066)	(0.037)	(0.098)	(0.017)	(0.048)
Commune having access to electricity	-0.0435**	0.4761***	0.0806	0.166*	0.0265	0.0584
	(0.019)	(0.105)	(0.079)	(0.099)	(0.044)	(0.047)
Commune having factories located within 10km	0.1306***	-0.0218	0.057	-0.0575	0.0676***	0.0921***
	(0.017)	(0.047)	(0.04)	(0.074)	(0.016)	(0.033)
Constant term	6.5147***	6.6255***	7.0435***	7.2948***	7.454***	7.5966***
	(0.093)	(0.265)	(0.151)	(0.222)	(0.108)	(0.215)
R^2	0.4049	0.3614	0.3162	0.4726	0.3122	0.4468
Number of observations	3,294	545	3,590	680	5,531	1,181

Notes: ***, **, and * denotes statistically significant at 0.01, 0.05 and 0.1 levels respectively; 'n/a' is 'not available' as there were no ethnic minority households located in rural midlands in the VLSS 1992/93.

Table A3.1 Quantile Regression Estimates for Log per Capita Household Expenditure Regression Models of the Majority and Minority Groups, 1993

	10th percentile		25th percentile		Median		75th percentile		90th percentile	
	Majority	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**
Household size	-0.0647***	-0.071**	-0.0457***	-0.0448**	-0.0562***	-0.0523***	-0.0589***	-0.0313*	-0.0668***	-0.0258
	(0.01)	(0.03)	(0.008)	(0.022)	(0.008)	(0.02)	(0.009)	(0.018)	(0.012)	(0.018)
Proportion of children aged from 7 to 16 years	0.4655***	0.3683	0.4247***	0.3025**	0.4097***	0.3382**	0.4634***	0.4069**	0.5198***	0.2253
	(0.102)	(0.251)	(0.061)	(0.157)	(0.067)	(0.162)	(0.09)	(0.19)	(0.12)	(0.199)
Proportion of male adults	0.6388***	1.0313***	0.6245***	0.905***	0.6128***	0.7135***	0.575***	0.4955**	0.3814***	0.4937**
	(0.106)	(0.288)	(0.102)	(0.282)	(0.09)	(0.208)	(0.104)	(0.213)	(0.144)	(0.231)
Proportion of female adults	0.7298***	0.6276*	0.6148***	0.3537	0.5407***	0.527**	0.4478***	0.8082***	0.3164**	0.6321***
	(0.11)	(0.373)	(0.086)	(0.287)	(0.085)	(0.267)	(0.099)	(0.253)	(0.129)	(0.236)
Household type 2: parents and one child	0.0789	0.1377	0.0058	-0.0248	-0.0319	-0.2391	-0.0273	-0.1948	-0.034	-0.0255
	(0.058)	(0.305)	(0.058)	(0.303)	(0.056)	(0.199)	(0.053)	(0.135)	(0.078)	(0.165)
Household type 3: parents and two children	0.0982	0.3066	0.0077	-0.1039	-0.0551	-0.2605	-0.0328	-0.2811**	-0.0899	-0.148
	(0.067)	(0.284)	(0.054)	(0.301)	(0.057)	(0.212)	(0.05)	(0.121)	(0.079)	(0.168)
Household type 4: parents + > three children	0.126*	0.2824	-0.0205	-0.1321	-0.0725	-0.3042	-0.0897	-0.3466***	-0.1948**	-0.2535
	(0.076)	(0.294)	(0.055)	(0.298)	(0.058)	(0.206)	(0.057)	(0.131)	(0.08)	(0.159)
Household type 5: three-generation household	0.0807	0.0828	-0.1	-0.1485	-0.0593	-0.3671*	-0.0944	-0.3826***	-0.0862	-0.3282
	(0.081)	(0.326)	(0.073)	(0.306)	(0.071)	(0.221)	(0.067)	(0.147)	(0.117)	(0.161)
Household type 6: other household structures	0.1352**	0.283	-0.0202	-0.1207	-0.0488	-0.278	-0.052	-0.3097**	-0.0907	-0.202
	(0.066)	(0.292)	(0.059)	(0.287)	(0.06)	(0.198)	(0.066)	(0.136)	(0.09)	(0.165)
Age of household head	0.0031	0.0076	0.0067	-0.0005	0.011**	-0.0096	0.0053	-0.0154	0.0053	-0.0006
	(0.007)	(0.017)	(0.005)	(0.016)	(0.005)	(0.011)	(0.006)	(0.014)	(0.008)	(0.013)
Age of head squared (divided by 100)	-0.0049	-0.0115	-0.0076	-0.0029	-0.0114**	0.0079	-0.0047	0.0148	-0.0043	0.0009
	(0.007)	(0.018)	(0.005)	(0.017)	(0.005)	(0.012)	(0.006)	(0.014)	(0.008)	(0.014)
Household head is female	-0.0723**	-0.0021	-0.0354	-0.0661	-0.0156	-0.0074	0.0369	-0.0035	0.0293	-0.0605
	(0.038)	(0.081)	(0.029)	(0.076)	(0.028)	(0.06)	(0.031)	(0.07)	(0.048)	(0.08)
Most educated member: primary education	-0.1342	-0.4648***	-0.137*	-0.4938***	-0.2154***	-0.4715***	-0.2169**	-0.369***	-0.254*	-0.2464**
	(0.106)	(0.122)	(0.079)	(0.119)	(0.062)	(0.096)	(0.085)	(0.109)	(0.132)	(0.124)
Most educated member: lower secondary	0.1436***	0.2133***	0.1175***	0.1427**	0.1149***	0.1212**	0.0907***	0.122**	0.1494***	0.1322*
	(0.037)	(0.082)	(0.032)	(0.062)	(0.028)	(0.049)	(0.028)	(0.057)	(0.044)	(0.072)
Most educated member: upper secondary	0.2481***	0.3643***	0.2622***	0.2199**	0.2266***	0.1839***	0.2108***	0.1804**	0.2779***	0.1067
	(0.041)	(0.108)	(0.034)	(0.092)	(0.035)	(0.065)	(0.034)	(0.073)	(0.056)	(0.1)
Most educated member: vocational/technical	0.3347***	0.2604**	0.2937***	0.2404**	0.2676***	0.1554*	0.2762***	0.2334***	0.3137***	0.2214**
	(0.048)	(0.115)	(0.041)	(0.105)	(0.039)	(0.09)	(0.043)	(0.076)	(0.085)	(0.112)
Most educated member: college/university	0.4361***	0.4597**	0.5475***	0.1925	0.509***	0.1162	0.516***	0.6529*	0.5612***	0.5481*
	(0.083)	(0.209)	(0.067)	(0.288)	(0.068)	(0.359)	(0.079)	(0.356)	(0.121)	(0.298)
Irrigated annual crop land (1000 m^2)	0.0231***	0.033	0.021***	0.0376	0.0187***	0.069***	0.0162***	0.046**	0.0108***	0.0555**
	(0.004)	(0.028)	(0.003)	(0.024)	(0.002)	(0.018)	(0.003)	(0.019)	(0.003)	(0.023)

Non-irrigated annual crop land (1000 m^2)	0.0189***	0.011	0.0196***	0.008	0.0207***	0.0102**	0.017***	0.0104**	0.0128***	0.009
	(0.006)	(0.007)	(0.004)	(0.006)	(0.002)	(0.005)	(0.003)	(0.005)	(0.003)	(0.006)
Perennial land (1000 m^2)	0.0174**	0.0423***	0.0202***	0.0297***	0.0267***	0.0328***	0.0325***	0.0195**	0.0295***	0.0208
	(0.007)	(0.01)	(0.007)	(0.011)	(0.007)	(0.01)	(0.009)	(0.01)	(0.007)	(0.014)
Forest plot (1000 m^2)	-0.0004	0.0077	-0.0002	0.0138*	0.0029	0.0143*	0.0004	0.013*	-0.0044	0.0171*
	(0.014)	(0.008)	(0.008)	(0.008)	(0.006)	(0.008)	(0.007)	(0.007)	(0.01)	(0.009)
Water surface (1000 m^2)	0.0022	0.1995**	0.0075	0.0237	0.012	0.1485	0.0326*	0.115	0.0261**	0.1545
	(0.014)	(0.089)	(0.015)	(0.118)	(0.02)	(0.107)	(0.02)	(0.106)	(0.013)	(0.152)
Other cultivated lands (1000 m^2)	-0.0069	0.0061	0.0043	0.0173**	0.0051	0.0095	0.0048	0.0044	0.0073	-0.0036
	(0.024)	(0.01)	(0.012)	(0.009)	(0.004)	(0.006)	(0.005)	(0.008)	(0.012)	(0.011)
Geographical types: rural coastal	-0.0198	-0.1655	0.0125	0.0524	0.0274	-0.2055	0.0398	-0.3691*	-0.0112	-0.2344
	(0.054)	(0.279)	(0.033)	(0.244)	(0.036)	(0.222)	(0.036)	(0.197)	(0.046)	(0.206)
Geographical types: rural midlands	-0.083*	n/a	-0.0487	n/a	-0.0906**	n/a	-0.1341***	n/a	-0.1372*	n/a
	(0.045)	n/a	(0.047)	n/a	(0.045)	n/a	(0.038)	n/a	(0.083)	n/a
Geographical types: rural low mountain	-0.0876**	-0.1928	-0.0446	-0.0791	-0.0959***	-0.2088	-0.1492***	-0.1781	-0.1943***	-0.0955
	(0.039)	(0.264)	(0.03)	(0.222)	(0.023)	(0.211)	(0.028)	(0.189)	(0.045)	(0.191)
Geographical types: rural high mountain	0.0198	-0.2929	0.017	-0.2052	-0.023	-0.2705	-0.0124	-0.2066	-0.0079	-0.1573
	(0.065)	(0.272)	(0.04)	(0.222)	(0.048)	(0.224)	(0.047)	(0.201)	(0.085)	(0.176)
Commune having access to road that car can travel	-0.18***	-0.1078	-0.1992***	-0.3095	-0.2058***	-0.1505	-0.2142***	-0.0702	-0.2634***	-0.1079
	(0.05)	(0.328)	(0.035)	(0.266)	(0.029)	(0.213)	(0.031)	(0.199)	(0.055)	(0.213)
Commune having access to public transport	0.1128***	0.0626	0.1082***	0.107	0.1588***	0.1047	0.2275***	0.0974	0.2737***	0.0705
	(0.03)	(0.088)	(0.029)	(0.084)	(0.023)	(0.074)	(0.027)	(0.068)	(0.041)	(0.095)
Commune having access to post office	-0.1095***	0.0701	-0.1145***	-0.0013	-0.1115***	0.0132	-0.1204***	-0.0396	-0.0579	0.0093
	(0.031)	(0.093)	(0.026)	(0.1)	(0.024)	(0.075)	(0.027)	(0.093)	(0.048)	(0.113)
Commune having access to daily market	0.135***	-0.0366	0.1234***	-0.2713***	0.1091***	-0.1147	0.0996***	0.1049	0.1062***	0.1134
	(0.029)	(0.118)	(0.025)	(0.104)	(0.022)	(0.102)	(0.027)	(0.105)	(0.038)	(0.115)
Commune having access to electricity	-0.0236	0.6199***	-0.0466**	0.6726***	-0.0488**	0.4597***	-0.067***	0.1269	-0.0951**	0.1885
	(0.026)	(0.236)	(0.025)	(0.166)	(0.021)	(0.156)	(0.025)	(0.154)	(0.038)	(0.198)
Commune having factories located within 10km	0.0349	-0.011	0.0941***	0.0225	0.1246***	-0.0049	0.1397***	-0.0313	0.1677***	0.0119
	(0.029)	(0.098)	(0.019)	(0.08)	(0.019)	(0.069)	(0.023)	(0.056)	(0.036)	(0.062)
Constant term	6.5527***	6.2425***	6.771***	7.2064***	7.0178***	7.6964***	7.4346***	7.8041***	7.8518***	7.5626***
	(0.147)	(0.483)	(0.114)	(0.418)	(0.115)	(0.346)	(0.126)	(0.293)	(0.194)	(0.348)
Psuedo-R^2	0.1354	0.3911	0.1483	0.2975	0.1702	0.2597	0.1853	0.2634	0.1726	0.295
Number of observations	3,294	545	3,294	545	3,294	545	3,294	545	3,294	545

Notes: see notes in table A2.

Table A3.2 Quantile Regression Estimates for Log per Capita Household Expenditure Regression Models of the Majority and Minority Groups, 1998

	10th percentile		25th percentile		Median		75th percentile		90th percentile	
	Majority	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**
Household size	-0.0571***	-0.0656***	-0.0639***	-0.0738***	-0.0707***	-0.0735***	-0.0692***	-0.0795***	-0.0513***	-0.0769***
	(0.009)	(0.019)	(0.007)	(0.015)	(0.007)	(0.013)	(0.007)	(0.016)	(0.014)	(0.02)
Proportion of children aged from 7 to 16 years	0.3877***	0.6853***	0.4124***	0.4349***	0.2856***	0.4119***	0.3284***	0.4372***	0.3092***	0.5834***
	(0.082)	(0.137)	(0.066)	(0.139)	(0.073)	(0.133)	(0.088)	(0.138)	(0.118)	(0.204)
Proportion of male adults	0.4891***	0.7585***	0.651***	0.4072**	0.5376***	0.3096	0.479***	0.2044	0.3849***	0.3071
	(0.103)	(0.203)	(0.089)	(0.169)	(0.08)	(0.204)	(0.088)	(0.152)	(0.135)	(0.275)
Proportion of female adults	0.3946***	0.7736***	0.4991***	0.5638**	0.447***	0.4402**	0.3599***	0.3601**	0.2378*	0.7234***
	(0.115)	(0.271)	(0.1)	(0.223)	(0.089)	(0.206)	(0.09)	(0.182)	(0.145)	(0.277)
Household type 2: parents and one child	-0.045	-0.0385	0.0596	-0.0846	-0.0183	-0.1589	-0.1035*	-0.04	-0.2598***	-0.2817*
	(0.055)	(0.19)	(0.039)	(0.153)	(0.043)	(0.129)	(0.059)	(0.175)	(0.077)	(0.168)
Household type 3: parents and two children	-0.0856	0.0268	-0.003	-0.0162	-0.0663	-0.2054*	-0.2084***	-0.1802	-0.3417***	-0.3027*
	(0.058)	(0.208)	(0.043)	(0.153)	(0.042)	(0.122)	(0.059)	(0.154)	(0.067)	(0.156)
Household type 4: parents + > three children	-0.1368**	-0.0615	-0.0353	-0.1562	-0.0931*	-0.2885**	-0.2243**	-0.2787*	-0.3635***	-0.3326*
	(0.061)	(0.215)	(0.051)	(0.149)	(0.049)	(0.133)	(0.069)	(0.16)	(0.084)	(0.177)
Household type 5: three-generation household	-0.105	-0.0113	-0.0119	-0.082	-0.0679	-0.2623**	-0.1518**	-0.2567	-0.3126***	-0.4006**
	(0.077)	(0.203)	(0.058)	(0.149)	(0.052)	(0.127)	(0.076)	(0.167)	(0.097)	(0.166)
Household type 6: other household structures	-0.0969	0.0107	-0.0087	-0.0798	-0.0809*	-0.2189*	-0.1865***	-0.2264	-0.3957***	-0.3342**
	(0.063)	(0.2)	(0.052)	(0.144)	(0.046)	(0.135)	(0.067)	(0.151)	(0.084)	(0.169)
Age of household head	0.0117*	-0.0012	0.0078	0.0058	0.0136***	0.0022	0.0136**	-0.0104	-0.0029	-0.0121
	(0.006)	(0.012)	(0.005)	(0.011)	(0.004)	(0.012)	(0.006)	(0.014)	(0.009)	(0.014)
Age of head squared (divided by 100)	-0.0105*	0.0024	-0.0078	-0.0061	-0.0135***	-0.0014	-0.0139**	0.011	0.0026	0.015
	(0.006)	(0.013)	(0.005)	(0.011)	(0.004)	(0.012)	(0.006)	(0.016)	(0.008)	(0.014)
Household head is female	-0.063**	-0.0405	-0.0283	-0.0417	0.0007	-0.0534	0.022	-0.0967*	0.0839*	-0.1093*
	(0.03)	(0.075)	(0.025)	(0.049)	(0.026)	(0.051)	(0.027)	(0.059)	(0.044)	(0.064)
Most educated member: primary education	-0.0925	-0.1006	-0.063	-0.0902	-0.0913*	-0.1661**	-0.123*	-0.1056	-0.21	-0.0933
	(0.07)	(0.098)	(0.067)	(0.085)	(0.055)	(0.068)	(0.073)	(0.082)	(0.156)	(0.081)
