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Who Gained from Vietnam's Boom in the 1990s?

An Analysis of Poverty and Inequality Trends

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Vietnam's gains in poverty reduction between 1992 and 1998 were striking, and the country's impressive growth has been fairly broad-based. Households that have benefited most are well-educated, urban, white-collar households, while agricultural workers, ethnic minorities, and those residing in poorer regions have progressed least.

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Summary findings

Glewwe, Gragnolati, and Zaman assess the extent to which Vietnam's rapid economic growth in the 1990s was accompanied by reductions in poverty. They also investigate factors that contribute to certain households benefiting more than others.

Using information from two household surveys, the Vietnam Living Standards Surveys (VNLSS) for 1992–93 and 1997–98, they show that Vietnam's gains in poverty reduction were striking during this period and that the country's impressive growth has been fairly broad-based.

After discussing descriptive statistics for both years, the authors examine factors contributing to poverty reduction using both simple decomposition analysis and a multinomial logit model. The results show that:

- Returns to education increased significantly during this period, particularly for higher levels of education.
- Location significantly affected a household's probability of escaping poverty during this period. Urban households enjoyed a greater reduction in poverty than did rural households, and households residing in the Red River Delta and the southeast were also better able to take advantage of new opportunities.
- White-collar households benefited most, and agricultural laborers the least.

However, Vietnam cannot afford to be complacent, as nearly half its rural population lives below the poverty line, poverty rates among ethnic minorities remain very high, and natural calamities are a serious impediment to poverty reduction.

This paper — a product of Poverty and Human Resources, Development Research Group — is part of a larger effort in the group to understand the dynamics of poverty. Copies of the paper are available free from the World Bank, 1818 H Street, NW, Washington, DC 20433. Please contact Patricia Sader, room MC3-556, telephone 202-473-3902, fax 202-522-1153, email address psader@worldbank.org. Policy Research Working Papers are also posted on the Web at www.worldbank.org/research/workingpapers. The authors may be contacted at pglewwe@dept.agecon.umn.edu, mgragnolati@worldbank.org, or hzaman@worldbank.org. January 2000. (55 pages)

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1. Introduction

In the 1980's, Vietnam was one of the poorest countries in the world, and its prospects appeared bleak. Economic growth was stagnant and the production of rice, the main staple, was not sufficient to feed its growing population. For some essential goods, such as drugs and manufactured products, Vietnam was dependant on heavily subsidized imports from the Soviet Union. Yet this picture began to change in the late 1980s, when the Doi Moi ("renovation") policies were adopted (Dollar and Litvack, 1998). In rural areas, collective farms were replaced by a system in which land was allocated to individual households. Many forms of private economic activity were legalized, and controls on most prices were removed. Foreign direct investment was legalized and encouraged, and many trade barriers were reduced or eliminated.

The results of these policies were spectacular, rivaling those of China's economy in the 1980's. Per capita economic growth was 6-7% per year between 1990 and 1997 (World Bank 1998). Vietnam became the world's second largest exporter of rice. Even more extraordinary was the fact that the dissolution of the Soviet Union in 1991, which ended subsidized imports that Vietnam relied heavily on in the 1980s, had almost no discernable impact. At the same time, international assistance to Vietnam was relatively low. Whilst the East Asian crisis has slowed Vietnam's economic growth in 1998 and 1999, there is no doubt that significant progress has been made since the late 1980s.

This paper seeks to assess the extent to which Vietnam's economic success has been accompanied by reductions in poverty. Some have speculated that continued economic growth would reduce poverty (e.g. Dollar and Litvack, 1998), but the likely decline in poverty depends crucially on the extent to which economic growth has reached the poorer members of the population. Fortunately, there are two household surveys that

can be used to address this question, the Vietnam Living Standard Surveys (VNLSS) conducted in 1992-93 and in 1997-98.

The paper is organized as follows. Section 2 describes that data used. Section 3 presents a descriptive analysis of changes in poverty and inequality, using data on consumption expenditures and income, between 1992-93 and 1997-98. Sections 4 and 5 use two different multivariate regression methods to explore some of the forces driving the change in poverty over these years, and Section 6 concludes by summarizing the findings and drawing some policy implications.

2. The Vietnam Living Standards Surveys

This paper makes extensive use of the 1992-93 and 1997-98 Vietnam Living Standards Surveys (VNLSS), an extremely rich data set for poverty (and other) analysis. Both surveys were conducted by the Vietnam's General Statistical Office, with financial assistance from the United Nations Development Programme (UNDP) and the Swedish International Development Agency (SIDA) and technical assistance from the World Bank.

The 1992-93 VNLSS covered 4800 households, while the 1997-98 VLNSS surveyed 6000 households. Both surveys are nationally representative. Over 4300 households were covered in both surveys and thus constitute a large, nationally representative panel data set. In both surveys, the household questionnaire covered a wide variety of topics, including education, health, employment, migration, housing, fertility, agricultural activities, small household businesses, income and expenditures, and credit and savings. In each year, community questionnaires were completed in rural

areas (where about 80% of Vietnamese households live) and detailed price questionnaires were completed in both urban and rural areas.

In this paper, the VNLSS data on consumption expenditures are used to measure households' living standards. There are two reasons for using consumption data instead of income data. First, consumption expenditure data are likely to be more accurate than income data, because questions on expenditure are often easier to answer (in particular, the self-employed have difficulty answering questions on income) and because some households are reluctant to reveal their true income. Second, income raises living standards only if it is consumed, and past income (savings) or borrowing can be used for consumption purposes. Thus consumption data are likely to reflect household's welfare levels more accurately than would income data.

Household income was calculated only for the 1997-98 survey, separating total income into its five main sources: wage labor; work in agriculture; private enterprises; remittances; and other income. The sum of these five components yields total household income[1]. Wage income includes all in cash and in kind payments earned by each household's wage earners, from both main and secondary jobs in the past 12 months. Agriculture income comprises both farm and non-farm production activities, the latter of which includes forestry, fishing, raising water products and processing of crops produced by the household. Prices collected in the price questionnaire were used to convert all costs and revenues expressed in quantities (in kind) into Vietnamese dong. Enterprise income was calculated from data on non-farm self-employment. Data on remittances were collected from questions on assistance (in cash and in kind) received by all

[1] Household income was also calculated for the 1992-93 survey. However, several checks revealed problems that were difficult to resolve, so the 1992-93 income data were excluded from the analysis done in this paper.

household members in the past 12 months. Finally, other income is a residual category for all other types of non-labor income, such as government social fund payments, social subsidies, interest income, and insurance payments.

3. Poverty and inequality in Vietnam in 1992-93 and 1997-98: a descriptive analysis

This section examines poverty and inequality in 1992-93 and 1997-98. Both poverty and inequality can be examined using either income or consumption expenditures. As explained above, use of consumption expenditures is preferred. Yet as explained below there some aspects of inequality that can be examined only by using income data. The first subsection reviews some concepts regarding the measurement of poverty and inequality. The next subsection examines the expenditure data, while the third examines the income data.

A. Measuring Poverty and Inequality. The first step in measuring poverty or inequality is to choose an overall indicator of household welfare. As explained above, good indicators are household consumption expenditures per capita and household income per capita. Whilst there are several reasons to consider consumption-based welfare indicators to be superior to those based on income, household income data can yield interesting insights concerning a household's socio-economic status, particularly when disaggregated by the source of income.

Now consider the analysis of poverty. In addition to choosing a welfare indicator, some judgement must be made regarding the level of income or expenditures that is absolutely necessary for a minimal standard of living. Households whose income or expenditure levels fall below this standard are then classified as poor. The analysis of this paper follows the common practice of setting a poverty line based on a basket of

goods that provides a minimum amount of calories. More specifically, the poverty line begins with the assumption that, on average, human beings need 2100 calories per day to have an adequate diet[2].

The VNLSS data provide information on the food consumption patterns of Vietnamese households, which can be used to calculate a typical basket of goods that yields 2100 calories. The cost of this basket can then be used as a starting point for calculating a poverty line. The following paragraphs explain how this was done.[3]

First, total (food + non-food) expenditures per capita were calculated for each of the 4800 households in the 1992-93 survey. Then, these households were divided into the poorest 20% of the population, the next poorest 20%, and so forth up to the wealthiest 20%, all in terms of real per capita total expenditures. For each of these "quintile" groups, total calories per person per day were calculated. The quintile group whose calorie consumption was closest to 2100 calories was the third quintile (i.e. the middle quintile), for which average calorie consumption was 2052 calories per person per day. (In contrast, calorie consumption for the second quintile was 1891 calories and for the fourth quintile was 2237 calories). Thus the food basket that gives 2100 calories is based on the food consumption patterns of the third quintile.

Second, the 1992-93 data was used to construct the basket of food items consumed by the households in Quintile 3. Since the calorie consumption of Quintile 3 households averaged 2052 calories per person per day, rather than the target of 2100, a small adjustment was made: the quantities consumed for each item were increased by

[2] In fact, adult males need more and children need less, but averaging over men and women of different ages, and assuming a moderate amount of effort in daily activities, yields a figure close to 2100 calories.

[3] For more details, see Annex 2 in World Bank (1999).

(2100/1969), which yields a basket that provides exactly 2100 calories. The denominator used was 1969 instead of 2052 because there is no quantity information (or in the case of barley/millet, no calorie information) for a few of the items, so they had to be removed from the food basket (after they are removed, the basket then yields 1969 calories). The cost of purchasing this (adjusted) basket of food items was then calculated, using prices that prevailed in January 1993. That cost is 749,723 Dong per person per year. This figure is based on national average prices, and thus it must be compared to household expenditure variables that have *already* been adjusted for regional price differences and already expressed in January 1993 Dong.

Third, this food poverty line was then used to calculate the general (food plus nonfood) poverty line. The basic idea is to look at non-food expenditures for the third quintile in 1992-93, which amounted to 401,291 Dong per person per year (note that this figure includes both explicit expenditures and imputed use values of durable goods and imputed rent from owner-occupied housing). This 401,291 number is then adjusted because the households in Quintile 3 did not consume exactly 2100 calories; instead, they consumed 2052 calories, which implied an adjustment of 2100/2052 (i.e. about 1.023) to the non-food items. Inflating the non-food component by this ratio gives a number of 410,640. The overall poverty line is then 1,160,363.

The food and general poverty lines for 1997-98 were created in a way similar to the 1992-93 poverty lines. For the food poverty line, the cost of the (adjusted) food basket in 1992-93 was updated using prices from the 1997-98 survey. As in the earlier survey, prices were calculated for Vietnam as a whole, so the cost of the basket of goods is a

nationwide average cost expressed in January 1998 prices. That cost is 1286,833 Dong per person per year. As before, this figure must be compared to household expenditure variables that have already been adjusted for regional price differences and have already been expressed in terms of January 1998 prices.

The method used to calculate the non-food component of the 1998 poverty lines is extremely simple. The 1993 non-food poverty line was inflated by a factor of 1.225, the rate of inflation for non-food items, as provided by Vietnam's General Statistical Office (GSO). This implies a non-food poverty line of 503,038 (=410,640x1.225). Thus the overall poverty line is 1,789,871.

