According to the approximation in (2), change of return to characteristics equals to $(\beta_M^{t+1}-\beta_M^t)X_M^t$, and thus change of return to a characteristic during period 1993-1998 equals to the coefficient of that characteristic in 1998 minus the coefficient of that characteristic in 1993 and multiplied by the mean of that characteristic in 1993 (as shown in Table 1). Moreover, based on (2) we can see that the change due to change in characteristic equals to $\beta_M^t(X_M^{t+1}-X_M^t)$, and thus change in characteristic of a characteristic during the period 1993-1998 equals to the mean of that characteristic in 1998 minus the mean of that characteristic in 1993 multiplied by the coefficient of that characteristic in 1993. Calculations for other characteristics of period 1998-2002 are made in the same way.

From Table 2, some important things are noted. Most changes in expenditure per capita in eight regions were due to changes in the returns to living in different regions in both periods.

The same story held for education and occupation. Most changes in expenditure per capita associated with education and occupation of the household head were attributed to the change in returns to these characteristics rather than the changing of those characteristics. The results are understandable since over time more household heads completing a higher degree of schooling will put pressure on the wage market.

Similarly, the change in expenditure attributed to gender and ethnicity also came mostly from changes in the returns to those characteristics

3.5. Pooling data for analysis

From the regressions of cross-sectional data, we can only examine the determinants of household expenditure in a single year. By pooling samples collected from the same population at different periods, we can earn more accurate estimators and test statistics with more power when compared to samples of single cross-sectional data because we can take advantage of the large sample size at different points in time. The VLSS9293, VLSS9798, and VHLSS2002 covered 4,799, 5,999, and 29,532 households, respectively, so that the pooled sample covers 40,330 households in three years, which is a large sample for deriving more precise estimators.

As can be seen in Table 3, which reports the results of the regres-

Table 3: Results of regression using the pooled data of
VLSS9293, VLSS9798, and VHLSS2002

	Combined data 1993–2002		
	Coefficient	Robust Std. Err	t-value
HH Head Gender			
HH Head is Male	-0.0215**	0.0062	-3.46
(HH Head is Female)			
HH Head Ethnicity			
(Vietnamese)			
Chinese	0.0168	0.0263	0.64
Other	-0.0673**	0.0078	-8.57
Region			
Red River Delta	0.1477**	0.009	16.39
North East	0.0075	0.0094	0.8
North West	-0.1935**	0.0145	-13.29
(North Central Coast)			
South Central Coast	0.1089**	0.0112	9.72
Central Highlands	-0.0412*	0.0139	-2.96
South East	0.3787**	0.0105	35.98
Mekong River Delta	0.2322**	0.0089	25.83
Area			
Urban	0.6359**	0.0069	91.18
(Rural)			
HH Head Education			
Never	-0.0593**	0.0071	-8.3
(Primary School)			
Junior High School	0.0082	0.0072	1.14
High School	0.0836**	0.011	7.61
Technical Training	0.0421**	0.0148	2.84
Vocational Training	0.0406**	0.0129	3.15
University or Higher	0.1359**	0.0158	8.58
HH Head Occupation			
White Collar	0.0856**	0.0103	8.27
Sales/Service	0.0848**	0.009	9.41
(Agriculture)			
Skilled Worker	0.0709**	0.0092	7.96
Unskilled Worker	0.0047	0.01	0.47
Other not working	0.0259**	0.0081	3.19
Log HHsize	-0.2949**	0.0063	-46.57
HH Head age	0.0073**	0.0012	6.04
HH Head age square	-0.00005**	0.000012	-4.68
Constant	7.73**	0.0313	246.32
R-squared = 0.35; No of Obs: 40330			

Note: Dependent variable is total consumption per capita
*: denotes significant at 5%; **: denotes significant at 1%; ***: denotes significant at 10%
- Regressions with robust standard errors
Source: Author's calculations

sions, the findings are consistent with those obtained in cross-sectional regres-sions in terms of the sign as well as the magnitude of each categorical variable: occupation, education of the household heads, and geographical locations were important determinants of expenditure deriving from economic growth. The

type of occupation and level of education of the head defined the degree to which the household gained benefits from economic growth.