Most educated member: lower secondary	0.1111***	0.1448**	0.1212***	0.1562***	0.1468***	0.175***	0.1428***	0.1575***	0.096**	0.1499**
	(0.033)	(0.064)	(0.029)	(0.048)	(0.028)	(0.048)	(0.027)	(0.047)	(0.043)	(0.061)
Most educated member: upper secondary	0.2178***	0.2752***	0.2297***	0.3027***	0.2695***	0.3218***	0.3236***	0.3385***	0.3238***	0.328***
	(0.038)	(0.08)	(0.032)	(0.057)	(0.027)	(0.053)	(0.035)	(0.066)	(0.047)	(0.077)
Most educated member: vocational/technical	0.298***	0.4582***	0.2988***	0.428***	0.3218***	0.3872***	0.3445***	0.2814***	0.2886***	0.3114*
	(0.049)	(0.111)	(0.034)	(0.084)	(0.039)	(0.069)	(0.04)	(0.11)	(0.067)	(0.191)
Most educated member: college/university	0.4751***	0.4248***	0.509***	0.4564***	0.5841***	0.4204**	0.7029***	0.4609	0.7132***	0.7705**
	(0.055)	(0.131)	(0.043)	(0.12)	(0.044)	(0.186)	(0.055)	(0.332)	(0.082)	(0.31)
Irrigated annual crop land (1000 m^2)	0.0102***	0.0219***	0.0089***	0.0176***	0.0086***	0.0117***	0.0061***	0.0147**	0.0024	0.0178***

	(0.002)	(0.006)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)	(0.007)	(0.002)	(0.006)
Non-irrigated annual crop land (1000 m^2)	0.0054***	0.0092	0.0047*	0.0081	0.006**	0.0034	0.0024	0.0029	0.0017	0.0111
	(0.002)	(0.008)	(0.003)	(0.007)	(0.003)	(0.006)	(0.002)	(0.009)	(0.003)	(0.013)
Perennial land (1000 m^2)	0.01***	0.0293***	0.0133***	0.0279***	0.0152***	0.0248***	0.0144***	0.0312***	0.0107***	0.0291***
	(0.003)	(0.007)	(0.002)	(0.005)	(0.002)	(0.004)	(0.002)	(0.006)	(0.003)	(0.006)
Forest plot (1000 m^2)	0.0051***	0.0028	0.0047*	0.0044*	0.0076**	0.0029	0.0083***	0.007**	0.0125	0.0057**
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.012)	(0.002)
Water surface (1000 m^2)	0.0001	-0.0261	0	0.0221	-0.0001	-0.008	-0.0002	-0.0097	-0.0003	-0.0535
	(0.003)	(0.072)	(0.004)	(0.066)	(0.004)	(0.096)	(0.006)	(0.111)	(0.004)	(0.157)
Other cultivated lands (1000 m^2)	0.0036	0.0058	0.0097**	0.0113*	0.0075***	0.0137**	0.0086**	0.0089*	0.0064	0.0049
	(0.008)	(0.006)	(0.005)	(0.006)	(0.002)	(0.006)	(0.003)	(0.005)	(0.004)	(0.008)
Geographical types: rural coastal	0.072**	-0.1281	-0.0019	-0.2918*	-0.033	-0.5016***	-0.0139	-0.4737***	0.0075	-0.4887***
	(0.032)	(0.163)	(0.027)	(0.155)	(0.029)	(0.116)	(0.034)	(0.14)	(0.067)	(0.151)
Geographical types: rural midlands	-0.0573*	0.1751	0.011	-0.2557	0.056*	-0.6228**	0.0676*	-0.8251*	0.0248	-0.9433*
	(0.034)	(0.155)	(0.037)	(0.174)	(0.033)	(0.315)	(0.036)	(0.431)	(0.065)	(0.5)
Geographical types: rural low mountain	-0.1053***	-0.0329	-0.0845***	-0.1658	-0.1046***	-0.351***	-0.1506***	-0.4143***	-0.209***	-0.4021***
	(0.036)	(0.145)	(0.023)	(0.126)	(0.022)	(0.105)	(0.025)	(0.126)	(0.043)	(0.135)
Geographical types: rural high mountain	0.0324	-0.2056	0.0193	-0.2716**	0.0057	-0.3768***	-0.0149	-0.3844***	-0.0739	-0.3228***
	(0.035)	(0.141)	(0.037)	(0.125)	(0.035)	(0.092)	(0.037)	(0.109)	(0.058)	(0.107)
Commune having access to road that car can travel	0	-0.0067	-0.0213	-0.0589	-0.0018	0.0625	0.0491**	0.0445	0.1542***	-0.0477
	(0.031)	(0.129)	(0.024)	(0.078)	(0.024)	(0.09)	(0.023)	(0.084)	(0.037)	(0.155)
Commune having access to public transport	0.043*	0.0971*	0.0243	0.0594	0.0454**	-0.0336	0.0692***	-0.0852	0.074**	-0.0737
	(0.025)	(0.057)	(0.02)	(0.046)	(0.02)	(0.039)	(0.024)	(0.064)	(0.033)	(0.067)
Commune having access to post office	0.0253	0.0866	0.0581**	0.1996***	0.056**	0.2035***	0.0967	0.109	0.1236***	0.1077
	(0.029)	(0.086)	(0.027)	(0.066)	(0.026)	(0.059)	(0.028)	(0.071)	(0.042)	(0.075)
Commune having access to daily market	0.1287***	-0.0264	0.081***	-0.0856	0.077***	-0.1362**	0.0409**	-0.0564	-0.0121	-0.1855**
	(0.022)	(0.094)	(0.022)	(0.072)	(0.017)	(0.064)	(0.018)	(0.089)	(0.027)	(0.091)
Commune having access to electricity	0.0304	0.1617	0.1064***	0.2517***	0.1225***	0.2628***	0.0371	0.1168	0.1219**	0.2053**
	(0.039)	(0.108)	(0.035)	(0.071)	(0.044)	(0.061)	(0.042)	(0.081)	(0.054)	(0.1)
Commune having factories located within 10km	0.0488**	-0.1052	0.0717***	-0.1735***	0.0636***	-0.1224**	0.0541***	-0.0046	0.0056	0.0385
	(0.02)	(0.067)	(0.02)	(0.053)	(0.017)	(0.051)	(0.018)	(0.053)	(0.034)	(0.069)
Constant term	6.7572***	6.5275***	6.8743***	7.0315***	7.0729***	7.5771***	7.5122***	8.2483***	8.2242***	8.341***
	(0.114)	(0.36)	(0.126)	(0.287)	(0.094)	(0.3)	(0.126)	(0.293)	(0.205)	(0.291)
Psuedo-R^2	0.1905	0.3731	0.1834	0.3529	0.1792	0.3092	0.1784	0.2949	0.1647	0.3249
Number of observations	3,590	680	3,590	680	3,590	680	3,590	680	3,590	680

Notes: see notes in table A2.

Table A3.3 Quantile Regression Estimates for Log per Capita Household Expenditure Regression Models of the Majority and Minority Groups, 2004

	10th percentile		25th percentile		Median		75th percentile		90th percentile	
	Majority	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**	**Majority**	**Minority**
Household size	-0.0367***	-0.0541***	-0.0469***	-0.0632***	-0.0572***	-0.0736***	-0.0619***	-0.0671	-0.0596***	-0.073***
	(0.012)	(0.017)	(0.008)	(0.013)	(0.008)	(0.012)	(0.009)	(0.012)	(0.015)	(0.018)
Proportion of children aged from 7 to 16 years	0.4175***	0.4764***	0.3591***	0.36***	0.2577***	0.4169***	0.2***	0.4457	0.2837***	0.2801
	(0.074)	(0.145)	(0.064)	(0.104)	(0.056)	(0.114)	(0.068)	(0.13)	(0.106)	(0.194)
Proportion of male adults	0.9055***	0.6466***	0.878***	0.5281***	0.8098***	0.6698***	0.7098***	0.7244	0.745***	0.616**
	(0.08)	(0.212)	(0.083)	(0.145)	(0.077)	(0.149)	(0.072)	(0.212)	(0.113)	(0.252)
Proportion of female adults	0.7262***	0.7489***	0.7006***	0.5572***	0.5847***	0.5751***	0.6304***	0.558	0.8186***	0.4172
	(0.082)	(0.215)	(0.08)	(0.159)	(0.066)	(0.162)	(0.084)	(0.187)	(0.12)	(0.288)
Household type 2: parents and one child	0.0265	0.0666	-0.0309	-0.215	-0.0845*	-0.0808	-0.0962**	-0.0308	-0.1257*	0.157
	(0.051)	(0.169)	(0.039)	(0.181)	(0.045)	(0.119)	(0.044)	(0.138)	(0.066)	(0.188)
Household type 3: parents and two children	0.0276	-0.1175	-0.0333	-0.3033*	-0.0685	-0.099	-0.0819*	-0.1683	-0.1675**	-0.0573
	(0.053)	(0.167)	(0.04)	(0.181)	(0.044)	(0.12)	(0.048)	(0.113)	(0.071)	(0.188)
Household type 4: parents + > three children	-0.0717	-0.1761	-0.1089**	-0.3574*	-0.1252**	-0.1792	-0.1518***	-0.2375	-0.2389***	-0.1569
	(0.062)	(0.172)	(0.049)	(0.186)	(0.049)	(0.123)	(0.054)	(0.118)	(0.087)	(0.196)
Household type 5: three-generation household	-0.0331	-0.1166	-0.075*	-0.3215*	-0.1065**	-0.0826	-0.1285***	-0.1078	-0.2103***	-0.0006
	(0.062)	(0.183)	(0.045)	(0.188)	(0.051)	(0.125)	(0.05)	(0.129)	(0.081)	(0.195)
Household type 6: other household structures	0.0084	-0.1113	-0.0224	-0.2963	-0.0653	-0.1475	-0.0687	-0.2154	-0.1477*	-0.0954
	(0.069)	(0.182)	(0.048)	(0.196)	(0.049)	(0.13)	(0.054)	(0.121)	(0.091)	(0.181)
Age of household head	0.0012	-0.0051	-0.0024	0.0013	0.0033	-0.005	0.0082**	-0.0031	0.0083	0.0128
	(0.005)	(0.011)	(0.005)	(0.008)	(0.003)	(0.008)	(0.004)	(0.01)	(0.007)	(0.015)
Age of head squared (divided by 100)	-0.0054	-0.0008	-0.0017	-0.0051	-0.0054*	0.0034	-0.0091***	0.0018	-0.0092	-0.0144
	(0.004)	(0.011)	(0.004)	(0.008)	(0.003)	(0.008)	(0.004)	(0.01)	(0.006)	(0.015)
Household head is female	0.0041	-0.0968	0.0128	-0.0549	0.0425**	0.0103	0.0529**	0.0052	0.0041	-0.0048
	(0.025)	(0.089)	(0.024)	(0.066)	(0.02)	(0.059)	(0.023)	(0.057)	(0.038)	(0.077)
Most educated member: primary education	-0.2185***	-0.2812***	-0.162***	-0.2653***	-0.1613***	-0.2507***	-0.1538***	-0.2063	-0.1713***	-0.16***
	(0.049)	(0.051)	(0.036)	(0.035)	(0.026)	(0.044)	(0.036)	(0.048)	(0.053)	(0.052)
Most educated member: lower secondary	0.0749***	0.1327***	0.0809***	0.1402***	0.0896***	0.1642***	0.0689***	0.1347	0.0597*	0.2218***
	(0.025)	(0.044)	(0.017)	(0.037)	(0.018)	(0.041)	(0.025)	(0.046)	(0.033)	(0.047)
Most educated member: upper secondary	0.1699***	0.289***	0.2022***	0.3669***	0.2463***	0.3215***	0.259***	0.3752	0.2513***	0.4931***
	(0.028)	(0.078)	(0.022)	(0.061)	(0.02)	(0.052)	(0.031)	(0.06)	(0.034)	(0.085)
Most educated member: vocational/technical	0.3194***	0.3195***	0.3437***	0.4047***	0.3835***	0.4269***	0.387***	0.3882	0.3652***	0.5881***
	(0.031)	(0.081)	(0.026)	(0.069)	(0.026)	(0.057)	(0.029)	(0.066)	(0.039)	(0.109)
Most educated member: college/university	0.5855***	0.3123**	0.5885***	0.5468***	0.5858***	0.5981***	0.5832***	0.6492	0.5851***	0.6092***
	(0.042)	(0.16)	(0.034)	(0.158)	(0.033)	(0.152)	(0.038)	(0.096)	(0.059)	(0.119)
Irrigated annual crop land (1000 m^2)	0.0113***	0.0133***	0.0108***	0.0115***	0.009***	0.0145***	0.0094***	0.0134	0.0084***	0.0105***

	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)	(0.004)	(0.002)	(0.003)	(0.002)	(0.004)
Non-irrigated annual crop land (1000 m^2)	0.0093***	0.0059**	0.0062***	0.0094***	0.0053***	0.0083***	0.0044***	0.0094	0.0035*	0.0089***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Perennial land (1000 m^2)	0.0066*	0.0083***	0.0092***	0.0068***	0.01***	0.0068***	0.01***	0.0101	0.0076**	0.0161**
	(0.004)	(0.003)	(0.003)	(0.001)	(0.002)	(0.002)	(0.002)	(0.005)	(0.003)	(0.007)
Forest plot (1000 m^2)	0.0006	0.0007	0.0013	0.0008*	-0.0004	0.0002	0.0012	-0.0001	0.0001	0
	(0.002)	(0.001)	(0.001)	(0)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)
Water surface (1000 m^2)	0.0119***	0.0129	0.0078***	0.0258	0.0115***	0.0308	0.0106***	0.0444	0.0106*	0.0392*
	(0.002)	(0.032)	(0.002)	(0.031)	(0.003)	(0.026)	(0.003)	(0.028)	(0.005)	(0.02)
Other cultivated lands (1000 m^2)	0.018***	0.0032	0.0217***	-0.0002	0.0254***	0.0094	0.0208***	0.0112	0.0336***	0.0037
	(0.005)	(0.007)	(0.005)	(0.008)	(0.004)	(0.009)	(0.004)	(0.005)	(0.008)	(0.006)
Geographical types: rural coastal	-0.0899***	-0.1246	-0.0264	-0.22	-0.0143	0.1166	-0.0149	0.2372	0.0013	0.1675
	(0.032)	(0.196)	(0.029)	(0.275)	(0.027)	(0.214)	(0.034)	(0.173)	(0.056)	(0.173)
Geographical types: rural midlands	0.0038	-0.0801	0.0106	-0.0977	0.0236	-0.0044	0.0347	0.1661	0.0758*	0.2501
	(0.029)	(0.156)	(0.027)	(0.163)	(0.027)	(0.169)	(0.036)	(0.167)	(0.047)	(0.361)
Geographical types: rural low mountain	-0.0125	-0.2253***	-0.038*	-0.2544***	-0.0299*	-0.1922***	-0.0458*	-0.0643	-0.0644*	-0.0318
	(0.023)	(0.074)	(0.021)	(0.077)	(0.018)	(0.063)	(0.024)	(0.066)	(0.037)	(0.109)
Geographical types: rural high mountain	-0.0716*	-0.2862***	-0.0531	-0.2831***	-0.0268	-0.2552***	0.0207	-0.1927	0.0878	-0.1348
	(0.042)	(0.08)	(0.04)	(0.066)	(0.029)	(0.061)	(0.042)	(0.049)	(0.057)	(0.1)
Commune having access to road that car can travel	0.0358	0.1483	0.0393	-0.078	-0.0038	0.0004	-0.0121	0.0764	-0.0294	0.15
	(0.053)	(0.135)	(0.041)	(0.123)	(0.035)	(0.076)	(0.041)	(0.069)	(0.05)	(0.096)
Commune having access to public transport	0.0557***	0.0597	0.0666***	0.085***	0.057***	0.0522	0.0552***	0.0632	0.104***	0.07
	(0.019)	(0.043)	(0.014)	(0.032)	(0.013)	(0.035)	(0.017)	(0.042)	(0.027)	(0.05)
Commune having access to post office	-0.0006	-0.1013***	-0.0048	-0.0948**	0.0122	-0.0529	0.0537***	-0.0178	0.0757***	-0.0146
	(0.017)	(0.036)	(0.02)	(0.042)	(0.015)	(0.044)	(0.018)	(0.043)	(0.025)	(0.045)
Commune having access to daily market	0.0804***	0.1189*	0.0945***	0.1409***	0.084***	0.1516**	0.0684***	0.1919	0.0747**	0.1169*
	(0.018)	(0.068)	(0.019)	(0.046)	(0.014)	(0.061)	(0.02)	(0.054)	(0.032)	(0.072)
Commune having access to electricity	0.0687	0.0133	-0.016	0.0831**	0.039	0.0323	0.0693	0.0792	0.1091	0.1027
	(0.079)	(0.053)	(0.05)	(0.037)	(0.053)	(0.044)	(0.061)	(0.044)	(0.093)	(0.068)
Commune having factories located within 10km	0.0571***	0.0916***	0.0601***	0.051*	0.0663***	0.1143***	0.0685***	0.063	0.057**	0.0773*
	(0.019)	(0.035)	(0.015)	(0.028)	(0.014)	(0.033)	(0.017)	(0.033)	(0.028)	(0.044)
Constant term	6.8327***	7.1108***	7.3119***	7.6243***	7.5133***	7.6382***	7.6725***	7.6402	7.8531***	7.3804***
	(0.14)	(0.324)	(0.122)	(0.246)	(0.095)	(0.235)	(0.131)	(0.237)	(0.221)	(0.388)
Psuedo-R^2	0.1679	0.2773	0.1661	0.2695	0.1761	0.2747	0.1796	0.2925	0.1682	0.327
Number of observations	5,531	1,181	5,531	1,181	5,531	1,181	5,531	1,181	5,531	1,181

Notes: see notes in table A2.