Whether consumption expenditures or income is used as an indicator of welfare, once a poverty line is chosen it is straightforward to produce figures on the percentage of individuals who are poor. This is often referred to as the 'head-count" measure of poverty. However, there is a serious conceptual problem with using this statistic as an overall indicator of poverty, which is that it is not sensitive to how far each household's income or expenditures fall below the poverty line. This can be overcome by using measures that are sensitive to the "depth" of poverty. This paper will use the Foster, Greer, Thorbecke (1984) poverty index, which is widely used in analyses of poverty. The general formula is:

$$P_\alpha = (1/N)\sum_{i=1}^{N} \max\left(0, \left(\frac{Z - Y_i}{Z}\right)^\alpha\right)$$

where Z is the poverty line, Y_i is the income or expenditure level of individual i, N is the total number of individuals in the data, and α is a parameter that allows this index to vary

its sensitivity to the depth of poverty. When $\alpha = 0$, this formula becomes the headcount index, which is completely insensitive to the depth of poverty. For values of α greater than zero the index is sensitive to the depth of poverty, and it becomes increasingly sensitive as 'α' increases. This paper will use the Foster-Greer-Thorbecke (FGT) index with values for α of 0, 1 and 2, as is standard in the literature. For more information on the FGT index, see Ravallion (1994).

Now consider the measurement of inequality. There are many different summary measures of inequality, such as the commonly used Gini coefficient. This paper uses the two Theil indices. The advantage of the Theil indices is that they allow overall inequality to be decomposed by population groups. That is, when the population is divided into several different (mutually exclusive) groups, the Theil measures can be used to divide total inequality into the inequality brought about by differences in the mean incomes across the different groups and inequality within each of those groups. To see this, consider the formulas for the two Theil measures:

$$T = \sum_{i=1}^{N} \frac{Y_i}{Y} \ln\left(\frac{Y_i}{Y/N}\right) = \sum_{j=1}^{J} \frac{Y_j}{Y} T_j + \sum_{j=1}^{J} \frac{Y_j}{Y} \ln\left(\frac{Y_j/N_j}{Y/N}\right)$$

$$L = (1/N) \sum_{i=1}^{N} \ln\left(\frac{Y}{Y_i N}\right) = \sum_{j=1}^{J} \frac{N_j}{N} L_j + \sum_{j=1}^{J} \frac{N_j}{N} \ln\left(\frac{N_j/N}{Y_j/Y}\right)$$

where Y_i, i and N are defined as before, J is the number of groups, Y is total income overall all individuals, Y_j is the total income of individuals in group j, and N_j is the number of individuals in group j. The advantage of the Theil index is seen in the expression after the second equality: overall inequality is the sum of the within-group (first term) and between-group (second term) components. The within-group component

is a weighted average of the degree of inequality within each of the J groups. The between-group component measures the level of inequality that would prevail if each person's income were the mean income of his or her group.

Inequality can also be decomposed in another way, which is useful when examining income data. Household incomes typically consist of the sum of many different kinds of income. These income components could vary widely in terms of how equally they are distributed. Indeed, an income source that is higher for poor households than for rich households reduces overall income inequality. An elegant way to decompose income inequality by different income sources was proposed by Shorrocks (1982). He showed that overall income inequality can be decomposed as follows:

$$I = \sum_{k=1}^{K} \frac{Cov(Y_k, Y)}{Var(Y)} I$$

where I is the overall inequality measure, K is the number of different kinds of income, Cov (Y_k,Y) is the covariance of total income (Y) and income from source k (Y_k), and Var(Y) is the variance of total income. Note that the I on the right of the equality sign does not have any subscript, which implies that the Cov(Y_k,Y)/Var(Y) terms can be thought of as weights that sum to one.

Two aspects of Shorrocks' formula are worth noting. First, the percentage breakdown of total inequality into inequality from different sources of income is independent of the inequality measure used. This being the case, there is no need to select an inequality measure at all; one can just look at the percentage breakdowns given in the formula. Second, it is possible for an income source to have a negative contribution to overall inequality. This will occur if the covariance between the income

source and total income is negative. This would be the case for a type of income that goes more to the poor than to the rich, as mentioned above.

B. Insights using consumption data. Table 1 uses the household consumption expenditure data to describe the nature of poverty in Vietnam in 1992-93 and 1997-98, using the FGT index. The first row in this table shows that Vietnam has experienced a remarkable decline in the incidence of poverty over the past 5 years, from 58.2% in 1992-93 to 37.4% in 1997-98. Using the FGT index with 'a' set to 1 (poverty depth) or 2 (poverty severity) leads to a similar conclusion: poverty was approximately halved over this period.

To test the robustness of these findings to alternative poverty lines and different poverty measures, consider the theory of stochastic dominance (Ravallion 1994, Deaton 1997). Figure 1 plots the cumulative density functions of the distribution of per capita expenditure in the two surveys[4]. Since expenditure in 1997-98 "dominates" expenditure in 1992-93 (i.e. the cumulative distribution of expenditure in 1997-98 -- expressed in 1992-93 prices -- lies nowhere above that of 1992-93), one can conclude that poverty in Vietnam has unambiguously decreased between 1992-93 and 1997-98, regardless of the poverty line chosen and regardless of the value chosen for a in the FGT poverty indices. But how have these gains been distributed across different socioeconomic groups? This is examined in the rest of Table 1.

The second and third rows of Table 1 show that the reduction in poverty in urban areas (the incidence of poverty fell from 25.1% to 9.2%) has been more impressive than

[4] For a clearer graphical presentation of these data, Figure 1 is presented in terms of the logarithm of per capita expenditure.

in rural areas (the incidence dropped from 66.4% to 45.5%)[5]. This means that despite Vietnam's rapid economic growth, nearly half the rural population, who constitute 80% of the population of Vietnam, are still poor.

The next rows in Table 1 examine poverty across the seven regions of Vietnam. The extent of poverty declined in every region, regardless of the poverty index used (that is, regardless of whether a is 0, 1 or 2), but some experienced steeper declines than others. The largest decline in overall poverty was in the Red River Delta, where poverty dropped by about 34 percentage points (from 62.9% to 28.7%). Indeed, its overall standing improved; in 1992-93 it ranked fourth out of the seven provinces in terms of the extent of poverty, but by 1997-98 it had moved to second in the rankings (the only other province with less poverty was the Southeast). In contrast, the Central Coast and the Mekong Delta had only moderate declines in overall poverty, with a decline of about 14 percentage points for the former and only 10 percentage points for the latter. The relatively poor performance of the Mekong Delta may reflect the fact that Typhoon Linda struck the Mekong Delta in November 1997, which underscores the vulnerability of Vietnamese households to risk. Finally, the Southeast also had an impressive reduction in poverty in the 1990s, with a reduction of about 25 percentage points (from 32.7% to 7.6%). Overall, poverty reduction occurred in all seven of Vietnam's economic regions, but not at the same pace. The biggest reductions were in the Red River Delta, followed by the North Central and the Southeast, while the reductions were smallest in the Mekong Delta, followed by the Central Coast.

[5] There is an important caveat to this statement. It is not clear whether the VNLSS surveys included migrants into urban areas who do not have official permission to live in those areas. Such migrants are usually the poorest members of urban areas and thus if the survey does not include them, and they are a substantial proportion of urban areas, poverty in urban areas is underestimated.

Poverty rates by ethnic group are also shown in Table 1. In Vietnam, the ethnic Vietnamese (Kinh) form about 84% of the population, and in 1998 the Moung are the only ethnic group comprising more than 2% of the population. The Chinese, who also constitute 2% of the population, are in general better off than the Kinh, in part because they are more likely to live in the Southeast region and more likely to live in urban areas. In contrast, all the other ethnic groups are much worse off than the Kinh and are usually found in remote areas. The incidence of poverty among the Kinh dropped 55% to 32% from 1992-93 to 1997-98, while the incidence among the Chinese dropped from 12% to 8%. Table 1 shows that poverty incidence is much greater in all the other ethnic groups. [6] Merging all those groups into a single "other" category (not shown in Table 1) shows that the incidence of poverty was still 75.2% in 1997-98. Even though there has been some improvement since 1992-93, when the poverty rate was 86.4% for this "other" group, it is clear that future poverty reduction efforts in Vietnam must address the problems faced by these minority groups.

Education is often strongly associated with the welfare of individuals and households. Table 1 examines this aspect of poverty by dividing the population according to the level of schooling of the household head. As one would expect, all education groups show declines in poverty, but the declines are proportionately much larger for those with higher levels of education. For example, 13.4% of the population in households headed by someone who attended university education were poor in 1992-93, yet by 1997-98 only 4.5% of this group remained poor. Moreover, 47.7% of households whose heads had attended technical school were poor in 1993 but by 1998 only 19.2% of these households were in poverty. In contrast, 69.9% of the people living in households

[6] Sample sizes for each ethnic group other than the Kinh are very small. They range between 9 for the Dao

headed by someone with no education were poor in 1992-93, but by 1997-98 this incidence of poverty had dropped only marginally, to 57.3%. This suggests that households with well-educated heads were better able to take advantage of Vietnam's economic boom than households whose heads had little or no education. The depth and severity of poverty (P1 and P2 in Table 1) also declined more sharply for households whose heads were better educated.

In almost all countries welfare levels are correlated with individuals' occupations. Table 1 examines this aspect of poverty by classifying households according to the occupations of their heads. People in households headed by a white collar worker have very low rates of poverty, and their gains in poverty incidence, depth and severity over these five years are striking. Poverty incidence for the population living in white collar households fell by more than half, from 24.1% to 10.1%, whilst the poverty depth and severity measures fell by two-thirds. Individuals in households headed by sales and service workers fare almost as well, with similarly sharp falls in poverty indicators.

At the opposite end of the spectrum are the 60% or more Vietnamese who live in households headed by agricultural workers; poverty incidence fell from 69% in 1992-93 to 48.2% in 1997-98. While this reduction is quite large, half of this population is still poor. Finally, in between are people who live in households headed by someone who works in manufacturing or construction, or in households headed by someone who is retired or not working for some other reason (the most common of which were illness or doing housework and/or childcare). The poverty rates for these groups fell sharply, particularly for the retired/not-working group whose poverty incidence rates fell from 59.0% to 26.3%, poverty depth was reduced by three fourths (from 0.24 to 0.06) and

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and 96 for the Tay in 1992-93 and between 9 for the Dao and 131 for the Chinese in 1997-98.

poverty severity plummeted from 0.12 to 0.02. The main lesson to draw from these figures is that poverty in both years is concentrated in households in which the head works in agriculture. Indeed, 78.6% of the poor live in such households, which implies that poverty reduction efforts must reach agricultural households to be effective.

Table 1 also shows that poverty rates are considerably less for female-headed households; although both male- and female-headed households have made significant progress in poverty reduction, the gains for female-headed households are more impressive when compared to 1992-93. One reason for this finding is that a large share of female-headed households in Vietnam live in urban areas (40.5% in 1997-98) where poverty is considerably lower, and where the incidence of poverty has fallen more swiftly in the past five years. Also, female-headed households are usually smaller than male-headed households.[7] The finding of larger welfare gains among female-headed households between the two survey years may be reversed if we were two use *total*, instead of *per capita*, expenditure as the indicator of household welfare (World Bank 1999).

Table 1 focused on the incidence of poverty among individuals. Table 2 examines the data from a different perspective by dividing the entire population into expenditure quintiles (poorest 20%, next poorest 20%, etc.) and examines the characteristics that each of these quintiles has. The results confirm that urban households appear to have benefited more than rural households during this period. This is shown most clearly by the fact that in 1992-93 the households in the top expenditure quintile were almost evenly split between urban and rural areas (48.3% in rural and 51.7% in urban), while by 1997-

[7] In the 1997-98 survey, average household size was 3.9 and 5.1 for female-headed households and male-headed households respectively.

98 the split had shifted so that more than two thirds of the population in this quintile was in urban areas (68.7%) while only one third in rural areas (31.3%).

Table 2 also shows the distribution of the population by region for each quintile. These figures highlight the significant improvement in living standards in the Southeast (27.3% of population in the top quintile resided in the Southeast in 1992-93, while by 1997-98 the figure had risen to 41.9%) as well as the relative decline of the Mekong Delta region (28% of the top quintile in 1992-93, but only 15.8% by 1997-98). Turning to education levels, households headed by individuals with an upper secondary or higher level of education gained more during this five year period than households with less educated heads, confirming the finding in Table 1.

The distribution of households by the occupation of their heads is also shown for each quintile in Table 2. The results show that individuals in households whose heads are engaged in white collar or sales/service jobs improved their relative position when compared to farming households. The share of farming households in the third, fourth and fifth quintiles fell from 71.6% to 64.2%, 56.0% to 47.3% and 34.0% to 19.3% respectively. Finally, the last two rows of Table 2 look at the sex of the head of household. Here there is very little change between the two surveys, although female-headed households are slightly less common in the poorest quintile in 1997-98 compared to 1992-93.

Table 3 breaks the expenditure per capita data into deciles for both surveys and shows the growth rates for each decile. Vietnam's growth was shared amongst all households in the sense that each decile shows an increase in real per capita expenditures. However, the increases are somewhat higher for the better off groups, in that the increases range from 23% to 29% for the five poorest deciles while they range from 31%

to 53% for the better off quintiles. This shows that the distribution of expenditures has become more unequal, something that will be examined in more detail below.

An important point to keep in mind is that the results in Table 3 do not necessarily imply that the poor benefited less than the rich, because it is not necessarily the case that the poorest 10% or 20% of households in 1992-93 were the same households that were the poorest 10% or poorest 20% in 1997-98. If there is mobility in the sense that some poorer households have moved into higher deciles or quintiles while some wealthier households have moved down, a rigorous examination of panel data is needed to determine whether the poor benefited less than the rich. Such an examination is beyond the scope of this paper, but preliminary evidence presented below suggests that there is some mobility of this type.

Table 4 uses the panel data to examine the extent of mobility. This information is important because mobility implies that poverty need not be a permanent condition. Indeed, if poverty is a temporary condition for many households policymakers may want to focus their efforts only on households that are "permanently" poor. Table 4 shows that only about 40% of households stay in the same quintile in both years. About 20% move up one quintile and another 20% move down by one quintile. Finally, about 10% move up by two or more quintiles while another 10% move down by two quintiles. These movements suggest a substantial amount of relative mobility among Vietnamese households. Yet one should exercise caution when interpreting these results, because some of these movements from one quintile to another could be due to measurement error in the expenditure variable, which in general leads to overestimates of the extent of mobility.

The results in Tables 3 and 4 also raise the general issue of how the distribution of household expenditures changed over time in Vietnam in the 1990s. Table 5 presents results for 1992-93 and 1997-98 using the Theil T measure; results for the Theil L measure are similar and are shown in Table A.1 in the appendix. Theil's T inequality measure suggests that overall inequality in Vietnam has increased somewhat from 1992-93 to 1997-98, from 0.1966 to 0.2302. The same trend is found when other inequality measures are used (not shown in Table 5) – the Theil L measure shows an increase from 0.1770 to 0.2013, and the Gini coefficient shows an increase from 0.329 to 0.352.

As explained at the beginning of this section, one can also use the two Theil inequality measures to decompose inequality in a way that sheds light on the nature of inequality. Decomposition analysis using Theil's T measure is shown in Table 5; the results for Theil's L measure are similar (see Table A.1 in the appendix). Consider first differences between urban and rural areas. Only about 21% of overall inequality in 1992-93 was due to differences in average expenditures between urban and rural areas, but this figure had increased to 31% by 1997-98. This suggests that the gap between urban and rural areas is increasing. The reason for this growing gap is a major research task; future analysis of Vietnam should examine this question in detail.

Table 5 also decomposes inequality by the seven main economic regions. For six of the seven regions, inequality did not change very much. However, for the North Central region inequality increased from 0.1013 to 0.1605. There is no obvious reason for this change; this is also left for future research. Another point regarding inter-region differences is that they did not contribute much to overall inequality in 1992-93, such differences accounted for only 13.4% of overall inequality. Yet this figure had increased to 21.8% by 1997-98, which suggests that some regions are pulling ahead of others.

In contrast with these results, differences in mean expenditure levels by ethnic groups and by the sex of the household head explain little of overall inequality (about 10% for the former and about 2-3% for the latter), and their contribution over time has not changed appreciably. However, in both cases this result is not very surprising because one group alone accounts for three fourths or more of the total population. In such cases, the inequality within the dominant group tends to overwhelm other possible sources of inequality.

Inequality decompositions can also be done by occupation categories, in which each household is classified according to the occupation of the head of household. This is done in Table 5 for seven occupational types, including retired and not working for some other reason. In 1992-93, differences in mean expenditure levels across these different occupational groups accounted for about 17% of overall inequality, a small but not a trivial amount. By 1997-98 this figure had increased to 24%, which suggests that some occupations have done better than others in the past five years. Within categories, there is also some increase in inequality, the largest increase is for white collar households, for whom inequality has risen by about 28% (from 0.1937 to 0.2478).

The final decomposition shown in Table 5 is by education. In 1992-93 the between group contribution to overall inequality was very small, only 7.8%. This is much smaller than similar decompositions in other countries (see Glewwe, 1986, 1987, 1989) and suggests that the economic benefits to education were quite small at that time. By 1997-98 this situation had changed, so that the between group component had nearly doubled to 14.4%. This suggests that the returns to education have increased significantly in Vietnam. This is also an area for future research. An additional observation regarding education is that inequality within some education categories was also increasing; among

individuals in households headed by someone with a university education inequality increased by about 17% (from 0.2034 to 0.2386), and a smaller increase, about 13%, occurred for households whose heads had an upper secondary education (from 0.1983 to 0.2248).

C. Insights Using Income Data. As explained above, the main advantage of looking at income data is that one can use it to decompose overall inequality into the contributions from many different types of income. Table 6 decomposes income inequality by the source of income using the data from the 1997-98 VNLSS (the data from the 1992-93 data were more difficult to work with and thus are not used in this paper). One can divide total income into five different sources, wage income, net income from agricultural activities, net income from non-agricultural household enterprises, income from remittances, and other income. The first column of Table 6 shows that agricultural income is most important type of income, constituting about 42% of total income. The next most important source is wage income, 23% of total income. Average income from household enterprises is relatively small, amounting to 12% of total income. Finally, remittances account for only 3% of income while "other" sources account for 19%.

The second column of Table 6 presents the decomposition of total income inequality by income source. Since Shorrock's decomposition method is independent of the inequality measure used, the table presents only this percentage breakdown. Several of these results are noteworthy. First, enterprise income accounts for nearly half of overall inequality (43%) even though it is only 12% of total income. Clearly, income from this source is very unequally distributed. This is consistent with results using a similar household survey of rural households in Northeast China in 1995 (Benjamin, et

al, 1999). In sharp contrast, income from agricultural activities represents 42% of total income but accounts for only 17% of overall income inequality.

Turning to the remaining income components, remittances tend to be disequalizing, but since they are a small amount of total income (3%) they contribute only 7% of overall inequality. The opposite is true of other income; this income constitutes 19% of total income but contributes to only 8% of overall inequality. Finally, wage income is neither equalizing nor disequalizing.

3. Micro-determinants of growth: a simple decomposition exercise

The growth in per capita expenditures across all socio-economic groups, and the fact that many households appear to have changed their relative position in the distribution of household expenditures (as seen in Table 4), leads to questions regarding which household characteristics explain per capita expenditure levels in 1992-93 and 1997-98, and which explain the growth of per capita expenditures during this period. These questions are examined in this section, using regression analysis.

Consider the reduced form determinants of consumption using a simple linear econometric specification:

$$\log(y_i) = \beta X_i + u_i$$

In this equation, y_i is real consumption per capita and X_i is a vector of independent variables that influence consumption. The independent variables contain individual, household and community characteristics. Examples of analyses of this type are Glewwe (1991) and Ravallion (1997).

The change in mean per capita consumption from 1992-93 to 1997-98 can be decomposed into those due to changes in household characteristics and those due to changes in the returns to those characteristics (Wodon 1999). More specifically, specifying the above equation for two different time periods, t and t+1, and then subtracting the latter from the former yields:

$$\log(y_i^{t+1}) - \log(y_i^t) = (\beta^{t+1}-\beta^t)X_i^t + \beta^t(X_i^{t+1}-X_I^t) + (u_{t+1} - u_t).$$

The first term on the right hand side represents the effect of changing returns over time and the second term represents the effect of changing household characteristics.

The results of this estimation for 1992-93 and 1997-98 and the results of the decomposition are presented in Table 7. The cross-sectional estimates in both years show that households living in the South East have higher expenditure levels than other Vietnamese households, even after controlling for other individual and household characteristics. More specifically, in 1992-93, the per capita expenditures of households in the South East were 63.8% higher than those of households in the reference category, the North Central region. By 1997-98, this gap had risen to 73.3%. In contrast, the relative advantage of living in the Mekong Delta appears to have fallen from 57.9% to 20.8%, again probably due to the severe typhoon in late 1997. The decomposition analysis in the last two columns of Table 7 demonstrates that almost all the changes in the relative positions of the seven regions is due to changes in the returns to living in the different regions. This is not surprising given that there is little change in the fraction of the population belonging to the different regions. A similar story holds for differences between urban and rural areas. Households in urban areas had consumption per head

29.3% greater than those in rural areas in 1992-93, and by 1997-98 this had risen to 36.8%.

The household head occupation variables indicate that white collar workers were 21% better off than agricultural workers in 1992-93, and 26% better off in 1997-98. Households headed by salespersons are around 20% better off than agricultural households in 1992-93 and about 22% better off in 1997-98. Households whose head's main occupation is in production activities are 10.1% better off in 1992-93 and 7.9% better off in 1997-98. Thus households headed by white collar workers and, to a lesser extent, households headed by sales and service workers, benefited more from economic growth than did agricultural households or household headed by workers engaged in non-agricultural production activities.

Turn now to the education variables, which separate formal education from technical/vocational training. The results suggest that an additional year of formal education of the household head raises overall household consumption per head by 3.0% in 1992-93 and 3.3% in 1997-98. The returns to vocational education declined over this time period; an additional year had a positive impact of 1.6% in 1992-93 but in 1997-98 the impact is negative, though not significantly so. A one year rise in the education of the spouse leads to a 1.7% greater household consumption per head in 1992-93 and a 0.9% increase in 1997-98, controlling for other factors. Relative to the education of the head, this impact is smaller and appears to be declining over time. Interestingly, the returns to vocational education for the spouse has risen in these two periods; a one year rise in vocational training is associated with a 3.4% increase in consumption per head in 1992-93 and 5.3% increase in 1997-98.

The household demographic characteristic variables are used in Table 7 (and subsequent tables) primarily to control for variation in household size and composition (for further explanation, see Glewwe, 1991). Because it is almost impossible to estimate credible equivalence scales (see Deaton, 1997), one should be cautious when interpreting the coefficients on these variables. For example, the significantly negative impact of overall household size does not necessarily imply that larger households have lower levels of welfare; if per capita expenditures were replaced by a welfare indicator that divided total household expenditures by "adult equivalents" this finding could disappear or even be reversed. Nevertheless, a few observations can be made regarding specific types of household members.

First, households with more working age adults (19-59 years for males, and 19-54 for females) have higher per capita consumption levels, while those with more small children have lower levels. Second, it seems that the benefit of having working age adults decreased over time (this is apparent in the change in the returns in the second to last column). Perhaps the increased returns to education prevailing in 1997-98 imply that household welfare levels are more influenced by the education of adult household members than by the number of those members. Third, the negative impact of having young children seems to have increased, while the positive impact of having children aged 15-18 years has disappeared. One possible explanation for the latter result is that upper secondary school enrollment rates were much higher in 1997-98 than in 1992-93, yet it is difficult to explain the change in the impact of younger children.

4. Analysis of panel households

The results presented in the previous section did not make use of the panel data contained in the two VNLSS surveys. As explained in Glewwe and Hall (1998), more precise estimates of the change in household expenditures can be obtained by using panel data. This section presents such estimates. The regression analysis of the panel households begins by regressing the change in per capita expenditures on the initial (1992-93) characteristics of households. This regression is a benchmark model that includes only variables that are "pre-determined" and thus likely to be exogenous to the change in consumption (the dependent variable). This benchmark model is then modified by adding "change variables," that is explanatory variables that are the difference between 1992-93 and 1997-98 values ($X_{t+1} - X_t$). Clearly, the exogeneity of these variables is questionable; to avoid drawing false inferences these variables are added only one at a time, and the results are interpreted cautiously.

Table 8 provides the results of the panel data analysis for rural households. Starting from the regional variables of Model 1, the "benchmark model", note that compared to the base category (the North Central region) households in the Red River Delta region experienced an improvement in expenditure per head that was 5.3 percentage points higher, *ceteris paribus*.[8] In contrast, consumption per head for households in the Central Coast improved by 14 percentage points less than that of households in North Central, and the figure for Mekong Delta is 20 percentage points less. These results are consistent with the earlier findings in Table 1.

[8] The coefficient on this variable is 0.05185. The percentage increase is given by $e^{0.05185}$, which equals about 0.053. This method of calculating percentage impacts is used for all of the explanatory variables.

Turning to the characteristics of the head of household, after controlling for other factors neither the sex nor the age of the head has a significant impact on changes in households' per capita expenditures. Among the occupational variables, only the coefficient for sales and service occupations appears statistically significant. The result suggests that, relative to households in the base category (agriculture), households headed by someone in a sales or service occupation experienced a change in expenditures that was 8.8 percentage points higher.

Now consider ethnic groups and religious affiliation. The reference category for ethnic groups is ethnic Vietnamese (Kinh), which constitute about 85% of the total population. Chinese households appear to have attained an increase in expenditures that is lower than that of the Kinh. However, this result is not statistically significant. In contrast, the relative deprivation of non-Chinese ethnic minorities is statistically significant. The change in their per capita expenditure levels was about 6 percentage points lower than that of Kinh households.

Turn next to the health and education of household members. Households whose heads were *not* ill during the four weeks preceding the 1992-93 interviews improved their consumption per head by 2.9 percentage points more than did households whose heads were ill. This demonstrates the economic benefits of good health. Regarding education, an additional year of general schooling is associated with a 0.6 percentage point increase in the improvement in consumption expenditures, holding other factors constant. No significant impact is found for the vocational education of the head. The negative sign on the education of the head's spouse's education variable is puzzling, but it is only significant at the 10% level. This imprecision may reflect the high correlation between education of the household head and that of the spouse.

The last household level variables in Table 8 are those measuring demographic characteristics of households and those related to assets and agricultural productivity. Almost all of the demographic variables are statistically insignificant, and given the difficulties in estimating equivalence scales it is difficult to interpret the one or two that are significant. The coefficients on two of the three agriculture productivity and assets variables, namely the productivity of rice and the debt-asset ratio, are statistically insignificant. The one that is significant, the amount of irrigated land per capita, is significantly negative. This result is difficult to explain, and a thorough investigation of it is beyond the scope of this paper, which is primarily an exploratory analysis.

Finally, turn to the community level variables.[9] The community level variables show that households who reside in communes with paved roads passing through them had an increase in expenditures 16 percentage points higher than did households who reside in communes without roads. One interpretation of this result is that households in such communes have better access to markets and other opportunities outside their communes. None of the other commune variables has a significant impact, except the distance to lower secondary schools, which has an unexpected negative sign.

The remaining regressions in Table 8 add "change" variables one at a time, yet the results can be discussed together. Increases in the irrigated land per capita (model 2) and in households' rice productivity (model 3) raise household consumption expenditures, as one would expect. In contrast, an increase in the debt-asset ratio between 1992-93 and 1997-98 significantly reduces the change in households' per capita expenditures during this period, which is also what one would expect. Another statistically significant 'change variable' is the 'out of agriculture' variable (model 5); the result suggests that

households who left agriculture for other occupations experienced a growth in consumption that was 10 percentage points higher than the growth of those who remained in agriculture. Finally, the dependency ratio variable is also significant and has the expected sign. However, the interpretations given for each of these variables are somewhat simplistic since these variables are endogeous. Future research needs to examine these preliminary findings more rigorously.

The parameter estimates of the determinants of per capita expenditure in urban areas are reported in Table 9. Again, the model with only exogenous variables (Model 1) is the "benchmark model". The results are generally consistent with the findings outlined above for rural areas. A few important differences, however, emerge. First, most of the regional dummies are not statistically significant in urban areas, a finding that suggests a more homogeneous welfare improvement in urban areas, after controlling for individual and household characteristics. Second, the welfare improvement of non-Kinh households in urban areas is no longer significantly different from the welfare improvement of Kinh households. Third, the dummy variable indicating a Buddhist household is significant and negative for urban areas (it is significant and positive for rural areas). Fourth, the parameter estimate of the coefficient for health status of household head is no longer significant in the urban regression. This last result suggests that health is a more important determinant of household welfare in rural areas.

5. What explains movements in and out of poverty?

The panel regressions in Section 4 provided some insights into the determinants of the change in consumption for the entire panel sample between 1992-93 and 1997-98.

[9] As explained above, it is difficult to interpret the impact of the household composition variables, so no

This section investigates the factors that determine movements in and out of poverty differently, by splitting the panel sample into four categories: households that are poor in both years ("remain poor"), households that are poor in 1992-93 but not in 1997-98 ("escape poverty"), households that were not poor in 1992-93 but are in 1997-98 ("fall into poverty") and households that were not poor in both years ("never poor"). The main focus of this section will be on comparisons between households who escaped poverty and households who remained poor.

Table 10 examines how many of the 4281 panel households fall into each category. For Vietnam as a whole, about 29% of the panel households were poor in 1992-93 and remained poor in 1997-98. A better outcome was experienced by a similar proportion of households, about 27% were poor in 1992-93 but managed to escaped poverty by 1997-98. Given Vietnam's overall impressive reduction in poverty, the proportion of households that moved in the other direction (not poor in 1992-93 but poor in 1997-98) was fairly small; only about 5% of households slipped into poverty between 1992-93 and 1997-98. Finally about 39% of households were not poor in 1992-93 and remained so in 1997-98.

Table 10 also provides a regional breakdown of these numbers and, not surprisingly, finds significant differences. For example, in the prosperous South East, two-thirds of the households were not poor in either year, 24% escaped poverty, 8% remained poor and only 2% slipped into poverty. In constrast, in the Mekong Delta nearly 9% of households slipped into poverty and only 19% escaped poverty. In the Northern Uplands, nearly half the population (47%) remained poor whilst 42% stayed poor in the Central Highlands.

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attempt will be made here to do so. In fact, almost all of them are statistically insignificant.

Table 11 presents the characteristics of these four sets of households. A brief discussion is useful. About 26% of households who remained poor resided in the Northern Uplands whilst only about 16% of those who escaped poverty resided in this region. Even though poverty fell by about 20% in this region during this period (Table 1), poverty levels are still the highest in Vietnam in 1997-98 (58.6%). In contrast, the figures for Red River Delta and the South East reflect the dramatic reductions in poverty that those regions experienced – about 21% of the population who remained poor were in Red River Delta whilst 30% of those who escaped poverty lived in this region, and the corresponding figures for the South East are about 3% and 10%, respectively.

The occupational categories suggest that households in white collar, sales or production were more likely to escape poverty than households headed by those mainly involved in agriculture. That is, whilst about 3% of population who escaped poverty lived in households headed by someone with a white collar occupation, only about 1% of those remaining in poverty lived in such households. The analogous figures for sales and service occupations are 5% and 2%, whilst those for production occupations are about 10% and 6%. The population in agricultural households, on the other hand, composed 81% of those who did not move out of poverty and only about 73% of those that did, a difference that is significant at the 1% level.

The relative disadvantage of minority households is once again apparent in Table 11; the population that is either Kinh or Chinese constitutes approximately 28% of those who remained poor but only 8% of those who escaped poverty. The contribution of education to escaping poverty is also evident in Table 11. Of the population who remained poor, the average education of the head was 5.2 years of formal education, while the comparable figure for the population who escaped poverty was 6.1 years, a

difference that is significant at the 1% level. Moreover, the same figure for the population who slipped into poverty (i.e. were not poor in 1993 but are poor in 1998) was 5.0 years of education, a figure similar to that of the population who remained in poverty. This pattern is also reflected in the mean years of vocational education; among the population that escaped poverty the household head had, on average, 0.14 years of vocational training, compared to 0.10 years for the population that remained in poverty. Finally, the education of the household head's spouse tells a similar story. Among the population that remained in poverty, the average years of education of the head's spouse was 3.9 years; the comparable figure for the population that slipped into poverty was 3.6 years. In contrast, among the population that escaped poverty the average education of the head's spouse was 4.5 years of education, which is significantly different (1% level) from the other two categories. A similar result holds for spouses' vocational education.

Table 11 also shows that households who possessed larger amounts of irrigated land and whose productivity of rice was higher had a better chance of escaping poverty. Households who remained poor also had approximately twice as much debt in relation to their assets compared to households who escaped poverty. Finally, Table 11 also suggests the importance of infrastructure in reducing poverty. Households living in communities with a paved road, where most households have electricity, where a lower secondary school exists, where a upper secondary school exists or with a market are more likely to escape poverty than households who live in communes where these facilities do not exist.

Of particular interest in Tables 10 and 11 is the large group of households that were able to escape poverty between 1992-93 and 1997-98. An important question is: What household characteristics enabled these households to escape poverty? A useful tool for

examing this question is multinomial logit regression, which predicts the probability that a given household will belong to any one of these four states.[10] The multinomial logit model states that the probability that a household i is in state j is given by:

$$P_{ij} = \frac{\exp(\beta_j x_i)}{\sum_{k=1}^{4} \exp(\beta_k' x_i)}$$

where P_{ij} is the probability that household i is in 'poverty state' j. In principle, there is one set of β's for each state j. However, to identify (estimate) these sets of β's one set needs to be set at an arbitrary value, with the consequence that the other sets of β's are defined relative to the "benchmark" set. For the purpose at hand it is useful to set all the β's to zero for the state "poor in 1992-93 and still poor in 1997-98". The interpretation of the other β's will become clear in the discussion below.