There is only difference in that households headed by males had lower standards of living compared to those headed by females. This result differs from the finding in the cross-sectional regressions with no statistical significance for this variable, suggesting that the returns to this category fluctuated over time.

3.6. Which characteristics determine the consumption of households in different socio-economic groups?

By using an econometric method, we are able to find out which characteristics determine the differences of expenditure between the poor and the rich households, or in other words, among socio-economic groups during the period.

Since VLSS9293 contains communal characteristics of the rural areas only, there is no such data on the urban areas and thus we cannot take advantage of the panel data. In the VLSS9798 commune data were collected in both rural and urban areas, so in this section only data from the VLSS9798 are used to investigate the determinants of household welfare of different socio-economic households. The regression results with the addition of communal characteristics[4] are put in the same table for analysis.

Table 4 reports the results of the regressions of each quintile. One important finding is that for poor households (households belonging to the 1st and 2nd quintiles) and the middle class (the 3rd quintile), factors, such as the level of education of the head and the region where the household resides, as well as communal facilities, such as market and electricity, are important for determining its living standard. For rich households (households belonging to

---

[4] Commune near a factory (apply value 1 for a commune which has at least one factory nearby; 0 if there no factory near the commune); Commune having traditional handicraft (apply value 1 for a commune which has traditional handicraft; 0 if there is no traditional handicraft); Road passable by cars (apply value 1 for a commune if there is a road that cars can use; 0 if there is a road but cars cannot use it); Electricity (apply value 1 if commune has electricity; 0 if electricity is not supplied in the commune); Market (apply value 1 if there is at least one market in the commune; 0 if there is no market in the commune); and Water-way transportation (apply value 1 if the commune has water-way transportation; 0 if there is no water-way transportation).

Table 4: Results of regressions for different quintiles of expenditure

Category	Quintile 1 (Poorest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (Richest)
HH Head Gender					
HH Head is Male	0.0141	-0.0062	0.0016	-0.0146	-0.0099
(HH Head is Female)					
HH Head Ethnicity					
(Vietnamese)					
Chinese	-0.1233	0.0473	0.0177	0.0260	0.1072
Other	-0.0552**	-0.0019	-0.0361**	-0.0125	-0.1085**
HH Head Religion					
Buddhist	-0.0185	0.0049	0.0137	0.0105	-0.0371
(None)					
Other	0.01	-0.0055	-0.0096	0.0098	0.0059
Region					
Northern Uplands	-0.0095	-0.0151	-0.0044	0.0098	-0.1318*
Red River Delta	-0.0088	0.011	0.0236*	0.0179	-0.0644
(North Central)					
Central Coast	-0.0721*	-0.0035	-0.0115	0.0131	0.0127
Central Highlands	-0.1441**	0.0124	0.0226***	0.0242	0.014
South East	0.0592	-0.0179	0.0147	0.0340*	0.0646
Mekong River Delta	0.0686***	-0.0247***	0.0294*	0.0282***	0.086
Area					
Urban	0.0084	-0.0154	0.0022	0.0044	0.0438
(Rural)					
HH Head Education					
Never	-0.060**	-0.0139	-0.0151***	-0.0234*	-0.035
(Primary School)					
Junior High School	0.0158	0.0023	0.0004	0.0077	-0.0108
High School	0.0683*	0.0169	-0.0004	0.0174	0.0850***
Technical Training	0.0444	0.0076	0.0207	0.0226	0.0849***
Vocational Training	0.0408	0.0269***	0.0045	0.0024	0.067
University or Higher	-0.1116*	0.0456	0.0652*	0.0375	0.1149*
HH Head Occupation					
White Collar	0.0241	0.0162	0.0163	0.0287*	0.0398
Sales/Service	0.0425	0.0272*	0.0164	0.0116	0.0718*
(Agriculture)					
Skilled Worker	0.0384	-0.0057	-0.0015	0.0294*	0.0439
Unskilled Worker	-0.0124	0.011	-0.0202	-0.0178	-0.0065
Other not working	0.0304	0.0209***	0.0006	0.0078	0.0592
Log HHsize	-0.0846**	-0.0206*	-0.0163*	-0.031	-0.1328*
HH Head age	0.0059	0.0002	0.0035**	0.003	0.0088
HH Head age square	-0.00004	-2.64E-06	-0.00003**	-0.00003	-0.00009***
Commune characteristics					
Factory nearby commune	-0.0154	0.0203**	0.0130*	0.0027	-0.0262
(No Factory)					
Traditional handicraft	-0.0398*	0.0022	-0.0033	0.005	-0.0347
(No traditional handicraft in commune)					
Car passable asphalt road	0.0145	-0.0009	0.0067	-0.0018	-0.0219
(No car passable road)					
Market	0.0449**	0.0096	0.0123***	0.0049	0.0008
(No market)					
Electricity	0.0783**	0.0104	0.029*	0.0131	0.0426