The results of the multinomial regressions for rural areas are presented in Table 12. The explanatory variables used are the same as those used in the panel regressions of Table 8, omitting the 'change variables' since they are likely to be endogenous. For ease of interpretation, the results are presented in terms of the impact of the variable on the relative risk ratio (RRR). An RRR is the probability of a given outcome divided by the probability of a "base" outcome. In Table 12, the base outcome is being poor in both years (1992-93 and 1997-98). For example, suppose one household has a 40% chance of being poor in both years (the base category) and a 20% chance of escaping poverty (poor in 1992-93 but not poor in 1997-98). For that household, the RRR of escaping poverty

[10] We would like to thank Lyn Squire for suggesting this approach.

(relative to remaining poor) is 0.5 (20 divided by 40). The RRR column in Table 12 shows the impact of each variable on the RRR's for the other categories. For example, suppose that a household with characteristic x (x=1) has an RRR of 0.6 while an otherwise identical household without that characteristic (x=0) has an RRR of 0.4. The impact of this variable on the RRR is 1.5 (0.6 divided by 0.4), which means that it raises the relative probability of escaping poverty (relative to the probability of remaining poor) by 50%. In terms of the equation for the multinomial logit model, the impact of a one unit increase in a given variable on the RRR for a given outcome (relative to the base outcome) is equal to e to the power of its associated coefficient, that is $\exp(\beta_{jk})$ where j indicates the outcome and k indicates the variable. A simple rule for the impact of variables on the RRR is that an impact of less than one implies that the variable increases the relative probability of being in the base state while an impact of greater than 1 implies that the variable reduces the relative probability of being in the base state (and thus rauses the relative probability of being in the "other" state).

Consider first the regional variables in Table 12. The impacts of variables on the RRR's are expressed with respect to the North Central region. Note first that there is no statistically significant impact of living in the Northern Uplands or the Central Coast (relative to living in the North Central region) on the probability of escaping poverty (relative to the probability of remaining in poverty). Yet living in the Red River Delta increases one's relative probability of escaping poverty by 44%, compared to living in the North Central region. Statistically significant and very large impacts on relative probabilities are also evident for the Central Highlands and the Southeast, where the relative probabilities of escaping poverty are 195% and 473% higher than in the North Central region. at 2.95 and 5.74. respectively. Finally, the relative probability of

escaping poverty in the Mekong delta region was about 49% higher than in the North Central region, but this is statistically significant at only the 10% level. The extremely high impact of living in the Southeast on escaping poverty is not surprising given that poverty dropped from 32.7% to 7.6% (see Table 1).

Most of the discussion of Table 12 concerns the first set of results, which compare the probability of escaping poverty with the probability of remaining poor. However, the second and third results are also of some interest. To show how to interpret these results, this paragraph will review the results just for the regional variables, and just for the second set of results (the relative probability of falling into poverty, as compared to being poor in both years). Again using the North Central region as the point of reference, the relative probability of becoming poor (relative to being poor in both years) is about the same in the Red River Delta and the Central Coast. However, it appears that becoming poor is more common (relative to being poor in both time periods) in the Northern Uplands and the Central Highlands – yet although the differences in relative probability are large, 82% in the Northern Uplands and 265% in the Central Highlands, they are not statistically significant. This lack of statistical significance reflects the fact that becoming poor is a relative rare event (see Table 10), which reduces the precision of such estimation. In contrast, the relative probability of becoming poor is much higher in both the Southeast (751% higher) and in the Mekong Delta (873% higher), and these impacts are very significant. The result for the Mekong Delta is plausible because poverty reduction in that region was relatively weak (see Table 1), and presumably Typhoon Linda caused many previously non-poor households to fall into poverty. This is consistent with the numbers in Table 11 for the Mekong Delta. However, the results for the Southeast at first glance appear very counterintuitive – how could a region that was

very successful at reducing poverty have a much higher probability of households becoming poor than a relatively unsuccessful region? The answer comes in two parts. First, recall that these probabilities are relative to being poor in both years, and very few households in the Southeast are poor in both years (8%). The second is that the Southeast seems to have a lot a volatility in household expenditure levels relative to other regions (it has the highest Theil T value amongst all regions, as seen in table 5), particularly relative to the North Central region.

Returning to the main interest in Table 12, the impact of variables on the relative probability of escaping poverty, note that the age and sex of the household head have no statistically significant impacts. In contrast, there are important differences regarding the occupation of the head of household. The impacts on the RRR's shown in Table 12 all take work in agriculture as the occupation or reference. The most salient result is that the relative probability of escaping poverty is 382% higher in households where the head has a white collar occupation than in households headed by someone who works in agriculture. This effect is very large and highly significant, but it is not surprising given the results in Table 1, where the incidence of poverty declined from 24% to 10% for white collar households but only from 69% to 48% for agricultural households. A second result is that households headed by someone working on a non-agricultural production occupation had a 62% higher relative probability of escaping poverty than did an agricultural household. In contrast, a household headed by someone who was not working is 32% *less* likely to escape poverty than an agricultural household, but this impact is significant only at the 10% level.

A particular area of concern are ethnic minority households. Their relative probability of escaping poverty is 63% *lower* than that of Kinh households, and this result

is highly significant. In contrast, their was no statistically significant impact of the religion variable.

Turning to the education variables, an additional year of formal education of the household head raises the relative probability of escaping poverty by about 11%. In contrast, there is no statistically significant effect of the formal education of the spouse. The results are reversed for vocational education, the effect for the head of the household is statistically insignificant, but there is a significantly positive impact of the vocational education of the spouse: each additional year is associated with a 55% increase in the relative probability of escaping poverty. Another "human capital" variable is the health of the head, but days ill in 1992-93 had no impact in any of the regression results in Table 12.

The only other household level variable that is highly significant is that concerning rice productivity. A one ton increase in kilogrammes of rice produced per hectare leads to a 17% increase in the relative probability of escaping poverty.

The last variables in Table 12 concern community characteristics. Of the five variables, one is significant at the 5% level (households with electricity) and two are significant at the 1% level (presence of post office and presence of a market). Surprisingly, the electricity and post office variables have negative impacts, in that communities that had them were less likely to escape poverty than otherwise similar communities that had them. In contrast, the presence of a market was associated with a higher relative probability of escaping poverty. However, one should be wary of interpreting all of these results. For example, the presence of a market may be determined by some unobserved variable that determines both households' ability to

escape poverty and the existence of a market. Further research is needed to disentangle these effects.

Finally, briefly consider the regressions for urban areas shown in Table 13, focusing on the probability of escaping poverty (the first set of results). The regional variables are less likely to be statistically significant, but where they are significant the results are not surprising, in that households in the Red River Delta and in the Southeast are much more likely to escape poverty then households in the North Central region. Most of the other variables are statistically insignificant, which reflects the small sample size (775) given the number of parameters estimated. The results significant at the 5% level are the following. First, an extra year of education is associated with a 23% increase in the relative probability of escaping poverty. Second, and in contrast, a year of formal education has the opposite effect, reducing the relative probability of escaping poverty by 51%. This result casts doubt on the usefulness of vocational education in urban areas of Vietnam, but a more thorough study is needed before clear policy implications can be drawn.

6. Conclusion

Vietnam's gains in poverty reduction have been striking during the period from 1992-93 to 1997-98; given the small rise in inequality it is evident that the country's impressive growth in the 1990's has been broad-based. However, Vietnam cannot afford to be complacent because nearly half of its rural population remains poor and both poor and non-poor households are vulnerable to exogenous shocks (as shown by the effects of the typhoon on the growth rate of households in Mekong River Delta). Moreover, poverty

rates amongst its ethnic minorities remain very high. An additional worry is the impact on Vietnam of the financial crises that have shaken many East Asian countries.

Vietnam's export-led growth and healthy investment climate of the 1990's created employment for those who possessed the attributes needed to take advantage of such opportunities. One such attribute is clearly education. The analysis in this paper illustrates the importance of education and the fact that the returns to education increased significantly during this period, particularly for higher levels of education.

Another factor that significantly affected a household's probability of escaping poverty during this period was location. Urban households enjoyed a greater reduction in poverty than did rural households, and households residing in the Red River Delta and the South East were also well placed. Households headed by someone with a white collar occupation also benefited significantly. Improvements in the productivity of rice also appeared an important factor behind growth of per capita consumption.

The analysis in this paper was primarily exploratory, but some policy suggestions arise for serious consideration.[11] First, anti-poverty programs should focus on the agricultural sector in an effort to raise productivity and ease other structural constraints such as access to credit and other extension services. Second, the needs of minorities are a particularly urgent problem. Finally, continued investment in the social sectors, particularly education, ought to remain a high priority.

[11] For a thorough discussion of policy options for Vietnam to reduce poverty, see World Bank (1999).

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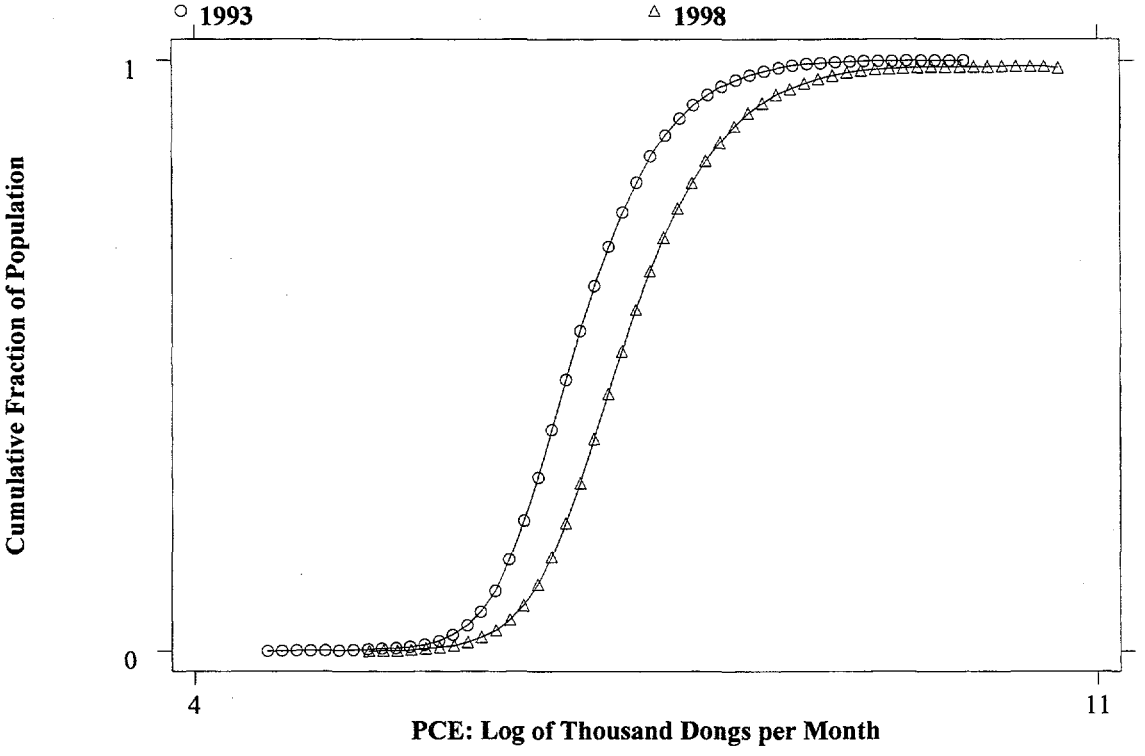
Table 1. Changes in poverty by socioeconomic characteristics (n=4800 for 1992-93 and n=6000 for 1997-98)

	Poverty incidence(P0)		Poverty depth(P1)		Poverty severity(P2)		Population share	
	92-93	97-98	92-93	97-98	92-93	97-98	92-93	97-98
All Vietnam	58.1	37.4	0.18	0.10	0.079	0.035	100	100
Urban/rural								
Urban	25.1	9.2	0.06	0.02	0.023	0.005	19.9	22.4
Rural	66.4	45.5	0.21	0.12	0.092	0.044	80.1	77.6
Region								
Northern Uplands	78.6	58.6	0.27	0.17	0.118	0.065	15.6	17.9
Red River Delta	62.9	28.7	0.19	0.06	0.073	0.018	21.6	19.6
North Central	74.5	48.0	0.25	0.12	0.105	0.041	12.8	13.8
Central Coast	49.6	35.2	0.17	0.11	0.079	0.047	11.9	10.7
Central Highlands	70.0	52.2	0.26	0.19	0.140	0.094	3.2	3.7
South East	32.7	7.6	0.09	0.01	0.037	0.004	12.6	12.7
Mekong River	47.1	36.9	0.14	0.08	0.056	0.027	22.4	21.4
Ethnic group								
Vietnamese (Kinh)	55.1	31.7	0.16	0.07	0.066	0.024	84.5	83.3
Tay	81.3	63.8	0.28	0.15	0.117	0.053	2.0	1.8
Thai	82.3	71.1	0.33	0.20	0.160	0.077	1.0	1.1
Chinese	11.8	8.4	0.03	0.02	0.016	0.010	2.4	2.0
Khome	75.4	57.5	0.28	0.15	0.133	0.057	2.0	2.0
Moung	89.6	80.6	0.31	0.25	0.133	0.099	2.0	2.4
Nung	91.8	72.0	0.31	0.16	0.123	0.052	1.6	1.7
H'mong	100	91.8	0.65	0.36	0.433	0.169	0.7	1.0
Dao	88.5	100	0.45	0.33	0.242	0.131	0.3	0.3
Other	90.0	75.8	0.41	0.31	0.234	0.157	3.5	4.5
Education of the household head								
No schooling	69.9	57.3	0.28	0.20	0.141	0.090	11.6	7.9
Primary	58.2	42.1	0.18	0.11	0.076	0.042	43.9	35.1
Low secondary	63.8	38.1	0.20	0.09	0.080	0.030	26.4	36.3
Upper secondary	45.9	24.9	0.13	0.05	0.050	0.017	8.5	12.4
Technical / vocational	47.7	19.2	0.12	0.03	0.043	0.009	7.3	5.4
University	13.4	4.5	0.04	0.01	0.014	0.005	2.3	2.8
Occupation of the household head								
White collar	24.1	10.1	0.06	0.02	0.021	0.007	4.6	6.5
Sales	27.7	13.2	0.07	0.02	0.025	0.005	8.1	9.0
Agriculture	69.0	48.1	0.23	0.13	0.098	0.049	64.7	60.9
Production	44.5	25.8	0.12	0.06	0.042	0.019	10.9	12.6
Other/no work	59.0	26.3	0.24	0.06	0.121	0.021	11.7	11.0
Sex of the household head								
Male	61.0	39.8	0.19	0.10	0.083	0.036	77.5	78.4
Female	48.3	28.2	0.15	0.07	0.064	0.029	22.5	21.6

Source: Vietnam Living Standards Measurement Surveys 1992-93 and 1997-98

Figure 1. Cumulative distribution functions: 1992-93 and 1997-98



Source: Vietnam Living Standards Measurement Surveys 1992-93 and 1997-98

Table 2. Characteristics of Vietnamese households by expenditure quintile (percentages)[a]

	Quintile 1		Quintile 2		Quintile 3		Quintile 4		Quintile 5	
	92-93	97-98	92-93	97-98	92-93	97-98	92-93	97-98	92-93	97-98
Urban/rural										
Urban	6.1	4.8	7.2	8.2	14.2	16.3	25.8	35.4	51.7	68.7
Rural	93.9	95.2	92.8	91.8	85.9	83.7	74.2	64.6	48.3	31.3
Region										
Northern Uplands	24.3	30.0	21.1	20.5	15.6	13.3	10.1	12.2	4.7	5.3
Red River Delta	21.7	13.0	24.7	20.4	22.7	23.4	20.3	22.8	17.8	21.3
North Central	17.8	18.3	15.7	16.6	15.5	13.8	9.1	10.2	4.2	5.8
Central Coast	10.2	10.2	10.3	10.7	10.1	11.1	13.8	12.8	15.8	8.7
Central Highlands	4.5	5.7	3.1	3.7	3.6	3.4	2.3	2.9	2.2	1.2
South East	5.4	1.9	7.4	4.3	9.7	9.95	16.0	18.5	27.3	41.9
Mekong River	16.1	20.8	17.8	23.7	23.0	25.0	28.5	20.6	28.0	15.8
Ethnic group										
Vietnamese (Kinh)	71.5	68.0	83.1	81.8	87.5	90.9	91.8	92.6	90.2	91.7
Tay	3.8	3.0	2.4	2.8	2.1	1.4	1.1	0.9	0.4	0.0
Thai	2.2	2.2	1.2	2.0	0.8	0.2	0.4	0.3	0.3	0.0
Chinese	0.4	0.4	0.5	0.6	1.2	1.4	2.8	2.7	8.2	7.1
Khome	3.7	3.0	1.5	2.5	2.6	2.1	1.8	1.7	0.3	0.1
Moung	3.5	5.7	3.7	2.9	1.5	0.9	0.5	0.2	0.4	0.2
Nung	3.2	3.0	2.9	3.0	1.1	1.3	0.6	0.2	0.0	0.0
H'mong	3.1	2.6	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.1
Dao	0.8	1.0	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Other	7.9	11.1	4.6	4.0	2.7	1.7	1.0	1.5	0.3	0.9
Education of the household head										
No schooling	18.7	14.7	12.7	6.6	8.6	7.1	9.1	4.6	7.4	3.4
Primary	42.6	40.5	43.1	38.8	47.1	35.5	47.1	33.0	39.3	21.4
Low secondary	28.9	35.7	30.6	38.4	23.0	39.3	23.0	36.2	21.9	30.3
Upper secondary	5.3	7.2	7.0	10.3	9.9	11.3	9.9	15.4	12.4	23.2
Technical / vocational	4.0	1.7	6.2	5.3	7.3	5.4	7.3	7.3	11.5	10.0
University	0.5	0.2	0.4	0.7	3.5	1.4	3.5	3.5	7.5	11.8
Occupation of the household head										
White collar	1.3	1.5	2.1	3.0	2.7	5.2	6.5	9.7	12.0	18.6
Sales/service	2.5	2.3	3.6	5.4	7.1	8.1	10.6	12.0	18.7	24.0
Agriculture	79.3	80.6	76.9	72.6	71.6	64.2	56.0	47.3	34.0	19.3
Production	5.8	8.0	9.0	10.5	9.14	12.6	12.9	16.8	15.7	19.1
Other	2.4	0.2	1.1	0.3	1.1	0.5	1.0	0.6	2.3	2.3
Retired	5.1	4.3	4.1	5.0	4.7	5.0	8.1	8.7	11.1	11.3
Other not working[b]	3.5	3.2	3.2	3.2	3.7	4.3	4.8	4.9	6.3	5.4
Sex of the household head										
Male	80.9	83.7	82.0	82.0	79.2	78.0	75.9	75.4	67.7	67.8
Female	19.1	16.3	18.0	18.0	20.8	22.0	24.1	24.6	32.3	32.2

Source: Vietnam Living Standards Measurement Surveys 1992-93 and 1997-98

a. Percentages refer to people, not households.

b. This category includes unemployed heads and heads not in the labor force for reasons other than retirement.

Table 3. Expenditure per capita for each decile of expenditure (1998 prices)

Decile	92-93	97-98	% change
1	703.5	867.6	23.3
2	994.1	1238.8	24.6
3	1157.3	1480.5	27.9
4	1331.5	1711.8	28.6
5	1519.5	1958.1	28.9
6	1720.2	2260.5	31.4
7	1984.8	2672.7	34.7
8	2368.5	3241.6	36.9
9	3010.3	4331.3	43.9
10	5618.9	8615.4	53.3

Source: Vietnam Living Standards Measurement Surveys 1992-93 and 1997-98

Table 4. Changes in expenditure ranking: a transition matrix from 1993 to 1998

	1998 quintile				
1993 quintile	**1**	**2**	**3**	**4**	**5**
1	10.4	5.40	2.87	1.19	0.19
2	5.54	5.98	5.02	2.66	0.79
3	2.64	4.77	5.07	5.37	2.15
4	1.10	2.94	4.95	6.54	4.46
5	0.37	0.91	2.08	4.23	12.40

Source: Vietnam Living Standards Measurement Surveys 1992-93 and 1997-98
Percentage on diagonal: 40.4
Percentage that move up by one quintile: 20.25
Percentage that moved up by two or more quintiles: 9.85
Percentage that move down by one quintile: 19.49
Percentage that moved down by two or more quintiles: 10.04

Table 5. Changes in inequality in Vietnam: Theil T

Region or group	Theil T		Between-group inequality (as a % of total inequality)		Population share %[a]	
	1993	1998	1993	1998	1993	1998
All Vietnam	0.1966	0.2302			100.0	100.0
Urban/Rural						
Urban	0.1941	0.2059	0.0416	0.0719	19.9	22.4
Rural	0.1365	0.1275	(21.1)	(31.2)	80.1	77.6
Region						
Northern Uplands	0.1008	0.1279	0.0264	0.0503	15.6	17.9
Red River Delta	0.1800	0.1913	(13.4)	(21.8)	21.6	19.6
North-Central Coast	0.1013	0.1605			12.8	13.8
Central Coast	0.1932	0.1949			11.9	10.7
Central Highlands	0.1583	0.1615			3.2	3.7
Southeast	0.2180	0.2108			12.6	12.7
Mekong Delta	0.1737	0.1694			22.4	21.4
Ethnic group						
Vietnamese (Kinh)	0.1839	0.2159	0.0198	0.0236	84.5	83.3
Tay	0.0678	0.0700	(10.1)	(10.3)	2.0	1.8
Thai	0.0911	0.0643			1.0	1.1
Chinese	0.1754	0.2152			2.4	2.0
Khome	0.1226	0.0896			2.0	2.0
Moung	0.0640	0.0744			2.0	2.4
Nung	0.0397	0.0427			1.6	1.7
H'mong	0.0638	0.0812			0.7	1.0
Dao	0.0744	0.0200			0.3	0.3
Other	0.1725	0.1871			3.5	4.5
Occupation of household head						
White collar	0.1937	0.2478	0.0326	0.0546	4.6	6.5
Sales/service	0.2087	0.2106	(16.6)	(23.7)	8.1	9.0
Farming	0.1298	0.1253			64.7	60.9
Production	0.1755	0.1916			10.9	12.6
Other	0.2723	0.1680			1.0	0.6
Retired	0.2089	0.2361			6.5	6.4
Other not working[b]	0.2315	0.2320			4.2	4.0
Education of household head						
None	0.1949	0.1727	0.0153 0.0156	0.0330	11.6	7.9
Primary	0.1654	0.1833	(7.8) (7.8)	(14.4)	43.9	35.1
Lower secondary	0.1837	0.1789			26.4	36.3
Upper secondary	0.1983	0.2248			8.5	12.4
Technical / vocational	0.2054	0.2496			7.3	5.4
University	0.2034	0.2386			2.3	2.8
Sex of household head						
Male	0.1851	0.2116	0.0042	0.0057	77.5	78.4
Female	0.2240	0.2608	(2.1)	(2.5)	22.5	21.6

Source: Vietnam Living Standards Measurement Surveys 1992-93 and 1997-98

a. Percentages refer to people, not households.

b. This category includes unemployed heads and heads not in the labor force for reasons other than retirement.

Table 6. Inequality by sources of income in 1997-98 (Shorrocks decomposition)

Income source	Income share	Inequality share
Wage	0.23	0.25
Agriculture	0.42	0.17
Enterprise	0.12	0.43
Remittance	0.03	0.07
Other	0.19	0.08

Source: Vietnam Living Standards Measurement Survey 1997-98

Table 7. Results of regressions on total consumption per capita (n=4800 for 1992-93 and n=6000 for 1997-98)

	Coeff 93	Mean 93	Coeff 98	Mean 98	d(dreturn)	d(dmean)
Northern Uplands	0.0675	0.1563	-0.0336	0.1789	-0.0158	0.0015
Red River delta	0.1065*	0.2156	0.0610	0.1963	-0.0098	-0.0021
(North Central)						
Central Coast	0.2789***	0.1189	0.1227**	0.1074	-0.0186	-0.0032
Central Highlands	0.3796*	0.0318	0.1897*	0.0366	-0.0060	0.0018
South East	0.4934***	0.1260	0.5501***	0.1276	0.0071	0.0008
Mekong River Delta	0.4566***	0.2237	0.1887***	0.2151	-0.0599	-0.0039
Urban	0.2568	0.1991	0.3137***	0.2245	0.0113	0.0065
(Rural)						
HH head is male	-0.0264	0.7746	-0.0456*	0.7844	-0.0149	-0.0003
(HH head is female)						
HH head age	0.0099**	45.4518	0.0013	46.9444	-0.3897	0.0147
HH head age squared	0.0000	2255.9570	0.0000	2369.5510	0.1954	-0.0057
HH head White Collar	0.1868***	0.0474	0.2311***	0.0652	0.0021	0.0033
HH head Sales	0.1804***	0.0825	0.2001***	0.0906	0.0016	0.0015
(HH head agriculture)						
HH head production	0.0966***	0.1046	0.0760**	0.1271	-0.0021	0.0022
HH head not working	-0.0494	0.1087	0.0830***	0.1027	0.0144	0.0003
(Ethnicity=Kinh)						
Ethnicity=Chinese	0.2361***	0.0245	0.1252**	0.0201	-0.0027	-0.0010
Ethnicity=other non Kinh	-0.1825***	0.1308	-0.1453***	0.1468	0.0049	-0.0029
Religion=Buddhist	-0.0408	0.2741	0.0330	0.1794	0.0202	0.0039
(Religion= Non Buddhist)						
Head: formal education (yrs)	0.0303***	6.1104	0.0326***	6.5807	0.0139	0.0143
Head: vocational education (yrs)	0.0163***	0.1794	-0.0045	0.2282	-0.0037	0.0008
Spouse: formal education (yrs)	0.0166***	4.3874	0.0091***	4.5567	-0.0330	0.0028
Spouse: vocational education (yrs)	0.0339**	0.1094	0.0528***	0.1424	0.0021	0.0011
HH head ill in past 4 weeks	-0.0025**	0.3289	-0.0214	0.4851	-0.0062	-0.0004
(HH not ill in past 4 weeks)						
Log of household size	-0.4288	1.6954	-0.3207***	1.6316	0.1833	0.0274
Males 19-59	0.0667**	1.2168	0.0325**	1.2397	-0.0416	0.0015
Females 19-54	0.0610**	1.2841	0.0352**	1.2452	-0.0332	-0.0024
Males 60-plus	0.0494	0.1902	-0.0274	0.1948	-0.0146	0.0002
Females 55-plus	0.1036***	0.3171	0.0135	0.3479	-0.0285	0.0032
Total 15-18	0.0511**	0.5755	0.0187	0.5789	-0.0187	0.0002
Total 6-14	0.0102	1.4630	-0.0314*	1.2996	-0.0609	-0.0017
Total 3-5	-0.0282	0.4539	-0.0869***	0.3218	-0.0266	0.0037
Total 0-2	-0.0613**	0.4118	-0.1364***	0.2468	-0.0309	0.0101
Household head is married	-0.0085	0.8549	0.0640**	0.8640	0.0621	-0.0001
(HH head is not married)						
Debt-asset ratio	-0.0096***	0.5496	-0.0265***	0.4861	-0.0093	0.0006
constant	6.6630***	1.0000	7.1575***	1.0000	0.4946	0.0000
	$R^2 = 0.42$		$R^2 = 0.55$			

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1%level

Table 8. Results of panel regressions in rural areas (n=3457)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Northern Uplands	-0.06265**	-0.06169**	-0.07024***	-0.06543**	-0.06159**	-0.06424**
Red River delta	0.05185**	0.05395**	0.04636*	0.05255**	0.04921*	0.04251*
(North Central)						
Central Coast	-0.13177***	-0.13302***	-0.13184***	-0.13707***	-0.13254***	-0.13118***
Central Highlands	-0.05344	-0.08790	-0.04348	-0.05339	-0.05345	-0.03409
South East	0.05542	0.04347	0.06940*	0.05824	0.05484	0.06457*
Mekong River Delta	-0.18271***	-0.20645***	-0.17797***	-0.18112***	-0.18342***	-0.17886***
HH head is male	-0.03023	-0.03145	-0.03351	-0.03017	-0.03011	-0.04363*
(HH head is female)						
HH head age	0.00112	0.00104	0.00113	0.00099	0.00148	-0.00328
HH head age squared	0.00000	0.00000	0.00001	0.00000	0.00000	0.00002
HH head White Collar	0.01767	0.02032	0.01924	0.01687	0.03333	0.02188
HH head Sales	-0.08596**	-0.07876*	-0.0788**	-0.08876**	-0.07274*	-0.08723**
(HH head agriculture)						
HH head production	-0.04244	-0.03767	-0.03380	-0.04449	-0.02689	-0.04423
HH head not working	-0.03220	-0.03063	-0.02382	-0.02006	-0.02209	-0.02246
(Ethnicity=Kinh)						
Ethnicity=Chinese	-0.16447	-0.16990	-0.16297	-0.15999	-0.16167	-0.18541
Ethnicity=other non Kinh	-0.07216***	-0.07587**	-0.07195***	-0.07183***	-0.06785*	-0.06472**
Religion=Buddhist	0.07972***	0.07761***	0.07886***	0.07927***	0.07714***	0.07504***
(Religion= Non Buddhist)						
Head: formal education (yrs)	0.00632**	0.00611**	0.00631**	0.00598**	0.00570*	0.00524*
Head: vocational education (yrs)	-0.01750	-0.01628	-0.01623	-0.01736	-0.01749	-0.01769
Spouse: formal education (yrs)	-0.00507*	-0.00530**	-0.00480*	-0.00544**	-0.00568**	-0.00505*
Spouse: vocational education (yrs)	0.01727	0.01838	0.01738	0.01838	0.01888	0.01411
HH head ill in past 4 weeks	-0.02926*	-0.02833*	-0.02913*	-0.02866*	-0.02782*	-0.03312**
(HH head not ill in past 4 weeks)						
Log of household size	0.14259**	0.14276**	0.14502**	0.14174	0.14072**	0.24297
Males 19-59	-0.03239	-0.03340	-0.03295	-0.03317	-0.03246	-0.00962
Females 19-54	-0.00154	-0.00200	-0.00217	-0.00115	-0.00166	0.00708
Males 60-plus	-0.04258	-0.04303	-0.04277	-0.04428	-0.04077	-0.11850***
Females 55-plus	-0.01450	-0.01381	-0.01481	-0.01423	-0.01488	-0.08320***
Total 15-18	0.00749	0.00598	0.00577	0.00746	0.00942	0.00185

Total 6-14	0.01623	0.01637	0.01613	0.01588	0.01667	-0.04105***
Total 3-5	0.00218	0.00451	0.00182	0.00236	0.00074	-0.00533
Total 0-2	0.03607*	0.03608*	0.03504*	0.03656**	0.03732*	0.03024
Land irrigated per capita	-0.00005***	-0.00004***	-0.00005***	-0.00005***	-0.00005***	-0.00004***
Productivity of rice	-0.04777	-0.07340	-0.00224	-0.05026	-0.04554	-0.06197
Debt-asset ratio	0.00030	0.00043	0.00032	-0.01524***	0.00021	0.00062
Road	0.14844***	0.15062***	0.14891***	0.14466***	0.14692***	0.14356***
(No road)						
Most households with electricity	0.01895	0.01834	0.01719	0.01816	0.01653	0.01905
(Most households with no electr.)						
Lower secondary school	-0.06855***	-0.07265***	-0.07079***	-0.06847***	-0.06550***	-0.06162***
(No lower secondary school)						
Upper secondary school	0.01557	0.00811	0.00876	0.01661	0.01484	0.02025
(No upper secondary school)						
Post office	-0.02312	-0.02162	-0.02278	-0.02587	-0.02263	-0.02709
(No post office)						
Market	0.01215	0.01212	0.01168	0.01501	0.00957	0.00994
(No market)						
Change in land irrigated per capita		0.00003***				
Change in productivity of rice			0.20292***			
Change in debt-asset ratio				-0.01602***		
HH head moved out of agriculture					0.09957***	
(HH head stayed in agriculture)						
Change in dependency ratio						-0.44382***
constant	0.03041	0.04008	0.00832	0.05516	0.01735	0.05806
	$R^2 = 0.11$	$R^2 = 0.11$	$R^2 = 0.11$	$R^2 = 0.11$	$R^2 = 0.11$	$R^2 = 0.14$

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1%level

Table 9. Results of panel regressions in urban areas (n=775)

	Model 1	Model 2	Model 3
Northern Uplands	-0.03724	-0.04264	-0.04019
Red River delta	-0.20024***	-0.20526**	-0.21263***
(North Central)			
Central Coast	-0.16521	-0.16834	-0.17677***
Central Highlands	(dropped)	(dropped)	(dropped)
South East	-0.08422	-0.08919	-0.09451
Mekong River Delta	-0.22708***	-0.23282***	-0.24404***
HH head is male	-0.02841	-0.02884	-0.02469
(HH head is female)			
HH head age	-0.00180	-0.00239	-0.00375
HH head age squared	0.00002	0.00003	0.00002
HH head White Collar	0.06713	0.06688	0.06978
HH head Sales	-0.02071	-0.01994	-0.02477
(HH head agriculture)			
HH head production	-0.00119	-0.00114	-0.00950
HH head not working	0.01680	0.01716	0.02178
(Ethnicity=Kinh)			
Ethnicity=Chinese	-0.02747	-0.02823	-0.03650
Ethnicity=other non Kinh	-0.01309	-0.01235	-0.02142
Religion=Buddhist	-0.08248**	-0.08299**	-0.07644**
(Religion= Non Buddhist)			
Head: formal education (yrs)	0.01334***	0.01318***	0.01257**
Head: vocational education (yrs)	-0.03684**	-0.03674**	-0.03325**
Spouse: formal education (yrs)	-0.00105	-0.00094	-0.00188
Spouse: vocational education (yrs)	0.00461	0.00446	0.00814
HH head ill in past 4 weeks	0.01911	0.01930	0.02107
(HH not ill in past 4 weeks)			
Log of household size	0.04469	0.04274	0.08666
Males 19-59	-0.00039	-0.00112	0.00630
Females 19-54	0.04636	0.04708	0.05151
Males 60-plus	-0.04902	-0.05145	-0.08734
Females 55-plus	0.02377	0.02381	-0.00439
Total 15-18	-0.02152	-0.02078	-0.02749

Total 6-14	0.03643	0.03707	0.00706
Total 3-5	-0.01459	-0.01373	-0.01361
Total 0-2	0.08013*	0.08130**	0.06794*
Debt-asset ratio	0.00579	0.00252	0.00602
Change in debt-asset ratio		-0.00357	
Change in dependency ratio			-0.21190**
constant	0.31284	0.33251	0.34690
	$R^2 = 0.09$	$R^2 = 0.10$	$R^2 = 0.10$

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1%level

Table 10. Poverty transition matrix (percentages) (n=4281)

All Vietnam	**Poor 98**	**Non poor 98**
Poor 93	28.7	27.4
Non poor 93	4.8	39.1
Northern Uplands		
Poor 93	47.1	27.2
Non poor 93	4.5	21.1
Red River Delta		
Poor 93	25.1	34.8
Non poor 93	3.9	36.3
North Central		
Poor 93	38.1	33.7
Non poor 93	4.1	24.1
Central Coast		
Poor 93	25.2	22.8
Non poor 93	4.0	48.0
Central Highlands		
Poor 93	42.2	25.9
Non poor 93	2.6	29.3
South East		
Poor 93	8.0	24.0
Non poor 93	2.3	65.7
Mekong Delta		
Poor 93	23.6	18.9
Non poor 93	8.7	48.8

Table 11. Socioeconomic characteristics and movements in and out of poverty (n=4281)

	Poor93 & Poor98	Poor93 & Non Poor98	Non Poor93 & Poor98	Non Poor93 & Non Poor98
Region				
Northern Uplands	0.262	0.159	0.151	0.086
Red River Delta	0.210	0.305	0.195	0.223
North Central	0.189	0.177	0.122	0.088
Central Coast	0.102	0.097	0.096	0.143
Central Highlands	0.040	0.026	0.0146	0.0203
South East	0.031	0.097	0.054	0.186
Mekong River	0.166	0.139	0.366	0.252
Sex of household head				
Male	0.811	0.759	0.737	0.676
Age of household Head				
Years	42.5	44.9	46.4	48.1
Occupation of household head				
White Collar	0.009	0.032	0.034	0.094
Sales	0.022	0.049	0.049	0.148
Agriculture	0.810	0.728	0.727	0.467
Production	0.058	0.096	0.073	0.133
Other	0.102	0.095	0.117	0.158
Ethnicity				
Kinh	0.715	0.915	0.854	0.921
Chinese	0.003	0.003	0.005	0.042
Other	0.282	0.082	0.141	0.036
Religion				
Buddist	0.232	0.240	0.224	0.306
Other Household-Level Variables				
Head formal education (yrs)	5.2	6.1	5.0	6.7
Head vocational education (yrs)	0.10	0.14	0.09	0.27
HH head ill in past 4 weeks	0.317	0.318	0.351	0.352
Household size	5.4	5.1	4.5	4.5
Spouse formal education (yrs)	3.9	4.5	3.6	4.7
Spouse vocational education (yrs)	0.03	0.10	0.07	0.17
Land irrigated per capita*	288.1	379.9	547.5	545.8
Productivity of rice*	0.265	0.307	0.304	0.328
Debt/asset ratio	0.918	0.495	0.541	0.387
Community-Level Variables				
Road	0.849	0.913	0.750	0.846
Most households with electricity	0.377	0.519	0.372	0.492
Lower secondary school	0.870	0.897	0.862	0.872
Upper secondary school	0.089	0.116	0.064	0.111
Post office	0.317	0.333	0.356	0.356
Market	0.361	0.543	0.580	0.671

*Only for households in rural areas

Table 12. Results of multinomial logit estimation for rural areas (n=3457)

	Poor93 & Non Poor98 RRR	Non Poor93 & Poor98 RRR	Non Poor93 & Non Poor98 RRR
Northern Uplands	0.9543	1.8193*	1.1717
Red River delta	1.4438*	1.0914	1.2532
(North Central)			
Central Coast	1.2913	1.6596	4.2328***
Central Highlands	2.9474***	3.6458*	13.5846***
South East	5.7397***	8.5909***	29.0015***
Mekong River Delta	1.4909*	9.7343***	7.4400***
HH head is male	0.9429	0.8227	0.7705
(HH head is female)			
HH head age	1.0556*	1.0172	1.1376***
HH head age squared	0.9996	0.9999	0.9990***
HH head White Collar	4.8173***	4.5349**	9.0957***
HH head Sales	1.4443	0.4932	4.1917***
(HH head agriculture)			
HH head production	1.6229**	2.0998*	2.4497***
HH head not working	0.6774*	1.0173	1.0533
(Ethnicity=Kinh)			
Ethnicity=Chinese	-	-	18.6047**
Ethnicity=other non Kinh	0.3680***	0.9554	0.3861***
Religion=Buddhist	1.2095	0.5559**	1.0703
(Religion= Non Buddhist)			
Head: formal education (yrs)	1.1136***	1.1080***	1.2213***
Head: vocational education (yrs)	0.8565	0.7648	0.8822
Spouse: formal education (yrs)	1.0162	1.0542	1.0672***
Spouse: vocational education (yrs)	1.5505***	1.8852***	1.8078***
HH head ill in past 4 weeks	0.9469	0.9828	1.0277
(HH not ill in past 4 weeks)			
Log of household size	0.8923	0.2805**	0.7460
Males 19-59	1.0194	1.5738**	1.0223
Females 19-54	1.1697	1.2711	1.0563
Males 60-plus	0.9283	1.2377	0.7742
Females 55-plus	1.2528	1.4114	1.3665*
Total 15-18	1.1334	1.1818	0.9785
Total 6-14	0.9214	0.6692**	0.6839***
Total 3-5	0.6826***	0.4878***	0.3799***
Total 0-2	0.6913***	0.4284***	0.3536***
Land irrigated per capita	1.0002*	1.0005***	1.0006***
Productivity of rice	1.1696***	1.2591***	1.3665***
Debt-asset ratio	0.9753	0.9668	0.9715
Road	1.6748**	0.5922	0.7916
(No road)			
Most households with electricity	0.7773**	0.8925	0.8533
(Most households with no electr.)			
Lower secondary school	0.7847	0.8472	0.7839
(No lower secondary school)			
Upper secondary school	1.1606	1.0589	1.3011
(No upper secondary school)			
Post office	0.6249***	0.4954***	0.4446***
(No post office)			
Market	1.5976***	2.0868***	2.1977***
(No market)			
	Pseudo $R^2 = 0.20$		

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1%level

Table 13. Results of multinomial logit estimation for urban areas (n=775)

	Poor93 & Non Poor98 RRR	Non Poor93 & Poor98 RRR	Non Poor93 & Non Poor98 RRR
Northern Uplands	3.0742	-	3.6014
Red River delta	15.3762**	-	104.2765***
(North Central)			
Central Coast	1.7535	-	17.0063***
South East	6.0697**	-	103.1158***
Mekong River Delta	1.0769	-	17.0029***
HH head is male	0.6249	1.6049	0.3994*
(HH head is female)			
HH head age	1.1104	1.1702	1.1600
HH head age squared	0.9996	0.9985	0.9993
HH head White Collar	-	-	-
HH head Sales	1.8814	1.4987	3.2913*
(HH head agriculture)			
HH head production	0.8369	0.4984	0.8594
HH head not working	0.6397	0.3815	0.5185
(Ethnicity=Kinh)			
Ethnicity=Chinese	2.4265	6.7237	15.0233**
Ethnicity=other non Kinh	4.9955	3.0817	3.3475
Religion=Buddhist	0.9230	0.9187	0.7592
(Religion= Non Buddhist)			
Head: formal education (yrs)	1.2335**	0.8889	1.4368***
Head: vocational education	0.4852**	0.6466	0.6724
Spouse: formal education (yrs)	1.0608	1.1297	1.1789***
Spouse: vocational education	-	-	-
HH head ill in past 4 weeks	1.0926	1.4246	0.9870
(HH not ill in past 4 weeks)			
Log of household size	0.3608	0.5243	0.0912
Males 19-59	1.0038	0.3884	1.3283
Females 19-54	1.6933	0.9298	2.7953***
Males 60-plus	0.4239	1.1643	0.7376
Females 55-plus	0.8871	1.1631	1.9548
Total 15-18	0.7792	1.1401	0.6955
Total 6-14	0.9218	0.4710	0.8752
Total 3-5	0.4194**	1.4964	0.2381***
Total 0-2	0.7390	0.5265	0.4391*
Debt-asset ratio	0.9096	0.7248	0.8704*
	Pseudo $R^2 = 0.30$		

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1%level

APPENDIX A. Changes in inequality in Vietnam: Theil L

Region or group	Theil L		Between-group inequality		Population share %[a]	
	1993	1998	1993	1998	1993	1998
All Vietnam	0.1770	0.2013			100.0	100.0
Urban/Rural						
Urban	0.1865	0.1941	0.0375	0.0647	19.9	22.4
Rural	0.1278	0.1199	(21.1)	(32.1)	80.1	77.6
Region						
Northern Uplands	0.0981	0.1202	0.0260	0.0458	15.6	17.9
Red River Delta	0.1538	0.1669	(14.7)	(22.7)	21.6	19.6
North-Central Coast	0.0953	0.1352			12.8	13.8
Central Coast	0.1893	0.1862			11.9	10.7
Central Highlands	0.1735	0.1672			3.2	3.7
Southeast	0.2103	0.1956			12.6	12.7
Mekong Delta	0.1599	0.1464			22.4	21.4
Ethnic group						
Vietnamese (Kinh)	0.1637	0.1876	0.0213	0.0263	84.5	83.3
Tay	0.0651	0.0683	(12.0)	(13.1)	2.0	1.8
Thai	0.0894	0.0631			1.0	1.1
Chinese	0.1696	0.2019			2.4	2.0
Khome	0.1142	0.0907			2.0	2.0
Moung	0.0612	0.0704			2.0	2.4
Nung	0.0390	0.0429			1.6	1.7
H'mong	0.0678	0.0750			0.7	1.0
Dao	0.0718	0.0190			0.3	0.3
Other	0.1777	0.1703			3.5	4.5
Occupation of household head						
White collar	0.1784	0.2300	0.0309	0.0516	4.6	6.5
Sales/service	0.1889	0.1951	(17.4)	(25.6)	8.1	9.0
Farming	0.1229	0.1171			64.7	60.9
Production	0.1638	0.1790			10.9	12.6
Other	0.2667	0.1773			1.0	0.6
Retired	0.1956	0.2168			6.5	6.4
Other not working[b]	0.2188	0.2083			4.2	4.0
Education of household head						
None	0.1931	0.1675	0.0134 0.0122	0.0287	11.9	7.9
Primary	0.1513	0.1619	(6.9) (6.9)	(14.3)	37.5	35.1
Lower secondary	0.1575	0.1582			33.5	36.3
Upper secondary	0.1796	0.2103			12.3	12.4
Technical / vocational	0.1831	0.2115			2.5	5.4
University	0.1958	0.2282			2.2	2.8
Sex of household head						
Male	0.1631	0.1856	0.0039	0.0055	77.5	78.4
Female	0.2073	0.2325	(2.2)	(2.7)	22.5	21.6

Source: Vietnam Living Standards Measurement Surveys 1992-93 and 1997-98

a. Percentages refer to people, not households.

b. This category includes unemployed heads and heads not in the labor force for reasons other than retirement.

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