(No electricity)					
Water-way transportation	0.0335	0.0243*	-0.0182**	-0.015	-0.1144
(No water way)					
Constant	6.95**	7.4**	7.5**	7.9**	8.4**
R-square	0.2	0.08	0.11	0.08	0.14

Note: Dependent variable is log of total consumption per capita
*: denotes significant at 5%; **: denotes significant at 1%; ***: denotes significant at 10%
- Regression with robust standard-error
Source: Author's calculations

the 4th and 5th quintiles) the level of education and type of job of the head are more important in defining their living standards. Communal characteristics, such as the availability of a market or electricity, play no role in affecting their expenditure because most of the rich are living in urban areas, so facilities, such as electricity and market, are common, while in rural area those facilities are important. For example, in the poorest quintile, households headed by an individual who has completed high school spent 7 percent more than house-holds with the head completing only primary school. Interestingly, in the poor-est quintile households headed by someone having a university or higher degree had a lower standard of living compared to those of households headed by someone having only a primary school degree. Similarly, households living in areas where there was a market and electricity spent 4.6 percent and 8.1 per-cent more, respectively, than households residing in areas without such facili-ties.

Regarding ethnicity, most quintiles show that households with the head being of an ethnic minority had lower standards of living when compared to those headed by Vietnamese. For all quintiles, gender and religion of the head show no impact on the expenditure of the households.

Importantly, when one looks at the results, one may notice that in some cases, the R-squared values are somewhat small. Statistically, the value of R-squared represents how much variance of the dependent variable can be col-lectively explained by the independent variables. Since the number of house-holds included in VLSS9798 is 5,999 households, but only 4,818 households qualified for the test, these households were divided into 5 small samples based on expenditure quintiles and then the regressions were done with each sample. This way of regression further lowered the number of households involved in

each regression, which then obviously affected the precision of the regressions. This suggests that a more adequate answer about the determinants of expenditure per capita of each expenditure quintile can only be obtained from much larger datasets, which we can obtain in the cross-sectional regressions (Vijverberg, 1998 and Tran, 2000).

3.7. Who benefits from economic growth?

For a poor country like Vietnam where the disparity of development between rural and urban areas is huge, it is expected that some determinants of expenditure in rural areas will differ from those of urban areas. For example, in urban areas, facilities like electricity, roads and telecommunications are common, but for rural areas, especially for mountainous areas, accessing those kinds of facilities is not easy, not only because of their limited financial capacity but also because of the shortage of those facilities, which is likely affected by the policies of the government. Therefore, it is essential to find out which characteristics determine the consumption of the rural areas (in which most of the poor reside), which then will help us to draw up policy suggestions. Moreover, in previous sections, we can only indicate the determinants of consumption of households or in other words, we could only state that the living standard of households attached to certain characteristics of the heads was higher or lower when compared to other households. One thing we have not still investigated is what kind of households gained more benefit from economic growth (or in other words, enjoyed improved consumption) when compared to other households during the period. Since 4,302 households were interviewed in both VLSS9293 and VLSS9798, this question can be answered by regressing the change of real expenditure per capita between two years 1993 and 1998 on the pre-determined characteristics of households in 1993. In order to have a more insightful image, some different variables from the previous sections are added into regressions including: