Living Standards During an Economic Boom
The Case of Vietnam

Between 1993 and 1998 Vietnam's GDP rose by 8.9% annually, the fourth fastest rate in the world. The increase in average incomes leaves some important questions unanswered:

First, whose living standards rose the most?

Second, what explains why some people are substantially better off than others?

And third, what are the effects particularly on such social indicators as school enrolments, child malnutrition, and health care of the spectacular increase in GDP?

This book answers these questions, drawing on data from the respected Vietnam Living Standards Surveys of 1992-93 and 1997-98.

The book documents the drop in poverty that occurred between 1993 and 1998, overall and for children. It goes on to explain why poverty fell, and looks at the role played by changes in the structure of the economy and by improved levels of education. Individual chapters examine the effects of rapid economic growth on child malnutrition, educational enrolment rates, employment, health, and fertility. Two chapters address the determinants of income and of income mobility. The book also includes interesting studies of household credit and of the incidence of taxation.

The book is written in an accessible and straightforward style, while being academically rigorous and using state-of-the-art analytical techniques. The 15 chapters represent the collective efforts of 55 authors.

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Living Standards During an Economic Boom: The Case of Vietnam

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Preface

This is a book about Vietnam. It is special in that it is largely written and researched by Vietnamese authors, and so gives a Vietnamese perspective.

It originated in the summer of 1999, when a two-month training workshop was held in Hanoi, sponsored by the United Nations Development Programme and SIDA under project VIE/95/043. Fifty participants learned how to use and analyze the data from the Vietnam Living Standards Surveys of 1992-93 (VLSS93) and 1997-98 (VLSS98). Twenty of the participants came from the Social and Environmental Statistics department of the General Statistical Office – the unit chiefly responsible for collecting the VLSS data – while most of the other participants came from line ministries, universities, and other departments of the General Statistical Office.

The projects that emerged from the workshop were presented to the public at an open workshop held in Hanoi in November 1999. The excellent PowerPoint presentations made at that workshop formed the basis of the chapters in this book. Jonathan and Dominique Haughton spent August 2000 in Hanoi working with the authors to create drafts of the chapters. These were subsequently revised and polished by the editors and authors, and then translated for the Vietnamese version of this book.

Putting together a book with fifty-five authors is a major undertaking, although the good working relationships between the GSO and line ministries have made the job easier. We have been greatly helped along the way, not only by the authors themselves, but also by many others.

Nguyễn Vân Tiến, deputy director of the General Statistical Office, formally opened the original workshop and both facilitated and supported the work, as did Hô Si Cúc, then head of the Social and Environmental Statistics department. They both kindly read the manuscript, as did their colleagues Đảo Ngọc Lân and Tống Thị Đua.

The UNDP not only funded the original workshop and provided financial assistance for the book, but provided intellectual support too. Ernst van Koesveld read the near-final drafts of all the chapters, and provided pages of very helpful comments. Other enthusiastic supporters at UNDP were Edouard Wattez, Dagmar Schumacher, Phạm Thanh Hằng, Marion Ginolin and Eliane Darbellay. Thanks are also due to Dặng Hữu Cự who designed the book cover.

Last but not least, we were delighted to be able to rely on the support of Nisha Agrawal and Bob Baulch of the World Bank, and to draw on the cheerful expertise of Sarah Bales.

To all who have helped, a very sincere "Thank You."

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Chapter 1

Introduction: Extraordinary Changes

Jonathan Haughton

INTRODUCTION

Between 1993 and 1998 Vietnam's GDP rose by 8.9% annually, the fourth fastest rate in the world.[1] This was accompanied by a substantial improvement in average incomes, but the economy-wide statistic leaves some important questions unanswered. First, whose living standards rose the most? Second, what explains why some people are substantially better off than others? And third, what are the effects – particularly on such social indicators as school enrolments, child malnutrition, and health care – of the spectacular increase in GDP?

We are in an unusually strong position to answer these questions thanks to data from Living Standards Measurement Surveys undertaken in 1993 (VLSS93) and again in 1998 (VLSS98). The results presented in this book draw heavily on the analysis of these household surveys, which is why the next section discusses the quality of the data in some detail. Only if the data are trustworthy will the results based on them be convincing.

In their different ways, the chapters in this book all address the key issues of the scope and effects of rapid economic growth. The purpose of this introductory chapter is to summarize the most interesting findings of the individual chapters, and to draw out some of the most significant themes. We do not however try to explain the underlying causes of the rapid economic growth that Vietnam experienced in the 1990s, a task that has been undertaken elsewhere (e.g. Dollar 2001).

There is one very clear pattern. During the five-year period from 1993 to 1998 Vietnam saw a extraordinary change not only in GDP, but also in almost all aspects of social and economic life. This was not just a period of growth, but also one of economic development in the widest sense of the

[1] The comparative numbers come from the World Bank (1999b) and refer to 1992-97. The fastest growing economies were Equatorial Guinea (23.8%), China (11%) and Lesotho (9.3%).

term. The ongoing transformation of Vietnamese society has continued since 1998, although the changes are less evident, in part because the pace of economic growth has been more modest. It is also clear that the reforms that were ushered in after 1986 under the rubric of *Đổi Mới* ("renovation") – openness to trade, a welcome mat for foreign investment, macroeconomic stability, a strong role for private business, de facto private ownership of land – will not now be reversed, and have had long-term effects that were at least as revolutionary as any other episode in the country's history.

THE VLSS DATA[2]

Sampling

The first Vietnam Living Standards Survey (VLSS93) was undertaken between October 1992 and October 1993. The survey used a multistage cluster sampling procedure to pick 4,800 households. The 1989 census showed that four fifths of the population was rural and so VLSS93 took 80% of its sample households from rural areas. To pick the rural households, all of the approximately 10,000 communes in the country were listed from north to south, along with their populations from the 1989 census. Then 120 communes were chosen, moving from north to south with a fixed population interval, but having chosen the first of the communes randomly.

Within each commune, two hamlets were chosen randomly, again in proportion to population. Sixteen households were surveyed randomly in each of the chosen hamlets, using the lists of households that are maintained by the local authorities. The sampling was done separately for urban areas, using the precinct as the primary sampling unit, following a similar procedure. Further details are given in the appendix in Dollar, Glewwe and Litvack (1998), Vietnam: SPC/GSO (1994) and Vietnam: GSO (2000).

The important point is that the sampling was done carefully and correctly, which helps explain why the VLSS93 data set has been so widely used for serious analysis (although it also helps that the data set is fairly easy to obtain). The data can be used without further weighting. That said, it is probable that the survey undersamples urban "squatters". This is because the final level of surveying chose households drawn from official lists, and these tended to exclude households deemed to be illegal.

The Questionnaires

The household questionnaire for VLSS93 runs to 100 pages. It was administered in the course of two visits, and collected information about all the individuals in the household. The questionnaire was based on the format

[2] This section is adapted from Haughton (2000).

used by the World Bank in other Living Standards Measurement Surveys (see Grosh and Glewwe 1995), but was adapted to Vietnamese conditions and needs, and pre-tested locally. A separate community questionnaire, administered only in rural areas, collected basic data on such items as the availability of electricity and the distance to the nearest school. The surveys were undertaken the State Planning Committee and the General Statistical Office, with technical assistance from the World Bank and significant financial support form the United Nations Development Program (UNDP) and the Swedish International Development Agency (SIDA).

The VLSS93 has spawned a good deal of scholarly research, including a detailed statistical abstract (Vietnam: SPC/GSO 1994), two edited volumes (Dollar, Glewwe and Litvack 1998, Haughton et al. 1999a) and several refereed articles, but its impact on policy within Vietnam has been limited (Blank and Grosh 1999).

In December 1997, interviewing began on a second Living Standards Survey (VLSS98), and the data collection was completed by November 1998. In many respects VLSS98 is very similar to VLSS93. Most of the questions are the same, but there are some refinements and additions, expanding the questionnaire to 115 pages. Technical advice and funding again came from the World Bank, UNDP and SIDA. The surveying itself was entirely done by the General Statistical Office. An abstract has been made public (Vietnam: GSO 2000), and the raw data are available for a fee from the GSO.

There is a significant difference in the sampling procedures used in the two VLSS surveys. The 1998 survey obtained usable responses from 5,999 households. Two principles underlay the sampling. First, as many households as possible that had already been sampled in 1993 were to be sampled again;[3] 4,305 households came from this source. Second, the sample in each of ten strata – large cities, small cities, towns, and rural areas in each of the seven old regions – was to be large enough to allow for analysis to be done at the strata level. This called for oversampling in areas such as the sparsely populated Central Highlands and undersampling in the large and dense Red River Delta region.[4] Where VLSS93 households had moved elsewhere in the commune they were still interviewed, but if they could not be found locally they were replaced by other households in the

[3] Actually three clusters, totaling 96 households, were dropped from the Red River Delta, to allow for more households to be surveyed in other regions.

[4] The relative sampling proportions for the ten strata are as follows:

Hanoi and Ho Chi Minh City	2	Rural North Central Coast	1
Medium size towns	2	Rural Central Coast	1.5
Small towns	1.5	Rural Central Highlands	3
Rural Northern Uplands	1	Rural Southeast	2
Rural Red River Delta	1	Rural Mekong Delta	1.

original hamlets. All the other additional households were chosen using the same sampling frame as the Multi-Purpose Household Survey, which also uses a multistage cluster procedure.

The details of the sampling may seem arcane, but they have some very important implications:

(i) All the results based on VLSS98 data need to be based on weighted estimates. Thus each observation from the Central Highlands has a low weight (because of oversampling) and each observation from the Red River Delta is accorded a high weight. In principle this fully accounts for the way the sampling was done; Bales (1999b) provides details.

(ii) The urban experience is understated. The weights used in analyzing VLSS98 data are based for the most part on population numbers drawn from the 1989 census, which showed a fifth of the population living in urban areas. The recently-announced preliminary results from the 1999 census (undertaken on April 1) show that the urban population now represents almost 24% of the total population (Central Census Steering Committee 1999). This too is probably understated, as urban squatters were again not counted thoroughly.

(iii) Newly-formed households are undersampled in the VLSS98. Households that existed in 1993 had been in existence for at least five years by the time they were resampled in 1998. Only the remaining 1,694 households (or 28% of the total of 5,999) could have been formed between 1993 and 1998. This undersampling reduces the usefulness of the VLSS98 for analyzing migration, and perhaps fertility.

In sum, both surveys were well designed and executed, and the sampling properties are known. They constitute the most trustworthy survey data on Vietnamese households. And they are unique in Vietnam in having a longitudinal (panel) dimension, surveying 4,305 households twice over an interval of five years. The data are thus highly representative of Vietnamese households, subject of course to the caveats outlined above.

POVERTY

The government is keen to see poverty reduced; its Ten Year Socio-Economic Strategy 2001-2010 aims to eradicate hunger and rapidly reduce the number of poor households. This is also a central concern of donors especially the Poverty Working Group – a coalition of government, NGOs, and donor institutions – which published an important report in 1999 entitled *Attacking Poverty* (World Bank/PWG 1999).

Kinh et al. (chapter 2) emphasize the negative effects of poverty – low quality housing; a lack of modern conveniences such as electricity, running water and latrines; few durable goods (except for bicycles); and a stunted intellectual and cultural life.

So there was widespread praise for government policy when the VLSS data showed that the incidence of poverty fell rapidly between 1993 and 1998.

The measurement of absolute poverty is highly arbitrary, but as long as a consistent definition is used, it is possible to track changes over time. Two definitions are widely used in Vietnam, both of them originating in the World Bank, although a variety of other measures have also been used (e.g. Anh 1997).

The *food poverty line* measures the expenditure level that would be required to ensure that a family can buy enough food to provide each member with 2,100 Calories per day. The patterns of food consumption, and the prices paid for the food, are taken to be those of households in the middle quintile of the expenditure distribution in 1993, because this group came close to consuming 2,100 Calories. Using this measure, 25% of individuals were in poverty in 1993, and 15% in 1998. The problem with this measure is that it does not make any allowance for non-food items, even though these too may represent very basic needs.

The *total poverty line* measures the cost of buying enough food to provide 2,100 Calories and also makes a provision for non-food items. The difficulty here is determining the appropriate size of the non-food component. A simple approach was followed, which essentially measured the non-food consumption of households in the middle expenditure quintile in 1993 and added it to the cost of buying enough food to provide 2,100 Calories per person per day. Further details are provided by Bales, Tung and Cuc (chapter 3). The same poverty line, adjusted for inflation, was used in both years, and shows poverty falling dramatically, from 55% in 1993 to 37% by 1998.

The reduction in poverty rates was substantial in all regions of the country, in both urban and rural areas, as the figures in Table 1.1 make clear. There is an important exception to this generalization, which is that ethnic minorities (excluding the Chinese) saw a much smaller reduction in the total poverty rate – from 86% to 75% – than the rest of the population, where it fell from 54% to 31% (World Bank/ADB/UNDP 1999a). The economic boom stretched far and wide, but barely reached the remoter areas where the ethnic minorities are disproportionately concentrated. Even if rapid economic growth continues, concerted government effort will still be needed to help lift these groups out of poverty (Baulch et al. 2001).

The Northern Uplands now stand out as the poorest part of the country, in contrast to the situation in 1993, when the North Central Coast was just as poor.

Table 1.1
Poverty rates by region and over time

	Food poverty line		Total poverty line	
	1993	1998	1993	1998
All Vietnam	**25**	**15**	**55**	**37**
Northern Uplands	34	29	74	59
Red River Delta	24	7	60	29
North Central Coast	32	19	72	48
Central Coast	19	17	46	35
Central Highlands	30	32	67	52
Southeast	9	2	30	8
Mekong Delta	15	11	42	37
Urban areas	7	2	23	9
Rural areas	27	18	63	45
Children			64	45
Ethnic minorities			86	75

Sources: VLSS93 and VLSS98.

Cross-country comparisons of poverty rates are notoriously difficult, but an attempt is made in Table 1.2. The numbers show the proportion of the population living on less than $1 per capita per day (in purchasing power parity terms, and in 1985 US dollars). They suggest that the poverty rate in Vietnam compares favorably with that of India, but lags behind (more affluent) China and Indonesia. There is another lesson from these numbers: the easy gains in poverty reduction are probably over, and Vietnam will have difficulty reducing its poverty rate substantially in the decade ahead, even if economic growth continues at its current relatively robust rate of between 6% and 7% annually.

Table 1.2.
Cross-country Comparison of Poverty and Inequality

	% of pop. living on <$1/day	Gini coefficient of inequality		
		Expenditure /capita	Income /capita	Year
Vietnam 1993	45	.33		
Vietnam 1998	**27**	**.35**		
China	22		.42	1995
India	47	.30		1994
Indonesia	8		.37	1996
Nigeria	31	.45		1992/3
Philippines	27	.43		1994

Note: Income is typically distributed more unequally than expenditure, which leads to higher Gini coefficients.
Source: World Bank 1999c. VLSS for Vietnam.

INEQUALITY

Many observers were surprised that poverty fell so much between 1993 and 1998, believing that most of the economic gains during these five years accrued to the affluent few. There was a concern that growing inequality would threaten social cohesion, as those left behind by the economic boom would feel increasingly marginalized and alienated.

Although there are indications that inequality rose between 1993 and 1998, the evidence is somewhat weak. The Gini coefficient, a commonly-used measure of inequality that varies from 0 (perfect equality) to 1 (perfect inequality), rose from 0.330 to 0.354 (Vietnam: GSO 2000, p.248). By the standards of other less-developed countries, this represents a low-to moderate degree of inequality (see Table 1.2). The transition economies of Eastern Europe and the Former Soviet Union, and even China, saw larger increases in inequality in the 1990s.

Deichmann et al. (chapter 14) point out that the increase in the Gini coefficient for Vietnam was not statistically significant, but few will be convinced. Table 1.3 presents a breakdown of expenditure per capita by quintile, using measures of expenditure that are comparable between 1993 and 1998 and are shown in the prices of January 1998. Over this five-year period the real expenditure per capita by the poorest 20% of the population rose by 29%, while that of the richest quintile increased by 54%. This meant that the proportion of spending done by the poorest group fell from 8.8% to 8.0% of total spending, while that done by the top fifth rose from 40.4% to 43.7%.

Table 1.3
Expenditure per capita by quintile, 1993 and 1998

	Lowest	Low-mid	Mid	Mid-upper	Upper	Overall
	Expenditure per capita, January 1998 prices					
1993	854	1,233	1,582	2,098	3,911	1,936
1998	1,099	1,632	2,125	2,929	6,032	2,764
% change	+29%	+32%	+34%	+40%	+54%	+43%
	Expenditure as % of overall expenditure					
1993	8.8	12.7	16.3	21.7	40.4	100.0
1998	8.0	11.8	15.4	21.2	43.7	100.0

Source: Vietnam: GSO 2000.

Curiously enough, measured expenditure inequality *within* rural Vietnam actually diminished between 1993 and 1998, with the Gini coefficient falling from 0.278 to 0.275; the increase within the urban areas was very modest, as it rose from 0.340 to 0.348. It follows that the main source of any rise in inequality appears to be an increase in the gap in expenditure levels between urban and rural areas. This emerges clearly

from Table 1.4; overall expenditure per capita rose by 43% between 1993 and 1998, but the increase was 60% in urban areas and just 30% in rural areas.

Table 1.4
Expenditure per capita by urban and rural area, 1993 and 1998

	Urban	Rural	Overall
1993	3,013	1,669	1,936
1998	4,829	2,166	2,764
% change	+60%	+30%	+43%

Source: Vietnam: GSO 2000.

It is worth noting that the apparent stability of the income distribution masks the true level of income mobility, a point emphasized by Haughton et al. (chapter 7). A tenth of households jumped at least two quintiles between 1993 and 1998 – the "shooting stars" – and on average their real per capita expenditures rose by 173%. At the other end were the "sinking stones," who fell at least two quintiles and saw their spending shrink by 34% on average over the same period. The shooting stars were disproportionately found in the Red River Delta region (around Hanoi) and the Central Highlands (where coffee cultivation took off in the 1990s); shooting starts were also more likely to be urban, or at least to live in places that were not remote. There were a relatively high number of sinking stones in the Mekong Delta.

Glewwe and Phong (2001) correctly point out that measurement error may lead one to overstate the extent of true mobility, but this only moderates rather than negates the basic conclusion, which is that many households move into and out of poverty from year to year: family members come and go, remittances may or may not arrive, farm prices may rise or fall. Thus the image of the poor household as being stuck in poverty is, at best, a caricature. There is an important practical implication of this churning, which is that it is difficult to target poor households, given that today's pauper may be comfortably off tomorrow.

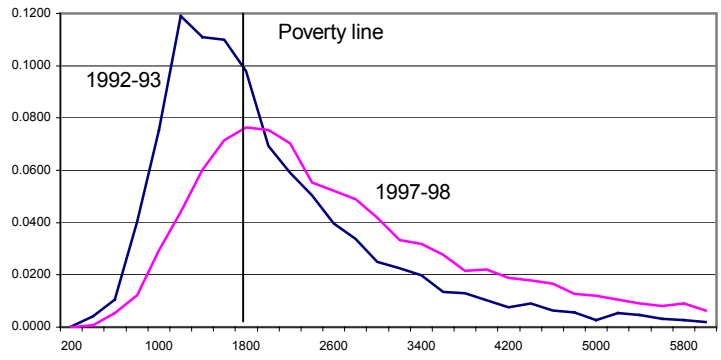
EXPLAINING THE FALL IN POVERTY

What explains the rapidity of the fall in poverty? Figure 1.1 helps tell the story. In 1993 a large proportion of the population found itself just below the poverty line. If their incomes (and expenditures) were to rise even a little, they would find themselves just above the poverty line. This is exactly what happened. It also means that the reduction in poverty is fragile. Any shock that reduces incomes even slightly could push a lot of households back below the poverty line, a point emphasized in the Poverty Working Group report on poverty in Vietnam (World Bank/PWG 1999a).

Bales, Tung and Cuc (chapter 3) show that over 90% of the reduction in poverty occurred because earnings rose in all sectors, rather than because people moved out of low-wage sectors such as agriculture into high-wage sectors such as services. The remaining 10% largely reflects the move out

of agriculture, which accounted for 66% of principal jobs in 1993 and 62% in 1998.

Figure 1.1. ***Distribution of expenditure per capita***



The movement from agricultural to wage employment appears to occur in stages. There is considerable occupational multiplicity, with fully 37% of workers holding more than one job (see chapter 8). It appears that typically farmers first pick up some part-time wage work, or move into self-employment. Only once these subsidiary activities prove profitable do they eventually break the link with agriculture.

Employment

We are still left with the question of why earnings rose across the board. Part of the explanation may be found in the increase in employment and decrease in underemployment. Loan et al. (chapter 8) report that the proportion of adults (15-60 for men, 15-55 for women) in the labor force rose from 85.7% in 1993 to 86.4% in 1998. All of the increase was attributable to a rise in female participation, and was concentrated in rural areas, as Table 1.5 shows. By world standards these are high rates, comparable only to China (88%) and much above the levels seen in India (61%), Indonesia (61%) or the world

Table 1.5
Adult labor force participation rates, 1993 and 1998

	1993	1998
Overall	**85.7**	**86.4**
Men	87.6	86.8
Women	84.0	86.0
Urban	78.9	76.3
Rural	87.7	89.5

Source: Chapter 8, based on VLSS93 and VLSS98.

average (70%) (Haughton 2000).

There was also a reduction in the number of people working less than 2,000 hours per year, from 60% in 1993 to 50% by 1998. Employed adults worked on "economic activities" for an average of 1,955 hours annually in 1998, up from 1,758 in 1993; this has all come at the expense of "house work," which fell from 722 to 541 hours annually over the same period (Loan et al., chapter 8).

Thus the economic boom has raised labor demand to the point where there is little unused labor capacity ("surplus labor"). This is good news for Vietnamese households, because it means that future increases in labor demand will mainly lead to higher wages. On the other hand there is little scope for further increases in labor force participation, so that future increases in incomes will have to depend on higher wage rates and earnings rather than more hours of toil – growth at the intensive rather than extensive margin.

Unemployment

At 1.6%, the open unemployment rate observed in Vietnam in 1998 is very low by the standards of the world's developed countries, and low when compared to most less-developed countries, although it was not far from the levels observed in China (3% in 1997) and Indonesia (4% in 1996). as the numbers in Table 1.6 make clear.

Table 1.6
Unemployment rates

	1993	1998
Vietnam overall	**3.4**	**1.6**
Rural areas	2.5	0.8
Urban areas	6.9	4.5
Men	3.5	1.9
Women	3.4	1.3

Source: Loan et al. (chapter 8); GSO (2000).

Within Vietnam there is a marked gap between the rate in rural areas (0.8%) and urban locations (4.5%), despite the fact that employment has grown faster in the cities and wages are higher there. These rates are about half of those seen in 1993, as Table 1.6 shows. Unemployment is measured using a similar methodology to that used in OECD countries; to be counted as unemployed, an individual must not have worked, and must have been "actively" seeking work, in the week prior to the survey.

How are these results to be interpreted? One can make a strong case that unemployment is a luxury that the poor cannot afford. Families that are dirt poor are obliged to find some activity, however menial or unremunerative, in order to survive. Once living standards rise a little, households can support members for some time while they search for a job more suited to their skills and aspirations. Looked at in this way, the urban-rural gap in unemployment rates is easy enough to explain.

Yet this cannot be the full explanation, because both urban and rural unemployment rates fell sharply between 1993 and 1998, while incomes for most households rose during the same period. If poor households have no choice but to find work then one would have expected the unemployment rate to be higher in 1998 than in the earlier, poorer, period. In this case the likely explanation is that the economic boom of the mid-1990s created a strong demand for labor, so that employment became much easier to find.

Agricultural Terms of Trade

An important part of the explanation for the reduction in poverty was that agricultural prices – both paid by consumers and received by producers – rose relative to non-farm prices; in other words the "agricultural terms of trade" rose. Between 1993 and 1998 the price of rice rose by 62%, while the price of non-food items increased by just 23%. The price of other food items rose even faster than the price of rice, so that food prices increased by 68% overall.

The implications are profound. Most poor households are rural, and net sellers of agricultural goods. For them the improvement in the terms of trade was of great benefit, given that their output did not fall. This helps explain why the benefits of rapid economic growth spread so widely, and why the poverty rate fell so fast. The movement in relative prices also moderated the real income gains in the urban areas, and also hurt landless rural households, a problem that is particularly important, and growing, in the Mekong Delta.

Explaining the improvement in the relative price of food is not easy. Between 1993 and 1998 the consumer price index rose by 51%; meanwhile the dong depreciated by 25% against the dollar (EIU, various issues). Given dollar inflation over the same period, the net effect was a real appreciation of the dong by about 6%. If anything, this would have served to lower, rather than raise, the relative price of export goods such as rice.

There are four plausible explanations for the rise in the agricultural terms of trade. First, the world price of rice rose, in dollar terms, from $262 per tonne (5% brokens fob Bangkok) in January 1993 to $294 by January 1998. Second, Vietnam's rice exports became more efficient, with improvements in delivery performance and quality. Thus the price of 5% brokens fob Ho Chi Minh City rose from $212 per tonne in January 1993 to $278 in January 1998, substantially narrowing the price gap between Vietnamese and Thai rice. Third, agricultural exporting was liberalized, which helped move domestic prices for goods such as rice closer to the world price. Finally, in the wake of the Asian financial crisis (which may be dated from the devaluation of the Thai baht in July 1997), the world dollar price of simple manufactured goods such as garments and footwear fell, keeping the prices of non-food goods in Vietnam from rising too fast.

EXPLAINING DIFFERENCES IN INCOME

Why are some households poor while others are rich? This is the fundamental question raised by Kinh and Baulch et al. in chapter 6.

They focus their attention on earnings per capita (Y/N), which they decompose into earnings per hour of work (Y/H), average working hours per worker (H/L) and the proportion of household members who are working (L/N). This gives

$$\frac{Y}{N} \equiv \frac{Y}{H} \times \frac{H}{L} \times \frac{L}{N}$$

A similar decomposition, including unearned income as well, is used by Haughton et al. in chapter 7.

From the decomposition it follows that a household will only be well off if its working members receive high wages or work long hours, or if the household has a high proportion of working members (and hence a low proportion of dependents, old and young). Some of the most interesting decompositions are reproduced in Table 1.7.

Table 1.7
Indexes of Earned Income Per Capita and Selected Characteristics, 1998

	Annual Earnings per Capita	Earned Income/hour	Working hours	Proportion of Working Persons
	As percentage of national average			
Vietnam overall	**100**	**100**	**100**	**100**
Rural areas	82	88	96	103
Urban areas	161	151	116	90
Southeast region	185	181	110	90
Female headed household	110	106	102	100
Ethnic minority[1]	62	61	101	105
One-adult household	76	80	79	103
Car can reach commune	41	48	103	103
Car cannot reach commune	101	101	100	100
National average	2,338*	2.25*	1,893†	0.576‡

Source: Based on various tables from chapter 6.
Notes: [1] Excludes Kinh and Chinese. * thousands of dong. † Hours per worker per year. ‡ Proportion of household that consists of working members.

From Table 1.7 we see that earnings per capita are almost twice as high in urban as rural areas. The overwhelming reason is that average earnings per hour ("wages") are much higher in urban than rural areas, but it is also worth noting that urban workers spend more time working in a year than do their rural counterparts. Why are urban wages so high? Part of the explanation is that urban workers are, on average, better educated than those

in rural areas. Also, job creation is particularly rapid in urban areas, and so wages there need to be high enough to draw labor in from the countryside.

The Southeast region, which includes Ho Chi Minh City, is far and away the most affluent part of the country. The decomposition results in Table 1.7 show that the main reason is that wages there are 81% higher than in the country as a whole.

One unexpected finding is that earnings per capita are higher for female-headed households. In such households, not only do working members put in long hours, but they receive above average wages too.

The decomposition results also help us to understand why some groups are so poor. Ethnic minority households work as hard as anyone else, but their earned incomes are almost 40% below the national average, which fully explains why they are so poor. Single-adult households are poor both because of lower wages and shorter working hours. Remoteness has a dramatic effect; in communes that cannot be reached by car, wages are less than half the national average, clear evidence of the need to ensure that all parts of the country are easily accessible if the benefits of economic growth are to spread to everyone.

EFFECTS OF POVERTY

Poverty has important social effects, which are especially evident among children. Children from poor households are less likely to be enrolled at school (chapter 9) and more likely to malnourished (chapter 4). People living in poor households are more likely to be sick and, when ill, to get lower-quality health care.

School Enrollments

The evidence that poverty affects access to schooling is strong. Between 1993 and 1998, as living standards rose, school enrollment rates increased markedly at all levels, (see Table 1.8). Even with this increase, Vietnam's enrollment rates are not very high by the standards of its most important regional competitors, particularly China, Thailand and the Philippines.

Table 1.8. ***Net School Enrolment rates, 1993 and 1998.***

	Primary age 6-10	Lower-sec. age 11-14	Upper-sec. age 15-17	University age 18-24
1993	78.0	36.0	11.4	1.8
1998	92.6	61.6	28.8	9.3
1998, male	93.5	61.1	30.3	10.0
1998, female	91.7	62.2	27.4	8.5

Notes: Net enrolment rate (level x) = Number of pupils of level x age that are attending level x ÷ total population of level x age

Sources: *Vietnam: SPC/GSO, 1994; Vietnam: GSO, 2000. From chapter 9.*

In any given year, children from poor households are less likely to attend school. This effect appears clearly in Table 1.9: 18% of those aged 12-20 who come from households in the top expenditure quintile are no longer at school or college, while the proportion is 43% for those from the bottom quintile.

Table 1.9
Secondary school attendance for children 12-20 by expenditure quintile, 1998

	Expenditure quintile					
	Poor	Poor-mid	Mid	Mid-Upr	Upper	Overall
Dropped out of school	43.3	36.1	32.7	29.5	18.2	30.4

Note: *Design-based F(3.72, 676.49) = 22.7; p-value = 0.000. From chapter 9.*

As Son et al. point out in chapter 9, income is not the only determinant of school enrollment rates. Children with well-educated parents are more likely to stay in school, and so are boys. As Table 1.8 shows, the gender bias is small at lower levels of education, but becomes more marked for older children. Children in the Mekong Delta region are less likely to go to school, holding other factors constant.

In a study using data from VLSS93, Chuyen, Dung and Viet (1999) found that higher school fees were associated with a *higher* probability of attending school. They speculated that this surprising result was due to a quality effect: higher fees improved the quality of the schooling so much that parents were more inclined to send their children to such schools. Son et al. (chapter 9), using data from VLSS98, find that higher school fees are now associated with a *lower* probability of going to school.

This presents a challenge to public policy, because if high school fees are a deterrent to schooling, and poor households have difficulty affording education, then more attention will be needed to providing subsidies to poor households to ensure that their children do not suffer from inadequate access to education.

Child Nutrition

It is no surprise that child malnutrition rates fell between 1993 and 1998. The proportion of children aged 0 to 5 who were stunted (i.e. had a height for their age at least two standard deviations below the median for the US NCHS sample) fell from 53% in 1993 to 34% by 1998 – a remarkable drop, even if the current malnutrition rate still falls short of the government's target of 30% by 2000 (now revised to 20% by 2010). The drop was much more dramatic than many expected. For instance Ponce, Gertler and Glewwe (1998), noting that the stunting rate had fallen from 56% in 1987-89 to 53% by 1993, expected it to drop to about 48% by 1998.

The stunting rates for children aged 13 and under are similar, as Table 1.12 shows. Malnutrition is more prevalent in rural than urban areas, but has fallen equally quickly everywhere. Despite the rapid fall in long-run malnutrition, the comparative data in Table 1.15 show that the malnutrition rate in Vietnam is not yet lower than one would expect based on the experience of relevant comparator countries.

Table 1.10
Percentage of children aged 13 and below who are stunted

	1993	1998
Vietnam overall	**54.6**	**41.7**
Urban areas	37.3	22.9
Rural areas	57.8	45.2
Girls		39.1
Boys		43.9
Rural boys		47.9

Note: A child is stunted if his or her height for age z-score is at least 2 standard deviations below the median.
Sources: SPC/GSO 1994; GSO 2000.

Remarkably, 34% of those who were stunted in 1993 were no longer so in 1998, based on information for those children for whom data are available in both years; on the other hand 21% of those children who were in the normal range at the start of the period had become stunted by the end. This suggests that efforts to combat and prevent malnutrition should not only focus on newborns, but also on helping currently stunted children to catch up, as well as ensuring that adequately fed children do not fall behind. There is still a clear need to address the weaning problem, because malnutrition rates jump very sharply when a child's age rises from about 15 to 30 months.

The underlying causes of malnutrition do not appear to have changed much, if one compares the models estimated by Haughton and Haughton (1997) with those of Koch and Linh (chapter 4). It is puzzling that a household's intake of Calories per capita does not appear to have an appreciable effect on malnutrition, suggesting that more attention needs to be paid to the type of foods eaten, particularly at weaning, as well as to the determinants of the intrahousehold distribution of food. The World Bank/ADB/UNDP (2000, p.68) notes that even among the most disadvantaged households, some are able to keep their children healthy and well-nourished; the implication is that education about nutritional best practice would be useful.

Affluence also matters; 54% of children in the lowest quintile of the expenditure distribution were stunted, compared to 19% of children in the top quintile. There is no statistically significant gender bias in malnutrition rates, although rural boys may be emerging as the single group most at risk.

Health Access

According to the VLSS98, 42% of all those surveyed reported being sick at some point during the four weeks prior to being surveyed. Lan et al.

(chapter 10) note that the incidence of sickness is strongly related to age, being high for the very young and for the old.

Poverty plays a significant role. Among households in the poorest expenditure per capita quintile, 43% fell ill, compared to 39% for those in the top quintile (see Table 1.13). Given that a person was sick, there was a 79% probability of getting treatment – 83% for those in the top quintile, 70% for those in the poorest quintile. The quality of treatment also differs, with the poor being more reliant on community health centers, while better-off households made greater use of private clinics and government hospitals. There is a strong, income-related, demand for good medical care. Gertler and Litvack (1998, p.246), using data from VLSS93, find relatively high income elasticities of demand for medical care in public hospitals, private providers, and private pharmacies, particularly for treating children; in contrast, for public clinics, the estimated elasticities were not statistically significant at the 1% level

When someone is sick, poor and rich households devote about the same proportion of total expenditure – about 5% – to health care. But this means that spending is seven times higher for top-quintile households than for bottom-quintile households.

Table 1.11
Sickness and treatment, by expenditure per capita quintile, 1998

	Expenditure per capita quintile					**Total**
	Poor	Poor-mid	Mid	Mid-upper	Upper	
Fall sick?	43.0	41.6	42.5	41.6	39.3	**41.6**
If sick, visit facility?	70.3	80.1	82.2	81.4	83.0	**79.3**
Memo:						
Visit govt. hospital	3.7	5.4	7.4	9.3	12.6	**7.6**
Visit pharmacy	52.6	62.0	63.9	60.0	61.4	**60.0**
Visit private clinic	8.4	8.1	10.9	11.3	14.5	**10.6**
If sick, spending on health care, '000 d.	55.5	89.0	129.0	178.8	368.9	**175.7**
Spending as % all exp	4.5	5.0	5.6	5.7	5.5	**5.3**

Sources: GSO 2000; chapter 10.

GETTING OUT OF POVERTY

The main emphasis of this book is on describing and explaining the evolution of living standards, and related social indicators, between 1993 and 1998. This means less attention has been paid to the fundamental problem of how to maintain, and even accelerate, the reduction in poverty. However four of the chapters are particularly relevant in this context: Duy et al. (chapter 11) look at the evolution of fertility, and find that it has reached

the replacement level; Toan et al. (chapter 12) consider the role of household credit; Quyen et al. (chapter 5) attempt to quantify the role of education in boosting incomes; and Bao et al. (chapter 13) try to measure the distributional effects of the Vietnamese tax system.

Fertility

The total fertility rate (TFR) measures the number of children that a woman would have, hypothetically, during her lifetime if current age-specific fertility rates were to persist. The TFR peaked in 1970 at 6, fell to 3.2 by 1993 (Haughton 1997) and to just 2.2 by 1998; Table 1.14 summarizes the details.

These numbers show that the total fertility rate has fallen at an unusually rapid rate, by 0.18 per year since 1980. Writing in 1992, Feeney and Xenos found comparably rapid declines only in Taiwan, Singapore and Hong Kong (in the 1970s), and a more rapid fall in China (0.24 per year in the 1970s). The decline in Vietnam was however achieved with a less draconian family planning program than in China (Goodkind 1995, Nhiem 1999). More recent numbers show that fertility decline has accelerated worldwide, making Vietnam's case somewhat less exceptional. Between 1980 and 1997, the total fertility rate fell by at least 0.1 per year in 28 countries; in Algeria, Bangladesh and Kenya it fell as quickly as in Vietnam, and in Iran and Syria it dropped even faster (World Bank 1999c).

Table 1.12
Evolution of the total fertility rate (TFR) since 1979

	TFR	Source
1979	5.6	Census of 1979
1992-93	3.2	VLSS93
1996-97	2.3	DHS of 1997
1997-98	2.2	VLSS98
1999	2.0	Census*

Source: Duy et al., chapter 11.

Vietnam's total fertility rate (TFR) is now one of the lowest in the developing world - higher only than Thailand and China. Some comparative numbers are shown in Table 1.15.

Duy et al., in chapter 11, analyze the immediate causes of the drop in fertility, and finds that it is due in about equal measure to later and fewer marriages, and to an increase in contraceptive use. The proportion of married women who say they are using modern contraceptive methods, particularly IUDs, is very high, having risen from 43.9% in 1993 to 55.1% by 1998. Contraceptive use rates also vary less across regions than they did in 1993; the Mekong Delta in particular has largely closed the contraceptive use gap with the rest of the country. Of the sixty less-developed countries for which the World Bank (1999c) provides data, only China (85%) and Brazil (77%) reported higher overall contraceptive use rates. Some comparative numbers are shown in Table 1.15.

What fundamental forces are behind the drop in fertility? The standard economic "explanation" is that households are moving from a desire for a large *quantity* of children to a preference for *quality* (Behrman and Deolalikar 1988), but this begs the question of why such a shift is underway. Possibly the mixture of rising and high educational costs – in 1998 households spent an average of 547,000 dong ($39) for every child at school – along with reduced labor contributions from children (who are more likely to be at school) and changed expectations about how to finance old age, may be combining to make having children less attractive. Increasing urbanization, high and rising levels of maternal education, and a vigorous family planning program also play a part, although the statistical evidence in chapter 11 suggests that the role they play is relatively modest. Certainly fertility rates are low in all rich countries; the puzzle is why the TFR should now be so low in a country as poor as Vietnam, where per capita annual income is $1,690 (in purchasing power terms in 1998, according to the World Bank (1999c)).

Table 1.13
Comparative data on fertility and nutrition, late 1990s.

	Total Fertility Rate	Contraceptive use rate (all methods)	% of children ≤5 years who are stunted[1]	GNP/capita, PPP, 1998
Vietnam, 1993	2.6	65[3]	53	1,200[2]
Vietnam, 1998	**1.8**	**77**	**34**	**1,690**
China	1.8	85	16	3,220
India	3.1	41	52	1,700
Indonesia	2.5	57	34	2,790
Nigeria	5.1	6	39	820
Philippines	3.6	48	30	3,540
E.Asia & Pacific[4]	2.1		20	3,400
Sources:	UNICEF; VLSS	World Bank (1999c); VLSS	World Bank (1999c); VLSS	World Bank (1999c)

Notes: Data for late 1990s, unless otherwise indicated.
[1] Weight for age at least 2 standard deviations below median for NCHS sample. Vietnam figure for 1993 refers to height for age.
[2] Author's estimate.
[3] The use rates for "modern" contraceptives were 44% in 1993 and 55% in 1998.
[4] Low-income countries only.

It is noteworthy that the fall in fertility has occurred despite the fact that son preference remains strong. A preference for having at least one son is by no means universal, although it has been observed in China, South Korea and much of South Asia. Rahman and DaVanzo (1993, p.329) assert that son preference, inasmuch as it leads families to have more children than would otherwise have been the case, is "a significant barrier to further fertility decline" in many countries. On the other hand, at least for the case

of Sri Lanka, De Silva (1993, p.329) concludes that "son preference has proved to be no substantial obstacle to achieving significant fertility decline."

Haughton and Haughton (1995) applied a number of tests to the VLSS93 data and found clear evidence of son preference. This showed up in the contraceptive use rates: women with a son were more likely to use contraceptives. It also appeared in hazard models, which found that the time interval between one child and the next was shorter for families that did not yet have a son. A similar set of models is estimated in chapter 11, but this time using the data from the 1998 VLSS. The estimates show that son preference is at least as strong as it was in 1993; for instance, if a benchmark 55% of married women aged 15-49 were using contraceptives in 1998, then the figure was 63% for women who already had a son. Without son preference the fertility rate would probably be as much as 10% lower than it currently is.

It is easier for a country with a slow-growing population to achieve higher growth in per capita GDP, because less of the country's investment needs to be devoted to equipping the new members of society. This implies that the low fertility rate in Vietnam is likely to be helpful as the country seeks to maintain its recent record of rapid increases in living standards.

Credit

About 51% of households owed money at the time they were surveyed, with borrowing more common among rural than urban families (Table 1.16). And 14% of households lent money to others. About half of the money borrowed came from formal sector institutions, mainly state-owned banks (38% of all borrowing); the other half originated in the informal sector, mainly from relatives and other individuals.

Table 1.14
Proportion of households borrowing and lending.

	1993	1998
Borrowing		
Vietnam overall	45.0	50.2
Urban areas	38.0	36.5
Rural areas	46.7	54.2
Lending		
Vietnam overall	16.5	13.9
Urban areas	15.5	9.2
Rural areas	16.7	15.2

Sources: Vietnam: GSO (2000), Vietnam: SPC/GSO (1994), Bich et al. (1999).

The most puzzling finding is that 46% of households that lend money also borrow money (Tam et al., chapter 12). Why is this? One possibility is that these "borrowing lenders" in fact borrow during some months of the year and lend at other times, but if this were true we would expect the interest rates to be similar on money borrowed and money lent. This is not in fact the case; the

borrowing lenders pay an average interest rate of 1.3% per month on dong that they borrow, and charge twice as much (2.6%) on money that they lend out. This suggests that borrowing lenders should be thought of as financial intermed-iaries, seeking to turn a profit out of providing a service. They may have more and better information about the people to whom they lend money than the formal banks do, and so can do a better job of evaluating the credit risk. That about 6% of all households are embryonic financial intermediaries testifies to the weakness of the formal banking sector in Vietnam, and to the strength of entrepreneurial urges at the individual level.

Taxation

The government of Vietnam, local, provincial and central, collects the equivalent of about 17% of GDP in the form of taxes, fees and grants. How equitably is this burden shared? An answer to this question would be useful because it opens the possibility of raising the (after-tax) incomes of the poor by changes in the structure of taxation. A similar case can be made for looking at the distributional effects of government social subsidies; a recent study by van de Walle (2001) finds that these do little to redistribute resources to the poor.

Bao, Haughton and Quan (chapter 13) attempt to estimate the effective incidence of taxation, using data from the 1998 VLSS. Information is available from the community questionnaires on the agricultural taxes, fees and contributions paid by households; the household questionnaire has information on taxes paid by non-farm household enterprises; and by combining household survey information on spending patterns with official data on tax rates it is possible to infer how much tax is paid on goods that the household purchases. The results, which are somewhat tentative, are summarized in Table 1.17. They show that the taxes whose incidence one can trace constitute 8.5% of spending; the proportions range from 7.8% for households in the lowest quintile to 9.5% for those in the top quintile, suggesting a modest degree of progressivity. Agricultural taxes and fees fall disproportionately on the poor; business taxes mainly hit better-off households and indirect taxes (the turnover tax that operated in 1998 plus excise taxes and import tariffs) fall in the same proportion on all groups. An interesting exception is the tax on gasoline, which is highly progressive.

There is a simple corollary. A reduction in agricultural taxes and fees, with the revenue recouped through higher taxes on motor fuels, would reduce some of the burden on poorer households.

Table 1.15
Summary of Taxes by Expenditure per capita Quintile, 1998

	Low	Low-mid	Mid-dle	Mid-upr	Upper	**All**
	(in '000 dong unless otherwise noted)					
Expenditure/household	6,608	8,844	10,379	13,255	25,587	**13,596**
Estimated indirect tax/h'hold	273	390	400	549	1,027	**554**
Agric. Taxes & fees/h'hold	232	337	346	302	135	**254**
Business taxes/household	13	42	46	146	1,270	**352**
So: All taxes & fees/h'hold	**518**	**769**	**792**	**997**	**2,432**	**1,160**
All Taxes as % of expenditure	7.8	8.7	7.6	7.5	9.5	**8.5**
Memo: Expenditure/capita	1,185	1,730	2,240	3,068	6,449	**3,120**

Source: From chapter 13.

The importance of such an effect should not be exaggerated, however; even if all agricultural taxes, fees and contributions were abolished, the after-tax income of households in the poorest quintile would only rise by a little over 3% – equivalent to six months worth of economic growth.

CONCLUSIONS

The economic boom of 1993-1998 had powerful effects. The poverty rate fell rapidly between 1993 and 1998; the growing economy raised wage rates, sucked people into the labor force, and reduced unemployment and underemployment. Fortuitously, the terms of trade moved in favor of agriculture, helping food producers at the expense of food consumers.

Not only the economy, but also Vietnamese society, changed during the boom years. Fertility continued to fall and is now low, and contraceptive use is high; open unemployment is low and labor participation rates very high; educational enrolment rates rose sharply and malnutrition became much less common. Perhaps we should not be surprised by these transformations, because they are very similar to those seen in China a decade earlier, and before that by Thailand, Indonesia and Malaysia. In many respects, Vietnam is typical of the countries in the region.

Despite the period of rapid economic growth, Vietnam is still poor. Within the country there is a moderate amount of inequality by world standards, but this means that more than a third of the population was still living in poverty (using the World Bank's "food plus" poverty line) in 1998.

In this chapter, as in much of this book, we have emphasized the ways in which poverty hurts, – less access to education, to food and to good health care; poor quality housing; a lack of conveniences such as running water; and insufficient time and means to participate fully in the intellectual and cultural life of the country.

Continued economic growth will raise wage rates, but there is little further scope for increased labor force participation. Over the past couple of years agricultural prices have fallen; while they are likely to recover,

Vietnam cannot again expect a major structural shift in prices such as that experienced between 1993 and 1998. As a result, further reductions in the poverty rate will be increasingly difficult to achieve. In this respect, there is a risk that Vietnamese experience will mirror that of China, where economic reforms and rapid growth led to a rapid fall in poverty in the 1980s, followed by a period when poverty hardly fell any further.

Hence the challenge: what needs to be done to ensure that Vietnam's continued economic growth will translate into continued rapid reductions in poverty? This is in part an intellectual challenge, because there are no simple or easy solutions. But it helps to begin with a sound analysis, to which we hope this book contributes usefully.

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Chapter 2

Inequality

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INTRODUCTION

The gap between rich and poor is a matter of growing concern in Vietnam, and has attracted the attention of researchers and policy makers (e.g. Poverty Working Group 1999).

In this chapter we first document the size and evolution of the gap between rich and poor in Vietnam, make the case that it represents a social and human problem, and then seek to explain the underlying causes of the gap. Our main conclusion is that the growing gap between rich and poor is mainly explained by the differential growth rates in real expenditure per capita between regions, and between urban and rural areas.

We base our analysis on the data gathered by the Vietnam Living Standards Surveys of 1992-93 and 1997-98, the most reliable and complete sources of information on the issue.

HOW BIG IS THE RICH-POOR GAP?

There are two popular, and straightforward, ways to measure economic inequality. The first is to compare the share of all expenditure that is undertaken by the poorest fifth of the population with the share undertaken by the most affluent fifth. In 1993 the rich accounted for 40.4% of spending, compared to 8.8% for the poor, a ratio of 4.6:1. By 1998 this ratio had widened to 5.5, with 43.7% of spending coming from the rich and 8.0% from the poor. By this measure, inequality increased in Vietnam between 1993 and 1998, but only slightly. For an analysis of inequality based on the 1992-93 VLSS, see Dollar, Glewwe and Litvack, chapter 1.

The other popular measure of inequality is the Gini coefficient, which ranges from 0 (perfect equality) to 1 (perfect inequality). Applied to expenditure per capita and on an individual (rather than household) basis, the Gini coefficient stood at 0.35 in 1998.

To put this number in context, it is helpful to compare it with the Gini coefficients of other countries, as is done in Table 2.1. These show that inequality in Vietnam is less than in Thailand, but similar to that found in Peru, Bangladesh, India and Indonesia. It is perhaps surprising that Vietnam, with its strong commitment to social equality, has such a significant degree of inequality.

Table 2.1
Gini Coefficients for Expenditure per Capita for Selected Countries

	Year	Gini
Bangladesh	1995/96	0.34
India	1996	0.33
Indonesia	1996	0.37
Pakistan	1996/97	0.31
Peru	1997	0.35
Thailand	1998	0.41
Vietnam	**1998**	**0.35**

Source: Poverty Working Group, 1999, p.70.

Based on comparisons such as these, the Poverty Working Group – a Government/Donor/ NGO group – was able to write, in a recent report, that "Vietnam remains a moderately equal society: its levels of inequality are comparable to those in some South Asian countries but are lower than those in some other East Asian countries . . . For most developing countries, Gini coefficients for expenditures or incomes range between 0.3 and 0.6" (Poverty Working Group 1999, p.155).

It is almost universally true that inequality in incomes is greater than inequality in expenditures. This is true in Vietnam too, where the ratio of the incomes of the rich to those of the poor was 6.98 in 1998 (see VLSS, 2000, table 7.1.2a page 305) compared to 5.3 for expenditures. Again it is useful to provide an international perspective, which allows one to compare the Vietnamese experience with a greater number of other countries. The results, displayed in Table 2.2, show that income inequality in Vietnam is probably relatively low by the standards of other developing countries, although the data in Table 2.2 refer to expenditure for Vietnam.

The inequality within Vietnam pales into insignificance when compared with inequality worldwide. The UNDP (1999) estimates that the poorest 20% of the world's population account for just 1% of its GDP, while the richest fifth account for 86% of the total. Put another way, the richest fifth of the world's population spends 16 times as much as the world's poorest fifth, and earns 74 times as much (UNDP 1999, p.24).

Changes in Inequality

Between 1993 and 1998 the Gini coefficient for per capita expenditures rose from 0.33 to 0.35, showing a small increase in inequality. In order to see

whether this increase might be statistically significant, we bootstrapped the difference in Gini coefficients between 1998 and 1993, and found that a 95% confidence interval (-.0017, .0401) just about includes a zero difference. Our bootstrap procedure takes into account the sampling design of the surveys, and the fact that the two samples – from 1993 and 1998 – are not independent. Thus the difference in Gini coefficients is not statistically significant. The statistical abstract for the 1998 survey (Vietnam: GSO 2000) correctly points out that the increase in Gini coefficients is "negligible" (p. 265).

To put this increase into perspective, note that the Gini coefficient for per capita income rose in China from .29 in 1981 to .39 by 1995 (Yao). There was also a substantial increase in income inequality in the transition countries of Eastern Europe and the Former Soviet Union, with the average Gini coefficient rising from .24 in 1993/95 to .33 by 1997/98 (Milanovic 1998). Milanovic also reports that the most spectacular increase in inequality occurred in Russia, where it rose from .24 in 1988 to 0.48 by 1993. Only in Poland was there little increase in inequality (Kolodko 1999).

Table 2.2
Income Distribution for Selected Countries, c.1995

	% of income going to:		
	poorest 20% of hholds/pop	richest 20% of hholds/pop	Gini coefficient
Developing countries	*5-6*	*>50*	
Uruguay (hholds)	5.0	48.7	0.43
Costa Rica (hholds)	4.3	50.6	0.46
Peru (hholds)	4.4	51.3	0.46
Ecuador (hholds)	2.3	59.6	0.67
Brazil (hholds)	2.5	63.4	0.59
Paraguay (hholds)	2.3	62.3	0.59
Egypt (pop)	5.8	48.0	0.40
Tanzania (pop)	5.8	50.4	0.42
Indonesia (pop)	6.6	49.4	0.43
Vietnam:			
1993 (expenditure)	**8.8**	**40.4**	
1998 (expenditure)	**8.0**	**43.6**	**0.35**
World, 1997 (GDP)	**1.0**	**86.0**	-

Sources: UNDP (2000) for countries from Uruguay to Paraguay and for the world, VLSS for Vietnam, National Economics University (1997) for countries from Egypt to Indonesia.

THE RICH-POOR GAP

One might argue that inequality per se is not a problem, provided that living standards are rising across the board. Certainly the evidence shows that the real level of spending rose for all quintiles, as Table 2.3 makes clear. Thus the average annual level of expenditure per capita for those in the lowest quintile rose from 853,632 dong ($60.97) in 1993 to 1,098,900 ($78.49) by 1998, all expressed in the prices of January 1998. This represents an increase of 29%, which is substantial, although lower than the 54% increase in the per capita spending of the rich.

If no one is worse off and at least someone is better off, is not society better off, even if inequality may have increased? For at least a century, this Pareto criterion has been the bedrock of welfare economics, and it is a principle that commands a lot of support (for a recent example, see Feldstein 1999).

There are however two reasons why one should be concerned with inequality. First, when economic growth is accompanied by rising inequality, poverty will fall more slowly. In China, for instance, in recent years poverty has fallen more slowly than income has grown, due to rising income inequality (Yao 2000). In this context the *Vietnam Development Report 2001* argues that if Vietnam grows by 7% annually for the next decade, the number of poor people will fall by about 20 million if economic growth is equally rapid in the (rich) cities and (poor) countryside. On the other hand, the number of poor will fall by only 12 million if growth is concentrated in the urban areas – in effect, if growth mainly helps better-off households and so is associated with a further rise in inequality.

Table 2.3
Per Capita Expenditure, 1993 and 1998

	Expenditure per capita p.a. in January 1998 prices, '000 dong		
	1993	1998	% rise
All people	**1,936**	**2,764**	**43**
Poor	854	1,099	29
Rich	3,911	6,032	54
Ratio, rich/poor	4.7	5.5	
Gini coefficient	0.33	0.35	

Sources: VLSS93 and VLSS98.

The second reason for being concerned with rising inequality is that could weaken social cohesion. The poor would feel that they are being left behind and have less of a stake in society, and are more likely to feel alienated. Together, these two arguments suggest that, where possible, one should aim at "pro-poor" growth.

Characteristics of the rich-poor gap

Inequality will more easily lead to dissatisfaction if the contrast in living standards between the poor and the affluent is visible. What are the main characteristics of this gap? In what follows we focus on three issues: housing, modern conveniences, and cultural life.

Poor people are badly housed. This is clear from Table 2.4, which shows that while 37% of rich people lived in permanent structures, only 4% of the poor were so fortunate. A remarkable 44% of the poor lived in "temporary" houses, compared to 9% of the rich.

Poor people lack modern conveniences. The evidence for this is presented in Table 2.5, which shows that almost no poor people had a refrigerator, motorbike or telephone. This stands in sharp contrast with the rich, 55% of whom had a motorbike, 35% a fridge, and 27% a phone. As a

general rule, the poor possess lower-valued items like bicycles and radio/ cassette players, but not expensive items such as color TVs.

Table 2.4
Quality of housing for rich and poor, 1998

	% of group		% within each area			
	Poor	Rich	Poor (1)	Middle (2,3,4)	Rich (5)	Total 1→5
City house with garden	0.0	0.4	0.0		100.0	100
Multi-storied house or apt. in multi-storied bldg. with private bathroom, kitchen, toilet	0.4	22.0	1.2		71.5	100
Permanent one-story house or apt. with private bathroom, kitchen, toilet	3.6	15.0	8.3		34.6	100
Semi-permanent house	52.6	53.6	17.8		18.1	100
Temporary house	43.5	9.0	33.5		7.0	100
All Vietnam	**100.0**	**100.0**	**20.0**	**60.0**	**20.0**	**100**

Source: Based on VLSS98.

Poor people cannot easily participate in intellectual and cultural life, largely because they lack the wherewithal to pay. Table 2.6 shows that just 1% of the poor spent money on books, newspapers or magazines in 1998, compared with 46% of the rich; for entertainment such as a visit to the cinema or a sports game, or a video rental, the figures are 5% for the poor and 24% for the rich.

Table 2.5
Percentage of Households Owning Different Durable Assets, 1998

	Poor (1)	Middle (2,3,4)	Rich (5)
Color TV	6.5	-	76.4
Black and white TV	15.0	-	9.4
Radio/Cassette Player	26.9	-	57.6
Refrigerator, freezer	0.1	-	35.3
Motorbike	1.0	-	55.4
Bicycle	61.9	-	76.7
Telephone	0.0	-	26.8

Source: VLSS98.

One might add that even rich households do not spent a lot on cultural needs. However three expenditures – hair cuts/styling, funerals and weddings, and buying gifts – are undertaken with almost equal probabilities by poor and rich households. The poor mainly buy a haircut, while the rich spend both on hair cuts (for men) and styling (for women).

The other remaining common expenditures show that traditional practices remain important for the people. Although 46% of the rich spend on buying books and newspapers, this is little higher than the proportion who spend on weddings and funerals. This shows that popular belief in these practices is almost as important as book and newspaper reading. For poor households, spending on weddings and funerals is over thirty times more common than spending on reading materials – a strong indicator of the influence of spiritual beliefs or social pressure over the desire for knowledge.

THE DETERMINANTS OF INEQUALITY AND POVERTY

To summarize the argument so far, we have established that inequality in Vietnam is moderate, although not especially low, by world standards. It rose slightly between 1993 and 1998, although incomes rose enough to reduce poverty rates too. Poor people have far less access to the good and fine things of life than do the rich. Now we need to ask what influences leave some people poor and others rich.

Household Characteristics

The most basic information on the correlates of inequality is set out in Table 2.7, and refers to 1998.

Female-headed households are more likely to be in the rich group than are male-headed households. A similar finding emerged from the 1993 VLSS survey (see Haughton et al. 1999, chapter 9). The result is difficult to interpret; female-headed households may indeed be better-off, or perhaps female heads more accurately recall how much was spent during the previous year than men, biasing the measure of expenditure upward for female-headed households. However this gender effect tends to disappear once other variables are taken into account as we will see below.

Table 2.6
Cultural Activity of Households, 1998

	Poor (1)	Rich (5)
Books, newspapers, magazines	1.0	45.5
Pictures, photos, houseplants	5.6	18.1
Entertainment (cinema, video, sports)	4.5	24.3
Toys	3.8	17.1
Jewellery, watch, makeup	5.5	32.3
Haircut, hairdressing	63.5	92.2
Cosmetic surgery, body building	0.2	1.2
Excursion, holidays	0.8	18.5
Funeral and worship on special occasions of members of the household	35.6	37.2
Gifts, donations (including wedding, old age and funeral)	88.0	98.3
Hiring domestic services	0.1	2.2

Source: VLSS98.

Almost two-thirds of ethnic Chinese (who account for 2% of the total population) were rich. On the other hand almost half of the people belonging to other ethnic minorities, who constitute 14% of the population, were poor.

Rich households are much better educated than poor, with family members (over five years old) having 8.2 years of schooling on average, compared to 4.4 years for poor households. Among households where the head had acquired a university or college education, three quarters were rich and less than one percent were poor.

Table 2.7
Description of poor and rich households, 1998

	Expenditure per capita quintile			
	Poor (1)	Mid (2,3,4)	Rich (5)	Total
Gender of household head				
Male	18.2		19.8	100
Female	12.4		31.9	100
Ethnicity of household head				
Kinh	15.5		22.0	100
Chinese	4.1		65.1	100
Other	48.6		1.7	100
Education of hh head				
Never went to school	30.6		11.6	100
Less than primary diploma	19.2		16.5	100
Primary diploma	18.6		20.2	100
Secondary diploma	15.3		19.1	100
Upr. secondary diploma	8.9		40.2	100
Technical worker	8.0		32.9	100
Professional secondary	5.8		42.8	100
University, college	0.6		75.2	100
Individuals overall	**20.0**	**60.0**	**20.0**	**100**
Average:				
Age of household head	43.6	48.1	50.2	
# workers in household[1]	2.7	2.7	2.6	
# illiterate workers in hh	0.83	0.30	0.10	
# unemployed in hh[2]	0.027	0.034	0.047	
Household size	5.6		4.1	
# children in hh[3]	2.5		0.9	
Yrs education, those >5[4]	4.4		8.2	
Occupation of household	*100.0*		*100.0*	
Farm[5]	83.3		23.2	
Non-farm	16.7		76.8	

Notes: [1] Workers are defined as family members aged 15-60 for men, and 15-55 for women. [2] Unemployment is defined using standard ILO definition, and includes working age household members who are not currently working but are actively seeking it. [3] Anyone aged below 15 is counted as a child. [4] Source: GSO (2000), p.53. [5] Farm households are those where a majority of time spent working was on farming activities (see Vietnam: GSO (2000), p.13).
Source: VLSS98.

Five out of every six poor people belong to farming families. This is in sharp contrast with rich people, where less than one in four is in a farming household.

Rich and poor households have, on average, the same number of working-age members. However poor families tend to be larger, with each worker supporting more children and old people.

Qualitative research conducted by Liljestrom et al. (1998) identifies the availability of work for both husband and wife as a positive factor for household prosperity, and poor health of a family member as a negative one. Ethnic effects come to light: the Kinh are better off.

Geographic factors

There is a clear geographic pattern in the distribution of rich and poor households, as the figures in Table 2.8 make clear. Almost all (96%) of poor people are rural, and nearly a third (32%) live in the rural parts of the Northern Uplands alone. There are also large concentrations of the poor in the rural parts of the Red River Delta, North Central Coast, and Mekong Delta.

At the other end of the distribution, close to two thirds (63%) of all rich people live in urban areas. A third of the rich live in Hanoi and Ho Chi Minh City alone. There is another way of expressing this gap: four fifths of all those living in the two big cities are rich, while less than 10% of the rural population is rich.

Table 2.8
Geographic breakdown of population by rich and poor, 1998

	% of group		% within each area			
	Poor	**Rich**	*Poor (1)*	*Middle groups (2,3,4)*	*Rich (5)*	*Total 1→5*
Urban:	**3.9**	**63.1**				
Hanoi & Ho Chi Minh City	0.1	32.2	0.3	-	80.8	100
Other cities	0.7	14.0	2.7	-	53.5	100
Other urban population	3.1	17.0	6.7	-	36.6	100
Rural:	**96.1**	**36.9**				
Northern Uplands	31.7	3.5	40.0	-	4.5	100
Red River Delta	11.9	6.1	16.3	-	8.4	100
North Central Coast	18.7	4.1	29.6	-	6.5	100
Central Coast	9.8	3.2	26.4	-	8.6	100
Central Highlands	6.6	1.3	35.6	-	6.9	100
Southeast	1.3	11.4	4.2	-	38.0	100
Mekong Delta	16.3	7.4	18.6	-	8.5	100
All Vietnam	**100.0**	**100.0**	**20.0**	**60.0**	**20.0**	**100**

Source: Based on VLSS98.

Despite these considerable differences, it is worth emphasizing that per capita expenditure levels rose in every region between 1993 and 1998, as Table 2.9 makes clear. What is relevant to our analysis is that the growth rate was uneven, with rapid advances in the urban areas and those rural areas close to the big cities (Red River Delta, Southeast), but modest elsewhere, especially in the Mekong Delta where spending levels virtually stagnated.

It is interesting to note that inequality within rural areas did not change between 1993 and 1998, with the Gini coefficient staying at 0.28; likewise inequality within urban areas hardly rose at all. The overall (non-significant) increase in Gini coefficients (.33 to .35) can be explained by a possible widening of the gap in living standards between the countryside and the cities.

Table 2.9
Geography and Per Capita Expenditure, 1993-1998

	Expenditure per capita p.a. in January 1998 prices, '000 dong		
	1993	1998	% rise
All households	**1,936**	**2,764**	**43**
Urban	3,013	4,829	60
Rural	1,669	2,166	30
of which:			
Northern Uplands	1,442	1,920	33
Red River Delta	1,966	2,938	57
North Central Coast	1,486	2,197	48
Central Coast	2,026	2,641	30
Central Highlands	1,537	1,942	26
Southeast	2,801	5,019	79
Mekong Delta	2,129	2,536	19
Gini coefficient:			
Urban	.337	.342	
Rural	.278	.277	

Sources: VLSS93 and VLSS98.

In many respects our conclusion is similar to that of the Poverty Working Group, whose recent report *Attacking Poverty* argued that

> "There has also been some increase in inequality between the seven regions of Vietnam. Regions have grown at different rates: the fastest growing region has been the South East, which has been dominated by the fortunes of Ho Chi Minh City . . . The poorest region was and remains the Northern Mountains region and the richest region was and remains the Southeast . . . Thus, the evidence seems to indicate that it is the widening rural-urban gap and the differences in growth between regions that are the major causes of the increase in inequality in Vietnam. " (Poverty Working Group, 1999, pp. ix & 73).

MODELING THE DETERMINANTS OF POVERTY/WEALTH

Although it is illuminating to consider the determinants of poverty/wealth one by one, as we have done up to now, the approach has one serious drawback. Suppose, for instance, that rural households are also, on average, less well educated. Then we are likely to find a higher incidence of poor people in rural areas. But is this because they are rural? or because they are less well educated? The only way to disentangle these effects is to use a regression, which allows one to measure the effects of individual variables, holding all other influences constant.

In our case, households fit into one of three groups: poor (the lowest quintile), middle, or rich (the top quintile, as determined by expenditure per capita). Once we can explain what determines whether a household is in the

poor or rich category, then we have also determined (as a residual) who will fit into the middle category. In situations such as this the most satisfactory approach is to estimate a multinomial logistic regression. This is what we do, estimating which households are poor, or rich, relative to the omitted middle category.

The estimation results are set out in Table 2.10, and they report on separate models that were applied to the VLSS93 and VLSS98 data. Almost all of the variables included in these equations turned out to be statistically significant. In order to be able to compare the experience of 1993 with that of 1998, we have used the same set of independent variables for both sets of estimates.

Table 2.10
Multinomial Logistic Regression Model: Who is Poor and Rich in 1993 and 1998?

	Poor households, coefficients		Rich households, coefficients	
	1993	1998	1993	1998
*Dependent variables:*poor, rich; mid = comparison grp.				
Independent variables:				
Gender of head (female=1)	.234	.210 *	.287	.257
Age of head (yrs.)	-.014	-.015	.013	.011
Education of head (yrs.)	-.105	-.099	.127	.139
Ethnicity (Kinh/Chinese=0)	.658	.467	-1.074	-.918
# of illiterate hh workers	.418	.488	-.676	-.446
# of unemployed hh workers	.015 *	.574	-.319	-.863
# of children in hh	.316	.519	-.369	-.477
Non-farm? (yes=1)	-.355	-.290	.740	.779
Urban? (yes=1)	-.620	-.915	1.059	1.349
Regional effects:				
Northern Uplands	-.187 *	.384 *	-.793	-.361 *
Red River Delta	reference		reference	
North Central Coast	.166 *	.322 *	-.560	-.190 *
Central Coast	-.662	-.249 *	.790	.298 *
Central Highlands	-1.087	-.493 *	1.671	.705 *
Southeast	-.920	-2.000	1.509	1.976
Mekong Delta	-1.204	-.932	1.349	.560
Constant	-.479	-1.080	-3.046	-3.271
# of observations	4,799	5,999	4,799	5,999
F value		25.2		25.2
P-value for F / chi sq.	.00	.00	.00	.00

Notes: * means *not* significant at 10% level.
Sources: VLSS93 and VLSS98.

A much better sense of the results may be had from the figures shown in Table 2.11. To interpret these figures, remember that if we were to pick an individual randomly, there would be a 20% chance that he or she is poor, and a 20% chance that he or she is rich. What we do in Table 2.11 is to calculate the probability that someone is poor (or rich) when an independent variable changes by one unit, holding all other influences constant.

For instance, suppose that the head of the household is female. Then there was a 23% (rather than 20%) probability that the household was poor, and a 24% (rather than 20%) probability that the household was rich, in 1993. In other words, female-headed households tended to cluster at the two ends of the expenditure distribution, with relatively large proportions either being rather poor or rather rich. It is popularly believed that female-headed households are disfavored; these results show that that is not universally so, but there is a cluster of poor, female-headed households that may merit special concern. Note that the gender effect for poverty becomes insignificant at level 10% in 1998.

An additional one year of schooling simultaneously reduces the probability of being poor from 20% to 18%, and raises the probability of being rich from 20% to 23%. This effect was equally strong in 1993 and 1998, and helps one understand why there is such a strong demand for education in Vietnam.

Table 2.11
Examples of Changes in Probability of Being Poor or Rich, Based on Multinomial Logistic Model, for 1993 and 1998.

	Estimated probability of poor-rich situation when independent variable changes (other variables are held constant) and initial probability is 20 %:			
	Poor		Rich	
	1993	1998	1993	1998
Female head of household (vs. male)	23		24	23
Ethnic minority (vs. Kinh and Chinese)	37	32	6	8
Age of head of hh rises 1 year	20	20	20	20
Education of hh head rises 1 year	18	18	23	23
# of illiterate workers in family rises by 1	30	25	10	13
# of unemployed workers in family rises by 1		34	15	8
# of children in family rises by 1	27	32	14	12
Non-farm household (vs. farm)	12	13	36	37
Urban (vs. Rural)	8	6	45	53

Note: Blank space means coefficient not statistically significant at 10% level.
Sources: Based on regression results in Table 2.10.

In addition, illiteracy is associated with poverty. Households with illiterate working members are more likely to be poor, and less likely to be rich, than other households, although this effect appears to have weakened over time – perhaps because the importance of the income of the illiterate working members may be falling in relative importance.

Ethnicity has a major effect on poverty. Households that belong to an ethnic minority, defined here as not being Kinh or Chinese, have a 32% probability of being poor and an 8% probability of being rich, holding all other variables (such as education and location) constant. By 1998 these effects were slightly less pronounced than in 1993, but it is clear that ethnic

minorities will not quickly see their living standards catch up with those of the rest of Vietnamese society.

Household expenditure per capita depends both on the number of adults who are working, and the number of children who "dilute" total expenditure. The regression results show these effects very clearly. Households with an unemployed adult are more likely to be poor, as are households with many children. The latter effect is almost a matter of arithmetic: for a given number of household members, when there are more children, the earnings of the adults have to be divided by more people in order to compute earnings per capita, and hence (indirectly) poverty.

The most striking findings concern the geography of poverty. Taking the Red River Delta as the reference point, regional effects are not pronounced, with only the Southeast and Mekong Delta having significantly lower proportions of poor and higher proportions of rich in 1998. The regional effects were stronger in 1993, suggesting that there has been some convergence in poverty rates (holding other influences constant) in the meantime.

However the urban/rural divide is very large. In 1998, a household that was urban, rather than rural, would only have a 6% probability of being poor (other influences being held constant) and a 53% probability of being rich, instead of the 20% probabilities that would hold if there were no urban/rural divide. The gap widened appreciably between 1993 and 1998, as Table 2.11 also makes clear. The extent to which this is the result of an urban bias in government policy is not clear; the government has stated that rural development and poverty alleviation are its main priorities.

CONCLUSION

By regional standards, inequality in Vietnam is moderate, although not especially low. Between 1993 and 1998 inequality, as reflected in the distribution of expenditure per capita, increased. This is a problem because it leaves a larger number of poor people than if growth had been distributionally neutral. And poverty is harmful, both through its direct effects on living standards, and because it limits the ability of people to participate in the cultural and intellectual life of the country.

We have argued in this chapter that the core of growing rich-poor differentiation is the growing gap between urban and rural living standards. This conclusion is similar to that reached in the recent Poverty Working Group (1999) report, *Attacking Poverty*.

The analysis leads to a straightforward recommendation to the government, which is that a greater emphasis development in rural areas will help moderate the urban/rural gap and, at the same time, prevent any worsening in the poor-rich gap. It is essential that any remaining urban bias

in government policies be removed, and perhaps even replaced with a "rural bias."

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Chapter 3

Sectoral Changes and Poverty

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INTRODUCTION

The transformation to a market economy has rapidly changed the face of Vietnam in the 1990s. High GDP growth – from 7 to 9 percent per year – combined with changes in other economic indicators including strong growth in the value of exports (from 20 to 30 percent per year), a boom in foreign investment and inflation held below the double digit level, have created a foundation for a promising future of sustainable socio-economic development in Vietnam.

Poverty, according to the headcount index and using data from the Vietnam Living Standards Surveys (VLSS), fell rapidly during this decade from 58% in 1992-93 to 37 % by 1997-98 (GSO, 2000). The food poverty rate, which is an indicator of extreme poverty, declined from 25% to 15% over the same period. Net school enrolments have increased at all levels, more than doubling for secondary school between 1992-93 and 1997-98. These results reflect the impact of Đổi Mới ("renovation," Vietnam's dramatic reform program initiated in 1986), and suggest that policy reforms in the past decade have led Vietnam in the right direction so that high growth has resulted in rapid declines in poverty.

Research on poverty in Vietnam has usually focused on analysis of poverty rates by region and rural/urban area, or ethnicity, which is useful for geographic or ethnic targeting of poverty alleviation programs. However, to understand what general types of economic support programs are appropriate, an analysis of poverty by employment sector and change in sector of employment is needed. Previous research on poverty has been limited to cross-sectional comparisons, as data has been limited. Now that the 1997-98 VLSS data are available, we have information for two points in time and an analysis of the dynamics of poverty becomes possible.

The incidence of poverty and the declines in poverty have not been the same across regions or urban/rural areas. These differences across location are linked closely to economic opportunities available in the different regions and urban/rural areas and to different productivity within each sector. Table 3.1 shows that agriculture, which tends to have lower value added per worker than industry or services, accounts for a large share of employment in the Central Highlands, Northern Uplands, and North Central Coast, which also happen to be the three poorest regions of the country. At the same time, the Southeast, with the lowest incidence of poverty, also has the highest share of employment in manufacturing and services.

Table 3.1
Employment Distribution, Poverty and Rice Yields for Workers Aged 15-65, 1998

	% of main jobs that are in:			% of population in poverty	Annual rice yield 1998
	agriculture	other production	trade and services		
Northern Uplands	68.4	11.6	20.0	58.6	32.9
Red River Delta	43.0	15.2	41.8	28.7	51.3
North Central Coast	58.2	15.4	26.3	48.1	34.2
Central Coast	36.2	20.8	43.0	35.2	37.0
Central Highlands	77.9	3.5	18.6	52.4	26.3
Southeast	15.9	27.0	57.2	7.6	28.8
Mekong Delta	43.8	12.2	44.1	36.9	40.7
All Vietnam	**68.1**	**12.2**	**19.6**	**37.4**	**39.6**

Notes: Industry includes manufacturing, construction and utilities.
Sources: Industrial distribution of employment – Authors' calculation from VLSS 1997-98, Headcount index figures taken from Table 6.5.2a in the Statistical Abstract of the VLSS 1997-98 and are calculated on total population; Annual rice yields 1998 taken from 1998 Annual Statistical Yearbook of the General Statistical Office.

It is not just industrial structure, but the combination of the industrial structure and differential productivity in the different sectors, and in the different regions, that explain poverty to a large extent. For example, within generally low productivity agriculture, annual rice yields by region in the last column of Table 3.1 differ greatly by region, and are likely to be strongly linked to poverty incidence in the different regions, thereby compounding the effect of sectoral structure. A deeper look at the sources of poverty reduction would examine how the structure of agriculture, industry and services has contributed to poverty reduction.

An analysis of the dynamics of patterns of poverty requires looking at changes in poverty incidence over time, and how these changes are related to: (i) changes in the sectoral structure of employment as people shift from one sector to the other, presumably moving from lower productivity, lower income sectors to areas in which they obtain higher returns for their labor, and (ii) changes in productivity within each sector.

A study by Hopi and Ravallion (1991) of the World Bank analyzes the effect of changes in the economic structure in Indonesia during the 1980s on changes in poverty, using various poverty indicators. The first part of their study has several aims including: a) describing in detail Indonesia's profile of poverty by principal sector of employment, and b) examining how these profiles changed over time. Our chapter aims to look at similar questions a decade later in Vietnam, using the methodological approach outlined by Huppi and Ravallion.

Our study decomposes the fall in poverty between the two VLSS surveys, in order to determine how much of the fall in poverty among the working age population was because of improvements in productivity *within* their sector of employment, and how much was due to people *moving* from low productivity to high productivity parts of the economy.

DATA

This study utilizes data from the two rounds of the Vietnam Living Standards Survey. The 1993 survey provides detailed information on 15,053 individuals aged 15 and over; the 1997-98 sample consisted of individuals interviewed in 1992-93, plus a supplementary sample of individuals, increasing the sample size to a total of 19,374 individuals aged 15 and over. The 1997-98 data oversampled certain areas, so sampling weights must be used to bring the data back to proportionality with the population.

The VLSS data contain detailed information on household expenditures and home production as well as information on major sector of employment and hours worked, which are largely comparable in terms of data collection methodology and questionnaire in the two surveys. Slight differences between 1992-93 and 1997-98 questionnaires regarding expenditures on tobacco and foreign language and computer courses mean the 1993 and 1998 figures for these items are not comparable, but as they do not account for a large share of expenditures, they have been excluded from this analysis.

Households, surveyed in different months and regions, faced different prices. It was therefore necessary to adjust household expenditures in the two VLSS surveys for these differences. The general Consumer Price Index was first applied to get rid of monthly differences, bringing the prices to those of January 1993 and January 1998 respectively. Then the expenditures by region were adjusted to national price levels in order to get a comparable expenditure figure for the whole country. The monthly and regional price indices used are both from the Trade and Prices Department of the General Statistical Office. This allowed us to create poverty lines and calculate poverty indices, which we can compare across regions and over time.

Working household members were asked about their industry of employment in both the VLSS93 and VLSS98 surveys. Unfortunately the industry codes changed significantly between the two surveys, which makes comparability somewhat difficult at the detailed level. However at the more aggregate level utilized in this paper, the reported industries can be considered to be comparable.

We have divided the adult workforce into seven employment sectors based on major industries and hired versus self-employment. The level of aggregation is determined by the number of observations in the sample. We have combined major industry categories that accounted for less than 3% of the workforce. The groups we focus on are:

- Self-employed in agriculture
- Hired labor in agriculture
- Self-employed in industry or construction
- Hired labor in industry or construction
- Sales, hotel and restaurant
- Government, Party or Social Organizations
- Other services.

Over a third of working adults held more than one job (see chapter 8), which makes it difficult to classify them by industry of employment. The solution used by Huppi and Ravallion (1991) was to classify individuals according to the sector of their main job. An alternative is to classify them according to the number of hours worked in each industry, in both main and supplementary jobs. This has the advantage of more fully utilizing the information available, and reflecting more accurately the true mix of employment between industries.

The questions asked on hours in self-employed agricultural work in 1992-93 are similar to questions for any other industry and form of employment, while in 1997-98 greater detail was asked on different aspects of agricultural work (e.g. cultivation, livestock,) and on the peak vs. non-peak seasons in agriculture. While this should give us a more accurate figure for total hours worked in that sector than in the previous round of the VLSS, it may affect the comparability of the data to some extent. Nevertheless, in general the figures can be considered comparable. Unless otherwise indicated, the analysis in this paper is based on the categorization by the proportion of hours worked in a particular sector.

In our analysis we have only included adults age 15 to 65 who have worked in the past 12 months. They account for the bulk of the workforce and are the major income earners in families. We have excluded those under 15 since most are in school. However, a significant number of children under 15 are employed in agriculture or other light work, which might be considered in future research. We have excluded those over 65, as labor force participation drops sharply in that age group, to less than 50%, probably due to a combination of retirement and health reasons.

METHODOLOGY

Most analyses of poverty looks simply at the headcount index, which tells us how many people are living below the poverty line. The analysis in this paper will examine poverty dynamics using the headcount index, poverty gap index and squared poverty gap index. Poverty gap indexes help us to understand the depth and severity of poverty rather than just poverty status, quantifying the amount that income must increase in order to pull people out of poverty. Combining this with the analysis by employment sector helps us to gain a better understanding of how much productivity must be enhanced, or to which sectors people must move, in order to reduce poverty further.

Calculating Poverty Lines

The *food poverty line* is based on a common standard of human energy requirements used in many countries: 2,100 Calories per capita per day. People whose per capita household expenditures are below the level needed to purchase this number of calories are categorized as living below the food poverty line.

The expenditure required – or in other words, the food poverty line – is calculated by first looking at the calories consumed per person per day on average for each of the five expenditure per capita quintiles. In the VLSS93 data the food consumed per person per day for individuals in the third quintile provided 2,052 Calories, which was the closest to 2,100 Calories of the five quintiles.

The second step is to calculate the physical amount of different food items purchased by households in the third quintile on average. Then the amounts of each item are multiplied by the factor 2100/2052 in order to blow them up to reach the standard of 2,100 Calories. Then the amounts of each item in the food basket are multiplied by the prices (adjusted to national levels by regional price indices and to January 1993 prices by monthly food prices) in order to obtain the actual amount of money required to purchase this food basket. Using the VLSS data for 1993 this gave a food poverty line of 749,722 dong per person per year.

The next step is to calculate the actual expenditures for non-food expenditures, which may be added to the value of food expenditures to obtain the *general poverty line*. With these non-food items it is difficult to determine the amount consumed for each item for example, health or education expenditures. Therefore the amount spent on each of these non-food items is calculated by taking the average expenditures per person in the third quintile (again these expenditures were adjusted for regional and monthly price indices), blown up again by the caloric adjustment factor

(2100/2052). This figure, amounting to 410,690 dong, is added to the food poverty line to yield the overall poverty line for 1993 of 1.160 million dong.

The 1998 poverty line is generated by using the basket of food goods from the 1993 food poverty line and multiplying by the prices of those items in 1998 (adjusted for regional and monthly price differences to January 1998 prices.) The food poverty line in 1998 is therefore 1.287 million dong.

As it is not possible to determine a basket of amounts of non-food items purchased, this amount is estimated by taking the non-food expenditures in the 1993 overall poverty line and multiplying by 122.5%, which is the January 1993 to January 1998 non-food price inflation according to the official Consumer Price Index. This amount is added to the food poverty line in 1998 giving us an overall 1998 poverty line of 1.790 million dong.

Poverty Indices

In this chapter we use three common poverty indices, based on work done by Foster, Greer and Thorbecke (1984). The headcount index, poverty gap index and poverty gap squared index are additively decomposable poverty measures. This means that the aggregate measure of poverty is the population-weighted mean of the poverty measures for all subgroups of the population, which allows us to decompose poverty by groups including, for our purposes, those who remain in their sector versus those who move between sectors.

Headcount index (P_0)

The headcount index is simply the proportion of the population living below the poverty line. While this index is simple to calculate and to understand, it does not give any indication of the depth of poverty, i.e. by how much incomes would have to improve to raise people above the poverty line.

Poverty Gap index (P_1)

This index is defined as the aggregate shortfall in expenditures of the poor as a proportion of the poverty line, normalized by population size:

$$P_1 = \frac{1}{N}\sum_{i=1}^{n} \max\left[\frac{(Z - Y_i)}{Z}, 0\right] \qquad (1)$$

Here Z is the poverty line, Y_i is the per capita household consumption of the individual, and N is the total population. For non-poor households, the value of $\max[(Z-Y_i)/Z, 0]$ will be 0, while for poor households it will measure the gap between their expenditures and the poverty line, as a share of the poverty line. This proportionate poverty deficit is then averaged over the total population.

This index allows us to get an estimation of the depth of poverty, which means that it answers the question "Are poor people living close to or far below the poverty line?"

Poverty Gap Squared index (P_2)
This index is defined as:

$$P_2 = \frac{1}{N}\sum_{i=1}^{n}\left[\max\left\{\left(\frac{(Z-Y_i)}{Z}\right),0\right\}\right]^2 \qquad (2)$$

This index is simply the arithmetic average over the population of the squared proportionate poverty deficits. The advantage of this index is that it reflects the situation that people in extreme poverty are likely to have greater difficulty escaping poverty, and they are therefore more heavily weighted in the index than those living close to the poverty line. In addition, it satisfies the transfer axiom (Sen 1976), which requires that when a poor person transfers income to a poorer person, measured poverty decreases.

Decomposition

The analysis in this chapter separates out the changes in poverty due to intra-sectoral effects, population shift effects and interaction effects along the lines of the decomposition formula proposed by Ravallion and Huppi (1991). Intra-sectoral effects are basically reductions in poverty due to improvements in productivity and incomes *within* a given employment sector. The population shift effects are the reductions in poverty that can be attributed to *shifts* in working time (or employment) from one sector to another. The interaction effects are a result of possible correlation between sectoral gains and population shifts. The Foster-Greer-Thorbecke class of poverty indices described above may be decomposed in this way, as they are additively separable. The basic decomposition formula is:

$$P_{98} - P_{93} = \sum(P_{i98} - P_{i93})n_{i93} + \sum(n_{i98} - n_{i93})P_{i93} + \sum(P_{i98} - P_{i93})(n_{i98} - n_{i93})$$

[intra-sectoral effect] + [population shift effect] + [interaction effect]

where P_{it} is the additively separable poverty index for sector i with population share n_i at date t. All summations are over the m sectors, $i=1, \ldots, m$.

RESEARCH RESULTS

Employment Structure

The sectoral structure of employment differs somewhat, depending on whether one utilizes jobs or hours as the basic unit underlying the

categorization. Table 3.2 shows the structure of employment from the 1992-93 and 1997-98 VLSS data, first by main job, and then by hours worked.

The data in Table 3.2 show that whether one uses jobs or hours of work, the share of people self-employed in agriculture accounts for the majority of Vietnam's employment. However the extent of underemployment in agriculture is evident in the fact that the share of *employment* in self-employed agriculture (61.6% in 1997-98) is substantially higher than the share of *hours* spent working in self-employed agriculture (56.0%). Sales, hotel and restaurant work indicates the opposite phenomenon; the share of people working in these jobs as their main sector of employment (11.6%) increases to over 14.5% when one uses the share of hours worked. Sales work, while not intensive, does involve large amounts of time – keeping shops open and waiting for customers. For all other sectors, there are no large differences in the structure of employment by sector with the two different methods of calculation.

Table 3.2
Percentage Breakdown of Employment by Sector, Workers Aged 15-65

	1992-93		1997-98	
	% breakdown of employment by		% breakdown of employment by	
	main Job	hours of work	Main Job	Hours of work
Self-employed farmer	65.5	58.6	61.6	56.0
Hired farm worker	5.0	5.6	3.8	4.1
Self-employed production	5.3	6.1	5.3	5.6
Hired production worker	7.0	8.3	8.1	9.1
Sales, hotels and restaurants	9.7	12.9	11.6	14.6
Government, Party and Social Organizations	3.9	4.2	4.7	4.9
Other Services	3.6	4.4	4.9	5.8
All Vietnam	100.0	100.0	100.0	100.0

Sources: VLSS93 and VLSS98.

Movement between sectors may be an important factor in poverty alleviation if people move from low productivity sectors to higher productivity sectors or, as is more likely, gradually increase their hours worked in one sector and decrease their hours worked in other sectors. Table 3.3 looks at the average annual percentage change in employment and total hours worked in various sectors. We can see that while the share of employment in agriculture has declined over time from 66% to 62% of all main jobs, there has still been an increase in the absolute number of people working in agriculture, as well as an increase in hours worked.

The services sector grew particularly quickly, with employment rising from 17% of the total in 1993 to 21% by 1998. Only hired farm workers have seen an absolute decline in their numbers, at a rate of 3.8% per year.

While there have been movements between employment sectors among the working age population (aged 15 to 65), is it these movements that have led to changes in poverty over the period 1992-93 to 1997-98, or rather improvements in productivity within sectors? The following section sets out a simple decomposition of poverty indices to examine this question.

Poverty Incidence

We now present the results of the poverty decomposition using the three different indices of poverty described above. The decomposition is based on the classifications of workers by their hours worked in various employment sectors, including their main and supplementary jobs, in order to obtain more precise estimates.

Table 3.3
Employment in 1997-98 and Growth, 1992-93 to 1997-98

	Total Employment ('000s), 1998	Average Annual Growth Rate, 1992-93 to 1997-98 (%)	
		Jobs	Hours Worked
Self-employed farmer	24,279	0.2	2.4
Hired farm worker	1,513	-3.8	-2.7
Self-employed production	2,074	1.3	1.6
Hired production worker	3,180	4.2	5.3
Sales, hotel and restaurants	4,573	5.0	5.7
Government, Party and Social Organizations	1,851	5.2	6.6
Other Services	1,928	7.5	8.8
All Vietnam	**39,398**	**1.4**	**3.3**

Sources: VLSS93 and VLSS98.

While poverty is a household level measure, which can be affected by many factors such as remittances, transfers, or income from investments, in most cases employed household members aged 15 to 65 are the main contributors to income. The changes in poverty are aggregate measures for all households weighted by hours worked in each sector. Likewise the change in hours worked between sectors is an aggregate of total hours worked in each sector in the two periods.

The poverty incidence among the employed adult population age 15 to 65, based on the headcount index, is presented in Table 3.5. Clearly poverty is highest for hired laborers in agriculture, with over 55% living with

household expenditures below the poverty line. However this group only accounts for a small, and declining, share of total employment. Self-employed farmers, with poverty incidence of close to half (47%), constitute the bulk of the poor. The lowest poverty rates are found among those with government jobs; these people tend to be the most educated. Poverty rates are also low among those working in sales, restaurants and hotels, and in other services.

The reduction in poverty is decomposed into three categories: sectoral effects, which means improvements in living standards for people within the same sector; the contribution of population shifts, which means improvement due to changing sector of employment; and interaction effects. The analysis shows that 92.0% of the reduction in poverty between 1993 and 1998, as measured by the headcount index, is accounted for by improvements in incomes of people who remained in the same sector of employment. Sectoral shifts, which were relatively small during the period, contributed only 8.8% to poverty reduction. Table 3.4 also shows that 60.5% of the reduction in poverty is due to improvements in agriculture incomes. The other sectors contributed very little to poverty reduction except for sales, hotels and restaurants, which accounted for 8.9% of the poverty decline.

Table 3.4
Decomposition of Changes in Poverty Using Headcount Index, 1993-98

	Headcount index of poverty		Reduction due to Sectoral Gains
	1992-93	1997-98	
Self-employed farmer	66.4	47.0	60.5
Hired farm worker	67.6	55.4	3.6
Self-employed production	39.5	21.0	6.0
Hired production worker	36.4	20.6	6.9
Sales, hotel and restaurants	24.2	11.2	8.9
Government, Party and Social Organizations	21.0	9.1	2.6
Other Services	30.1	15.4	3.4
Vietnam overall	**53.3**	**34.6**	
Total Sectoral Effects			**92.0**
Contribution of labor shifts			**8.8**
Interaction Effects			**-0.8**
Total			**100.0**

Sources: Based on VLSS93 and VLSS98.

The headcount index is relatively simple and easy to understand, but does not give an indication of the depth of poverty. To address this

weakness, we have performed the same decomposition exercise using the Poverty Gap index, with the results presented in Table 3.5.

In decomposing poverty as measured by the poverty gap index we find that a slightly greater share of poverty reduction occurred due to intrasectoral effects. Among those effects, agriculture again accounted for the largest share. Improvements in living standards among workers in sales, hotels and restaurants contributed 11.7% to the reduction in poverty. Improvements in incomes from production work, whether employed or self-employed, contributed from 7.3 to 8.8% to the reduction in poverty. Government again showed the smallest contribution to poverty reduction, because there is not very much poverty to alleviate within that sector.

Table 3.5
Decomposition of Changes in Poverty Using Poverty Gap Index, 1993-98

	Poverty Gap index of poverty		Reduction due to Sectoral Gains
	1992-93	1997-98	
Self-employed farmer	19.7	12.3	54.8
Hired farm worker	22.9	14.9	5.7
Self-employed production	13.7	4.2	7.3
Hired production worker	12.8	4.4	8.8
Sales, hotel and restaurants	8.9	1.8	11.7
Government, Party and Social Organizations	6.1	1.7	2.3
Other Services	10.7	3.4	4.1
Vietnam overall	16.6	8.7	
Total Sectoral Effects			**94.5**
Contribution of labor shifts			**6.0**
Interaction Effects			**-0.5**
Total			**100.0**

Sources: Based on VLSS93 and VLSS98.

Table 3.6 presents the decomposition results based on the squared poverty gap index, which examines changes in the severity of poverty. Poverty is most severe among hired farm workers, followed by self-employed farm workers, as we found with other poverty indices. The contributions to declines in severity of poverty are similar to those of the poverty gap index, reinforcing the above findings.

It is helpful to compare our results with the findings of Huppi and Ravallion (1991). They examined the case of Indonesia during a period of dramatic declines in poverty. The headcount index in Indonesia fell from 33.0% to 21.7% between 1984 and 1987. At that time, the structure of employment in Indonesia was similar to that in Vietnam, with the largest

share of employment being in agriculture, and with a growing services sector.

Their decomposition of the changes in poverty in Indonesia showed that intersectoral shifts of labor contributed slightly more than in Vietnam to the decline in poverty. These shifts contributed from 9.4% to 13.2% to the fall in poverty in Indonesia, depending on which poverty index was used, compared to 6.0-8.8% in Vietnam. Improved productivity in agriculture in Indonesia contributed from 60.9% to 74.0% to the reduction in poverty. In contrast with Vietnam, the improved productivity in Indonesian agriculture contributed more to reducing the poverty gap than to reducing the number of people in poverty. However, as in Vietnam, Indonesia farmers remained the poorest major group.

Table 3.6
Decomposition of Changes in Poverty Using Squared Poverty Gap Index, 1993-98

	Squared poverty gap index of poverty		Reduction due to Sectoral Gains
	1992-93	1997-98	
Self-employed farmer	8.3	4.7	56.3
Hired farm worker	10.2	5.5	5.4
Self-employed production	5.3	1.3	6.2
Hired production worker	4.9	1.4	8.8
Sales, hotel and restaurants	3.3	0.5	11.6
Government, Party and Social Organizations	2.2	0.5	2.3
Other Services	4.2	1.2	4.8
Vietnam overall	6.8	3.2	
Total Sectoral Effects			**95.3**
Contribution of labor shifts			**6.2**
Interaction Effects			**-1.5**
Total			**100.0**

Sources: Based on VLSS93 and VLSS98.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The sectoral structure of employment and hours worked have not changed substantially between the two VLSS surveys of 1992-93 and 1997-98. Agricultural work declined from 65.5% of all main jobs to 61.6%, and 58.6% of all hours worked to 56.0%. All other sectors of employment

remain relatively small, although growth rates in the service sectors were around 6% per year.

Poverty incidence among the working population declined substantially between the two surveys, from 53.3% to 34.6%. Likewise the depth and severity of poverty have declined substantially as measured by the poverty gap and poverty gap squared indexes.

Over nine-tenths of all poverty reduction has been within sectors; shifts in hours worked between sectors contributed from 6.0% to 8.8% to the reduction in poverty, depending on which poverty index is used. This small contribution to poverty reduction reflects the small shift in time worked between sectors.

Improvements in incomes within the agricultural sector accounted for 55% to 60% of the poverty reduction due both to substantial reductions in poverty in that sector and the large share of hours in that sector out of total hours worked in all sectors. The only other sector making a substantial contribution to poverty reduction is the sales, hotels and restaurants sector.

Despite the strong contribution of agriculture to poverty reduction during this period, poverty among farmers remains high at 47.0% for self-employed farmers and 55.4 % among hired farm workers. With the largest share of the workforce and the highest poverty rates, farmers account for the great bulk of the poor population in Vietnam.

Recommendations

The results of this analysis suggest that policies for poverty reduction should focus on two areas. First, increasing the shift of workers out of agriculture into higher productivity sectors. Second, continuing to encourage productivity gains in agriculture, as farmers are likely to continue to remain the poorest group, and to account for a large share of the workforce for years to come.

Over half of all hired farm workers are living below the poverty line. The share of hired farm workers without annual cropland is about 55%. It is likely that their landless status forced them to work for others to earn their living. However as farm work for pay is seasonal, income is usually unstable and insufficient to satisfy basic needs all year round and without land to fall back on, their basic consumption needs cannot be met. Fortunately, the VLSS data indicate that the share of workers in this category has declined over the period between the two surveys. Over the period 1992-93 to 1997-98 we have seen a movement of hired farm workers into other sectors, leading to a reduction in their share of total employment from 5.6% to 4.1% of total hours worked.

While hired farm workers have a greater probability of being in poverty, the bulk of poverty is still among self-employed farmers. Although this category has declined as a share of total workers and total hours

worked, the absolute number of people in this sector continues to increase, albeit slowly. Methods to speed up the shift of workers out of agriculture into higher productivity sectors are needed to contribute to further poverty reduction.

The sectors with the lowest incidence of poverty are the services, in particular sales, hotels and restaurants, and government. However, these sectors are quite selective about whom they recruit, and may require high levels of education, which farmers and their children are less likely to have. For self-employed people in sales and hotels, substantial financial capital requirements may hinder absorption of agricultural workers. It is more likely that movement out of agriculture will be into the production sectors, either self-employed or as a hired employee. What can be done to foster growth in the production sectors to speed up the pace of this employment shift?

The second solution is to increase productivity within sectors of current employment. There is some potential for increasing productivity in existing farming activities and diversifying into higher value activities such as livestock, aquaculture or cash cropping. The public sector should focus poverty alleviation efforts on assisting farmers to increase their productivity through credit, agricultural extension including higher productivity genetic material, increased irrigation, increased use of appropriate inputs, and assistance in marketing output. Within the other production sectors, although poverty is low, there is still scope for increasing productivity and incomes.

While this research points out the great contributions made by the agricultural sector in poverty alleviation, further research should examine in depth the mechanisms that led to these significant poverty declines within the agricultural sector, so as to identify what combination of factors led to these reductions in poverty between 1992-93 and 1997-98. In addition, research should examine the factors inhibiting the shift in employment out of agriculture. If information were available on income growth by sector of employment, the research could pursue further the contributions of economic growth over the past 5 years on reductions in poverty.

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Chapter 4

Child Malnutrition

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INTRODUCTION

Worldwide, malnutrition affects one third of all children and is implicated in more than half of all child deaths. While adequate child nutrition is positively associated with cognitive development in early childhood and school performance, malnutrition is known to result in poor physical and cognitive growth and lower resistance to illness (see for example Allen 1993). Malnutrition therefore can lower the productivity and abilities of entire societies (Spurr 1988). It further violates children's rights and compromises their physical and mental well being and development and helps to perpetuate poverty (UNICEF 1998).

As a result of insufficient food intake and frequent infections, 37% of all children worldwide suffer from poor linear growth (stunting), the most representative indicator of long-run poor social conditions that result in undernutrition. This figure rises to 47% for the least developed countries (UNICEF 1998). In 1985, just before the beginning of the Vietnamese reform process (Đổi Mới), almost 60% of all Vietnamese children under five suffered from stunting (Vietnam: NIN 1985). Since reform began in 1986, significant improvements in the living conditions of the Vietnamese population have been achieved and malnutrition has decreased considerably.

At the time of the first Vietnam Living Standards Survey in 1992-93 (VLSS93), Vietnam had largely completed its transition from a planned to a mixed market economy. That survey found that 56% of all children aged 12 or less were stunted (Vietnam: SPC/GSO 1994, p.93). By 1997-98, according to the second Vietnam Living Standards Survey (VLSS98), this proportion had fallen to 42%.

A relatively high rate of stunting persisted despite the rapid economic growth rate of 8.9% annually from 1993 to 1998 (Haughton 1999) and the fact that the food requirements of the whole population could theoretically be met. According to the Food and Agricultural Organization of the United Nations (FAO) the dietary energy supply per capita increased from 2.097 kcal in 1965 to 2.541 kcal in 1997 due to a continuous increase in the annual per capita availability of all major food groups (FAO 1999). National surveys (Tu Giay et. al. 1990; Vietnam: NIN 1995) however show that despite sufficient food availability, the daily energy intake has remained lower than the recommended daily energy requirement of 2.300 kcal.

Recognizing the importance of children for the development of the nation, the government endorsed a *National Plan for Action for the Survival, Protection and Development of Children* in 1990. The *Plan* aimed to reduce the proportion of underweight children under five (using weight for age as the guide) to 30% by 2000 (Vietnam: GSO 1997). This plan has now been superceded by the *National Programme of Action for Children 2001-202,* which aims to reduce child malnutrition to 20% by 2010.

To reach this goal the government, among other measures, has implemented campaigns to extend breastfeeding and to motivate households to participate in household food security systems. The VAC system (vườn=orchard, ao=pond and chuồng=stable), a combination of fresh-water aquaculture, crop production, horticulture and livestock husbandry, for example, is seen as one of the most effective and sustainable weapons against malnutrition by the National Institute of Nutrition. In April 2001, the government launched the *National Nutrition Strategy 2001-2010*, which gives priority to assisting disadvantaged areas of the country.

The objective of this paper is to analyze the current extent of child malnutrition in Vietnam, focusing on regional and social differences, to evaluate whether malnutrition rates fell between 1992-93 and 1997-98, and to determine whether the government goals were reached. It also seeks to determine the household and other characteristics of malnourished children. The analysis is based on data from the two nationally representative Vietnam Living Standards Surveys of 1992-93 and 1997-98. The existence of the two data sets allows one to examine the changes in nutritional status for 2,664 children who live in households that were interviewed in both surveys. We can then answer the question of whether the recent fall in malnutrition is because the latest cohort of children is better nourished, or because some children have been able to grow out of malnutrition.

CHILD MALNUTRITION IN VIETNAM

In order to examine child malnutrition in Vietnam it is useful to outline first how children's nutritional status can be measured.

Measures of malnutrition

The nutritional status of children is commonly assessed by using data on their age, sex, height and weight. These data are then used to calculate three indices - each reflecting a different aspect of malnutrition.

Stunting, as expressed by low height-for-age, measures long-term malnutrition. It is the product of a cumulative history of nutritional stress periods that led to reduced growth and could not be made up by catch-up growth in more favorable periods. According to the World Health Organization (WHO), stunting is a reliable measure for overall social deprivation since it measures long-run social conditions (WHO 1986).

Wasting is reflected in a low measure of weight-for-height and indicates current growth disturbances caused by insufficient nutritional intake, or infections. It is particularly useful in describing the current health status of a population. A disadvantage of this index is that it risks classifying children with poor growth in height as normal (Gibson 1990).

Underweight, the composite indicator of long- and short -term effects on children's nutritional status, is expressed in low weight-for-age. The disadvantage of this indicator is that it does not differentiate between long-term and short-term malnutrition.

All indices are expressed in Z-scores, which are calculated by comparing a child's height and weight with the height and weight of a child of the same age and sex from a reference population.

Stunting Z-scores, the preferred anthropometric index for malnutrition for the purpose of this study, are calculated by comparing the difference between the height of a child H_i and the median height of healthy children of the same age and sex from the reference population, H_r, divided by the standard deviation of the height of the same children from the reference population, SD_r:

$$Z - score = \frac{H_i - H_r}{SD_r}$$

Moderately stunted children are commonly defined as those having Z-scores between -2 and -3, while severely stunted children will show Z-scores of -3 and lower. The National Center for Health Statistics (NCHS) has selected the reference population in accordance with WHO recommendations. The applicability of the reference population dataset, which consists mainly of US-children, to a Vietnamese context has been questioned (Haughton and Haughton 1999; Desai 1995); Habicht (1974), however, argues that the norms of developed countries are applicable to developing countries since

there is little evidence that genetic differences affect growth potential in the early years of life.

Extent of malnutrition

In 1997-98, 41.7% of all children twelve years of age and under were stunted, 12.3% of them severely. Wasting affected 8.1% of all children and 40.9% were underweight. The prevalence of malnutrition, however, differs quite considerably between age groups, gender, regions and social classes.

Age effect

Vietnamese children begin to fall behind NCHS standards between the sixth and twelfth months of life. All three malnutrition measures show an initial peak in the age group from one to two years of life, which reflects a common pattern in developing countries (Matorell and Habicht 1986; UNICEF 1989). Stunting peaks for boys by the end of their first year of life and for girls about three to four months later, as Figure 4.1 shows. A possible explanation for this pattern is that this age most commonly reflects the weaning of children, with the introduction of solid food. Children are therefore increasingly exposed to infectious diseases through food. Stunting and underweight rates reach another peak in the older age groups whereas wasting declines after the initial peak period and is almost nonexistent in children older than 11 years. This can be explained by the fact that after two years of age, stunting is the most prevalent malnutrition phenomenon, since children that have fallen behind growth standards in the first two years of life are usually not able to catch up in height.

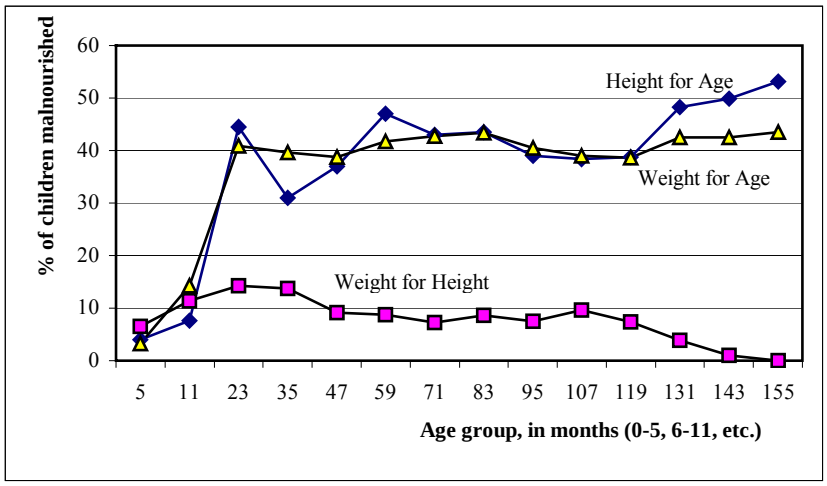


Figure 4.1. ***Malnutrition by Age***

Geographic effects

Vietnam has, until recently, been divided into seven regions. The prevalence of malnutrition varies significantly between these regions. Stunting rates vary from 27.6% in the South East (including Ho Chi Minh City) to 57.8% in the Central Highlands. These differences are correlated with the per-capita expenditures in the respective regions, coupled with the fact that food security seems to be more problematic in the rural areas of the Vietnamese midlands. The two main rice-growing regions, the Mekong Delta and the Red River Delta show stunting rates of 36.9% and 36.7% respectively. The lower rates reflect these regions' higher food security compared to the Northern Highlands, the Central Highlands and the North Central regions.

Malnutrition is more prevalent in rural than in urban areas: in 1998, 45.2% of all children in rural areas, but only 23.9% of all urban children, were stunted. The rates for severe stunting are even more alarming with 13.7% of children living in rural areas being severely stunted, as opposed to 5.4% in urban areas. This difference is not surprising though, considering the fact that household expenditure is much higher in urban than in rural areas and that children are more exposed to infections in rural areas.

Gender effects

Stunting rates for boys are higher than for girls, with 32.8% of all female children and 36.8% of all male children being stunted. This finding corresponds with the results of an analysis conducted by UNICEF in 39 developing countries that showed that boys are at a slight disadvantage in terms of stunting (UNICEF 1989). The gender differences for severe malnutrition are slightly smaller with 12.8% of all boys and 11.7% of all girls being severely stunted. The group most at risk seems to be rural male children; 47.9% of this group are stunted.

Economic influences

The economic background of the households surveyed reveals further differences. For the purpose of an economic analysis the households have been divided into five groups of equal size on the basis of their household expenditures per capita, and the results are set out in Table 4.1.

Table 4.1
Percentage of Children Stunted, by Expenditure Quintile

	Degree of malnutrition	
Expenditure quintile	Moderate	Severe
Poor	33.1	21.1
Poor-mid	32.7	13.0
Middle	29.6	10.2
Mid-upper	27.4	8.6
Upper	16.5	2.8
Overall	**28.7**	**12.3**

Source: VLSS98.

As expected, the highest stunting rate of 54.2% can be found in the poorest quintile. The stunting rate steadily drops as one

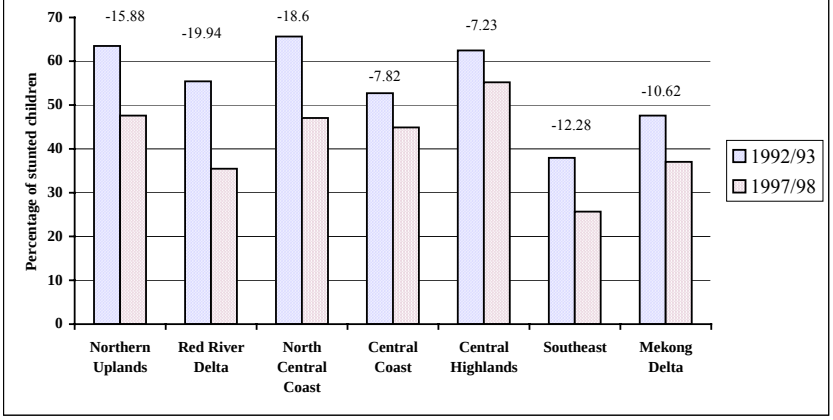
moves to richer quintiles. The wealthiest quintile shows a stunting rate of 16%. The differences for severe stunting are even more stunning with 20.1% in the poorest quintile being severely stunted but only 2.4% in the richest quintile. This pattern suggests that household income has a decisive impact on children's nutritional status.

The fall in child malnutrition, 1993-1998

Malnutrition rates have fallen quite considerably since the first Living Standards Survey in 1992-93. Based on the 1992-93 data, Ponce, Gertler and Glewwe (1999) forecast that stunting rates below 35% for children under five could not be expected before the year 2013. VLSS data, however, show a decrease from 53% in 1993 to 33.6% by 1998. For children 12 years of age and under, stunting rates have decreased from 54.6% to 41.7%, and severe malnutrition in this age group has fallen from 20.7% to 12.3%. The proportion of underweight children 12 years of age and under decreased from 46.7% to 40.9% during the same period. The government's official goal of reducing the proportion of underweight children under five to 30% by the year 2000, however, has not yet been reached – in 1998, 35% of all children under five were still underweight.

It is striking, and somewhat puzzling, that wasting rates, in contrast to stunting and underweight rates, have increased from 4.7% in 1992-93 to 8.1% in 1997-98. If one takes into consideration that the average height of children has increased considerably between 1992-93 and 1997-98, the increase in wasting nevertheless seems consistent with the dramatic drop in stunting rates.

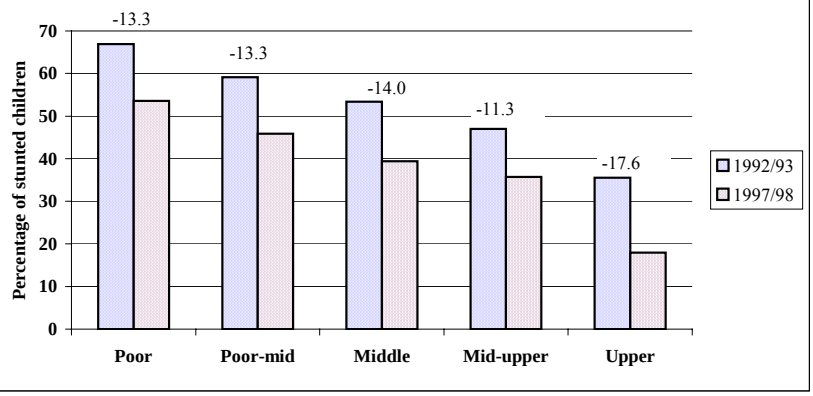
Figure 4.2 ***Regional decreases in stunting rates***



The decline in stunting rates has not been uniform for all regions in Vietnam, as Figure 4.2 shows clearly. The largest reduction was achieved in the Red River Delta (-19.9 percentage points) and the North Central Coast (-18.6 percentage points). The smallest declines were found in the Central Coastal region and the Central Highlands (-7.8 and -7.3 percentage points respectively). The Central Highlands represent the region with the highest stunting prevalence in 1997-98, whereas in 1992-93 the North Central Coast recorded the highest rates. The lowest stunting rates were found in the Southeast (including HCMC), both in 1992-93 and in 1997-98.

The increasing level of inequality between the rich and the poor that has accompanied the reform process manifests itself also in the differences in the decline of malnutrition rates, as Figure 4.3 shows. Stunting rates decreased in each quintile – but to a higher degree in the richer quintiles. For children living in households of the poorest quintile, stunting rates dropped by 13.3 percentage points between 1992-93 and 1997-98 whereas the stunting rate in the richest income group decreased by 17.6 percentage points.

Figure 4.3 ***Economic differences in decrease of stunting***



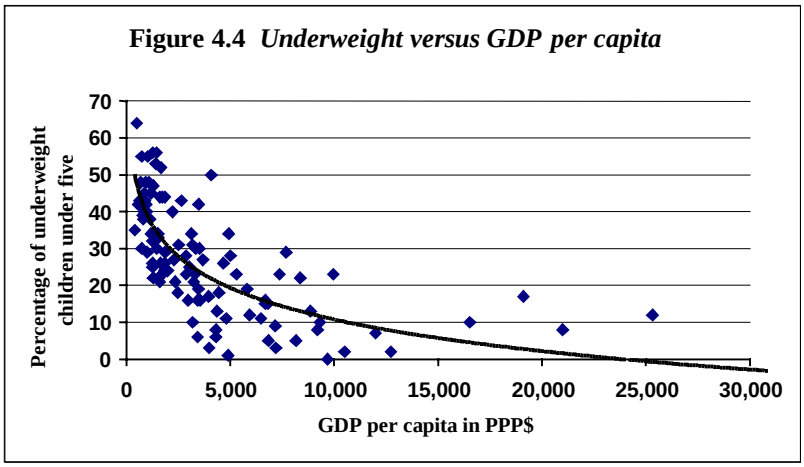
International comparisons

Higher per-capita income is usually associated with better health standards, including better nutrition. Figure 4.4 plots GDP per capita in purchasing power parity (PPP) dollars against the percentage of underweight children under five as reported by the UNDP (1999).

The regression line indicates that higher GDP is associated with lower child malnutrition rates. The figure shows that most countries with a similar GDP record slightly *lower* underweight rates than Vietnam; in other words

malnutrition rates in Vietnam compare unfavorably with comparably poor countries elsewhere. An important exception is India, which has a higher GDP but also a much higher underweight rate.

Figure 4.4 ***Underweight versus GDP per capita***



In comparison with other low-income developing countries Vietnam has relatively favorable social indicators, reflected in its high Human Development Index (HDI). The HDI incorporates data on income per capita, literacy, school enrolment and life expectancy and can take on values between one and zero. Higher values correspond to higher levels of development.

Figure 4.5 ***Underweight versus HDI***

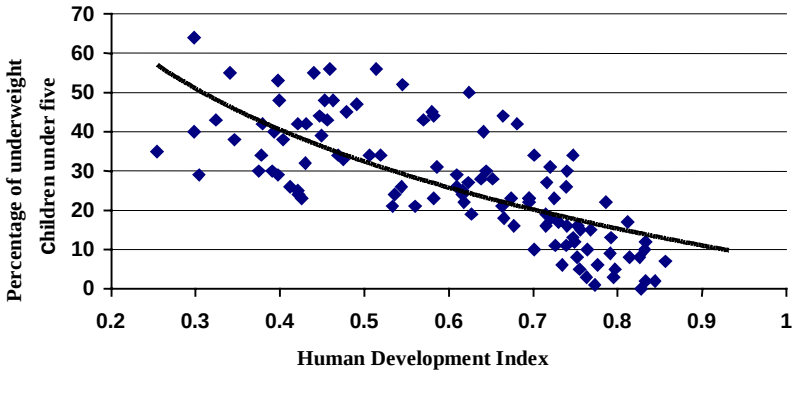


Figure 4.5 graphs recent information on malnutrition and the Human Development Index for 109 countries, and shows that malnutrition rates decline with a higher HDI. Since the HDI reflects good performance of indicators that are commonly associated with better health standards, this is not a surprising result. What is unexpected is that Vietnam has a higher malnutrition rate than one would expect, given its HDI. This means that relatively high levels of education and life expectancy coexist with relatively poor nutritional status.

We now turn to a more detailed examination of the determinants of malnutrition.

DETERMINANTS OF MALNUTRITION

In the malnutrition literature, and as shown in Figure 4.3, higher income is generally associated with better-fed children. However recent studies emphasize the importance of other factors on the extent of child malnutrition, such as the educational level of parents, and the geographic location of the household (Haughton and Haughton 1997, Desai 1995, Horton 1988, Frongillo et al. 1997, Martorell 1986, Begin 1998, UNICEF 1989).

In order to investigate the factors that determine child malnutrition in Vietnam we apply a logistic regression model to the 1998 VLSS data set. The models seeks to measure the effects on malnutrition of regional, gender, urban/rural, economic and household-based differences. It is designed to reflect the influence of various factors on the probability that a child is malnourished.

The basic unit of observation is the individual child. Data on 7,501 children 12 years of age and under are included in this model. The average age of these children is 6.7 years, 17.2% live in female-headed households and 81% are ethnic Vietnamese (Kinh). The regression results are based on the largest sample of children for which data were available.

Dependent variable

Anthropometric data, notably height and weight, were collected in the course of both Living Standards Measurement Surveys. Using these data, and information on sex and age, the stunting, wasting and underweight rates of all children 12 years of age and under may be calculated. A dichotomous variable, equal to 1 if a child is stunted and 0 otherwise, is used as the dependent variable. Since stunting is best thought of as reflecting long-run social conditions, the model uses height-for-age Z-scores to measure overall and severe malnutrition.

The genetic variables – height and weight of the child's mother and father – prove to be highly significant, as the estimation results in Table 4.2 show. This confirms the finding by Haughton and Haughton (1997), in their

models of height-for-age z-scores for Vietnam in 1993, that parental height and weight are important determinants of the nutritional status of children. Our results thus differ in emphasis from those of Martorell and Habicht (1986); in their survey of results from several countries they accept that generics plays a role, but go on to argue that "the variation [in height-for-age] that can be attributed to the environment is several times greater than that which can be attributed to genetics" (p.244).

Surprisingly, given the findings of earlier studies, this model shows a gender effect working *against* boys. If a boy has a 45% probability of being malnourished, the probability for a girl (holding all other factors the same) would be 39%. The gender variable proved to be insignificant in studies using the VLSS93 data set (Haughton and Haughton 1999; Desai, 1995).

The dummy variables for the different regions show significant effects. Living in the central coastal region or the Central Highlands has a high influence on the probability of being malnourished. Consider a child from the reference regions (all omitted regions) with an initial 45% of being malnourished; an otherwise identical child would have a 55% of being malnourished in the Central Coast, 54% in the Central Highlands. The urban-rural differences further change the nutritional risk considerably. If the probability of being malnourished is 45% in the rural area, it drops to 35% for an otherwise identical urban child.

The regional effect is in addition to all the other effects controlled for in the equation, including ethnicity. Minority groups such as the Muong and the H'mong live mainly in remote, rural areas in the Northern Uplands or the Central Highlands. Being of Muong or H'mong ethnicity increases the probability of being malnourished from 45% to 57% and 64% respectively as compared to children of Kinh origin. Anecdotal evidence suggests that the children of other ethnic minority groups also have a high probability of being malnourished, but the VLSS98 data set is not large enough to pick up these effects for each group.

Similarly large differences are associated in some cases with religious affiliation; 71% of the Vietnamese population professes no religion, there is a Christian minority making up 9% of the population, and most of the rest are Buddhists. The initial risk of being malnourished of 45% increases to 57% for children in Christian households.

Attention to mothers' education has increasingly been the focus of efforts to improve children's health outcomes. In Vietnam a relationship has been found between the education both of the father and mother, and nutrition (Haughton and Haughton 1999; Glewwe 1999). In our model the variables representing parental education do not have statistically significant effects. This is true whether they are entered separately or, as here, both at the same time. This finding is most interesting since it suggests that educational efforts in Vietnam may need to focus more on particular health-related information than on broad general education. It is worth

remembering that literacy in Vietnam is almost universal, which is not the case in many other less-developed countries.

Table 4.2
Logistic model of determinants of height-for-age z-scores, 1998

	Coefficient	P-value	New prob. after unit change in indep. var., given initial probability of 45%
Dependent variable			
Malnourished? (yes=1)			
Independent variables			
Mother			
Height (cm)	-.078	.00	43
Weight (kg)	-.026	.00	44
Years of education	.012	.31	
Father			
Height (cm)	-.070	.00	43
Weight (kg)	-.016	.03	45
Years of education	-.003	.74	
Ethnicity:			
Muong (yes=1)	.493	.00	57
H'mong (yes=1)	.791	.00	64
Religion			
Christian (yes=1)	.463	.00	57
Regions			
Central Coast	.417	.04	55
Central Highlands	.362	.00	54
Urban/Rural (urban=1)	-.420	.00	35
Child			
Age of child in years	.083	.00	47
Child 15 month and under	-1.500	.00	15
Birth parity	.190	.00	50
Gender (girl=1)	-.263	.00	39
Other			
Flush toilet? (y=1)	-.906	.00	25
G'mother in house? (y=1)	-.157	.06	41
Household Size	.052	.02	46
Constant	24.231		

Note: Number of observations, 6,441.
Source: VLSS98.

A household's composition has a significant effect on children's probability of being stunted: Every additional household member increases a child's probability of being stunted, whereas a grandmother living in-house appears to have a beneficial effect on nutritional risk. In this model, however, the "granny-effect" is significant only at the 10% level. As has been found in earlier studies (Haughton and Haughton 1999; Horton 1988),

higher birth order – i.e. being born after one or more siblings – increases the risk of being stunted.

No household income or expenditure variable has been included in this model. Income is the result of different choices of a household like time spent working, educational levels etc. and is therefore not appropriate to be used as an independent variable to explain nutritional outcome (Haughton and Haughton 1999; Behrman and Deolalikar 1988). However, a household's type of sanitation may serve as a proxy for income. The results show that the availability of a flush toilet decreases children's probability of being stunted sharply, from 45% to 25%. However if one cheats, and includes the logarithm of household expenditure, the coefficient on expenditure is statistically significant (results not shown here), but does not much alter the essential magnitudes of the other effects – except that the variables measuring the composition of a household (household size and "granny-effect") lose their statistical significance.

Very comparable results (not shown here) emerge if the model is applied to severely malnourished children only – i.e. those with height for age z-scores at least three standard deviations below the NCHS median. The main differences are that when the focus is on severe malnutrition, the ethnic effects are more evident, and regional differences become more significant. Particularly surprising is the high rate of severe stunting in the rice-surplus Mekong Delta, holding other variables constant. We speculate that this may be due to poor sanitation standards in the region, as well as significant pockets of quite severe poverty in an otherwise comparatively well-off part of the country.

BEHIND THE IMPROVEMENT IN NUTRITIONAL STATUS

The considerable drop in malnutrition rates between 1992-93 and 1997-98 raises the question of what caused this change.

Is it because some children grew out of malnutrition, and so were stunted in 1993 but no longer so in 1998? It is widely believed that poor linear growth is determined during the first two years of life, and that children, once they are stunted, cannot easily make up the early deficit.

Or does the superior nutritional status of children who were born in this five-year period between the two surveys account for all of the drop in malnutrition? There is, after all, some evidence that young adolescents may be able to make up, at least in part, for earlier malnutrition.

The combination of the VLSS93 and VLSS98 data sets allows us to solve this puzzle, by looking at a panel of 2,664 children for whom we have nutritional information for both years. The essential results are shown in the transition matrix in Table 4.3. As shown in Table 4.3, the nutritional status of 21% of all children with a normal nutritional status in 1992-93 deteriorated, and these children are now malnourished. In the other

direction, 34% of all malnourished children in 1992-93 have been able to improve their status and are now in the normal category. This intriguing result raises the possibility that there may be ways to compensate for early stunting, an issue that we now explore further.

Table 4.3
Transition Matrix of Stunting (height for age z-scores), 1993 and 1998

Stunting in 1993:	Stunting in 1998			
	Normal	Moderate	Severe	Total
Normal	36.0	7.8	1.7	45.5
Moderate	14.2	15.3	2.8	32.3
Severe	4.6	9.5	8.2	22.3
Total	54.8	32.6	12.7	100.0

Sources: VLSS93 and VLSS98.

An exploratory stepwise logistic regression model (results not shown) analyzing children who were able to improve their height-for-age Z-scores by at least one standard deviation reveals little information on the determinants of such a nutritional improvement. Residence in the Red River Delta or the South East in 1992-93, as well as living in urban areas, have statistically significant positive effects on children's probability of improving their nutritional status. Younger children, children who live in households with a higher proportion of people working, and with grandmothers living in the same household, have better chances of growing out of malnutrition.

It is surprising however that neither the increase in expenditure per capita between 1992-93 and 1997-98 nor the caloric intake are significant in this model. This strongly suggests that other variables that have not been included in this model have an important impact on nutritional improvement. One possible starting point for further research would be an analysis of the composition of the diets of the children and their micronutrient intake. Further, community-related variables like water and sanitation, as well as the accessibility of health services in relation to children's nutritional status, deserve subsequent examination. The unavailability of these services may result in frequent infections as a result of poor hygienic conditions, in which case the better food availability may be of little help.

POLICY RECOMMENDATIONS

Malnutrition among children fell markedly, and more than many experts had expected, between 1993 and 1998. Even so, current malnutrition rates in Vietnam compare unfavorably with comparably poor countries elsewhere,

particularly when set beside Vietnam's good performance on the Human Development yardstick (which emphasizes education and health outcomes). It follows that there is still considerable scope for further declines in malnutrition rates. Several of the important variables that influence malnutrition – parental education, urbanization, birth parity, per capita expenditure levels – are likely to continue to work to lower malnutrition, albeit less quickly than in the 1990s.

What room does this leave for public policy? The answer is, potentially quite a lot. Rural areas, particularly in the center of Vietnam, might benefit from special attention. The data further show that ethnic minorities, especially the H'mong, are particularly disadvantaged and need to be a target of efforts to improve nutritional status. Interventions are especially necessary in the Central Highlands, where the incidence of malnourished children is the highest in the country and where the potential for nutritional improvement may be low due to the high poverty rates (see chapter 2). The remoteness of the villages in this region, and in areas populated by ethnic minorities, make it harder to provide adequate health care and increase children's infectious risk.

Increasing educational levels has commonly been the focus in regard to ensure proper nutrition and better health outcomes. The finding that further parental education does not have a significant influence on nutrition indicates that efforts to promote broad basic education *as a way to combat malnutrition* may be misplaced; it might be more useful to focus on providing more specialized nutritional information. This might include information for mothers and caregivers about the composition of diets, proper weaning food and how to avoid infections in infants and toddlers.

A further challenge to nutritional education is posed by the fact that the high economic growth resulted in overnutrition of a small part of the population. This trend has been observed earlier in other developing countries like China, the Philippines and Thailand. In order to avoid a growing number of obese children, educational efforts will have to be directed to this specific target group.

The exploratory model found, surprisingly, that the level of caloric intake had little effect on nutritional status. This suggests that one needs to look elsewhere for explanations of malnutrition, possibly focusing more on measures that decrease the risk of children catching infections. Unless measures are taken to improve access to safe water, sanitation and the availability of adequate health care, gains in food availability will partly be squandered.

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Chapter 5

Education and Income

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Trần Bích Phượng
with
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Jonathan Haughton

INTRODUCTION

Although Vietnam is ranked among the world's poorest countries, it has enjoyed a period of sustained and rapid economic growth in the fifteen years since the market-oriented reforms that resulted from *Đổi Mới* ("renovation") were first approved.

Perhaps the most impressive achievement is the fall in poverty, from 75% of the population in 1988 (Dollar 2001) to 55% in 1993 and 37% by 1998 (Haughton, chapter 1). There has been a parallel rise in income per capita, from $157 in 1991 to $352 by 1998.

Among the accompanying social changes has been a rise in educational enrolment rates at all levels. Between 1993 and 1998 the net enrollment rate rose from 78% to 93% at the primary level, 36% to 62% at the lower secondary level, and from just 11% to 29% for upper secondary school. It is clear that one of the results of rising affluence is that more households want, and are able, to send their children to school for longer.

Causality also runs in the other direction, from education to income. In the words of a World Bank report, "education improves the living standard of population, especially the poor, by increasing the productivity of labor, by reducing fertility and improving health, and by equipping people to participate fully in the economy and society" (World Bank 1995, p.19). Specifically, education confers skills, knowledge and attitudes that create opportunities for educated persons to improve their productivity and to have better opportunities to gain access to jobs both in the formal and informal

sectors. The result is higher income, which in turn implies a better standard of living (WB 1, 1995, p.19).

In a broader context, Jones (1990, p 12) argues that education should be seen as an investment good, providing the key to better jobs and higher incomes for individuals, while at the same time lifting national production and raising the level of output per head. There is a massive literature on the returns to education; for instance, in a careful study of twins, Arias et al. (2001) estimate rates of return of between 9% and 13% on the investment in education, in the United States;

Watkins (1995, p 25) focuses on the converse; he attributes low incomes to low education, and makes the case that "the low incomes of poor people are partly a consequence of their low levels of skills and literacy. Education will increase their earning capabilities and employment prospects, while bringing wider benefits for society".

These arguments are relevant to Vietnam. The expansion of education has helped sustain the rapid economic growth. In the next section of this chapter we provide evidence that better-educated people tend to have higher incomes and a higher standard of living.

We then separate earnings into three parts – wages, agricultural income, and income from non-farm household enterprises – and ask what effect education has on the level of earnings from each source. To do this we estimate three regression models of earnings, and pay special attention to the specification and interpretation of the educational effects. Our study is based on the data from the 1998 Vietnam Living Standards Survey (1998).

OVERVIEW OF INCOME AND EDUCATION IN VIETNAM

A breakdown of the sources of income is provided in Table 5.1, for each of the seven (old) regions of Vietnam. Earnings come from agriculture (32% of all income), non-farm self employment (27% of income) and wages (23% of income), and total 81% of all income. Households also receive modest amounts of income from pensions and subsidies, and from "other" sources (including interest, remittances, and rent). We expect education to influence earnings, but not the other sources of income, and so in what follows we concentrate exclusively on the earnings component of income.

The importance of agricultural income is greatest in the poorest regions (the Northern Uplands, the North Central Coast and the Central Highlands); conversely, wage income is important in the more urbanized areas, and particularly in the Southeast region (which is centered on Ho Chi Minh City). One of the ways in which education may influence income is through its effects on the *source* of income. For instance, with more education an individual is more likely to earn income from wages than from agriculture; since wage income is typically higher than agricultural income, education is in effect raising income in a roundabout way.

Table 5.1
Breakdown of Nominal Income by Region, 1998.

Source of income	N. Uplands	Red River Delta	N. Cent Coast	Cent Coast	C. High-lands	South east	Mek-ong Delta	Total
Agric, Forestry	60.2	24.3	38.2	33.5	74.6	7.8	48.5	32.0
Non-Frm Self-emplt.	16.8	30.5	22.9	27.2	10.5	33.6	23.0	26.6
Wages	8.9	21.0	16.7	26.0	8.9	34.7	18.3	22.8
Pensions, subsidies	4.3	5.4	6.0	1.7	0.9	1.0	1.3	2.8
Other income	9.8	18.8	16.3	11.5	5.1	22.9	8.9	15.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Memo: mean income*	2,155	3,264	2,325	2,723	2,796	7,432	3,040	3,389

Note: * in '000 dong per capita per year, 1998.
Source: Vietnam: GSO, 2000, Table 7.1.1d, p.303.

The level of educational attainment is summarized in Table 5.2, which also provides a breakdown by gender. On average, men have obtained more formal education than women. For instance, while 2.7% of men have at least a university degree, the equivalent figure for women is just 1.6%. At the other end, 27% of men do not even have a primary school diploma, while for women this figure is 42%. In passing we note that these numbers refer to all adults, including old people, and so the gender gap is to a significant degree due to a legacy of past inequality in access to education.

Another breakdown of educational attainment, this time by region, is given in Table 5.3. The regional differences are striking: more than half of all adults (aged 15 or more) have not completed even a primary diploma in the Mekong Delta, while in the Red River Delta the figure is just over 20%. At the other extreme, university graduates are disproportionately found in the most urbanized provinces (the Red River Delta and Southeast), and especially in and around Ho Chi Minh City.

Table 5.3 also provides information on income per capita levels for each region. There appears to be a correlation between educational attainment and income; by and large the regions with the highest incomes (the Southeast, followed by the Red River Delta) are also the areas with the

Table 5.2
Breakdown of Educational Attainment by Gender, 1998

	Total	Male	Female
Never went to school	9.5	5.2	13.4
Less than primary diploma	25.4	21.5	29.0
Primary diploma	25.3	27.6	23.3
Lower secondary diploma	22.9	25.2	20.8
Upper secondary diploma	6.9	7.9	6.0
Technical worker	3.1	4.0	2.3
Professional secondary	4.4	5.6	3.4
2-year univ. certificate	0.3	0.3	0.2
University degree	2.1	2.6	1.6
Master's degree	0.04	0.07	0.01
Ph.D. degree	0.02	0.04	0.00
Total	100.0	100.0	100.0

Sources: Vietnam: GSO, 2000, Table 2.5.2 p. 60.

highest educational levels. However the link is not watertight; the poorly-educated Mekong Delta is comparatively affluent, and the very poor North Central Coast is relatively well educated.

This suggests that if we want to quantify the link between education and income, it is necessary to look at data at the level of the household, not the province. This in turn calls for the specification and estimation of an appropriate set of formal models, and we turn to this task in the next section.

Table 5.3
Educational Attainment and Income by Region, 1998
(for individuals aged at least 15)

Source of income	N. Uplands	Red River Delta	N. Cent Coast	Cent Coast	C. High-lands	South east	Mek-ong Delta
Never went to school	11.5	5.3	6.5	12.3	20.5	7.6	12.0
Less than primary dipl.	20.7	15.9	19.0	28.5	28.9	24.4	40.2
Primary diploma	26.1	18.1	25.0	27.4	29.5	29.0	27.7
Lower secondary dipl.	25.9	36.4	28.8	17.0	13.0	18.6	11.6
Upper secondary dipl.	5.2	9.3	8.7	7.4	2.8	8.9	4.0
Technical worker	3.2	5.3	3.0	3.7	3.7	1.8	1.5
Professional secondary	6.2	6.1	6.9	2.00	1.4	4.7	1.7
2-yr university cert.	0.1	0.5	0.1	0.2	0.0	0.6	0.1
University degree	1.1	2.9	2.0	1.6	0.2	4.3	1.3
Master's degree	0.00	0.08	0.03	0.00	0.00	0.14	0.00
Ph.D. degree	0.00	0.07	0.00	0.00	0.00	0.03	0.00
All educational levels	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean income	2,155	3,264	2,325	2,723	2,796	7,423	3,040
Median income	1,641	2,029	1,726	2,028	1,864	5,190	2,285

Note: Income is in thousands of dong per capita per year.
Sources: Vietnam: GSO, 2000, Table 7.1.3a p. 308; GSO, 1998.

THREE MODELS RELATING INCOME TO EDUCATION

In this section we turn to the problem of quantifying the effects of education on earnings. Ideally, the estimates would be done at the level of individuals, so that one may trace the effect of an individual's education on his or her earnings. However we only have wage information at the individual level; data on agricultural income, and income from non-farm household enterprises, are only available at the household level.

To address this difficulty, we have separated earnings into three components – wages, agricultural income, and non-farm enterprise income – and we specify and estimate separate models for each. A similar approach was taken by Yúnez-Naude and Taylor (2001), who modeled six separate income-generating activities using data from a sample of rural households in Mexico. Like us, their interest was in the ways in which education affects the choice of activity, as well as in the influence of education on earnings from any given activity. They found that primary and secondary education had positive effects on income from grain cultivation, but not on income

from non-farm household enterprises; higher levels of schooling were particularly effective in raising wage earnings.

Wages

Of the 16,909 adults in the labor force that were surveyed by the VLSS in 1998, 5,179 (30.6%) were wage earners. For these individuals we may estimate a wage equation by regressing the log of wages on education and other relevant variables (such as experience, region of the country, and gender). This should permit us to isolate the effects of education on wages, holding the other influences constant.

There is a technical problem. We only observe wages for those who work for a wage, and not for others. It is possible, indeed likely, that those who work for wages are not randomly drawn from the population at large. For instance, they may be better educated, or older, or live in cities, or be unusually dynamic individuals. Unless we address this problem of sample selection, the estimates of the wage equation are likely to be biased.

The standard solution, generally associated with Heckman (1979), is to first estimate a probit regression that determines who works for wages, and then used the transformed errors from the probit regression as a variable in the wage equation. In this chapter we use a full maximum likelihood Heckman procedure, implemented by the `Heckman` command in STATA (StataCorp 1999).

The results are shown in Table 5.4. The bottom panel shows the estimates of the selection equation (wage earner/non wage earner), and the top panel gives the estimates of the wage equation. In addition to the conventional variables, such as dummy variables for geographic areas, and years of education and experience, the equations include a variety of non-linear and interactive effects. Our procedure was to include all the possible multiplicative interactions between education and the other variables initially, and then to drop any terms that were not statistically significant at the 10% level.[5]

Who earns wages?

The effect of education on the probability of earning wage income is surprisingly complex, because not only are the influences not linear, but they also depend on the region in which the household is living. Figure 5.1

[5] Note that the selection equation includes two variables (size of household, gender of household head) that do not appear in the wage equation; this helps improve the identification of the sample selection bias.

Table 5.4. ***Heckman model for the logarithm of wages, 1998***

	Coefficient	p-value
Wage equation		
Dependent variable: Log of wage		
Independent variables:		
Experience in years	-0.014	0.01
Diploma: primary	0.146	0.00
Diploma: Lower secondary	0.192	0.00
Diploma: Upper secondary	0.256	0.00
Male (M=1, F=0))	-0.156	0.00
Geographic effects:		
Hanoi-Ho Chi Minh City	Reference	
Other cities	-0.212	0.00
Other urban areas	-0.318	0.00
Northern uplands-rural	-0.202	0.06
Red River Delta-rural	-0.705	0.00
North Central Coast-rural	-0.788	0.00
Central Coast-rural	-0.896	0.00
Central Highlands-rural	-1.104	0.00
Southeast-rural	-0.612	0.00
Mekong Delta-rural	-1.265	0.00
Non-linear effects		
Number of yrs of education: squared	-0.003	0.06
Number of yrs of education: cubed	0.0002	0.01
Experience in years: squared	0.0005	0.00
Interaction effects		
Yrs education x Central Coast-rural	0.055	0.00
Yrs education x Central Highlands-rural	0.044	0.00
Yrs education x Southeast-rural	0.028	0.01
Yrs education x Mekong Delta-rural	0.081	0.00
Constant	9.617	0.00
Sample Selection Equation		
Dependent variable: Wage earner? (Yes=1)		
Independent variables:		
Household size	-0.005	0.22
Male head of household? (M=1, F=0)	-0.093	0.00
Experience in years	0.051	0.00
Diploma: beyond upper secondary	0.377	0.00
Male (M=1, F=0)	0.463	0.00
Geographic effects:		
Hanoi-Ho Chi Minh City	Reference	
Other cities	-0.226	0.00
Other urban areas	-0.445	0.00
Northern uplands-rural	-1.148	0.00
Red River Delta-rural	-1.040	0.00
North Central Coast-rural	-1.015	0.00
Central Coast-rural	-0.422	0.00
Central Highlands-rural	-0.659	0.00
Southeast-rural	-0.246	0.00
Mekong Delta-rural	Reference	
Non-linear effects		
Number of yrs of education: squared	0.002	0.00
Experience in years: squared	-0.001	0.00
Interaction effects		
Yrs education x experience	-0.001	0.00
Yrs education x Red River-rural	0.026	0.02
Yrs education x North Central Coast-rural	0.028	0.00
Yrs education x Mekong Delta	-0.064	0.00
Constant	-0.501	0.00

Notes: Based on 16,909 individuals in the labor force, 5,179 wage earners, 11,730 non-wage earners. Log likelihood = - 41,204,363.

provides a sampling of these effects. It uses the estimated probabilities that an individual is a wage earner, derived from the selection equation in Table 5.4, to work out the probability that a "typical" worker (household with a male head, 8-12 years of experience, male) will be working for a wage.

The first thing to note in Figure 5.1 is that people are more likely to be working as wage earners in the large cities (Hanoi and Ho Chi Minh City) than in rural areas. In the cities, and in most of the rural areas (including the Red River Delta), individuals with more education are more likely to be working for a wage. This effect is particularly strong for those who have completed a primary education or more.

The rural Mekong Delta is an anomaly. There it is the least educated who are most likely to be wage earners, mainly as farm hands, although well-educated individuals are also relatively likely to earn wage income. This is the only area of the country where there is a substantial class of landless households that rely on wages to survive (Haughton 2000); this rural proletariat has also been left behind somewhat by the economic growth of the 1990s, and its poor performance helps explain why the Mekong Delta region saw its standard of living slip, relative to other regions, between 1993 and 1998; there is some further discussion of the deteriorating relative position of hired farm workers in chapter 3.

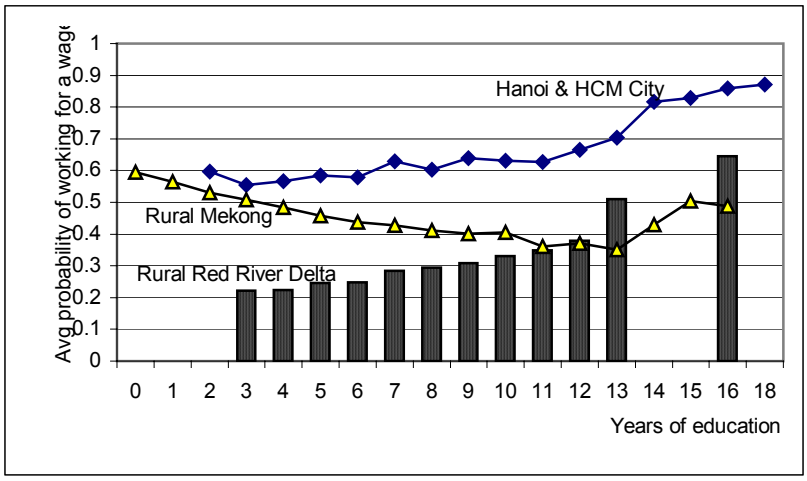

Figure 5.1. ***Average estimated probabilities of working for a wage, by years of education, for males with 8-12 years of experience in households with a male head, 1998***

How does education affect wages, for wage earners?

Given that someone earns a wage, to what extent does the education they have received influence the amount of the wage? The answer is to be found

in the wage equation estimates in Table 5.4, but the problem is that the effects of education are non-linear, and cannot easily be summarized in a few numbers.

Instead, we have chosen to present the results graphically in Figure 5.2. On the horizontal axis we have put the number of years that individuals stayed in school, including years that they may have repeated. For each individual we then computed, the part of the wage equation that contains the variable on the number of years of education, and the dummy variable on diploma attained. Thus we are plotting on the y-axis the contribution of education (and diplomas) to the wage equation. If someone has only a primary school diploma, for instance, this increases their wages over and above what they would have made if they had, for instance, done five years of schooling but not properly completed primary school.

The curves in Figure 5.2 have been smoothed, to allow us to focus on the essential trends. There are separate curves – reading from top to bottom in Figure 5.4 – for the rural areas of the Mekong Delta, the Central Coast, the Central Highlands, and the Southeast; the bottom curve refers to all the other regions, including the towns and cities.[6]

The first point to note is that all of the curves in Figure 5.2 trend upwards. This means that more years of schooling contribute to higher wages. As Vietnam has continued to move towards a market-oriented economy, the labor market has become more meritocratic, and wages increasingly reflect the schooling and ability of workers. A similar increase in the flexibility and efficiency of labor markets has occurred in the transition economies of eastern Europe (Terrell et al. 2000).

The second interesting feature of these "wage curves" is that they are not linear; extra years of primary education do not appear to help very much, but university education boosts wages substantially.

The curves in Figure 5.2 also have kinks. For instance, at about five years of schooling, all the curves turn up sharply. This reflects the influence of the diploma variable: most people, after about five years of schooling, obtain a primary school diploma, and this is apparently very helpful in boosting their wage levels. Similar, but less obvious, jumps are discernible after 9 years of schooling (end of lower secondary school) and 12 years of schooling (end of high school).

The odd "wobbles" in Figure 5.2 occurs because there are two types of people with 12 to 16 years of education: those with higher diplomas (who push up the wage curve), and those who have spent long years in school without getting the higher-level diplomas (who push down the wage curve).

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[6] The reference group consists of all those strata for which the interaction effects between education and regions (see wage equation, Table 6.4) were not statistically significant at the 10% level.

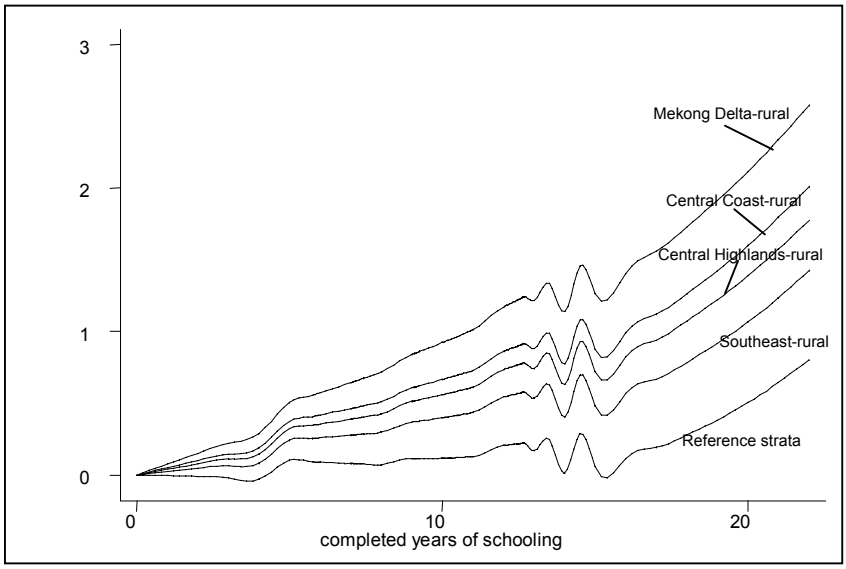

Figure 5.2
Effect of years of education of individual on (log) of wages.
Based on wage equation results in Table 5.4.

Perhaps the key point that emerges from this analysis is that years of schooling alone are not enough; it is also important to obtain educational qualifications. This probably has important policy implications: now that educational enrollment rates have risen to respectable levels, the challenge is not so much one of providing education for more children – although this certainly helps (Duflo 2000) – but rather one of ensuring that the quality of education is good enough so that they are able to earn their diplomas, and to do so in a timely fashion.

Non-farm income

Almost 45% of households reported receiving non-farm non-wage income in 1998. This came from a wide variety of activities, including services (retail outlets, food stalls, and the like), small manufacturing activities, and construction; for further details of the role and importance of non-farm household enterprises, see Vijverberg (1998), and Vijverberg and Haughton (2001).

We expect that the education of the head of the household will affect the profitability of a non-farm enterprise. In Table 5.5 we report the results of regressing the log of non-farm household enterprise income on a number of independent variables that are designed to capture the effects of

Table 5.5
Regression model for the logarithm of non-farm income, 1998

	Coefficient	p-value
Dependent variable: Log of non-farm income		
Independent variables:		
Number of years of education of head of household	0.141	0.00
Diploma: upper secondary for head of household	0.187	0.05
Experience in years of head of household	0.052	0.00
Male head of household (M=1, F=0)	0.214	0.00
Geographic effects:		
Hanoi-Ho Chi Minh City	Reference	
Other cities	-0.491	0.00
Other urban areas	-0.382	0.04
Northern uplands-rural	-1.773	0.00
Red River Delta-rural	-1.705	0.00
North Central Coast-rural	-1.966	0.00
Central Coast-rural	-1.014	0.00
Central Highlands-rural	-1.267	0.00
Southeast-rural	-0.942	0.00
Mekong Delta-rural	-1.187	0.00
Non-linear effects		
Number of yrs of education: squared	-0.003	0.06
Experience in years: squared	-0.0005	0.00
Interaction effects		
Yrs of education x experience	-0.002	0.00
Yrs of education x Other urban areas	-0.036	0.06
Yrs of education x Central Coast-rural	-0.041	0.05
Yrs of education x Southeast-rural	0.038	0.04
Constant	8.031	0.00

Note: Based on 2,673 households active in non-farm work. R-squared = 0.26.

education and geography. Here too we have non-linear and interactive effects, which make the presentation of the results more difficult. Again the easiest solution is to present the effects of education in the form of a diagram; the top panel of Figure 5.3 shows the effects of years of schooling on non-farm enterprise income, holding other effects (except diplomas) constant, for household heads with 10 years of experience; the top panel shows the situation for households where the head has had 30 years of work experience.

For households where the head had about ten years of experience, additional schooling generally raises non-farm non-wage income, as the upward slope of the top two curves in the upper panel of Figure 5.3 shows. This effect is much weaker in the rural Central Coast region, and in smaller urban centers, and all but vanishes for households with thirty years of experience. One interpretation is that schooling is a particularly important contributor to the success of a household non-farm enterprise in the early years of the business, but eventually it is experience rather than formal schooling that matters most.

The curves in Figure 5.3 show no upward jumps for cases where the head of the household gets a primary, or lower-secondary, diploma – in

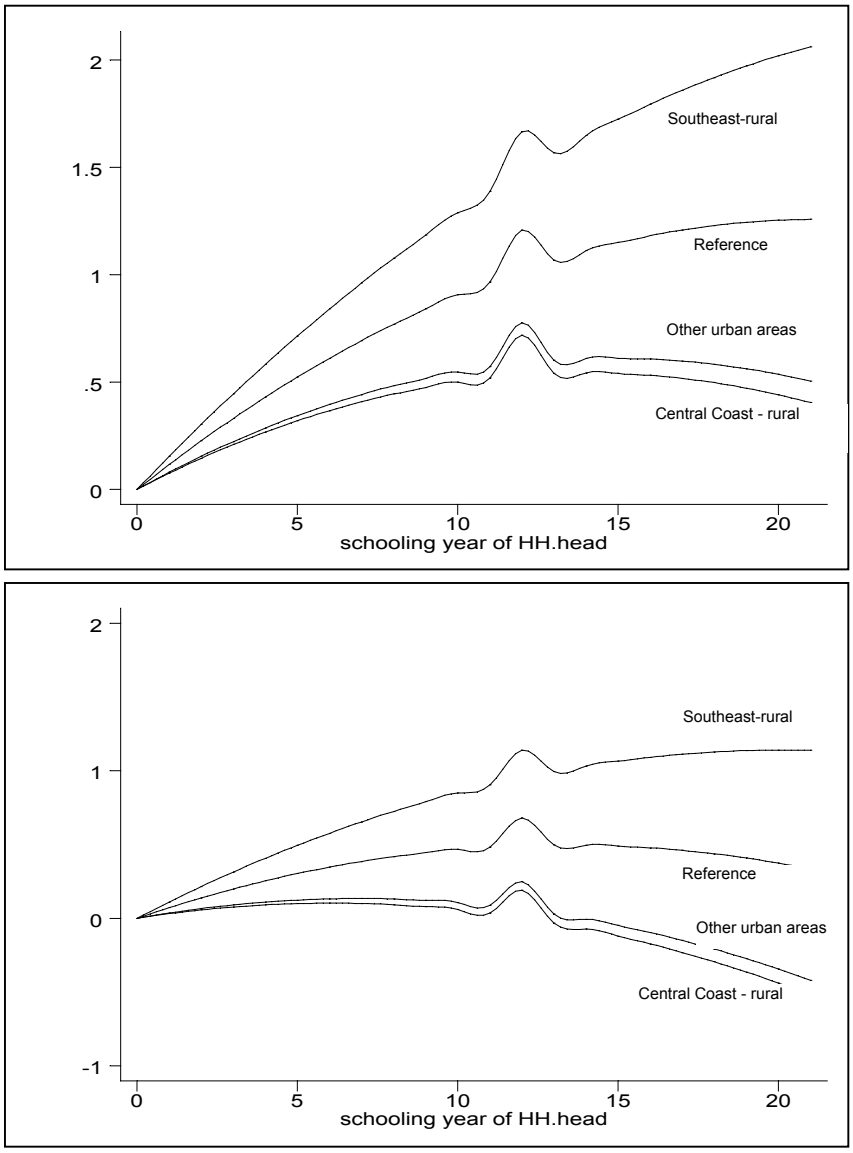

Figure 5.3
Effect of years of education of household head on (log) of non-farm income, for 10 years of experience (top panel) and for 30 years of experience (bottom panel).
Based on non-farm earnings estimates from Table 5.5.

contrast to the case of the wage curves in Table 5.2, where this was important. This finding is both interesting and sensible: formal educational qualifications may be important to an employer, but they have little value for someone who is self-employed. The one exception occurs for those with a high-school diploma and 12 years of schooling. These are the people who finished high school on time, and are probably bright and dynamic, factors that undoubtedly contribute to higher incomes.

There is another important difference between the curves in Figure 5.2 and 5.3. The wage curves (Figure 5.2) in general become steeper as schooling rises, indicating a growing return to extra education as people become more educated. On the other hand the non-wage income curves in Figure 5.3 become flatter for those with more education. Put another way, the payoff to extra education diminishes in self-employment, while it rises for wage employment. A corollary is that we would expect substantial numbers of moderately well-educated individuals to operate their own businesses, but the very well educated will find wage employment more attractive.

Agricultural income

Just over 70% of households were active in farming. We estimated a simple model of the log of farm income for these households, again emphasizing geographic and educational factors; the results are shown in Table 5.6. An unusually large number of interactive effects proved to be statistically significant in this case, giving a relatively complex model. It is however still estimated using ordinary least squares, which appears to be relatively robust when estimating earnings equations (Dearden 1999).

The best way to understand the educational effects on farm income is with the help of Figure 5.4. A better-educated household head is associated with higher agricultural income, provided he or she has only ten years of experience, and given that the household is engaged in farming. On the other hand the effects of schooling on agricultural income are much weaker when the head of the household had thirty years of experience, as the bottom panel in Figure 5.3 shows.

There are two possible interpretations of these findings. The first is that education really does help improve people's ability to farm. The other possibility is that well-educated people will not engage in farming unless they can get a good return on their efforts, so that the graph in Figure 5.3 is picking up sample selection effects.

Table 5.6
Regression model for the logarithm of farm income, 1998

	Coefficient	p-value
Dependent variable: Log of farm income		
Independent variables:		
Number of yrs of education of head of household	0.397	0.000
Diploma: primary for head of household	0.202	0.002
Diploma: lower secondary for head of household	0.415	0.000
Diploma: upper secondary for head of household	0.569	0.000
Diploma: beyond upper secondary for head of household	0.341	0.001
Experience in years of head of household	0.111	0.000
Male head of household (X=1)	0.421	0.000
Geographic effects:		
Hanoi-Ho Chi Minh City	Reference	
Other cities	Reference	
Other urban areas	1.261	0.000
Northern uplands-rural	1.890	0.000
Red River Delta-rural	0.966	0.000
North Central Coast-rural	1.219	0.000
Central Coast-rural	1.676	0.000
Central Highlands-rural	2.169	0.000
Southeast-rural	1.685	0.000
Mekong Delta-rural	1.806	0.000
Non-linear effects		
Number of yrs of education: squared	-0.022	0.000
Number of yrs of education: cubed	0.0007	0.001
Experience in years: squared	-0.001	0.000
Interaction effects		
Yrs of education x experience	-0.004	0.000
Yrs of education x Other cities	-0.056	0.031
Yrs of education x Other urban areas	-0.125	0.000
Yrs of education x Northern uplands-rural	-0.106	0.000
Yrs of education x Red River Delta-rural	-0.051	0.027
Yrs of education x North Central Coast-rural	-0.074	0.001
Yrs of education x Central Coast-rural	-0.102	0.000
Yrs of education x Central Highlands-rural	-0.095	0.012
Yrs of education x Southeast-rural	-0.107	0.000
Yrs of education x Mekong Delta-rural	-0.062	0.008
Constant	3.575	0.000

Note: Based on 4,252 households active in farming; R-squared = 0.20.

CONCLUSIONS

The focus of this chapter is on the links between schooling and earnings. We estimated a individual-level wage equation, after controlling for sample selection bias, and household-level equations for non-farm enterprise income and for agricultural income.

Education has an important effect on income, in two ways. First, more education allows people to choose to pursue more remunerative lines of activity – wage employment rather than farming, for instance. And second, it raises the return within any activity.

Additional schooling is particularly effective at raising wages; in this part of the labor market, qualifications are important too. Five years of education, without a primary school diploma, brings only a modest return.

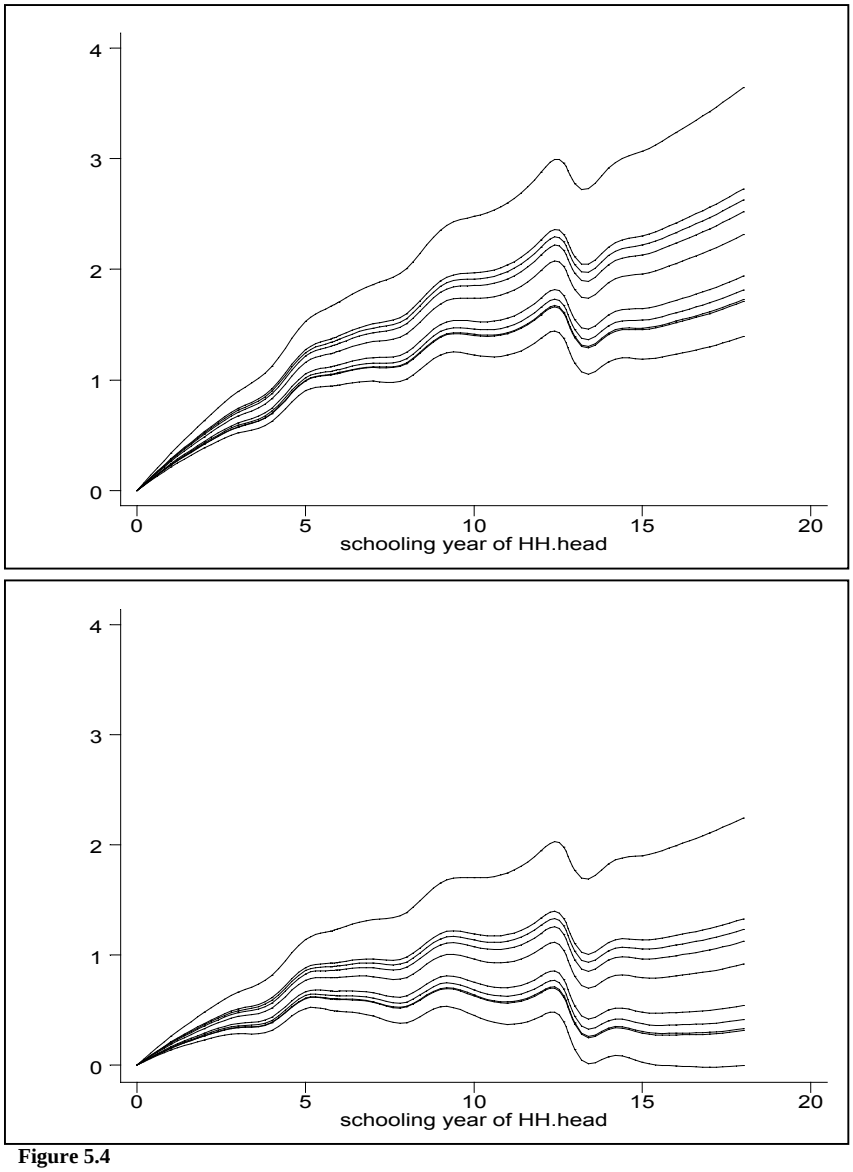

Figure 5.4
Effect of years of education of household head on (log) of farm income, for 10 years of experience (top panel) and for 30 years of experience (bottom panel). From top to bottom: Hanoi and HCM City, Other cities, Mekong Delta-rural, Red River-rural, North Central Coast-rural, Central Highlands-rural, Central Coast-rural, Northern Uplands-rural, Southeast-rural, other cities.
Based on farm income estimates in Table 5.6.

A feature of our models is that they contain a substantial number of interactive and non-linear effects. This is interesting, but makes the presentation of the results more difficult. The payoff comes when we develop a more realistic picture; for instance, more education is associated with a higher probability of wage employment everywhere except in the rural parts of the Mekong Delta region, where there are many landless laborers who take on wage labor to make ends meet.

The study is not without weaknesses. For instance, we assume that the information on education and income from the VLSS98 survey is accurate, but this is a strong assumption. We know that income is underreported. And a recent study by Kane et al. (1999) found that although U.S. households reported their degrees and diplomas accurately, this was not true of the number of years of schooling that they had undertaken.

We probably should pay more attention to the possibility of sample bias in the enterprise earnings, and agricultural earnings, equations. There may also be scope for adding further variables (such as land holdings, for the agricultural earnings equation). Meanwhile we are relatively confident that the results in this chapter are robust enough to be both interesting and useful.

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Chapter 6

Determinants of Earned Income

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INTRODUCTION

Recent research shows that poverty is still widespread in Vietnam, especially in more remote areas (GSO 2000, World Bank 1999). In 1998, 15% of the population was in food poverty, meaning that they lived in households that could not afford to buy 2,100 Calories of food per day even if they bought nothing else; 37% were poor using a poverty line that allows for adequate purchases of food and other basic necessities.

Living standards are lowest and poverty is highest in the Northern Uplands (food poverty of 29%) and in the Central Highlands (32%). By international standards inequality is not high (the national Gini coefficient was .354 in 1997-98), but inequality varies significantly between urban and rural areas and between regions.

Why are some households poor while others are rich? This paper examines the changes and determinants of households' earned income in the 1992-93 to 1997-98 period. Among the sources of household income, earned income (comprising wages and net revenue from agricultural and non-farm enterprises) is the most important component of sustainable living standards.

How is earned income distributed by urban/rural residence and by regions? How do locational factors such as the local transport system, the ability to access markets, and the extent of traditional handicraft production, affect the earned income distribution? Do household characteristics such as

size, head's gender, age or occupation, and average characteristics of household members such as education or experience, have strong effects on earned income? How has household earned income changed since 1993, and what are the major determinants of these changes? These are questions that need to be answered. This paper explores all of these issues using data from the two Vietnam Living Standard Surveys of 1992-93 (VLSS93) and 1997-98 (VLSS98).

This paper analyzes three dimensions of earned income: its levels, components and changes over time. The next section breaks down the levels of household earned income in 1997-98 by geographic location, commune and household characteristics. The subsequent section describes the changes in earned incomes and the determinants and correlates of these changes over the five years between the two VLSS surveys. Then there follows a section in which we use two types of regression models to analyse the determinants of earned incomes. One type of model is a direct model, in which the logarithm of earned income is regressed on household and commune characteristics plus location dummies to see what determines income levels. The second type of regression model decomposes earned income into three components: earned income per hour, working hours, and labor force share in the household. This allows us to examine the determinants of each of these three components. The most important findings are summarized in a concluding section.

LEVELS AND DETERMINANTS OF EARNED INCOME, 1997-98

In this section, we look first at the geographic differences in earned income by urban/rural residence and by region, then at the accessibility and market orientation of communes, and finally at household characteristics. Throughout the paper we use earned income per capita as the principal welfare measure. We define earned incomes to include all net payments to household members (wages, net revenue from agriculture and household enterprises) that vary with hours worked. We exclude, from earned income, payments like pensions, scholarships, remittances, rent and interest on savings that do not vary with the hours worked (at least contemporaneously) by household members. This allows us to focus on the returns and incentives facing labor .

Hours worked is calculated by dividing the total working hours recorded by household working members by the numbers of working members. A person is regarded as a working member of a household if he or she works at least one hour per day, on average, in either a main or secondary job. Fully 86% of the working age population was economically active in 1998, a high proportion by world standards (GSO 2000, p.157).

Geographic Differences in Earned Incomes

Table 6.1 provides a geographic breakdown of earned income, hours worked and the proportion of working people. In each case the numbers are presented as indexes, with 100 representing the national average, in order to make comparisons easier and more precise.

The first two columns of numbers in Table 6.1 show that both annual earned income per capita and earned income per hour vary substantially between regions. The earned income index is the highest in the Southeast (the region centered on Ho Chi Minh City), where, somewhat surprisingly, it is more than twice as high as in the Red River Delta (the region centered on Hanoi). Annual earnings per capita are the lowest in the Northern Uplands, at only 68% of national earnings per hour. Generally earnings per hour tend to rise as one moves from the north to the south: the lowest value of the index is in the Northern mountains (58% of the national average) and the highest is in the Southeast (181% of average).

Column 3 of Table 6.1 shows that working people in the Northern Uplands have the longest working hours (111% of the national average), following by the Southeast (110% of the national average). The working hours in the Mekong Delta are the lowest (84% of the national average), following by the Red River Delta (97% of the national average). However, with the exception of the Mekong Delta, the variation in the hours worked is small compared to hourly earnings. This suggests that hourly earnings is the main factor determining income levels and the income differentials between rural and urban areas and regions.

Table 6.1
Earnings and Working Hours by Geographic Location, 1997-98

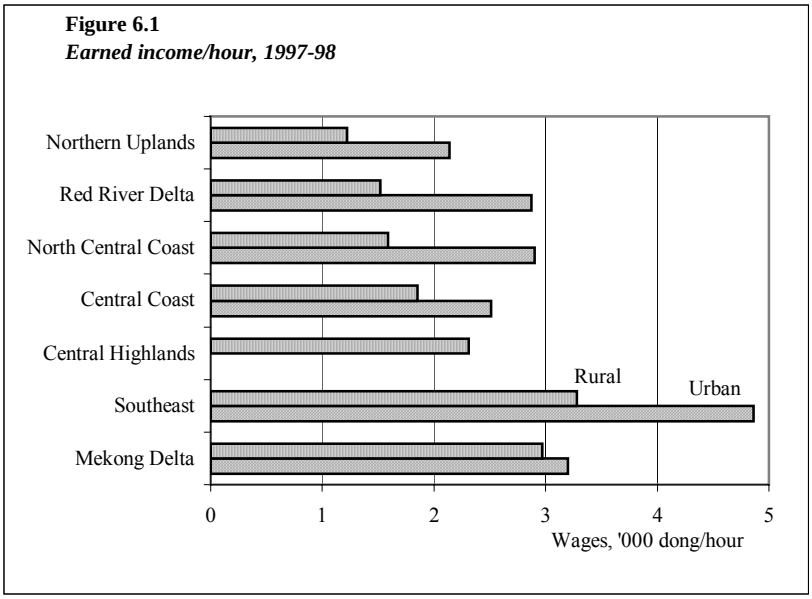
	Annual Earnings per capita	Earned Income per hour	Working hours*	Labor Force Proportion
	As percentage of national average			
Vietnam	**100**	**100**	**100**	**100**
Rural Areas	82	88	96	103
Urban Areas	161	151	116	90
Regions				
Northern Uplands	68	58	111	106
Red River Delta	82	81	97	103
North Central Coast	77	75	99	106
Central Coast	97	90	107	96
Central Highlands	98	103	101	92
Southeast	185	181	110	90
Mekong Delta	110	134	84	99
Memo:	*('000 dong)*		*(hrs/yr)*	*(% of hh)*
Vietnam overall	**2,338**	**2.25**	**1,893**	**57.60**

Source: Authors' calculation based on data from VLSS98.
Notes: * Average working hours is the result of dividing total working hours of the household working members by the number of working members. A working person is defined as someone who works at least 300 hours annually.

Finally, the fourth column in Table 6.1 shows that the proportion of household members who work is substantially higher in rural than urban areas. The proportion is higher in the north than in the south of the country. One explanation is the low earned income per hour in the north; more people there need to work in order to achieve an adequate minimum level of earned income.

If we examine earned income per hour in the urban and the rural areas by region, the data show that the urban Southeast leaves other regions far behind (Figure 6.1); its earned income was 4,860 dong/hour in 1997-98, 66% higher than the urban areas in the Red River delta (2,870 dong/hour). Again the region with the lowest urban earnings is the Northern Uplands (2,140 dong/hour).

Figure 6.1
Earned income/hour, 1997-98



In rural areas, earned income per hour ranked in quite clear ascending order from north to south. The earnings in the Northern Uplands are the lowest, followed by the Red River Delta and the North Central Coast at about 1,550 dong/hour ($0.11). The highest hourly earnings are in the Southeast (3,280 dong/hour), somewhat above earnings in the Mekong Delta (2,970 dong/hour). We expected earned income in the Red River Delta to be higher than in the North Central and Central Coast regions, but the facts do not bear this out.

If we look at the difference between urban and rural areas, the difference within the Mekong Delta is the lowest (7.7%). This may reflect the greater integration of labor markets there, and the absence of any very large cities.

Why is earned income in the north lower than in the south? According to microeconomic theory, there are two main reasons. First, the quantities of labor supplied and labor demanded are not the same, so there may be a relative shortage of labor supply in the south and a relative surplus of the labor supply in the north. Second, the structure of labor supply and demand may differ between the north and the south, with greater demand for skilled labor in the south.

Commune Infrastructure

How does the infrastructure of communes affect earned income? More specifically, we ask: Can a car reach the commune? Is there a regular market in the commune? Is industrial/handicraft employment available in or near the commune? If the answers are yes, it means that there are job opportunities available in the commune, and greater ability to access markets. We assume that cars can reach every urban area, and there are handicraft activities and regular markets in all urban areas.

Table 6.2
Earned Income Per Capita and Components by Commune Characteristics, 1998

	Annual Earnings per Capita	Earned Income/hour	Working hours	Proportion of Working Persons
	As percentage of national average			
Can car reach commune?				
No	41	48	103	103
Yes	101	101	100	100
Are handicrafts produced?				
No	83	85	96	105
Yes	110	110	102	97
Is there a regular market?				
No	77	81	98	103
Yes	115	114	101	98
National average	2,337.75*	2.25*	1,892.84†	.576‡

Source: Authors' calculation based on data from VLSS98.
Notes: * thousands of dong. † Hours per worker per year. ‡ Proportion of household that consists of working members.

Table 6.2 shows that accessibility matters. Annual and hourly earnings are higher in communes that can be reached by car, and where there are handicraft operations and regular markets. The same factors are associated

with higher working hours and lower proportions of working persons. This phenomenon fits with what we expected to observe at the commune level.

HOUSEHOLD CHARACTERISTICS

Several household characteristics are likely to influence living standards. We consider these in turn.

Household Size

Because Vietnam's economy is developing from a low starting level based heavily on agriculture, it is dominated by labor-intensive production. We expected that larger households would have higher earned income per working member, because these households may exploit economics of scale better, or may need to earn more in order to support more dependents. On the other hand, for large households engaged in agriculture, the marginal productivity of labor may be declining. Table 6.3 shows that households with 5 to 7 members have the highest earned income *per hour*. However, the highest earned income *per capita* is in households with 3 or 4 members. It is high because both working hours and the proportion of working people are higher. Total working hours of very large households, especially those with 12 or more members, is considerably higher than for households of smaller size.

Table 6.3
Annual Earned Income Per Capita and Components by Household Size

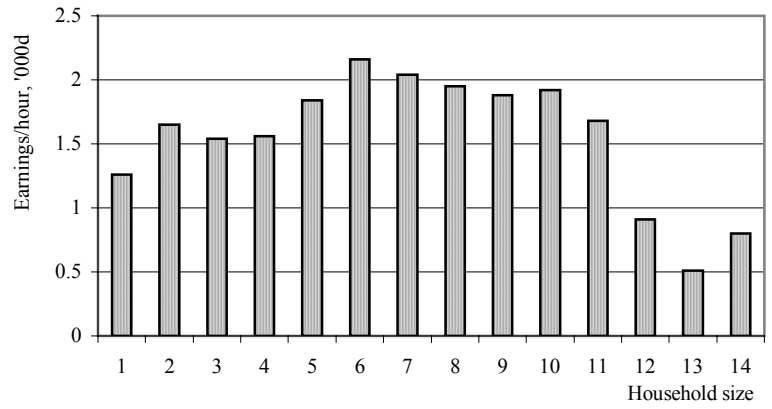
Household size	Annual Earnings per capita p.a.	Earned Income/hour	Working hours	Proportion of Working Persons
		As percentage of national average		
1	76	80	79	103
2	89	88	87	118
3-4	106	96	104	107
5-7	101	104	100	97
≥ 8	87	99	95	92
National average	2,337.75*	2.25*	1,892.84†	.576‡

Source: Authors' calculation based on data from VLSS II.
Notes: * thousands of dong. † Hours per worker per year. ‡ Proportion of household that consists of working members.

Figure 6.2 shows that earned income/hour of households, *where the head works in the agriculture*, tends to increase as the household size increases, reaches a maximum at a household size of 6, and decreases thereafter. One explanation for this decrease may be that larger families

tend to have lower education levels, and as a result the higher household size, the lower the earned income/hour.

Figure 6.2
Earnings/hour by household size, for heads working in agriculture, 1998



Religion and Ethnicity

In the VLSS data, the number of observations for some ethnic minorities and religions is low, so we have combined groups that have similar characteristics. Table 6.4 shows that the earned income of the Buddhist group is quite high, at 20% above average; however the working hours of people with no religion are higher than for other groups. We had expected the opposite – i.e. that non-religious people would have higher earnings.

As has been found in previous studies (Dollar et al. 1998, Haughton et al. 1999), the Chinese are the most educated ethnic group. They are also the most hard-working, as measured by their working hours. The combination ensures that their annual earned income per capita is the highest (83% above the national average).

Education, Gender and Occupation

Vietnam is one of the countries in Asia where a feudal patriarchal society still exists. The importance of the family hierarchy cannot be ignored, as many economic decisions – such as what occupation children take, where they live, what they study – depend on the head of household. The decisions of the household head therefore strongly influence the household's earnings. The quality of these decisions, in turn, depends on characteristics of the head (such as his or her education, age, occupation, and gender).

Figure 6.3 shows that earnings per hour are positively correlated with the educational level of the household head. The hourly earnings of households whose head graduated from university are twice as high as the national average. Heads who have completed upper secondary education also earn more but a lower secondary level education only has a weak effect on earnings.

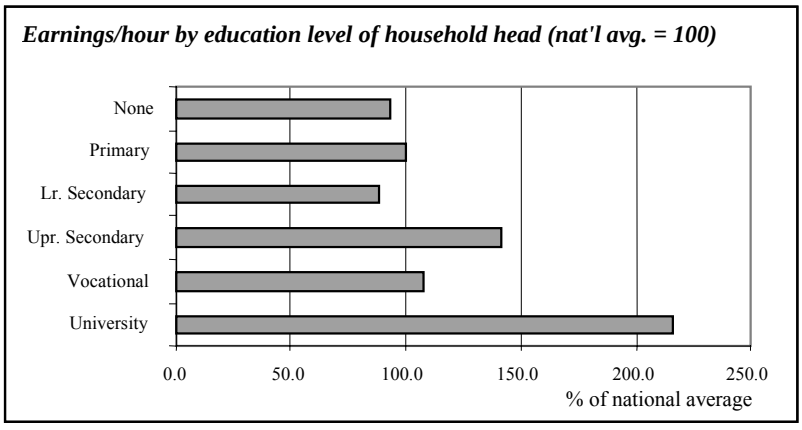
Table 6.4
Annual Earned Income Per Capita and Components by Religion and Ethnicity

	Annual Earnings per Capita	Earned Income/hour	Working Hours	Proportion of Working Persons
	As percentage of national average			
Religion				
Buddhist	114	120	99	97
Christian & Hoa Hao	85	96	95	94
Others	67	70	85	101
No religion	99	97	101	101
Ethnicity				
Kinh	105	106	99	99
Chinese	183	179	114	89
Other	62	61	101	105
National average	2,337.75*	2.25*	1,892.84†	.576‡

Source: Authors' calculation based on data from VLSS II.
Notes: * thousands of dong. † Hours per worker per year. ‡ Working persons as proportion of number of household members.

Table 6.5 breaks down earned income by the gender and occupation of the head of household. One surprising finding is that the hourly earned income of households with female heads is higher than for households with male heads (106% and 99% of the national average respectively). The working hours of female-headed households are also higher, so their

Figure 6.3



earnings per capita are substantially higher than for male-headed households. Note that this surprising finding cannot be explained by remittances from migrant husbands, as we have excluded remittances from earned income. The presence of a middle-aged son or daughter with relatively higher income, living with a widowed mother, might however, explain part of this difference.

Table 6.5 also shows that earned income *per hour* is highest for households where the heads are white collar workers (158% of the national average). However the highest earnings *per capita* are found for households where the head is in sales, the results of a combination of high earnings per hour (141% of the average) and a very high number of hours worked per year (120% of the average).

Table 6.5
Annual Earned Income Per Capita and Components by Gender and Occupation

	Annual Earnings per Capita	Earned Income/hour	Working Hours	Proportion of Working Persons
	As percentage of national average			
Gender				
Male	97	99	99	100
Female	110	106	102	100
Occupation				
Agriculture	78	82	95	107
Other production	140	138	105	95
White collar	165	158	108	97
Sales	172	141	120	100
Retired	90	111	104	76
National average	2,337.75*	2.25*	1,892.84†	.576‡

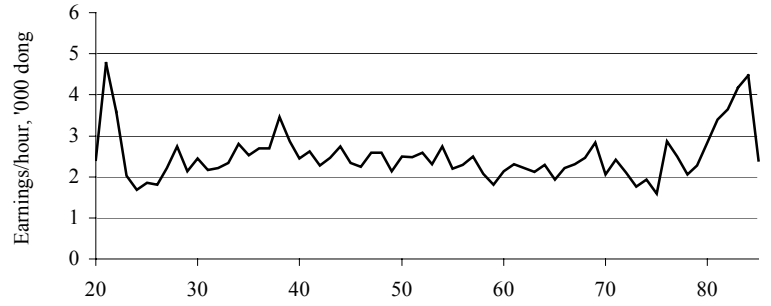
Source: Authors' calculation based on data from VLSS II.
Notes: * thousands of dong. † Hours per worker per year. ‡ Proportion of household that consists of working members.

Another clear finding is that the earned incomes and working hours are low for households where the head works in agriculture. This supports the view that there is some idle time in the agricultural sector. Better exploitation of labor in the agricultural sector could make a substantial contribution to national economic welfare, especially when it is remembered that the agricultural sector uses 65% of the national labor force.

Earned income per hour of households with very young or very old heads was relatively high (Figure 6.4). Young households tend to be high-earning people who are able to set up separate households on their own. In the case of old household heads, there are presumably high-earning children within the household who are bringing in income. The most striking feature

of Figure 6.4 is how modest the variation in hourly earnings is across most of the age spectrum.

Figure 6.4
Earnings/hour by age of household head, '000 dong, 1997-98



CHANGES IN HOUSEHOLD EARNED INCOME, 1993-1998

Annual earned income changed a lot between the two surveys, rising in real terms from 2.430 million dong per person in 1993 to 3.389 million dong by 1998.

Some households did better than this. The transition matrix in Table 6.6 gives a good sense of the degree of earned-income mobility. It is based on information for those households that were surveyed both in 1993 and 1998. Of those in the poorest quintile in 1993, 36% remained in the same quintile in 1998, but the remaining 64% had moved up by at least one quintile; indeed 7% had jumped all the way to the top quintile, the real rags to riches group.

There was (relative) downward mobility too, with 55% of those who were in the top quintile in 1993 slipping one or more quintile by 1998; fully 8% actually found themselves in the bottom quintile by 1998, moving from riches to rags in just five years. The substantial degree of earnings mobility shown here is typically in a dynamic economy, but does make it more difficult to target the permanently poor, who are hard to distinguish from the transient poor.

Geographic Characteristics

In 1992-93, urban earned income/hour was 33% higher than rural earned income/hour. By 1997-98 this differential had increased to 72% (Table 6.7). This wider gap is the main source of the increase in overall

income inequality that occurred between 1993 and 1998 (see chapter 2), offset only slightly by an increase in rural working hours relative to urban. The widening gap in earnings per capita suggests that urban labor demand has increased faster than rural, or has changed in composition and increasingly favors highly skilled labor.

Table 6.6
Transition Matrix of Earned income Per Capita

Quintile in 1992-93	Quintile in 1997-98					*Total*
	Low	Low-mid	Middle	Mid-upr	Upper	
Low	7.1	5.4	3.5	2.8	1.3	*20.0*
Low-mid	5.1	5.0	4.6	3.5	1.8	*20.0*
Middle	4.1	4.4	4.3	4.3	2.9	*20.0*
Mid-upr	2.1	3.3	4.5	5.1	5.0	*20.0*
Upper	1.6	1.9	3.1	4.4	9.0	*20.0*
Total	*20.0*	*20.0*	*20.0*	*20.0*	*20.0*	*100*

Source: Authors' calculation based on data from VLSS I & VLSS II.

Urban earned income per hour rose fastest in the North Central Coast region, where it increased from 24% below the national average in 1992-93 to 29% above the national average in 1997-98 (see Table 6.7). Other regions with relatively high growth in urban hourly earnings were the Northern Uplands, Southeast, and Mekong Delta. Unexpectedly, earned income per hour in the urban areas of the Red River Delta actually declined relatively, from 49% above the national average in 1992-93 to just 28% above in 1997-98.

As one moves from north to south, *rural* hourly earnings go from well below the national average – especially in the Northern Uplands – to well above (Southeast, Mekong Delta). However between 1993 and 1998, relative earnings fell in the rice-bowl regions of the Red River and Mekong Deltas, while rising appreciably in the Central Coast and Central Highlands.

Changes in working hours are quite different between urban and rural areas and across the regions. In urban areas, where working hours tend to be high, they tended to decrease relative to the national average between 1993 and 1998, except in the Northern Central Coast (Table 6.7). In rural areas, working hours have risen relative to the national average in the north, but have fallen in the Southeast and Mekong Delta (where hours continue to be the lowest among the seven regions). Hours worked in the Red River Delta and the North Central Coast also increased, moving closer to the national average. In contrast, hours worked decreased both absolutely and relatively in the Central Coast.

Table 6.7
Percentage Deviation of Earnings, and Working Hours, from National Average

	1992-93		1997-98	
	Urban	Rural	Urban	Rural
Hourly Earnings				
Vietnam overall	**25**	**-6**	**51**	**-12**
Northern Uplands	-38	-45	-5	-46
Red River Delta	49	-19	28	-32
North Central Coast	-24	-31	29	-29
Central Coast	-1	-38	12	-18
Central Highlands		-9		3
Southeast	72	41	116	46
Mekong Delta	15	49	42	32
Working Hours				
Vietnam overall	**23**	**-6**	**16**	**-4**
Northern Uplands	13	3	7	11
Red River Delta	25	-11	10	-7
North Central Coast	-7	-14	14	-2
Central Coast	38	16	29	0
Central Highlands		-1		1
Southeast	29	-3	23	-4
Mekong Delta	12	-14	7	-20

Notes: This table shows that, for instance, rural wages in Red River Delta were 19% below national wages in 1993 and 32% below the average in 1998. Blank spaces indicate that coefficient was not statistically significant at the 10% level.

Connectedness

Three commune-level variables are considered in our analysis: Is there transportation (specifically a bus service to the village)? Is there a local market? And is there a handicraft industry in the commune?

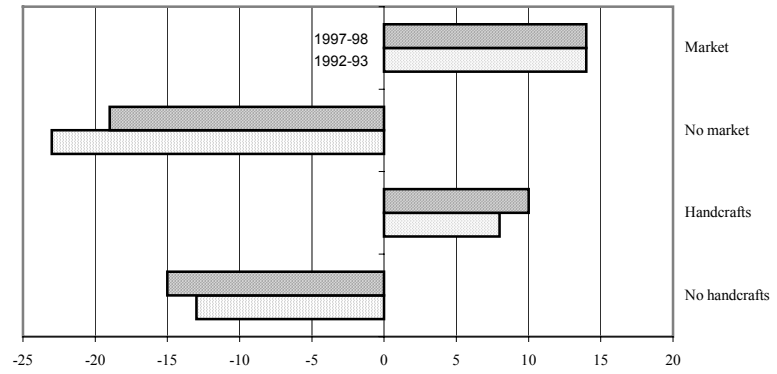
A good local transport system would be expected to facilitate exchanges of labor and commodities with other areas.[7] The existence of a market within the commune affects households' ability to market their produce. Proximity to a major employer or local handicrafts industry influences the ability of individuals to find off-farm employment. Figure 6.5 shows that where a handicraft or regular market does not exist, hourly earnings are significantly lower.

[7] Note that although river transportation is important in parts of Vietnam (especially the Mekong delta) we do not include it in our analysis as no questions water transportation were asked in the first Vietnam Living Standards Survey.

Change in Characteristics of Household and Its Head

Ethnic Chinese households gained in recent years. Their earned income rose from 58% above the national average in 1993 to 79% above the national average in 1998. Although their working hours declined relative to other groups over the same period, they are still 14% higher than the national average. The net effect is that earned income per capita for Chinese households rose from 76% above the national average in 1993 to 83% above by 1998.

Figure 6.5
Deviation of Hourly Earnings from National Average, by Commune Characteristics, 1993 and 1998.



Earned income per hour for households with 5 to 7 members remained stable at 104% of the national average. Their working hours are also stable at the national average. The earned income/hour of smaller households tends to be lower than the national average, as Table 6.8 shows.

Head's Characteristics

An interesting finding is that the *earned* income of female-headed households is 6% above the national average (see Table 6.9). Working hours for female-headed households are also higher than the national average in both surveys. Since female-headed households accounted for about 27% of households in both surveys, we can say that their role is significant in generating household earnings.

Table 6.8
Change of Earned Income/hour and Working Hours by Characteristics of the Household and the Head of Household (% Relative to the National Average)

	Earned Income/hour		Working Hours Per Capita p.a.	
	1992-93	1997-98	1992-93	1997-98
Ethnicity				
Kinh	105	106	99	99
Chinese	158	179	123	114
Other	60	61	104	101
Household size				
1	58	80	93	79
2	160	88	95	87
3-4	90	96	102	104
5-7	104	104	99	100
8-11	95	99	100	96
≥12	112	92	113	110
National average	*1.86**	*2.25**	*1,724†*	*1,893†*

Source: Authors' calculation based on data from VLSS I & VLSS II.
Notes: * thousands of dong. † hours per year.

The occupation of the household head affects earned income substantially. Between 1993 and 1998 the hourly earnings of households with white-collar heads rose from 5% to 58% above the national average. By way of contrast, there was little change in the relative earnings per hour for workers from households headed by a farmer, with hourly earnings continuing to run at 18% below the national average.

Table 6.9
Change in Earned Income Per Hour and Working Hours by Characteristics of the Head of Household

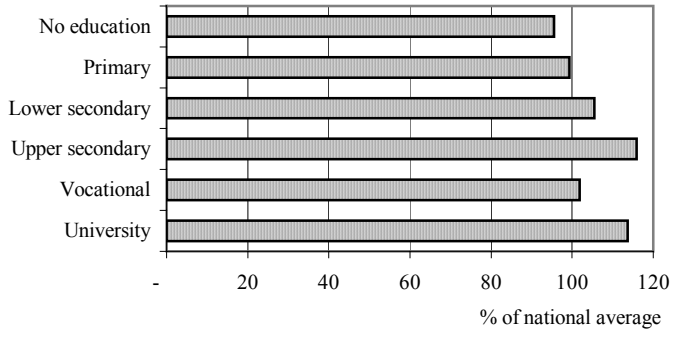
	Earned Income/hour		Working Hours Per Capita p.a.	
	1992-93	1997-98	1992-93	1997-98
	As percentage of national average			
Gender of head				
Male	99	99	99	99
Female	104	106	105	102
Occupation of head				
White collar	105	158	116	108
Sales	131	141	128	120
Agriculture	83	82	93	95
Other production	124	138	108	105
Retired	124	111	105	104
Other not working	213	99	91	101
National average	*1.86**	*2.25**	*1,724†*	*1,893†*

Source: Authors' calculation based on data from VLSS I & VLSS II.
Notes: * thousands of dong. † hours per year.

Despite very wide variation in earnings per hour, the differences in earned income per capita were relatively modest across occupational groups, because high-wage households also tended to be larger than average. Among the major occupational groups, households whose heads worked in sales had the highest earned income per capita, 20% above the national average. At the other end of the spectrum, households headed by a farmer had earned income that was 5% below the average for the country as a whole.

Figure 6.6 shows that the higher the education of the household head, the greater the number of hours worked – 2,151 hours annually in households where the head is a university graduate, and just 1,809 hours per year where the head has no education at all.

Figure 6.6
Hours worked per year by education of household head (% of national average)



To sum up, the data show that geographic characteristics have a strong influence on earned income per capita, earned income per hour and the working hours of households. Commune characteristics such as the existence of a road, handicraft industry or local market are also clear factors affecting these outcomes in 1997-98. When household characteristics are considered, the religion, ethnicity, sex and occupation of the household head are also important factors.

Are the trends and effects set out above robust? In the next section, we use regression analysis to examine this issue more systematically.

REGRESSION MODELS AND RESULTS

We now turn to regression analysis to examine the determinants of earned income, starting with a discussion of the determinants of earned income per capita, and then the factors affecting earned income per hour, hours worked, and the proportion of working people per household.

Theory

In order to make comparisons between households, we use annual earned income per capita as a measure of welfare. This indicator may be separated into three components:

$$\frac{Y}{N} \equiv \frac{Y}{H} \times \frac{H}{L} \times \frac{L}{N}$$

where *Y/N* is annual earned income per capita, *Y/H* is earned income per hour, *H/L* is the average working hours per worker in the household, and *L/N* is the proportion of the household members who are working This identity indicates that earned income per capita will be higher, the higher are earned income per hour, working hours or the proportion of working members in the household.

To examine which variables influence earned income per capita, we use both a direct and an indirect approach. The direct approach regresses the log of earned income per capita on geographic, commune, and household characteristics. The indirect approach examines the determinants of each of the three components of earned income (earnings per hour, working hours and the proportion of household working members) in turn by regressing them on the same set of explanatory variables.

Formally, the direct approach models annual earned income per capita for the *i*th household as

$$\ln \frac{Y_i}{N_i} = a + \sum_{j=1}^{n} b_j x_{ij} + u_i$$

where a, b_j are parameters to be estimated, u_i is a random error term, and the x_j are a set of j independent variables comprising geographic, commune and household characteristics.

The indirect approach examines earnings by estimating separate models for each of the three components of earned income per capita. Formally, in the first model the logarithm of earned income/hour is regressed on geographic, commune and household characteristics, so

$$\ln \frac{Y_i}{H_i} = a + \sum_{j=1}^{n} b_j x_{ij} + u_i$$

where a, b_j are parameters to be estimated, u_i is an error term, and the x_j are the independent variables.

In the second model, the hours worked by household workers is the dependent variable. The formula for this model is:

$$\frac{H_i}{L_i} = a + \sum_{j=1}^{n} b_j x_{ij} + u_i \ .$$

In the third model, the proportion of household working members is the dependent variable, and so the model may be written as

$$\frac{L_i}{N_i} = a + \sum_{j=1}^{n} b_j x_{ij} + u_i$$

The independent variables for these three models are similar to the geographic, commune and household variables used in the direct approach

Selection and Specification of Variables

As is usual, the earned income per capita and per hour variables are highly skewed to the left. We therefore use a logarithmic transformation to bring these closer to a normal distribution before using them in the regression.

The first group of explanatory variables are *geographic*. These are included in the above models as a series of regional dummies, in which rural and urban areas are considered separately and the urban Southeast (dominated by Ho Chi Minh City) is the omitted base case.

The second group of explanatory variables relates to *commune characteristics*, and is associated with access to the market, or job opportunities. Dummy variables are included for whether there is a road to the village in which the household lives and whether there is a market, or local industry or handicraft firms in the commune.

The third group of explanatory variables relates to *household characteristics* and include two sub-groups: common characteristics of household (such as religion, ethnicity, household size, and average education or experience of working persons); and the characteristics of the head of household (such as gender, occupation, age or education).[8]

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[8] We faced four technical problems in this analysis. First, earned income per capita is calculated by dividing total household earned income by household size. However, we define the number of working people per household as the number of household members who work more than 300 hours per year. Clearly, some household members may work less 300 hours but earn income for the household. Such income is included in household earned income is included in the direct but not in the indirect approach.

Second, since earned income is calculated at the household level, it aggregates the earnings of highly experienced workers with those with less work experience. To deal with this issue, an experience variable is calculated by the taking the average experience of all household working members. Note that experience is defined as "age-years in school-6", or "age-15" if that is smaller (Dougherty and Jimenez 1991).

ECONOMETRIC RESULTS

This section presents the results of four regression models described above. Each model was run for both 1992-93 and 1997-98 surveys using independent variables that have been constructed to be the same for both surveys. It is therefore legitimate to compare our results across survey years.

Regression Model for Log of Annual Earned Income Per Capita

There are clear and strong geographic influences on the distribution of earned income per capita, with high levels in the urban southeast, and lower levels in rural areas everywhere, particularly in the north (see Table 6.10). The gap between earned income levels (per capita) in the north and the south of the country widened considerably between 1993 and 1998, despite government efforts to steer some of the foreign direct investment inflows towards the north.

By 1998, households living in communes that had passable roads had 16% higher earnings, holding all other influences constant, than more isolated areas. One interpretation is that good road communications are increasingly important to connect workers to the national economy.

As expected, households whose heads had more education or (by and large) more work experience tended to have higher levels of per capita income. Earned income per capita was also lower in households, of any given size, which had more children – again an unsurprising result, because the presence of children means that earnings are spread over more capita.

Once other variables are taken into account, we find that ethnic minority households have earned income per capita that is only 5% lower than households at large. This effect is only just statistically significant (at the 10% level). Put another way, ethnic minority households appear to be poor not so much because of their ethnicity, but because they live in remoter rural areas, have less education, work in agriculture, and have larger families.

Third the earned income of some households is negative in one or more of the survey years. This may be because they work inefficiently, farm revenue is smaller than costs, or there have been natural disasters and other shocks. However it is not possible to take a log of a negative number. To deal with this problem, we added the maximum negative income observed (1,200,000VND in 1992-93 and 2,000,000VND in 1997-98) to all earned incomes per capita, and 2,000 VND to earned income per hour in both surveys before running the models.

Finally, note that the education variable is calculated as the average of total school years completed by household working members divided by the number of working persons in the household. This is a somewhat problematic procedure: for instance, two households could have the same average years of education, but differ in that one might have two equally-educated adults while the other has one well-educated, and one poorly-schooled, member.

Table 6.10
Regression Model of Logarithm of Earned Income Per Capita

	1992-93		1997-98	
	Coeffic-ient	P-value	Coeffic-ient	P-value
Dependent variable:				
Natural Log of earned income per capita*				
Independent variables:				
Rural Northern Uplands	-.351	*0.00*	-.505	*0.00*
Rural Red River Delta	-.350	*0.00*	-.600	*0.00*
Rural North Central Coast	-.398	*0.00*	-.575	*0.00*
Rural Central Coast	-.345	*0.00*	-.386	*0.00*
Central Highlands	-.244	*0.00*	-.266	*0.00*
Rural South East	-.176	*0.00*	-.228	*0.00*
Rural Mekong Delta	-.155	*0.00*	-.273	*0.00*
Urban Northern Uplands	-.425	*0.00*	-.601	*0.00*
Urban Red River Delta	-.151	*0.00*	-.382	*0.00*
Urban North Central Coast	-.368	*0.00*	-.458	*0.00*
Urban Central Coast	-.289	*0.00*	-.273	*0.00*
Urban Southeast	Omitted		Omitted	
Urban Mekong Delta	-.174	*0.00*	-.266	*0.00*
There is road in the commune	-.043	*0.00*	.157	*0.03*
Ethnic Minority	-.019	*0.04*	-.052	*0.10*
Religion (Buddhist=1)	-.018	*0.05*	-.032	*0.23*
Head's sex (male=1, female=2)	-.003	*0.65*	.033	*0.01*
Head's main occupation is sales	-.059	*0.00*	.064	*0.02*
Head's main occupation is agriculture	-.110	*0.00*	-.176	*0.00*
Head's main occupation is production (excluding agriculture)	.011	*0.49*	-.004	*0.90*
Head is not working	-.054	*0.01*	-.125	*0.00*
Household size	-.006	*0.00*	.005	*0.29*
Average completed years of education	.022	*0.00*	.031	*0.00*
Average years of experience ÷ 10^3	-.656	*0.59*	6.208	*0.00*
Average years of experience squared ÷ 10^3	-.049	*0.03*	-.142	*0.00*
Proportion of female workers	-.075	*0.00*	-.063	*0.01*
Number of adult dependents	-.068	*0.00*	-.0539	*0.00*
Number of Children	-.088	*0.00*	-.101	*0.00*
Constant	8.553	*0.00*	8.496	*0.00*
Number of observations	13,521		18,882	
R-squared	0.218		0.366	

Source: Authors' calculation based on data from VLSS I and VLSS II.
Note: * VND 200,0000 has been added to earned income per capita for both surveys.

Gender matters, but the effects are complex. Earned income per capita is lower in households with a high proportion of female workers, reflecting the lower hourly earnings of women. On the other hand, households headed by women have slightly higher earned income overall. In order better to

understand these effects, we first need to examine the regressions for the components of earned income per capita, and to this we now turn.

Regression Model for Log of Earned Income Per Hour

What determines how much household members make per hour of work? The results of our regression model are set out in Table 6.11.

As anticipated, hourly earnings are lowest in the north, and particularly in the rural north of Vietnam. However there is no evidence here of a growing gap in earnings per hour between the north and the south, during the period 1993-1998.

Hourly earnings of ethnic minority households were almost 10% lower than the average in 1993 (holding other variables constant), but just 6% lower in 1998. The effects of ethnicity on earnings appear to be weakening.

Each additional year of education raises hourly earnings by 3%; someone completing primary school can therefore expect to make more than a third more, per hour of work, than someone with no education. Experience also helps to boost earnings, but the effect weakens with time; after 30 years of experience earnings begin to fall, again holding other factors constant. We should add that the effect of experience is only barely statistically significant, and so should be treated cautiously.

Regression for Working Hours Per Employed Person

The amount of hours worked per household worker varies considerably from household to household. The regression results in Table 6.12 show that working hours are lowest in the rural rice-bowl areas (Mekong and Red River deltas, as well as the rural North Central Coast), where there is inadequate work during some seasons of the year.

Households with more children or adult dependents worked more hours than average in 1998, but less hours than average in 1993. It is not clear what is behind this change, but one possibility is that the vigorous economy in 1998 was willing to accommodate the more flexible work schedules required by mothers with young children.

Possibly the most interesting results concern the variables that are *not* statistically significant. Holding other influences constant, ethnic minority households neither work more norless than other households; hours worked are unrelated to the gender of the household head and the gender of household workers; and hours worked are no different in isolated communes than elsewhere. Among occupational groups, only when the head works in "sales" are the hours worked on the long side.

Table 6.11
Regression Model of the Logarithm of Earned Income Per Hour

	1992-93		1997-98	
	Coeffic-ient	P-value	Coeffic-ient	P-value
Dependent variable:				
Natural log of earned income per hour*				
Independent variables:				
Rural Northern Uplands	-.413	*0.00*	-.445	*0.00*
Rural Red River Delta	-.346	*0.00*	-.465	*0.00*
Rural North Central Coast	-.445	*0.00*	-.477	*0.00*
Rural Central Coast	-.540	*0.00*	-.313	*0.00*
Central Highlands	-.216	*0.00*	-.201	*0.02*
Rural South East	-.145	*0.00*	-.114	*0.01*
Rural Mekong Delta	-.011	*0.70*	-.075	*0.10*
Urban Northern Uplands	-.568	*0.00*	-.490	*0.00*
Urban Red River Delta	-.250	*0.00*	-.298	*0.00*
Urban North Central Coast	-.387	*0.00*	-.394	*0.00*
Urban Central Coast	-.475	*0.00*	-.270	*0.00*
Urban Southeast	Omitted		Omitted	
Urban Mekong Delta	-.180	*0.00*	-.179	*0.00*
There is road in the commune	-.133	*0.00*	.155	*0.07*
Ethnic Minority	-.095	*0.00*	-.055	*0.08*
Religion (Buddhist=1)	-.014	*0.38*	-.003	*0.91*
Head's sex (Male=1, Female=2)	.038	*0.00*	.026	*0.04*
Head's main occupation is sales	.084	*0.00*	-.021	*0.42*
Head's main occupation is agriculture	-.084	*0.00*	-.145	*0.00*
Head's main occupation is production (excluding agriculture)	.088	*0.00*	.006	*0.83*
Head is not working	-.010	*0.79*	-.082	*0.00*
Household size	.103	*0.00*	-.021	*0.00*
Average completed years of education	.037	*0.00*	.029	*0.00*
Average years of experience	.002	*0.38*	.003	*0.10*
Average years of experience squared × 10^3	-.110	*0.01*	-.057	*0.13*
Proportion of female workers	-.138	*0.00*	-.084	*0.00*
Number of adult dependents	-.005	*0.66*	.053	*0.00*
Number of Children	-.012	*0.39*	.050	*0.00*
Constant	1.705	*0.00*	1.421	*0.00*
Number of observations	13,521		18,882	
R-squared	0.267		0.323	

Notes: * VND 2000 has been added to earned income per hour for both surveys.
Source: Authors' calculation based on data from VLSS I and VLSS II.

Regression Model for Share of the Working Household Members

The final model considers the determinants of the proportion of household members that work, with the results shown in Table 6.13. The estimated equation for 1997-98 has relatively high explanatory power, with an R^2 of 0.70.

Geographic effects are of some importance, with high proportions of working members in the rural areas of the north of the country. This reflects both the relatively low birth rates in these areas (so there are fewer children, and so more adults of working age), and their relative poverty (so all hands are needed for working).

Table 6.12
Regression Model of the Working Hours Per Worker

	1992-93		1997-98	
	Coeffic-ient	P-value	Coeffic-ient	P-value
Dependent variable: Working hours/worker				
Independent variables:				
Rural Northern Uplands	-370.63	*0.00*	-37.12	*0.72*
Rural Red River Delta	-573.28	*0.00*	-425.57	*0.00*
Rural North Central Coast	-563.30	*0.00*	-303.02	*0.01*
Rural Central Coast	-115.26	*0.00*	-214.79	*0.02*
Central Highlands	-402.73	*0.00*	-209.27	*0.02*
Rural South East	-388.52	*0.00*	-325.48	*0.00*
Rural Mekong Delta	-559.39	*0.00*	-617.70	*0.00*
Urban Northern Uplands	-270.50	*0.00*	-265.76	*0.00*
Urban Red River Delta	-87.79	*0.03*	-202.82	*0.00*
Urban North Central Coast	-522.16	*0.00*	-104.89	*0.25*
Urban Central Coast	78.41	*0.04*	123.06	*0.14*
Urban Southeast	Omitted		Omitted	
Urban Mekong Delta	-248.40	*0.00*	-248.50	*0.08*
There is a road in the commune	76.36	*0.00*	-43.34	*0.85*
Ethnic Minority	118.19	*0.00*	-1.62	*0.98*
Religion (Buddhist=1)	-85.37	*0.00*	-131.31	*0.09*
Head's sex (Male=1, Female=2)	8.64	*0.52*	23.60	*0.37*
Head's main occupation is sales	65.80	*0.03*	286.98	*0.00*
Head's main occupation is agriculture	-282.60	*0.00*	-43.51	*0.37*
Head's main occupation is production (excluding agriculture)	-147.47	*0.00*	3.74	*0.94*
Head is not working	-269.31	*0.00*	-5.00	*0.93*
Household size	-5.97	*0.05*	-72.02	*0.00*
Average completed years of education	-8.00	*0.00*	17.82	*0.03*
Average years of experience	5.46	*0.02*	9.57	*0.01*
Average years of experience squared	-.21	*0.00*	-.34	*0.00*
Proportion of female workers	27.95	*0.36*	17.68	*0.71*
Number of adult dependents	-151.36	*0.00*	111.98	*0.00*
Number of Children	-178.46	*0.00*	171.41	*0.00*
Constant	2279.24	*0.00*	2205.39	*0.00*
Number of observations	13,521		18,882	
R-squared	0.187		0.194	

Source: Authors' calculation based on data from VLSS I and VLSS II.

Several of the household-level variables are important. Larger households tend to have a smaller proportion of working members; female-headed households have relatively fewer working members. As educational levels rise, there is first a tendency for fewer family members to be working, but this is reversed at very high levels of education. Presumably in poorly-educated (and poorer) households, everyone needs to contribute to

Table 6.13
Regression Model of the Working Member Proportion

	1992-93		1997-98	
	Coeffic-ient	P-value	Coeffic-ient	P-value
Dependent variable: Proportion of household working member				
Independent variable:				
Urban (yes=1)	-6.0	*0.00*		
Urban Northern Uplands	4.3	*0.00*		
Urban Red River Delta	-3.7	*0.00*		
Urban Northern Central Coast	7.8	*0.00*		
Urban Central Coast	-3.8	*0.00*	-1.7	*0.02*
Urban Southeast	Omitted		Omitted	
Urban Mekong Delta	3.9	*0.00*		
Rural Northern Uplands	5.4	*0.00*	3.2	*0.00*
Rural Red River Delta	0.8	*0.08*	2.6	*0.00*
Rural Northern Central Coast	5.1	*0.00*	4.1	*0.00*
Rural Central Coast	-1.4	*0.02*		
Rural Central Highlands (yes=1)			-2.6	*0.05*
Rural Southeast (yes=1)	-3.0	*0.00*		
Buddhist (yes=1)	-2.1	*0.00*	-1.5	*0.01*
Other religion (yes=1)	-1.7	*0.05*		
Household size	-4.9	*0.00*	-5.3	*0.00*
Household size squared	0.2	*0.00*	0.2	*0.00*
Head's sex (Male=1, Female=2)	-1.8	*0.00*	-1.7	*0.00*
Completed school years (urban =1)	1.1	*0.00*	0.6	*0.00*
Completed school years	-5.9	*0.00*	-4.7	*0.00*
Completed school years squared	0.2	*0.00*	0.1	*0.00*
Years of experience	0.6	*0.00*	0.7	*0.00*
Years of experience squared	0.0	*0.00*	0.0	*0.00*
Head's occupation is sales (yes=1)			-3.0	*0.00*
Head's occupation is agriculture (yes=1)	2.9	*0.00*	-1.7	*0.00*
Head's occupation is non-agricultural production (yes=1)	-2.0	*0.00*	-2.4	*0.00*
Other occupation (yes=1)	-13.8	*0.00*	-3.7	*0.00*
Coefficient	71.7	*0.00*	73.7	*0.00*
Number of observations	13,069		16,132	
R-squared	0.429		0.695	

Source: Authors' calculation based on data from VLSS I & VLSS II.

household income; and in highly-educated households, everyone wants to be working, and can find interesting and well-paid work.

Ethnicity has no significant effect on the proportion of family members that work. Religion does enter the equation however, with a smaller proportion of Buddhist households working than for households that profess other religions or no religion at all.

MAIN FINDINGS AND CONCLUSIONS

Among the many possible themes that emerge from our analysis of the data from the Vietnam Living Standards Surveys of 1993 and 1998, there are six that we would like to emphasize.

First, household earned income per capita depends mostly on the earned income per hour, and only secondarily on the number of hours worked (be worker) or the proportion of household members who work.

Second, regional effects matter for hourly earnings. Hourly earnings rise markedly as one moves from north to south, with the highest rates in the Southeast region that is centered in Ho Chi Minh City. Despite considerable economic growth in Hanoi, hourly earnings in the Red River Delta region did not rise as rapidly as elsewhere between 1993 and 1998, so the region's relative position has worsened. There is much greater similarity across regions in the number of hours worked per adult worker, although there is still evidence of underemployment in the rice bowl areas of the Red River and Mekong deltas.

Third, the urban-rural gap has widened. This is entirely due to a rise in urban, relative to rural, hourly earnings; the hours worked in rural areas actually rose faster than in urban centers, moderating the urban-rural gap to some degree. The growing earnings gap helps explain the continued migration of people from the countryside to the cities. It is also behind the rise in overall income inequality that occurred in Vietnam between 1993 and 1998.

Fourth, it is important to be connected to the wider economy. Households living in areas that had year-round road access, or at least markets, were somewhat better off than those that were cut off from the rest of the country for part of the year.

Fifth, education is useful in boosting incomes, particularly at the tertiary level. This emerges clearly from our study, although our analysis is based on households rather than individuals. With more education, adults are more likely to be working, and tend to earn more per hour.

Finally, ethnicity and religion are both correlated with affluence. Chinese households are almost twice as well-off as the rest of society. At the other end of the spectrum, other ethnic minorities are markedly poorer than society at large, although this appears to be due more to low educational levels and remoteness than to ethnicity per se. Households

adhering to a minor religion are somewhat less well off than Buddhist households and those that profess no religion.

There are some implications for policy. Incomes could be raised by investing in roads to connect remote villages; by more education; by letting migration continue freely; and by maintaining economic growth so that labor demand remains high.

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Chapter 7

Shooting Stars and Sinking Stones

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INTRODUCTION

Between 1993 and 1998, Vietnam's real GDP per capita rose by a total of 40%, an increase exceeded only by China during the same period. This rising tide lifted all, or at least most, boats and the real per capita expenditures of Vietnamese households rose by a remarkable 43% during this time.

Some households saw their expenditure levels (per capita) rise substantially faster than the average. These are the *shooting stars*. Divide individuals into quintiles, from poorest (1) to richest (5), based on the level of their expenditure per capita as reported by the Vietnam Living Standards Surveys of 1992-93 and 1997-98. Then we define someone as a shooting star if their position in the expenditure distribution jumped by at least two quintiles between 1993 and 1998. Fully 10.0% of the sample may be classified as shooting stars.

The first premise of this paper is that there is something that distinguishes shooting stars from the rest of the population. Is their rise due to luck? Or more education? Or because they lived in the right place? In particular we are interested in the extent to which government policies, whether wittingly or not, contribute to whether one is a shooting star.

At the other end of the spectrum are the *sinking stones*. These are the people whose position in the expenditure distribution fell by two or more quintiles between 1993 and 1998. They constitute about 9.6% of the sample. Our second premise is that sinking stones are also worth particular attention. For some reason they slipped behind during a period of very rapid growth. Why did this happen? And what could or should be done to prevent people from sinking in this way?

To address these issues we proceed as follows. First we present a transition matrix, which enables us to identify the shooting stars and sinking stones, and provides an opportunity to discuss the nature of the data used. Then we ask what determines whether someone will be a shooting star and, given that they are, what influences explain the changes that occurred in their spending. We then do the same for sinking stones.

IDENTIFYING SHOOTING STARS AND SINKING STONES

Between October 1992 and October 1993, 4,800 randomly-selected households were surveyed throughout Vietnam, using a questionnaire based on Living Standards Measurement Surveys undertaken elsewhere (Grosh and Glewwe 1995), adapted to Vietnamese conditions. The quality of the data collected by this VLSS93 is considered to be good (Dollar 1994; for summaries of the procedures used, see Haughton 1999, and Vietnam 1994).

Another survey, using a very similar questionnaire, was undertaken between December 1997 and December 1998 (VLSS98). Again, the data are of high quality (see Vietnam 2000). Of the 5,999 households for which complete data are available, 4,305 were also surveyed in 1992-93. All of our analysis is based on this panel of households. A fuller discussion of the panel is given in Chapter 1; the issues that arise in working with panel data are summarized in Haughton (2001).

Ideally we would have used per capita income as a guide to the relative economic position of each individual. Unfortunately this is not satisfactory, because of the difficulty involved in measuring income accurately.

So instead of using income, we measure the relative position of an individual using per capita expenditure. This measure has its own weaknesses as discussed briefly in Chapter 1, as there might be some controversy about how expenses on items such as housing, tobacco, health are accounted for. Like income, it is probably underestimated, although by an unknown amount. However expenditure is less variable than income, and some see it as a good proxy for "permanent" income. An implication of this relative stability is that our measure of the number of shooting stars and sinking stones, based as it is on expenditure, will yield a lower number than if the measurement were based on income.

Table 7.1 shows a transition matrix, which maps the expenditure per capita quintile in which a household was placed in 1993 to their quintile in 1998. The shooting stars are found in the northeast corner of the matrix, in bold print, and account for 10.0% of all the households in the panel. The sinking stones constitute 9.6% of all households surveyed. Households on the diagonal were in the same quintile in 1998 as in 1993, and constituted 40.6% of the total.

Table 7.1
Quintile Transition Matrix for Households, 1993 to 1998

	Number of households, by expenditure/capita quintile, 1998:					
	Poor	Poor-mid	Middle	Mid-upr	Upper	**Total**
Quintile 1993:						
Poor	*384*	216	**127**	**54**	**9**	**790**
Poor-mid	193	*264*	223	**120**	**32**	**832**
Middle	**100**	183	*234*	254	**85**	**856**
Mid-upr	**38**	**127**	217	*301*	205	**888**
Upper	**12**	**35**	**100**	209	*550*	**906**
Total	**727**	**825**	**901**	**938**	**881**	**4,272**

Source: VLSS93 and VLSS98.

PROXIMATE CORRELATES OF INCOME MOBILITY

Having established that there is considerable movement both up and down the expenditure distribution, it is natural to ask what is associated with these changes. In answering this question, it is helpful to make a distinction between the immediate ("proximate") determinants of changes in household expenditure or income, and the underlying fundamental causes.

Our analysis begins with an identity, which states that the income received by a household in year i (Y_i) consists of earned income (E_i) and unearned income (U_i), so

$$Y_i \equiv E_i + U_i.$$

[income] ≡ [earnings] + [unearned income]

This may be disaggregated further to give

$$\left(\frac{Y}{N}\right)_i \equiv \left(\frac{E}{H}\right)_i \times \left(\frac{H}{L}\right)_i \times \left(\frac{L}{N}\right)_i + \left(\frac{U}{N}\right)_i.$$

Income /capita ≡ Earnings per hour worked × Hours worked per household worker per year × Workers per household member + Unearned income per household

Our focus is on the *change* in per capita income between 1993 and 1998, so

$$\Delta\left(\frac{Y}{N}\right) \equiv \left(\frac{Y}{N}\right)_{98} - \left(\frac{Y}{N}\right)_{93}.$$

By expanding the initial identity we then get

$$\Delta\left(\frac{Y}{N}\right) = \left(\frac{H}{L}\right)\frac{L}{N}\Delta\left(\frac{E}{H}\right) + \left(\frac{E}{H}\right)\frac{L}{N}\Delta\left(\frac{H}{L}\right) + \left(\frac{E}{H}\right)\frac{H}{L}\Delta\left(\frac{L}{N}\right) + \Delta\left(\frac{U}{N}\right) + R$$

Change in per capita income = Due to change in earnings per hour. + Due to change in hours worked per worker. + Due to change in no. of workers per household. + Due to change in unearned income.

where *R* is a remainder. This decomposition helps us to organize the most basic data on shooting stars and sinking stones, which we present in table 7.2. For the reasons given above, we actually look at expenditure rather than income, but with the working assumption that expenditure tracks long-term income adequately. Between 1993 and 1998, per capita expenditure rose by 173% for shooting stars and fell 34% for sinking stones. Explaining this enormous difference is of course the central focus of this chapter.

Table 7.2
Decomposition of change in per capita income into its proximate sources

	Expend. /capita '000 dong	"Earnings" /hr worked '000 dong/hr	Hours /worker p.a.	Workers/hh member	Remittances /capita '000 dong
			Baseline, 1993		
Shooting stars	1,156	1.397	1,271	0.618	59
Middle group	2,058	2.065	1,466	0.625	166
Sinking stones	2,427	2.614	1,327	0.681	64
			Baseline, 1998		
Shooting stars	3,156	2.670	1,678	0.657	213
Middle group	2,938	2.384	1,810	0.629	224
Sinking stones	1,612	1.427	1,784	0.607	66
			Sources of change, '000 dong		
Shooting stars	2,000	1,196	528	117	154
Middle group	880	327	480	15	59
Sinking stones	-815	-1,189	595	-233	2
			% breakdown of change		
Shooting stars	100	60	26	6	8
Middle group	100	37	55	2	7
Sinking stones	-100	-144	72	-28	0

Source: Based on VLSS93 and VLSS98.
Notes: Sample sizes: 427 shooting stars, 412 sinking stones, and 3,433 households in the middle.

The results of applying the decomposition formula are set out in the third block in Table 7.2. Consider the case of shooting stars. Between 1993 and 1998 the annual expenditure per capita of this group rose from 1,156,000 dong ($94) to 3,156,000 dong ($257), expressing both in the prices of January 1998. The total increase in expenditure per capita was 2,000,000 dong. What contributed most to this change? From Table 7.2 we see that 60% of the increase occurred as a result of higher wages and salaries. Most of the rest of the rise was because household workers put in more hours of work per year.

On average, working household members toiled for about 400 more hours per year in 1998 than in 1993. Surprisingly, the increase was slightly greater for sinking stones than for shooting stars – perhaps they were putting in more effort in order to compensate for the drop in earnings per hour worked – but this means that we must look elsewhere for an explanation for the drop in their expenditure levels. Part of that explanation is that sinking

stone households found themselves with more dependents per worker. But the key proximate cause was a huge reduction in earnings per hour worked for these households.

Caught between the shooting stars and sinking stones are the households in the middle, whose per capita expenditure level rose by 43% in real terms between 1993 and 1998. This is a large increase, but it is somewhat less impressive when we realize that 55% of the rise is because household workers were working for more hours per year.

In short, the most important single influence on income mobility is changes in earnings per hour.[9] But this begs the question of what determines these changes. To answer this question we need to examine the "fundamental" determinants of income mobility.

FUNDAMENTAL CORRELATES OF INCOME MOBILITY

Each component of the decomposition in the previous section is the result of the behavior of households, along with interactions with the external environment in which the operate. Thus:

- earnings per hour is likely to depend on the educational level, experience, gender, ethnicity and location of the household;
- the hours of work per worker also very probably depend on similar variables. Any *change* in hours worked will also be influenced by the initial level of work, because someone who is already working full time cannot easily work more.
- the number of workers per household will depend on the age structure of the household, and over the long term is affected by the reproductive decisions of the household.
- the amount of unearned income that the household receives is likely to be influenced by the number of old members (for pensions), and whether family members have migrated and are now sending back remittances.

Two main points emerge from this discussion. First, in order to model the fundamental determinants of the change in income per capita, we should include only the underlying variables, but not earnings (E), hours worked (H), number of workers (L) or unearned income (U) directly. This is a "reduced form" model. In the next section we discuss the fundamental variables in more detail.

Second, most of the variables that affect the change in per capita income should be entered in differenced form, and the variables should be allowed to interact with one another. This is the main reason for our experiments with flexible functional forms, as reported below.

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[9] Since we are working with expenditure data, we approximate earnings per hour with (expenditure-unearned income)/hour of work.

CORRELATES OF INCOME MOBILITY

What distinguishes shooting stars from sinking stones? It is convenient to separate the influences into household level effects (Table 7.3) and commune level or geographic effects (Table 7.4).

Between 1993 and 1998, households became slightly smaller in Vietnam, but the effect was most pronounced for shooting stars. If a child grows up and moves away, or an elderly household member dies, then expenditure per person will automatically rise simply because there are fewer non-earning persons.

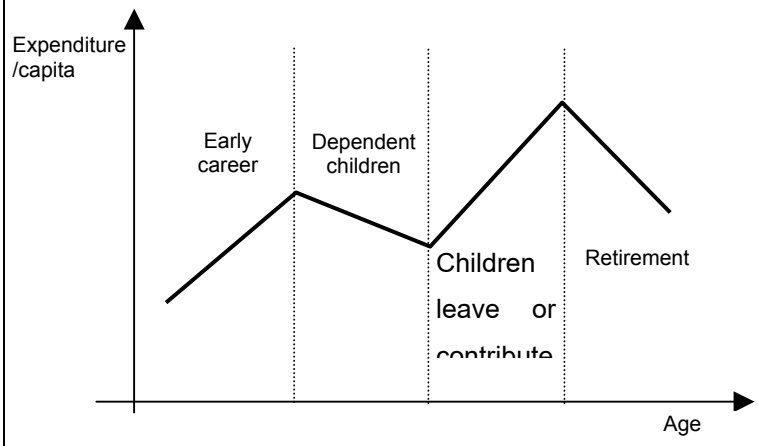
Table 7.3
***Differences Between Households that Are* Shooting Stars *and* Sinking Stones**

	Shooting stars	Others	Sinking stones
Household size (persons):			
in 1993	5.41	5.03	4.62
in 1998	4.38	4.77	5.15
change, 1993-98	-1.01	-0.28	0.56
Yrs of schooling of working household members:			
in 1993	6.2	6.5	5.7
in 1998	6.4	6.8	6.3
Percentage of income (in 1998) due to:			
wages	17.5	19.1	20.1
net agricultural income	39.7	40.6	44.7
net income from self employment	18.7	19.1	18.2
pensions	6.0	5.0	3.6
remittances from overseas	0.9	1.8	0.4
remittances from domestic sources	5.6	3.7	2.9
other sources	11.6	10.6	9.9
Total	100.0	100.0	100.0
Land per household (excl. house plot), m^2			
All land, 1993	5,045	6,145	7,371
All land, 1998	6,048	6,438	7,061
Annual land, 1993	3,634	4,940	5,938
Annual land, 1998	3,428	4,165	5,008

Sources: VLSS93 and VLSS98.

This is consistent with a life cycle story, shown schematically in Figure 7.1. Newly formed childless couples may be comparatively well off (as measured by expenditure per person); with the arrival of children, income has to stretch further and they are comparatively poorer; but once children begin to earn or move out, there may be a period of comparative affluence before retirement.

Figure 7.1. ***Expenditure per capita and the life cycle.***



Curiously enough, the other household variables are of little help in explaining why some households are shooting stars. These households are only marginally better educated than sinking stones, and indeed have less years of education than households in the middle. Shooting starts are somewhat less likely to rely on income from agriculture, and somewhat more dependent on remittances, than other households, but again the differences between household groups is rather small. And shooting starts had less land than other groups both in 1993 and 1998, although they added more land during this period than did the rest of society. In passing we note that the amount of agricultural land planted to annual crops, per capita, fell for all groups between 1993 and 1998, evidence of growing pressure on good quality land.

The geographic effects are more striking, as the numbers in Table 7.4 make clear. A greater proportion of the population were shooting stars in the Red River Delta (which is centered on Hanoi) and the Central Highlands (where coffee cultivation boomed), than elsewhere, although the proportions were almost as high in the Southeast and the North Central Coast. Unexpected is the high proportion of sinking stones in the Mekong Delta, a comparatively affluent region that nonetheless has pockets of very deep poverty. This may be due in part to the significant number of landless workers in the region, a group that was particularly hard hit by the sharp rise in the relative price of food between 1993 and 1998 (there is a fuller discussion of price effects in chapter 1).

Table 7.4
***Differences Between Households that Are* Shooting Stars *and* Sinking Stones**

	Shooting stars	Others	Sinking stones
Geographic effects:			
% of each group living in urban areas:	8.3	86.7	5.0
% of each group living in rural areas:	10.4	78.9	10.7
Regions: % of each group living in:			
Northern Uplands	7.2	83.8	9.1
Red River Delta	13.3	80.2	6.4
North Central Coast	11.7	80.0	8.3
Central Coast	9.2	79.1	11.7
Central Highlands	13.0	77.4	9.6
Southeast	11.5	83.4	5.1
Mekong Delta	6.6	77.3	16.1
Vietnam overall	10.0	80.4	9.6
Disasters, 1998 data			
% of hh where community received disaster relief	46	54	71
Avg. # years, 92-98, when >10% of crop lost to:			
floods	35	36	44
droughts	32	33	39
pests	45	45	56
typhoons	20	18	21
other disasters	14	15	20
Distance (km.) from nearest road:			
to commune, 1993	0.37	1.18	2.29
to village, 1998	0.63	0.85	1.40
% of communes with road impassable for part of year:			
in 1993	13.7	13.8	16.1
in 1998	9.0	12.1	16.5
Electricity available (% of communes)			
in 1993	92.5	89.8	89.3
in 1998	96.5	92.7	91.0
% of communes with enterprise/factory within 10 km.			
in 1993	60.1	57.1	52.7
in 1998	68.4	65.3	60.2
New factory established, 93-98	21.6	18.9	21.4

Sources: VLSS93 and VLSS98.

Disasters hurt, and sinking stone households were far more likely to be hit by a flood, drought, or invasion of pests than were shooting stars. This suggests that there may be a demand for insurance against risks of this type.

Remoteness also hurts, and a high proportion of the sinking stones are concentrated in remote areas. Conversely, the shooting stars are more closely plugged in to the rest of the economy. There are a number of measures of remoteness, including distance from the nearest road that is passable for cars (1.4 km for sinking stones, 0.6 km for shooting stars), and the availability of electricity. Perhaps most interesting is that 68% of shooting stars lived within 10 km. of a factory, compared with just 60% for sinking stones.

REGRESSION ANALYSIS

The descriptive information is helpful, but does not give a good sense of how important each variable is, once one has controlled for other influences. The conventional solution to this problem is to estimate a regression equation or, as in our case, a number of regression equations.

For the first regression the sample consists of households in the two bottom expenditure quintiles in 1993; the dependent variable is binary, set equal to one if a household jumped at least two quintiles by 1998, and to zero otherwise (a "poor shooting star"). The regression estimates are shown in Table 7.A1 in the appendix, but to understand the results it is easier to turn to Table 7.5, where we estimate the probability that a household will be a poor shooting star given that the independent variable rises by one unit.

Consider the case of a typical household, which has a 10% probability of being a shooting star. An otherwise identical household, larger by one person in 1993, would have an 8% probability of being a shooting star. A household is also much more likely to be a shooting star if it had a high proportion of adolescents (aged 10-14) in 1993, because by 1998 these young people would be working or even have left the household. Households that are Kinh, urban, receive remittances from abroad, or live close to a factory or school, are also more likely to be shooting stars.

Similar influences determine which rich households – defined as falling into one of the top two quintiles in 1993 – are likely to be sinking stones. The logistic regression estimates are shown in the appendix in Table 7.A2, and the more intuitive results are displayed in Table 7.5. The model of sinking stones is simpler than that for shooting stars, but as a general rule it shows effects that work in the opposite direction. For instance, households that grew between 1993 and 1998 are *less* likely to be shooting stars and *more* likely to be sinking stones.

There is another group that merits separate attention, and it consists of households that were in the middle quintile in 1993. Some of this group rose into the top quintile by 1998, and so became shooting stars; others fell into the bottom quintile as sinking stones. To model this effect formally we estimated a multinomial logistic model for this group, where the alternatives were (a) shooting star, (b) sinking stone, and (c) neither. The estimates are shown in Table 7.A3 in the appendix, and are presented in a more accessible way in Table 7.6.

Table 7.5
Effect of Variables on Probability of Being a Shooting Star/Sinking Stone

If there is a unit increase in the independent variable	the probability changes from 10% to xx% if the hh is a shooting star	sinking stone
Household demographics		
Household size in 1993	8	
Change in household size (from plus 1 to plus 2)	3	15
Prop. of hh. aged 10-14 in 1993	11*	9*
Kinh? (yes=1)	20	
Household human capital		
Avg. workdays lost to sickness/month	11	
Yrs education of hh workers, 1993	11	8
Change in yrs. education, hh workers, 93-98	11	8
Household physical capital		
Own forest land of <1,500 m^2, 1993	15	
Increase in total land used, 93-98, m^2	17	
Geographic variables		
Urban in 1998? (yes=1)	31	5
Regions (in 1993) (given prop. in ag. = 39.7%)		
Northern Uplands (Kinh)	6	9
Northern Uplands (non Kinh)	6	25
Central Highlands	7	
Southeast		3
Mekong Delta	10	
Income structure		
Prop. of income from agriculture	9**	
Prop. of income from overseas remittances	14**	7*
Prop. of income from domestic remittances	11**	8*
Accessibility/Isolation		
Primary school in district,1993?		7
Upper secondary school accessible	16	
Km. from commune to nearest road, 1993	9	
Factory w/in 10 km. in 1993? (yes=1)	15	4***
New factory w/in 10 km, 1993-98? (yes=1)	18	
Disasters		
# yrs. >10% crops lost to pests, 93-98	7	
# yrs. >10% crops lost to typhoons, 93-98		17

Notes: * Assumes independent variable rises by 0.1. ** Assumes rise in independent variable of 0.1, and regions 1,2,4 only (Northern Uplands, Red River Delta, and Central Coast.). *** For factory within Northern Uplands only.
Sources: Based on Table 7. A2.

For the households that were originally in the middle, those living in the Southeast region (which embraces Ho Chi Minh City), and with a high proportion of older adolescents (aged 15-19) in 1993, were more likely to be shooting stars, while those in the Northern Uplands, and who were hit by flooding, were more likely to sink.

Table 7.6
Examples of Changes in Probability of Being a Shooting Star or a Sinking Stone, for Households in Middle Quintile in 1993, Based on Multinomial Logistic Model

	Estimated probability of being Shooting Star/Sinking Stone when independent variable changes (other variables are held constant) and initial probability is 10 %:	
	Shooting Star	Sinking Stone
Household demographics		
Change in household size	7	16
Prop. of hh. aged 15-19 in 1993 (up by .1)	12	10*
Kinh? (yes=1)	16*	5
Household human capital		
Yrs education of hh workers, 1993	11	8
Change in yrs. education, hh workers, 93-98	11*	9
Household physical capital		
Annual crop land < 2,300 m^2, 1998	16	9*
Annual crop land > 2,300 m^2, 1993	6	17
Own forest land of <1,500 m^2, 1998	5	13*
Geographic variables		
Regions (in 1993)		
Northern Uplands	6*	22
Red River Delta	reference	
North Central Coast	7*	13
Central Coast	9*	17*
Central Highlands	reference	
Southeast	22	7*
Mekong Delta	reference	
Accessibility/Isolation		
Factory w/in 10 km. in 1993? (yes=1)	11*	6
New factory w/in 10 km, 1993-98? (yes=1)	12*	6
Disaster		
# yrs. >10% crops lost to flooding, 92-98	7*	30

Note: * means coefficient *not* statistically significant at 10% level.
Sources: Based on regression results in Table 7.A3.

CART MODEL: FLEXIBLE FUNCTIONAL FORM

We argued above that any satisfactory model of shooting stars and sinking stones would have to take into account interactions between the variables involved, as well as dealing with both changes and levels in the variables. We use below the CART (Classification and Regression Trees) methodology, which is useful as an exploratory tool to help decide which predictors are important in a model, as well as which interactions of predictors to consider including in the model.

So we estimate a regression tree using the CART software. The tree is constructed by a process of binary recursive partitioning. Starting with all the data (the first parent node), the data are split into two child nodes. Each new node may then be split again, and the process repeated until a full tree

structure has emerged. To work properly, the algorithm requires rules for splitting each node, and for deciding when a tree is complete.

At each step the goal is to partition the data into nodes that are relatively homogeneous, in the sense of having the lowest possible unexplained variance.[10] Typically one divides the data into a training sample, which is used to create an initial large tree, and a smaller test sample that is used to prune the large tree in order to arrive at the tree with the lowest possible mean square error. The procedure is nonparametric and essentially exploratory, and is most helpful when the underlying model is non-linear or complex.

The regression tree that we created is summarized in Figure 7.2, where we have left out a few of the low-level nodes because of space constraints. Initially the sample consisted of 4,272 observations, including 427 shooting stars and 412 sinking stones. The data then split into two on the basis of the initial quintile, with poorer households (the bottom two expenditure quintiles in 1993) going into one group and the rest into another. Note that the poor group had 1,622 observations, including 342 shooting stars and no sinking stones. This simply makes the point that to be a shooting star you first have to start out relatively poor.

This poor group then splits on the basis of whether there is a factory nearby. By this point there are 625 households living within 10 kilometers of a factory; almost a third of these households shooting stars, and they constitute almost half of all of the shooting star households. This is also a terminal mode, shown by a double-barred box in Figure 7.2, and does not split further. The remaining poor households split by region, as may be seen in the upper right hand corner of Figure 7.2.

Now consider the group of households that were better off in 1993, of which there were 2,650. These split further, by change in household size; a high proportion of sinking stones were households that grew in size between 1993 and 1998, and (after the next split) had heads that were less well educated.

What do we learn from this relatively complex procedure? The first point is that the effects of the independent variables on whether households

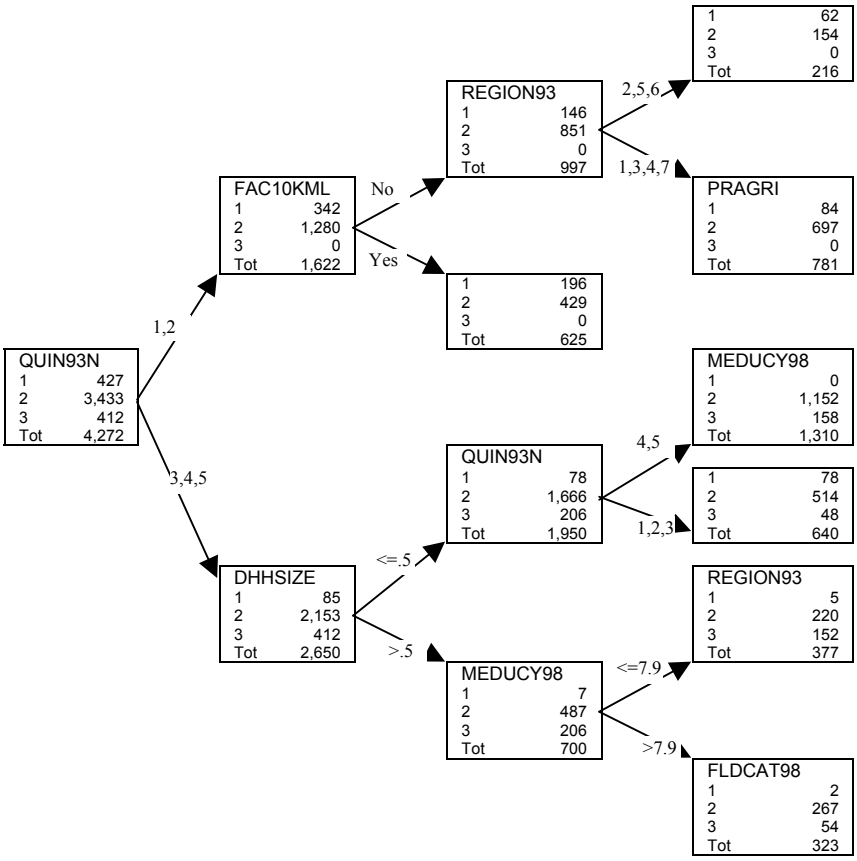
[10] Formally, let $n(t)$ be the number of observations in the parent node, with a population variance at this node of $POPVAR(t)$. The goal is to split the sample into a left hand group with $n(t_L)$ observations and a right hand group with $n(t_R) = n(t) - n(t_L)$ observations, such that one maximizes

$$POPVAR(t) - \frac{n(t_L)}{n(t)} POPVAR(t_L) - \frac{n(t_R)}{n(t)} POPVAR(t_R).$$

For a succinct description of the procedures, and an example, see Haughton and Haughton (1997).

are shooting starts or sinking stones are rife with nonlinearities. For instance, the initial sample splits by expenditure quintile, but two nodes later one of the subgroups also splits on the basis of expenditure quintile.

Figure 7.2
CART model of shooting stars and sinking stones



Variables:
QUIN93N = expenditure quintiles in 1993 (1=poorest).
FAC10KML = is there a factory within 10 km? (yes=1).
DHHSIZE = change in household size between 1993 and 1998.
REGION93 = regions in 1993, from 1 (Northern Uplands) to 7 (Mekong Delta)
MEDUCY98 = mean years of education of household members in 1998
PRAGRI = proportion of household workers in agriculture
FLDCAT98 = forest land availability (1: urban, 2: rural, no forest land, 3: rural, forest land<1500, 4: rural, forest land >1500)

Note:
The three categories are 1. shooting stars, 2. middle households, and 3. sinking stones. Figures show number in each category at each node.
The numbers attached to the arrows indicate the criterion used to split the sample in moving to the next node.

Second, the effects are not symmetric. Since the first split involves the 1993 quintile, the mechanism that explains shooting star/sinking stone status in 1998 is different for households in the bottom two quintiles and those in the top two quintiles in 1993. The two portion of the tree involve different splits, according to different variables. Indeed, this is what led us to consider the separate models described in the previous section.

The tree helps us identify important interactions; for example the interaction between region and proportion of income from agriculture, which is apparent near the northeast part of the tree, turned out to be significant in the regression model.

CONCLUSIONS AND IMPLICATIONS

In finishing, we would like to draw what we see as the main findings, and suggest some policy conclusions. The first point is that income (or more strictly, expenditure) mobility in Vietnam was considerable between 1993 and 1998, with about 10% of all households rising at least two quintiles in the expenditure per capita distribution ("shooting stars") and another 10% falling by at least two quintiles ("sinking stones").

The second important finding is that shooting stars saw their expenditure per capita rise by 173% between 1993 and 1998, while for sinking stones it actually fell by 34%. A decomposition analysis shows that most of these changes were due to changes in earnings per hour worked; the effects of working more, or having a higher proportion of the household working, or receiving more remittances, were comparatively minor.

The logistic models work quite well, and show that demographic variables do have some influence whether a household is a shooting star or not. Perhaps more striking are the strong geographic effects: households are more likely to be shooting stars if they live in urban areas, and if they are close to schools and roads.

The CART model highlights the importance of changes in household size, of the presence of a near-by factory, of education and regional effects, as well as of the proportion of income from agriculture, and helps identify interactions. In particular it is interesting to note the rather strong positive effect of the proportion of income from agriculture in the Central Highlands (while that effect is negative in regions other than Southeast and Mekong Delta).

In thinking about policy implications we assume that there is no reason to want to limit income mobility; on the other hand the substantial extent of income mobility suggests that there may be a demand for insurance, especially, given our results, to protect against rapid falls in earnings per hour of work.

There is clearly a case for tackling the problem of remoteness, by building all-weather roads and providing schools. There is also evidence that disasters create sinking stones, which implies that there may be a role for more disaster relief.

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APPENDIX: REGRESSION RESULTS

Table 7.A1
Logistic Regression Estimates: Was household a shooting star, given that it was in one of the bottom two expenditure/capita quintiles in 1993?

	Coefficient	p-value
Dependent variable: Given household was in poorest quintiles (1 or 2) in 1993, was it a shooting star? (yes=1)		
Independent variables		
Household demographics		
Household size in 1993	-.251	.00
Change in household size	-.365	.00
Change in hh size, squared	-.272	.00
Prop. of hh. aged 10-14 in 1993	1.518	.00
Kinh? (yes=1)	.826	.00
Household human capital		
Avg. workdays lost to sickness/month	.064	.02
Yrs education of hh workers, 1993	.151	.00
Change in yrs. education, hh workers, 93-98	.109	.01
Household physical capital		
Own forest land of <1,500 m^2, 1993	.468	.08
Increase in total land used, 93-98, m^2	.610	.01
Geographic variables		
Urban in 1998? (yes=1)	1.400	.00
Regions (in 1993)		
Northern Uplands	-.611	.01
Red River Delta	reference	
North Central Coast	reference	
Central Coast	reference	
Central Highlands	-2.668	.04
Southeast	reference	
Mekong Delta	-.650	.07
Geographic interactions		
Prop. of inc. from ag. × North Central Coast	-1.330	.00
Prop. of inc. from ag. × Central highlands	5.697	.00
Prop. of inc. from ag. × Southeast	2.814	.00
Prop. of inc. from ag. × Mekong Delta	1.630	.02
Income structure		
Prop. of income from agriculture	-1.032	.00
Prop. of income from overseas remittances	3.545	.05
Prop. of income from domestic remittances	1.110	.08
Accessibility/Isolation		
Upr. Secondary School < 5 km. (ref: no USS, or urban)	.544	.00
Upr. Secondary School > 5 km. (ref: no USS or urban)	.500	.02
Km. from commune to nearest road, 1993	-.066	.08
Factory w/in 10 km. in 1993? (yes=1)	.475	.03
Factory w/in 10 km × N. Central Coast	.901	.02
New factory w/in 10 km, 1993-98? (yes=1)	.678	.00
Disasters		
# yrs. >10% crops lost to pests, 93-98	-.358	.01
"score" (to correct for attrition bias)	-.149	.31
Constant	-2.370	.00

Notes: 1,622 observations. Pseudo $R^2 = 0.22$. Probability > chi2 = 0.00.
Sources: Based on data from panel, VLSS93 and VLSS98.

Table 7.A2
Logistic Regression Estimates: Was household a sinking stone, given that it was in one of the top two expenditure/capita quintiles in 1993?

	Coefficient	p-value
Dependent variable: Given household was in richest quintiles (4 or 5) in 1993, was it a sinking stone? (yes=1)		
Independent variables		
Household demographics		
Change in household size	.476	.00
Prop. of hh. aged 10-14 in 1993	-.910	.08
Kinh? (yes=1)	.474	.24
Kinh × Northern Uplands	-1.173	.06
Household human capital		
Yrs education of hh workers, 1993	-.196	.00
Change in yrs. education, hh workers, 93-98	-.159	.01
Yrs education 1993 × Northern Uplands	.126	.09
Geographic variables		
Urban in 1998? (yes=1)	-.808	.00
Regions (in 1993)		
Northern Uplands	1.105	.14
Red River Delta	reference	
North Central Coast	reference	
Central Coast	reference	
Central Highlands	reference	
Southeast	reference	
Southeast	-1.305	.00
Mekong Delta	reference	
Income structure		
Prop. of income from overseas remittances	-3.604	.02
Prop. of income from domestic remittances	-2.016	.00
Accessibility/Isolation		
Primary school in district, 1993?	-.285	.02
Factory w/in 10 km × Northern Uplands	-1.037	.04
Disasters		
# yrs. >10% crops lost to typhoons, 93-98	.654	.01
"score" (to correct for attrition bias)	-3.543	.10
"score" squared	1.769	.06
"score" cubed	-.254	.05
Constant	1.757	.29

Notes: 1,794 observations. Pseudo $R^2 = 0.21$. Probability > chi2 = 0.00.
Sources: Based on data from panel, VLSS93 and VLSS98.

Table 7.A3
Multinomial Logistic Regression model: Were households in middle expenditure/capita quintile in 1993 shooting stars or sinking stones?

	Shooting star		Sinking stone	
	Coefficient	p-val	Coefficient	p-val
Dependent variable: Given household was in middle quintiles (3) in 1993, was it a shooting star or sinking stone?				
Independent variables				
Household demographics				
Change in household size	-.440	.00	.513	.00
Prop. of hh. aged 15-19 in 1993	1.631	.05	.417	.61
Kinh? (yes=1)	.459	.40	-.625	.07
Household human capital				
Yrs education of hh workers, 1993	.129	.01	-.130	.01
Change in yrs. education, hh workers, 93-98	.059	.34	-.117	.07
Household physical capital				
Annual crop land < 2,300 m^2, 1998	.568	.06	-.035	.90
Annual crop land > 2,300 m^2, 1993	-.564	.06	.539	.05
Own forest land of <1,500 m^2, 1998	-.725	.02	.241	.42
Geographic variables				
Regions (in 1993)				
Northern Uplands	-.409	.30	.909	.01
Red River Delta	reference		reference	
North Central Coast	-.340	.38	.710	.04
Central Coast	-.077	.87	.626	.11
Central Highlands	reference		reference	
Southeast	.910	.03	-.314	.69
Mekong Delta	reference		reference	
Accessibility/Isolation				
Factory w/in 10 km. in 1993? (yes=1)	.081	.83	-.479	.09
New factory w/in 10 km, 1993-98? (yes=1)	.180	.68	-.615	.06
Disaster				
# yrs. >10% crops lost to flooding, 93-98	-.150	.69	1.362	.00
"score" (to correct for attrition bias)	-.478	.62	2.120	.10
"Score" squared	.102	.62	-.383	.16
Constant	-2.939	.03	-4.538	.00

Source: Based on VLSS93 and VLSS98.

Chapter 8

Labor and Employment

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INTRODUCTION

Over the past two decades, thanks in part to the implementation of the *đổi mới* (renovation) strategy, economic growth has been robust. In the 1990-2000 period annual GDP growth averaged 7.4%, move than doubling over the decade.

Economic development has made it possible for the overwhelming majority of the population to have enough food, and even to begin to accumulate assets, according to the living standards surveys of 1992-93 (VLSS93) and 1997-98 (VLSS98). The number of households considered to be "food poor" – i.e. who would still not have enough to eat even if they devoted all their spending to food – has fallen steadily, from 20.0% in 1993 to 16.5% by 1995 and 13.3% by 1999.

One of the factors contributing to the reduction in poverty has been an increase in employment. In this chapter we describe the recent trends in employment, unemployment and labor force participation, drawing heavily on the results of VLSS93 and VLSS98.

The policy challenge is how to help ensure productive employment for the more than one million new workers who join the labor force every year. Although population growth has slowed down to just 1.5% in 1999, the labor force is still growing at a faster pace, reflecting with a lag the more rapid population growth of the past. Between 1991 and 1995 the labor force grew at 2.7% per year, compared with population growth of 2.2%; in 1996-97 labor force growth rose to 3.4% while population growth fell to 1.8%.

The government has instituted a number of programs that are designed to help create jobs. These include the *National Fund for Employment*; the *Bank for the Poor* that makes small loans to poor households; the institution of land-use rights, which provide an incentive for farmers to invest in their land; vocational training centers, especially for working-age young people; a reforestation program; and a program supporting offshore fisheries.[11] Zhu and Fahey (1999) refer to the creation in the early 1990s of about 130 Centers for Employment Promotion to gather labor market information, provide job placement services and conduct vocational training.

The creation of a Labor Code is Vietnam is also of importance and is referred to again further in this chapter. Zhu and Fahey (1999) give a very useful discussion of the Vietnam labor code, compared to that of China. Of particular interest is the fact that the Vietnam labor code provides for a (restricted) right to strike, which conforms to the International Labor Convention, while the Chinese code does not (see Zhu and Fahey, 1999, p. 186). In general the article by Zhu and Fahey discusses the impact of economic reform on industrial relations in China and Vietnam. It investigates whether the two countries "are indeed developing a stable system consonant with the notion of a 'socialist market economy'" and concludes that it is too early to answer, as both societies are groping their ways towards creating viable labor market institutions.

A recent study by Athukorala, Manning and Wickramasekara (2000) investigates the impact of economic reform on labor markets and international labor migration in the Greater Mekong Region (GMR: Thailand, Vietnam, Cambodia, Laos, Myanmar and China's Yunnan province), and examines the effect of structural change and greater economic integration in the GMR on labor markets, international migration and labor market information systems.

For a related discussion of future labor trends in Vietnam, we refer the reader to an article by Boismery (1998), where a mesoeconomic (between macro- and micro-economic) model including an informal sector reveals that only a strong specialization in labor intensive exports could prevent a rising unemployment in Vietnam, but then the country could experience immerising employment growth (that is, an employment growth where people could actually be worse off).

Also of interest is an article by Curry (1996) that argues that because of Vietnam's relatively strong human development index, the country's workforce has the capacity to augment its current skill level through

[11] Since its inception the Bank for the Poor has lent over 4 billion dong to more than 5 million households; the interest rate is subsidised and collateral is not required. The Offshore Fisheries project has, so far, lent more than 1 billion dong to 28 coastal provinces, which among other things has helped finance the construction of over 20,000 boats.

education and training. However, Vietnam faces the challenge of implementing additional public policies to provide all Vietnamese with opportunities to gain access to skills and income-generating employment, while at the same time promoting rapid economic growth.

LABOR FORCE PARTICIPATION

A striking feature of Vietnam is that 86.4% of adults - defined as men aged 15-60 and women aged 15-55 - were economically active in 1998, up slightly from the 85.7% observed in 1993. These figures are very high by world standards. Just as remarkably, the rates are almost the same for women (86.0%) as for men (86.8%). Between 1993 and 1998 the rate for men fell slightly, while that for women rose, as the figures in Table 8.1 (and Figure 8.1) show. In common with most other less developed countries, labor force participation is somewhat higher in rural (89.5%) than urban (76.3%) areas – mainly because a higher proportion of the urban adult population is still at school instead of working.[12]

Table 8.1
Labor Force Participation Rates, 1993 and 1998

	VLSS93			VLSS98		
	Rural	Urban	Total	Rural	Urban	Total
Male	89.4	81.1	87.6	89.0	79.4	86.8
Female	86.0	76.9	84.0	89.9	73.3	86.0
Total	**87.7**	**78.9**	**85.7**	**89.5**	**76.3**	**86.4**

Note: Labor force participation rate is defined as the proportion of working age adults (women 15-55, men 15-60) who are employed or unemployed.
Sources: VLSS93 and VLSS98.

Between 1993 and 1998 the labor force participation rate rose by 4.5 percentage points for households in the poorest quintile (as measured by per capita expenditure), but fell by 3.0 percentage points for households in the richest quintile. The most compelling explanation is that the booming economy sucked poorer people into the labor force, as they were ready to work any job to make a living; there was a particularly rapid increase (9.3 percentage points) in labor participation in the Central Highlands, where the coffee boom has opened up employment opportunities. On the other hand, better-off households appear to be paying more attention to educating their children, which tends to keep young men and women out of the labor force

[12] The numbers cited in the text come from the VLSS surveys. Slightly different numbers emerge from the larger, but less detailed, survey undertaken annually by the Ministry of Labor, Invalids and social Affairs (MOLISA). According to the MOLISA survey of July 1, 1997, the labor force participation rate was 81.1% (up from 80.1% in 1996). The participation rate was 83.8% in rural, and 72.0% in urban areas.

until they are older. This is reflected in the rapidly rising enrollment rates at upper-secondary and third-level institutions (see Chapter 9).

Some definitions

The *working age population* is defined as males aged 15-60 and females aged 15-55 (the official retirement ages). The *economically active population* consists of those who were involved in remunerative activities in the week prior to the survey ("employed") or those who were not working but were seeking a job ("unemployed").

Vietnamese statistics often refer to the "*underemployed*," who are individuals working less than 40 hours per week (or 2,000 hours per year, allowing for a two-week holiday at Tet).

Figure 8.1
Labor Force Participation Rate by Gender and Location, 1993 and 1998

UNEMPLOYMENT

According to the VLSS data, the unemployment rate was 1.6%, down from 3.4% in 1993. Similar figures emerge from the annual surveys undertaken by MOLISA. By the standards of developed countries, these are remarkably low numbers, but similarly low unemployment rates are found in a number of other less-developed countries, including China. Further details are presented in Table 8.2. These do not measure *under*employment, which we discuss further below.

At 4.5% in 1998, urban unemployment was well above the 0.8% rate seen in rural areas.[13] This might seem surprising; despite the higher unemployment rates, the cities are richer, the wages there higher, the job opportunities greater – and all these attract migrants in large numbers. The answer to this puzzle is that poor people cannot afford to be unemployed for long, and so are willing to take almost any job, however menial, that comes their way. The rapid economic growth of the 1990s provided plenty of such job opportunities, and so the unemployment rate fell. At the same time, young people from better-off families have the luxury of taking time to look for a job that fits their skills and tastes; while they are searching, their families are able to feed and clothe them.

Table 8.2
Unemployment Rates, 1993 and 1998

	VLSS93			VLSS98		
	Rural	Urban	Total	Rural	Urban	Total
Male	2.4	7.9	3.5	1.0	5.2	1.9
Female	2.7	6.0	3.4	0.7	3.7	1.3
Total	**2.5**	**6.9**	**3.4**	**0.8**	**4.5**	**1.6**

Sources: VLSS93 and VLSS98.

The unemployment rates published by MOLISA differ slightly from those based on the VLSS surveys. The MOLISA figures showed an unemployment rate of 2.0% among working age people (1.9% among those over 15) in 1996. They claim that the urban unemployment rate rose from 5.8% in 1996 to 6.0% in 1997, a somewhat surprising finding given that economic growth was running at 9% annually at the time.

WORKING HOURS

For working-age people, the number of hours spent at remunerative activities increased markedly between 1993 and 1998, from 1,758 per year to 1,955. Most of this increase came at the expense of time spent at household chores, which fell from 722 to 541 hours annually. The economic boom of 1993-98 has connected people more thoroughly with the market, and given them the opportunity to substitute more-remunerative activities for chores that used to be done at home. Further details are given in Table 8.3.

By 1998, household members active in industry and services spent an average of more than 2,000 hours per year (i.e. about 40 hours per week) working; hours worked in the service sector may not always be very intensive, but as Table 8.3 shows, they are certainly long. This is in contrast

[13] Officially, the urban unemployment rates were 6.9% in 1998, 7.4% in 1999 and 6.4% in 2000, based on large annual samples and a slightly different set of questions from the VLSS.

with farmers, who worked an average of 1,815 hours annually in 1998 – well up from 1,622 in 1993, but still not the equivalent of full-time year-round work. The rhythm of most agricultural activities, particularly rice (which accounts for half of all agricultural GDP), means that there are times when farmers are busy from dawn to dusk, but these are interspersed with periods when there is not enough to do.

UNDEREMPLOYMENT

From the information on working hours, it is possible to construct a measure of the proportion of working-age adults who are underemployed, in the sense that they are working less than 2,000 hours annually. In presenting these results, we are implicitly assuming that everyone wants to work at least 2,000 hours, and so if they are working less than this, it is because they are unable to find enough work in the course of the year.

Just over half (52%) of all working-age adults are working less than 2,000 hours per year. The proportion of underemployed adults is particularly high in agriculture (60%), and lowest in the services sector (35%). Men are just as likely to be underemployed as women, as the figures in Table 8.4 show.[14]

Table 8.3
Mean working hours for working age individuals, 1993 and 1998

	VLSS93			VLSS98		
	Total hours	Hours spent on		Total hours	Hours spent on	
		"economic" activities	household chores		"economic" activities	household chores
Agriculture	2,212	1,622	722	2,275	1,815	541
Industry	2,366	1,957	680	2,456	2,109	527
Services	2,820	2,276	756	2,754	2,354	558
Other	2,585	1,988	726	2,561	2,137	537
Overall	**2,321**	**1,758**	**722**	**2,389**	**1,955**	**541**

Source: Based on VLSS93 and VLSS98 data.

Not surprisingly, there was a sharp drop in the proportion of working adults who were under-employed between 1993 and 1998, from 62% to 52%, as the booming economy sucked workers into jobs. The change is particularly clear in the agricultural sector, especially for women.

[14] The Ministry of Labor, Invalids and Social Affairs (MOLISA) undertakes an annual survey in July in which it asks about employment and underemployment. According to this survey, rural workers worked just 72% of full time in 1998, and 74% of full time in 2000. This implies a rural "underemployment rate" of 28% in 1998. The MOLISA measure of underemployment is high, relative to the figures found by the VLSS98 (9.3% underemployment for agricultural households in 1998; see Table 9.3). One important difference is that the VLSS data refers to the whole year, while the MOLISA numbers are from one (possibly atypical) point of time in the year.

Working-age adults consist of men aged 15-60 and women aged 15-55. It might be objected that this includes too many school-age individuals, who could not realistically be expected to want to work 2,000 hours every year. If one sets a lower threshold of 1,000 hours for anyone aged 15-18, the proportion of adults who are underemployed comes to just 48% in 1998, but the main conclusions of this section remain unchanged.

Table 8.4
Proportion of working-age adults working less than 2,000 hours per year

	VLSS93			VLSS98		
	Total	Men	Women	Total	Men	Women
Agriculture	69	66	72	60	62	59
Industry	46	46	47	39	38	41
Services	38	38	38	35	38	33
Other	47	39	53	36	34	39
Overall	**62**	**59**	**64**	**52**	**53**	**52**

Sources: VLSS93 and VLSS98.

Although on average the proportion of adults working less than full-time fell between 1993 and 1998, this hides the fact that people moved out of as well as into full-time work. In 1998 an effort was made to re-survey almost all of the 4,800 households that were interviewed in 1993; in the end 4,307of the original households were interviewed. This created a panel of households, for whom we have information at two points in time. This allows us to create a transition matrix, which shows the employment status of individuals that were of working age both in 1993 and 1998. The results are displayed in Table 8.5. In 1993, 60% of these individuals were underemployed, but by 1998 this proportion had fallen to 50%.

The interesting finding is that 38% of those who were fully employed in 1993 were underemployed by 1998; and 43% of those who were underemployed in 1993 had found full-time work by 1998. In other words, there is a lot of flexibility in the labor market, which allows workers to take advantage of rapid economic growth, but is likely to hurt them quickly in a recession.

Table 8.5
Transition Matrix Showing Number of Working-Age Adults in VLSS Panel Who Were Fully and Under-Employed in 1993 and 1998

	VLSS98		
VLSS93	Fully employed	Underemployed	**Total**
Fully employed	1,816	1,136	**2,952**
Underemployed	1,904	2,521	**4,425**
Total	**3,720**	**3,657**	**7,377**

Note: "Underemployed" means that the person was working for less than 2,000 hours per year.
Source: VLSS93 and VLSS98 panel.

OCCUPATIONAL STRUCTURE

The single largest group of workers consists of farmers. This share is falling slowly, from 43% in 1993 to 41% in 1998, as agricultural growth lags behind that of other sectors of the economy. In passing we might note that a clear majority of those who are engaged solely in farming are women (58% of the total); further details are shown in Table 8.6.

The relative decline in agricultural employment has been taken up by the increasing share of jobs that are filled by employees and by the self-employed. Over a third of all workers – almost 40% of men and about 30% of women - combine two or more of these categories, which means that they are simultaneously farmers, employees and/or self-employed.

Commenting on the trend towards more self-employment, and the growing proportion of workers who are employees, *Labor Market Information* writes that urbanization and "the renovation of employment-related awareness and job creation have produced far-reaching and radical changes. With the adoption of the Labor Code in 1995 workers, instead of waiting passively for the State, have been more active, seeking jobs for themselves and others, on the basis of the legal environment being imposed in due course and of necessary socio-economic conditions."

The information presented in Table 8.7 provides more detailed information about the way in which occupational structure has changed using a transition matrix. It shows, for the 11,752 working-age adults who were included in both the VLSS93 and VLSS98 surveys, what their occupational status was in 1993 and in 1998.

Table 8.6
Percentage of Workers by Type of Work and Gender, 1993 and 1998

	VLSS93			VLSS98		
	Total	Men	Women	**Total**	Men	Women
Employees (E)	**10.6**	12.8	8.5	**12.8**	15.4	10.3
Farmers (F)	**43.3**	37.9	48.4	**40.7**	34.5	46.7
Self-employed (SE)	**10.8**	9.5	12.0	**11.9**	11.0	12.8
(E) + (F)	**15.9**	20.4	11.7	**17.0**	21.8	12.2
(E) + (SE)	**1.6**	1.8	1.4	**1.6**	2.0	1.2
(F) + (SE)	**14.6**	13.3	15.8	**14.2**	13.0	15.4
(E) + (F) + (SE)	**3.3**	4.4	2.3	**1.9**	2.5	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Overall	**100.0**	48.7	51.3	**100.0**	49.7	50.3

Sources: VLSS93 and VLSS98.

The table shows, for instance, that among those solely employed in wage labor in 1993, 62% were still employees in 1998. A further 17% were still working for wages, but by 1998 were engaged in other activities

(agriculture, self-employment) as well. Most of the rest had moved into non-agricultural self-employment.

As noted above, one of the clearest movements over time is out of agriculture and into wage employment. However this does not appear to occur directly; just 2% of those working solely in farming in 1993 were working solely for wages in 1998. Instead the movement appears to be indirect. Some farmers pick up some part-time wage work, or move into self-employment. Gradually they gain the experience and confidence that may enable them to jump completely into a non-agricultural career. Wage employment also rises because new entrants into the labor force take up wage-paying jobs, but this is not picked up in the transition matrix.

Table 8.7
Transition matrix for type of work, 1993 and 1998

VLSS93	VLSS98								
	Wage	Agric	N-ag	W+A	W+N	A+N	AWN	All	**Total**
Wage empl	62.0	3.2	16.0	10.8	5.3	1.8	1.0	100	**8.2**
Ag. self-empl	1.9	69.5	1.6	14.4	0.1	11.5	1.0	100	**48.1**
Non-ag self-empl	12.1	5.7	64.1	2.7	3.8	10.6	1.1	100	**9.6**
Ag + wage	9.1	31.8	2.2	40.9	1.0	11.2	3.8	100	**15.1**
Non-ag + wage	36.9	3.3	18.0	14.8	15.6	9.8	1.6	100	**1.4**
Ag + non-ag	3.1	31.4	11.1	11.2	0.3	39.7	3.2	100	**14.6**
Ag+wage+non-ag	5.8	25.3	6.5	31.8	2.5	21.7	6.5	100	**3.1**
Total	**9.65**	**44.4**	**10.6**	**17.1**	**1.3**	**15.0**	**1.9**	**100**	**100**

Sources: VLSS93 and VLSS98.

EDUCATION

Another factor contributing to the change in the structure of employment is the rise in educational levels. In 1993 just 8.8% of the working population had a diploma – defined as at least a high school (level III) diploma or a formal vocational qualification. By 1998 the proportion had risen to 10.9%, with rates of 6.9% in the countryside and 25.6% in urban areas (see Table 8.8). Better-educated workers are more likely to be employees or self-employed, rather than farmers.

Table 8.8 ***Percentage of workers with diplomas, by location, 1993 and 1998***

	1993	1998
Rural	5.8	6.9
Urban	20.0	25.6
Total	**8.8**	**10.9**

Sources: VLSS93 and VLSS98.

These numbers are consistent with those obtained from the labor and employment survey undertaken by MOLISA in 1997. According to that survey, 71% of the country's workforce was involved in agriculture, forestry and fishing; out of this group, just 12.2% were professionally qualified,

including primary and middle-level skilled workers (5.9%), intermediate professional school graduates (3.8%), college and university graduates (2.5%), and post graduates (0.04%). Of related interest is a recent study by Sakellariou and Patrinos (2000), based on data from the Higher Education Tracer Study, implemented by MOLISA. The study uses a representative sample of 1,829 graduates from 60 institutions, and investigates the relationship between earnings, education and training, duration of job search, as well as the incidence of employment/unemployment.

OCCUPATIONAL MULTIPLICITY

Many workers of working age – 37% in 1998, in fact – work at more than one job. This is particularly true of men (42%) and, surprisingly, is especially common for workers whose main job is in industry, as Table 8.9 shows. Such occupational multiplicity has increased only slightly since 1993.

Some additional information on occupational multiplicity is shown in Table 8.10. Between 1993 and 1998 the proportion of rural workers holding more than one job rose, while the proportion for urban workers fell (from 23.5% to 19.0%), and is now less than half of the level in the rural areas. Occupational multiplicity is comparatively rare among better-off households; just one in four workers in the top quintile (as measured by expenditure per capita) held more than one job, compared to two-fifths of all workers in the rest of the labor force.

Table 8.9
Percentage of workers of working age with more than one job, classified by gender and by sector of main job, 1993 and 1998

Sector of main job:	VLSS93			VLSS98		
	Overall	Men	Women	**Overall**	Men	Women
Agriculture	**34.4**	41.3	27.8	**35.9**	42.8	29.3
Industry	**38.4**	39.5	37.0	**42.5**	42.7	42.1
Services	**31.2**	30.1	31.9	**29.2**	30.3	28.2
Other	**54.3**	51.4	56.9	**53.0**	53.0	52.9
Overall	**35.3**	**40.3**	**30.6**	**36.7**	**42.6**	**31.8**

Sources: VLSS93 and VLSS98.

These trends appear to be the outcome of two forces tugging in opposite directions. More economic growth opens up job opportunities and makes it easier to find a second job. At the same time, this growth increases the pay and improves the conditions of existing jobs, particularly in the high-paying "formal" sector, so that there is less need for a second source of income for those fortunate enough to have jobs of this nature.

It is useful to construct a transition matrix, applied to the adult household members that were surveyed both in 1993 and 1998, showing how many went from one to multiple jobs, and vice versa. The details are given in Table 8.11. Once again they point to the flexibility of Vietnam's labor markets. Of those with just one job in 1993, almost a third (31%) had more than one job in 1998; conversely, of those with more than one job in 1993, 42% had just one job in 1998.

Table 8.10
Percentage of workers of working age with more than one job, classified by Rural/Urban and by expenditure quintile, 1993 and 1998

Expenditure quintile:	VLSS93			VLSS98		
	Overall	Rural	Urban	**Overall**	Rural	Urban
Poor	**35.2**	35.8	23.9	**38.1**	38.4	30.3
Poor-mid	**36.0**	37.0	23.1	**40.9**	42.3	19.6
Middle	**39.2**	41.7	25.3	**41.6**	43.6	25.8
Mid-upper	**38.6**	41.7	29.2	**38.3**	42.9	19.6
Upper	**27.5**	35.7	20.1	**25.3**	38.5	16.7
Overall	**35.3**	**38.6**	**23.5**	**36.7**	**41.5**	**19.0**

Sources: VLSS93 and VLSS98.

It is possible to model, in a more formal way, the factors that determine whether a working-age worker will work at more than one job, or will just hold down a single job. The results of the appropriate logistic regressions are shown in Table 8.12 (for 1998 data) and Table 8.13 (for 1993 data). The dependent variable is binary, set equal to one if the person has more than one job, and to zero otherwise.

Table 8.11
Transition Matrix Showing Number of Working-Age Adults in VLSS Panel Who Had One, or More Than One, Job in 1993 and 1998

	VLSS98		
VLSS93	One job	More than one job	**Total**
One job	3,193	1,419	**4,612**
More than one job	1,164	1,602	**2,766**
Total	**4,357**	**3,021**	**7,378**

Source: VLSS93 and VLSS98 panel

The results essentially confirm the findings of the earlier, more informal, analysis. Holding other factors constant, men are more likely than women to hold a second job. A relatively high proportion of adults in the Red River Delta and Mekong Delta have more than one job; this probably reflects the large proportion of rice farmers who fill in the gaps between planting and harvesting with other activities. By 1998, occupational

multiplicity was equally widespread at all income levels except in the top quintile, where it was less common.

The gender gap remains wide; in 1993, if a woman had a 35% estimated probability of holding a second job, the probability for an otherwise identical man would be 45%; by 1998 this estimated probability had risen to 46%. The urban effect has also become more evident. If 35% of working adults hold more than one job in rural areas, then the predicted proportion in urban areas (holding all other factors constant) was 21% in 1993, but 16% by 1998 (see Tables 8.12 and 8.13). In short, occupational multiplicity is particularly prevalent among rural men, and in the rice-bowl deltas.

Table 8.12
Logistic Model for 1998: Does working age worker hold more than one job?

	Coeff-icient	p-value	New probability after unit change, given initial probability of 0.35
Dependent variable: Works >1 job? (Y=1)			
Independent variables:			
Gender (M=1)	0.470	0.00	0.46
Urban? (Yes=1)	-1.052	0.00	0.16
Number of years of education	0.013	0.01	0.35
Regional effects:			
Northern uplands	-0.669	0.00	0.22
Red River Delta	reference		
North Central Coast	reference		
Central Coast	-0.382	0.06	0.27
Central Highlands	-0.431	0.02	0.26
Southeast	-0.358	0.00	0.27
Mekong Delta	reference		
Expenditure per capita quintiles:			
Poor	reference		
Poor-mid	reference		
Middle	reference		
Mid-upper	reference		
Upper	-0.218	0.00	0.30
Constant	-0.430	0.00	
Notes: 14,060 observations. Weighted (10 strata, 194 PSUs). F(7,178)=21.4, p-value=0.000.			

CONCLUSIONS

Between 1993 and 1998, incomes rose rapidly in Vietnam, and the proportion of households in poverty fell dramatically. The economic boom helped the poor in large part through its effects on the labor market. Economic growth increased job opportunities almost everywhere.

The first result was an increase in the labor force participation rate, due to the rise in the *female* labor force participation rate, which is now close to the male level. These are high rates by world standards, and are likely to fall somewhat in the years ahead, as more young adults stay longer at school.

Economic growth also reduced unemployment, from 3.4% of the labor force in 1993 to 1.6% by 1998 - rates comparable to those found in China. At 0.8%, the rural unemployment rate is especially low. The higher urban rate (4.5% in 1998) is actually a reflection of relative affluence, because some families can now afford to support some of their members during spells of unemployment, while they look for the right job. As a matter of

Table 8.13
Logistic Model for 1993: Does working age worker hold more than one job?

	Coeff-icient	p-value	New probability after unit change, given initial probability of 0.35
Dependent variable: Works >1 job? (Y=1)			
Independent variables:			
Gender (M=1)	0.422	0.00	0.45
Urban? (Yes=1)	-0.680	0.00	0.21
Number of years of education	0.037	0.00	0.36
Regional effects:			
Northern uplands	-0.526	0.01	0.24
Red River Delta	reference		
North Central Coast	-0.242	0.00	0.30
Central Coast	-0.160	0.03	0.31
Central Highlands	-0.312	0.01	0.28
Southeast	-0.790	0.00	0.20
Mekong Delta	0.292	0.00	0.42
Expenditure per capita quintiles:			
Poor	reference		
Poor-mid	reference		
Middle	0.140	0.01	0.38
Mid-upper	0.105	0.06	0.37
Upper	-0.253	0.00	0.29
Constant	-0.810	0.00	
Notes: 11,593 observations. Pseudo R-square = 0.05. LR Chi2 = 689.1, p-value = 0.00.			

social policy the main problem is not unemployment per se - the labor market is flexible enough for anyone to find some sort of job if they really need one. The bigger challenge is ensuring that the quality of jobs continues to improve, bringing higher wages and better working conditions to those who work.

The economic boom led to a lengthening of hours worked per year. Where 62% of adults worked less than 2,000 hours per year in 1993 (i.e. were considered to be unemployed), this fell to 52% by 1998. The increase in hours worked came to 2.1% per year, and was a significant contributor to economic growth (9% annually). Although some further increase in hours worked will occur, particularly as people move out of agriculture (with its long periods when there is not enough work to do) into other sectors of the economy, but the rise in hours worked per worker will not be as substantial as it was in the 1990s. This means that future economic growth will have to rely on working smarter rather than longer.

With economic growth comes structural change, as agriculture declines in relative importance and the slack is taken up by industry and services. Vietnam is no exception to this universal pattern.

The movement out of agriculture is not sudden, in the sense that farmers just drop their tools and take jobs elsewhere. Instead it appears that farmers and their children first pick up some part-time non-agricultural work, and if that proves profitable they continue to shift out of agriculture. This occupational multiplicity is especially marked for men (42%). It is commonest in the rice bowl areas of the Red River Delta and Mekong Delta, where rice cultivation alone is not enough to keep one busy full-time.

Between 1993 and 1998, households in the poorest two quintiles were more likely to take on supplementary jobs, another measure of the rising opportunities provided by a booming economy. But the shape of the future is most evident in the top quintile, where just one in six adults held more than one job, down from 1 in 5 in 1993. This suggests that the economy is creating jobs of sufficient quality that these workers do not feel obliged to look for additional work, and yet they are still able to achieve a good standard of living.

The picture we paint is one of a flexible labor market, where households have seized the opportunities provided by a growing economy. By 1998, Vietnam had achieved near full employment. Continued economic growth cannot be based on getting people to work more hours, because they are already busy enough. The economy will, however, need to absorb about a million new workers (net) every year, as the labor force is projected to expand by 2.6% annually over the next few years. As long as it continues, robust economic growth of 5% or more per year holds the potential for better, rather than simply more, jobs. Based on the experience of the 1990s, the benefits from such jobs will spread far and wide.

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Chapter 9

School Enrolments and Drop-Outs

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INTRODUCTION

By the standards of comparably poor countries, the proportion of children enrolled in school is high and rising. The key figures are summarized in Table 9.1, based on data from the Vietnam Living Standards Surveys of 1992-93 (VLSS93) and 1997-98 (VLSS98). Primary schooling is now almost universal, although this was not true in 1993. Over the five-year interval between 1993 and 1998, enrolments in lower-secondary school rose by about half, while they doubled at the upper-secondary level and at least tripled for colleges and universities.

One of the goals of the Ministry of Education and Training, set out in 1995, was that by 2000 all children would complete lower secondary school in the large cities, industrial areas, and rice-bowl areas (Ministry of Education and Training 1995). This ambitious goal has almost been met. By 2010 the government's (draft) *Education Strategy* aims to achieve a net primary enrolment rate of 98% and a primary school completion rate of 85-95%.

Despite the remarkable progress, there is still a serious problem of pupils dropping out of school. It happens in all parts of the country, at each of the three basic levels of schooling: primary (level 1), lower secondary (level 2) and upper secondary (level 3). Since 1991, primary school education has been compulsory, and support has been given to children of the age of 6 and above so they can attend school and get through the five grades of primary school. Even so, 5% of primary school children dropped

out of a primary level class during the 1998-99 season, including those pupils who did not go on to lower secondary school.

Table 9.1
School Enrolment rates, 1993 and 1998.

	Primary age 6-10	Lower-sec. age 11-14	Upper-sec. age 15-17	University age 18-24
Gross				
1993	100.6	48.1	16.6	2.7
1998	114.7	77.7	36.3	9.8
1998, male	119.1	79.3	40.1	10.5
Age-specific				
1993	84.4	69.0	25.5	4.2
1998.	95.2	85.5	52.1	14.6
1998, male	95.7	88.3	58.0	16.9
Net				
1993	78.0	36.0	11.4	1.8
1998	92.6	61.6	28.8	9.3
1998, male	93.5	61.1	30.3	10.0

Sources: Vietnam: SPC/GSO, 1994; Vietnam: GSO, 2000.

Enrolment in post-primary school is still optional, albeit encouraged by society. Not surprisingly, the dropout rates are higher, at least for the four years of lower secondary level, where 8.7% of pupils ended their studies in 1998-99 (including those pupils who did not go on to upper secondary school). For those who made it to upper secondary school - which requires passing a competitive examination - the dropout rate was just 5.1% in 1998-99 (Ministry of Education 1999).

It is important to reduce dropout rates, for several reasons. First, when parents start their children at school, they do so in the expectation that their children will be taking steps towards a better life. Never do they think that their children may drop out of the school in a few years. Second, one needs to complete the last grade of the upper secondary level in order to have a good level of knowledge, enough to understand the technological, social and economic things that happen in life. A complete secondary education also enables the individual to apply the knowledge to everyday life.

Third, a good educational level helps people find good jobs, the ones that are interesting and provide good incomes, particularly when new technologies become available (see Behrman and Knowles 1999). Fourth, dropping out is often inefficient, because one has invested in a child's schooling without fully arriving at providing a full education. Finally, education leads to a safer society. Well-educated people are less likely to engage in criminal behavior. The final, and perhaps most important, reason is that the education of an individual can benefit the rest of society, through

its impact on the development of society as a whole. In the words of Ho Chi Minh, "for the benefit in a hundred years, people ought to be educated."

This chapter analyzes why students in lower- and upper-secondary school drop out. It draws mainly on the data from the 1998 Vietnam Living Standards Survey (VLSS98), as well as using data provided by the Ministry of Education and Training. We first document the degree to which children drop out of school, then explore possible explanations of the phenomenon, and end by presenting a more formal analysis of the variables associated with dropping out of school.

We address three important issues. The first is the extent to which access to education depends on the income of the household; if poor children are less likely to get an education, then there is a risk that the cycle of poverty will be reproduced, generation after generation. The second issue is whether school fees, which have risen sharply over the past decade, have limited access to education. Recent academic work on school fees has tended to emphasize their contribution to improving the quality of education, while downplaying their effect on enrollment, but is this still the right way to think about the subject? And the third issue is whether there is a gender bias in school enrolments. Vietnam prides itself in its commitment to gender equality, but does this reflect the reality of school dropout rates?

DROPOUT RATES

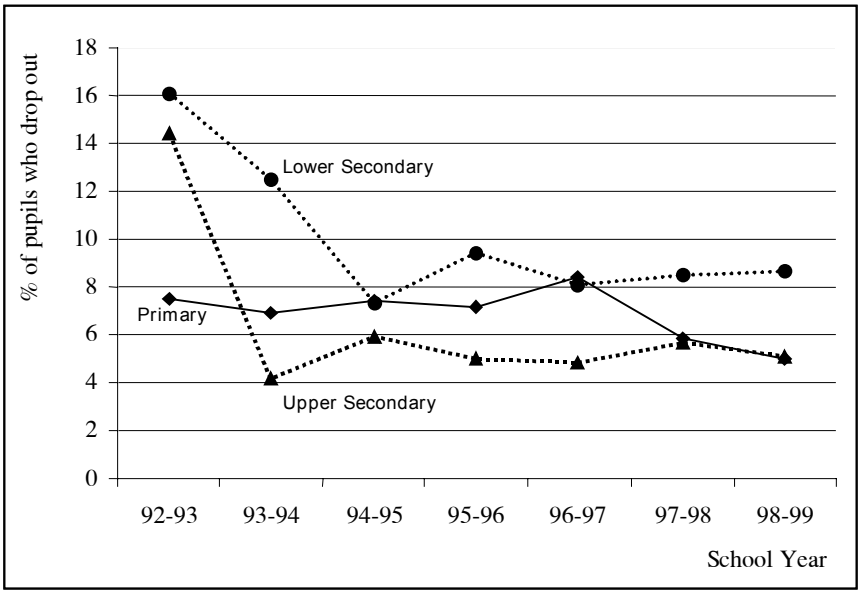
To fix ideas we first need to present the essential data on dropout rates. Figure 9.1 shows the percentage of students who dropped out during each school year, for 1992-93 to 1998-99, based on official data from the Ministry of Education and Training (MOET). The data come from an annual report prepared at the beginning of each school year, where the number of pupils who dropped out of school during the previous school year is given. The resulting dropout rates include those who do not pursue lower secondary school (having attended at least part of the last year of primary school), as well as those who do not pursue upper secondary school (having attended at least part of the last year of lower secondary school).

The very high dropout rates of the early 1990s are now a thing of the past. Since 1994-95 dropout rates have been relatively stable, consistently higher at the lower- than the upper-secondary level. This stability means that when we investigate the causes of dropout rates in more detail, using data for 1998, we can be confident that we are getting at root causes, and not picking up the temporary effects of transient shocks to the educational system.

Dropout rates vary considerably from region to region. The evidence for this is gathered in Table 9.2, which provides a detailed breakdown for the 1993-94 and 1994-95 school years, and a less refined breakdown for

1998-99. It shows that dropout rates are higher in the Central Highlands and Mekong Delta than in other regions; dropout rates are particularly low in the Red River Delta. This pattern is reflected in the less disaggregated numbers for 1998-99, which show higher dropout rates in the south than in the north of the country.

Figure 9.1
Dropout Rates in Primary, Lower- and Upper-Secondary Schools



Source: Ministry of Education and Training (1999).
Note: Dropout rate is defined as number of pupils who drop out during the year as a proportion of the number of pupils at the beginning of the academic year. The lower-secondary dropout rates include pupils who did not go on to upper-secondary level, and the primary dropout rates include pupils who did not go on to lower-secondary level.

It is possible to calculate dropout rates using the VLSS98 data, although the results are not exactly comparable with the official Ministry data. We have constructed a dropout rate (R) that is defined as R = 100*D/T, where T is the number of people aged 12-20 who attended, or are attending, school, and D is the number who no longer attend school. The computation may be done separately for lower- and upper-secondary school, and gives dropout rates of 14.4% and 4.3% respectively. These are consistent with the pattern seen above, of higher dropout rates at the lower- than upper-secondary level. It is also interesting to note that 5.6% of pupils who complete primary school do not go on to lower secondary school, and 19% of pupils who complete lower secondary school do not go on to upper secondary school.

Table 9.2
Dropout rates for Lower- and Upper-Secondary school pupils

	Lower secondary: grades				Upper secondary: grades		
	6	7	8	9	10	11	12
	1993-94 and 1994-95 school years						
Vietnam overall	**10.4**	**10.7**	**9.3**	**5.6**	**6.8**	**4.5**	**7.0**
Northern Uplands	9.4	10.4	8.8	2.4	6.3	2.7	10.1
Red River Delta	6.2	7.6	4.9	2.4	3.6	3.9	4.7
North Central Coast	8.4	9.1	7.9	10.0	3.1	1.4	6.1
Central Coast	13.2	13.3	13.2	11.5	10.1	4.1	5.3
Central Highlands	28.8	27.6	29.5	18.0	17.4	15.1	9.3
Southeast	10.5	8.6	7.7	1.9	8.1	7.0	2.3
Mekong Delta	16.7	16.1	15.3	7.5	12.5	8.0	16.1
	1998-99 school year						
Vietnam overall	8.8	8.5	7.6	10.0	6.2	4.0	4.5
- north	5.6	6.5	5.9	7.9	3.3	2.4	1.8
- south	12.3	10.9	9.6	12.9	9.5	6.0	8.0

Sources: Ministry of Education and Training (1999).

WHY DO STUDENTS DROP OUT OF SCHOOL?

If education is so important, why do students drop out? One way to address this question is by asking community leaders why they believe students drop out of school. The Vietnam Living Standards Survey of 1998 (VLSS98) collected such information in rural areas, yielding the results that are summarized in Table 9.3. Of the various possible reasons, family poverty was mentioned most often, by about three-quarters of the respondents. Other important reasons mentioned are that some pupils do not want to study, or are working, or have to travel too far to school, or are not pushed by their parents.

In the light of these results it is helpful to distinguish between two types of influences: the economic situation of the family, and the social and environmental variables outside the household's immediate control.

Economic Variables

Income

Because of their low incomes, poor households have little spending power. Spending on education – for tuition, textbooks, supplies, uniforms – can therefore be too great a burden for such households, who are then are unable to send their children to school.

Table 9.3
Why pupils drop out of school, 1998

	Secondary education	
	Lower	Upper
Poor household	76.9	72.8
Pupil dislikes school	60.8	56.7
Child is working	35.4	50.3
Parents don't care	47.0	39.6
School is too far	23.0	32.8
Illness	17.3	9.3

Note: Based on the opinions of community leaders interviewed for the community questionnaire component of VLSS98.

The link between household income and success at school is the focus of an important article by Behrman and Knowles (1999). They consider several measures of children's school success, including the age when the child started school, grades passed per year of schooling, last completed grade and exam score in the last completed grade. The data used in their study came from the 1996 Vietnam Social Sector Financing Survey (VNSSFS), conducted by the General Statistical Office and the World Bank. They found a close association between household income and school success; the effect of income on the probability of completing any given grade was five times stronger in Vietnam than the median estimate from earlier studies (based on 21 other countries). The authors also found that the association between grades completed per year of schooling and household income was stronger for girls that for boys, suggesting that the schooling of girls may be considered more of a luxury compared to the schooling of boys.

The numbers from the VLSS98 survey also show a strong link between household living standards and whether children drop out off school. Table 9.4 shows the effect that wealth and poverty has on school attendance: 43% of children from poor households (defined as those in the bottom quintile, as measured by expenditure per capita) had dropped out of secondary school according to the VLSS98 data, compared with 19% for children from households in the top quintile. These differences are statistically significant.

Table 9.4
Secondary school attendance for children 12-20 by expenditure quintile, 1998

	Expenditure quintile					
	Poor	Poor-mid	Mid	Mid-Upr	Upper	Overall
Attending School	56.7	63.9	67.3	70.5	81.8	69.6
Dropped out of school	43.3	36.1	32.7	29.5	18.2	30.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Design-based F(3.72, 676.49) = 22.7; p-value = 0.000.

Plenty of anecdotal evidence points in the same direction. In a recent report on the assessment of poverty in Lao Cai, a province in the Northern Uplands, when a teacher visited villages in order to encourage children to go to school, what he often heard was "Sir, would you give me rice if I go to school?" (World Bank/ADB/UNDP 1999, p.63). In Tra Vinh, a province in

the Mekong River Delta, the words that many a child said were: "The school always asks for the money that we do not have, so I want to quit" (World Bank/ADB/UNDP 1999, p.49).

The cost of schooling

It is expensive to send a child to secondary school. Some of the expenses are monetary, on uniforms, books and supplies. The other main expense is the time that the student has to spend traveling to school, which can be quite substantial in the less densely populated parts of the country.

According to VLSS98, the average expenditure per pupil per year was 557,500 dong ($45) at the lower secondary level and 1,186,300 dong ($97) at the higher secondary level. The fee gradient is shown clearly in Figure 9.2 and the accompanying Table 9.5. Such levels of spending are impossible for poor households. There is also substantial regional variation in fees, as Table 9.6 shows.

Figure 9.2
Scatter plot of school fees per year, by age of pupil

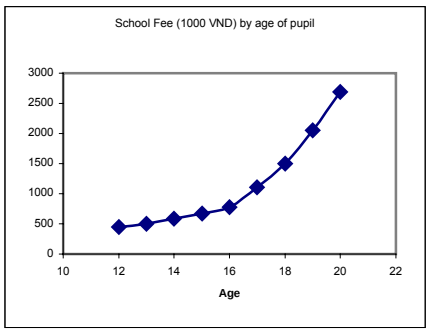


Table 9.5
School fees per year, by age of pupil, 1998

	Fee (1000 VND)
Overall	**804.5**
Ages	
12	448.2
13	495.2
14	584.4
15	668.7
16	777.5
17	1,107.8
18	1,501.4
19	2,047.9
20	2,686.2

Source: VLSS98, 3,368 pupils, 12-20.

Anecdotal reports confirm the burden that such fees impose. In Ha Tinh, a province well known for its interest in education, "the discussion in the [World Bank/ADB/UNDP poverty assessment focus] groups involved with the education issue concentrated on the problem of high expenditure for the poor households. Children could go to school only when this expenditure was reduced" (World Bank/ADB/UNDP 1999, p.55).

Figure 9.3
Box plots of school fees per year, by region

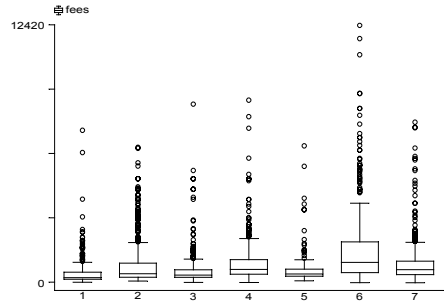


Table 9.6
School fees per year, by region, 1998

	Fee (1000 VND)
Overall	**804.5**
Regions	
1 Northern Uplands	399.4
2 Red River Delta	751.0
3 N. Central Coast	544.1
4 Central Coast	918.5
5 Central Highlands	666.9
6 Southeast	1554.2
7 Mekong Delta	895.8

Source: VLSS98, 3,368 pupils, 12-20.

Apart from the cost of school fees and other expenses, households forego the money that their children would have earned if they were not attending school. Poor households can ill afford to do without this money. This is reflected in Table 9.7, which shows that 65% of working children attend school, compared to 74% of children that are not working, although perhaps the most surprising thing about these numbers is how many working children still manage to attend school.

Table 9.7
Secondary school attendance, for working and non-working children aged 12-20, 1998

	Child is:		Overall
	not working	working	
At school	74.1	64.8	69.6
Dropped out	25.9	35.2	30.4
Total	100.0	100.0	100.0

Source: VLSS98.
Note: Design-based F(1, 182) = 32.7; p-value = 0.000.

Social and Environmental Variables

Parental education

Better-educated parents are more likely to encourage their children to go to, and remain in, school. The effect is picked up in Table 9.8, which shows that 27% of children whose mother had a diploma (i.e. had successfully completed upper secondary school or better) dropped out of secondary school, compared with 31% for less-educated mothers. A very similar pattern is found for paternal education, and in both cases the differences are statistically significant.

Gender

Among those aged 12-20 in 1998, 72.5% of boys and 66.6% of girls were at school. This difference is statistically significant. That female students

drop out of secondary school more than male students is common in developing countries.

Table 9.8
Secondary school attendance, for parents with and without diplomas, 1998

Child is:	Mother has		Father has		Overall
	a diploma	no diploma	a diploma	no diploma	
At school	72.7	66.7	71.6	67.4	69.6
Dropped out	27.3	33.3	28.4	32.6	30.4
Total	100.0	100.0	100.0	100.0	100.0

Source: VLSS98.
Notes: Design-based F(1, 182) = 11.6; p-value = 0.001 (mother). Design-based F(1, 182) = 5.2; p-value = 0.024 (father). A "diploma" means a high school graduation diploma or equivalent.

The gender effect seems to become stronger with age, with a wider (although not very large) male-female gap at the upper-secondary than the lower-secondary level. Truong Thi Kim Chuyen et al. found evidence of such an effect in a model of *age-specific* enrolment in school for children aged 11-14 (1999) using data from the VLSS93. Interestingly, this interaction effect, and in fact gender effects altogether, were not significant in models of *net enrolment rates* in lower secondary school for children aged 11-14, or of completion of sixth grade. In other words, girls aged 11-14 were as likely to be at lower-secondary school as boys - a result that is also evident in Table 9.1 - but were less likely than boys to still be in primary school. Glewwe and Jacoby (1998) found insignificant gender effects in models for enrollment in and completion of primary school in 1993.

One possible explanation for the gender differences is that families simply discriminate in favor of their sons. A more strictly economic reason might be that an educated male might have better job prospects than an educated female, in which case providing education to a girl would be less profitable than providing the same education to a boy.

Another interesting issue pertains to household size. Truong Si Anh, Knodel, Lam and Friedman (1998), using data from the 1994 Inter-Censal Demographic Survey find only a modest educational advantage for children from a one- , two- or even three-child family compared to a four- or five-child family when other factors, such as region and urban/rural effects, parents' education, household wealth and child's age are controlled for. This is an important issue, because it may imply that the rationale to encourage families to have two children only may need to rest on arguments other than educational advantage. Indeed we found that household size is not significant in our model, in the presence of other factors, so our results tend to corroborate those of Truong Si Anh et al.

Geographic variables

An estimated 76% of the population lives in rural areas, according to the 1999 census. Children are significantly less likely to drop out of school in urban than in rural areas, as Table 9.9 shows. One reason is that rural children typically have to travel much further to school than their urban counterparts, and as a result greater dedication is needed if the child is to stay at school. A second reason is that in rural areas there may be more demand for child labor, to help look after animals and undertake other chores. This may distract children from schoolwork, and lead them to drop out earlier.

A further plausible explanation is that the benefits of education may be less in rural areas. According to a poverty assessment undertaken in the mountainous province of Lao Cai in 1999, "In the remote rural areas the opportunities for getting income from non-agricultural jobs are too rare. It makes parents think that the investment in education for children will not help them much, because both parents and children believe their occupation is still in the agricultural field so that there is no need to study much" (World Bank/ADB/UNDP 1999, p.64).

According to the VLSS data, dropout rates at the secondary level are particularly high in the Mekong Delta and, less markedly, in the center of the country; Table 9.7 provides details. It is possible that schools are less easily accessible in the Mekong Delta, where travel is frequently by boat.

School quality

The extent to which pupils drop out will depend in part on the quality of the schooling. There is no direct way to measure whether a school or a class is good or bad, but one useful indicator is the number of pupils per classroom.

Over the period 1993 to 1999 the number of secondary-school (lower and upper) teachers rose by 63%, the number of schools by 73% and the number of classrooms by 89% (Ministry of Education 1999). Even these large increases failed to keep up with the number of students, so that the number of pupils per classroom actually rose between 1993 and 1999, as Table 9.10 shows. Not only were more students packed into each classroom, but also the number of teachers per classroom fell from 1.78 in 1992 to 1.54 by 1999.

Table 9.9
Dropout Rates for Secondary Education, by Region and Location, 1998

	Dropout rate
Overall	**30.4**
Urban	22.1
Rural	33.0
Regions	
Northern Uplands	29.8
Red River Delta	28.2
North Central Coast	25.1
Central Coast	32.9
Central Highlands	29.6
Southeast	25.8
Mekong Delta	39.9

Source: VLSS98.

Despite the worsening teacher/student ratios, the dropout rates remained essentially unchanged between 1993 and 1999 (see Figure 9.1). Clearly other influences must be at work as well.

A MODEL OF DROPPING OUT OF SECONDARY SCHOOL

We now develop a logistic regression model for the probability that a child aged 12-20 drops out of secondary school. The dependent variable is set equal to one if the child has dropped out of school, and to zero otherwise.

Our earlier discussion provides some guidance about the appropriate sets of individual, household and community variables that should serve as independent variables in the regression. At the individual level we include the age and gender of the child, whether the young person is married, is working, or has had to repeat some grades. Both the results of previous studies, and our own reasoning, point to the value of including a term that allows an interaction between age and gender; this should allow us to test whether gender has a bigger effect on dropout rates for older children.

Table 9.10
Students per Classroom, Secondary Education, 1992-3 – 1998-9

	School year						
	'92-93	'93-94	'94-95	'95-96	'96-97	'97-98	'98-99
Lower secondary	38	40	40	41	41	42	42
Upper secondary	40	43	44	47	47	48	48

Source: Ministry of Education and Training 1999.

The household variables include the educational levels achieved by the child's father and mother, and the living standard (as measured by expenditure per capita) of the household.

At the community level, we include dummy variables that capture differences across the main regions of Vietnam, as well as the urban/rural gap. Possibly the most interesting community variable is the level of school fees. The practical problem is that the amount paid to schools by households is known only for children actually enrolled in school, so we had to use an estimated fee calculated from a simple regression of (the logarithm of) school fees on the age of the child and the commune of residence.

The logistic regression results are shown in Table 9.11. As expected, older children (especially girls) are more likely to have dropped out, as are children who work, or who have had to repeat grades. Children who live in communities where the school is considered to be far away are also less likely to stay at school. On the other hand when the parents are themselves more educated, their children too are less likely to drop out of school. Holding other factors constant, children are less likely to drop out in the North Central Coast region (where there is a tradition of emphasis on

education as the path out of poverty); however, pupils are more likely to drop out of secondary school if they are living in the Mekong Delta.

Table 9.11
Logistic Regression Model: Which children aged 12-20 dropped out of secondary school?

	Coefficient	p-value	Effect on est'd prob. of dropping out (initially .3) of a unit increase in independent var.
Dependent variable: Dropped out? (Y=1)			
Independent variables:			
Age of child (yrs)	0.528	0.00	F: 0.421 M: 0.415
Male * age interaction	-0.024	0.00	F to M, 11yrs: 0.29 F to M, 15 yrs: 0.23 F to M, 18 yrs: 0.22
Has child repeated some grades? (Y=1)	0.352	0.00	0.38
Child is working? (Y=1)	0.454	0.00	0.40
Child is married? (Y=1)	1.842	0.00	0.73
Distance to school among top 4 reasons for dropping out? (Y=1)	0.385	0.03	0.39
Number of yrs of education of Hhold Hd.	-0.054	0.00	0.29
Log of real per capita exp.	-1.723	0.00	0.07
Log of estimated school fees	0.676	0.00	0.46
Urban? (Y=1)	-0.565	0.01	0.20
Regional effects:			
Northern Uplands	Reference		
Red River Delta	Reference		
North Central Coast	-0.441	0.01	0.22
Central Coast	Reference		
Central Highlands	Reference		
Southeast	Reference		
Mekong Delta	0.417	0.05	0.37
Constant	-0.147	0.90	

Notes: When the log of school fees (or of exp/cap) increases by 1, school fees (or exp/cap) increase 2.72-fold. With 4,879 observations, weighted, 10 strata, 192 PSU. F(12,172)=50.77, p-value = 0.000.
Source: VLSS98.

Our first hypothesis is that the children of more affluent families are more likely to stay in school. The evidence supports this; for a child that otherwise has a 30% probability of dropping out of school, a 10% increase in household per capita expenditure will reduce this probability to 27%.

Our second hypothesis is that higher school fees lead to higher dropout rates. Here too the evidence supports this notion; a 10% increase in fees would raise the probability of dropping out by about one percentage point.

The third concern was with gender effects. The regression evidence in Table 9.11 shows that girls are somewhat more likely to drop out of school than boys, and this effect is larger, the older are the children. In addition,

5.0% of young women (aged 12-20) are married, compared to just 0.8% of young men; this is important, because married individuals are less likely to remain at school.

CONCLUSIONS

Over the past decade, school enrolment rates have risen substantially in Vietnam, at all levels of education. Nonetheless, retention is far from perfect, and every year between five and eight percent of pupils drop out, according to Ministry of Education figures.

Dropping out of school does not occur randomly, and in this chapter we ask what factors determine who leaves school prematurely.

Our first hypothesis is that the children of better-off households stay in school. There are plenty of anecdotes to this effect. The hard evidence, which comes from the VLSS98 survey, confirms that income matters: of children aged 12-20, 43% of those from households in the poorest quintile had dropped out of school, compared with just 18% of those from households in the top quintile.

The second hypothesis is that school fees matter, and that higher fees lead to more dropping out. The VLSS93 survey did not show this; indeed it found that higher fees were associated with *higher* enrolment rates, presumably because they had an even bigger effect on improving school quality. By 1998 this pattern had changed, and high fees were clearly associated with lower enrolments. This showed up most sharply in the results of estimating a formal regression model of dropouts: a 10% increase in fees, holding all other factors constant, raises dropout rates by about a percentage point. There is therefore a serious tradeoff: fees may lead to better school quality, but at the expense of more dropouts. The current system of subsidies to poor children does not appear to be enough to prevent this from happening.

The third hypothesis is that gender matters. This is not evident at the primary level, where enrolment is close to universal. By some measures a gender gap appears at the lower secondary level. But the more important finding is that the gap widens at the upper secondary level. This is reinforced by the effects of marriage: women tend to get married younger, and married individuals are more likely to drop out of school.

The policy implications are clear. If neither the poor nor girls are to be disadvantaged, then the government will need to expand the fee subsidies provided for the poor; to continue to proclaim that girls are as entitled to an education as boys; to avoid gender discrimination in the conditions of work and employment; and probably to improve school quality. The specific problems of the Mekong Delta, where enrolment rates are low, also merits special attention, and probably requires efforts to make it easier simply to get to school.

These are manageable policies, but call for attention if the progress made in enrolment rates in recent years is to be extended to rich and poor, girls and boys, and Vietnamese throughout the country.

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Chapter 10

Health

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INTRODUCTION

Vietnam is rapidly making the transition from a subsidized, centrally-planned economy to a market-oriented one. We know from the Vietnam Living Standards Surveys of 1992-93 (VLSS93) and 1997-98 (VLSS98) that per capita incomes have risen markedly; furthermore, the poverty rate, using the World Bank threshold of 2,100 Calories per day plus non-food spending, fell from 55% to 37% during the same period (see chapter 1).

The life of the great majority of the population has improved visibly, both materially and spiritually. Social activities are increasingly diverse, and health care services are developing vigorously.

In this chapter we focus on health and medical care, starting with an assessment of the health status of the population. Our aim is to provide medical policy makers with accurate and relevant information, and to come up with recommendations to improve the health status at the community and individual level.

Recent years have seen great efforts by the medical sector to improve medical consultations and treatment, not least better bedside services and free services for the poor and for those entitled to social welfare. This has aimed to ensure social equity in medical services. Medical institutions have become more professional.

However, central and provincial hospitals, endowed with government infrastructure and equipment as well as qualified health workers, are more often than not overloaded. This is particularly true of central hospitals. And although there are over 10,000 community health centers, operating in 93% of communes, they are poorly funded, employing 23% of all health care personnel with just 5% of the government's health budget (Dinh 1999).

Gertler and Litvack (1998) point out that these centers mainly serve poorer households, and so adequate funding for them would have a pro-poor bias.

In the market-oriented economy, the private medical sector is developing strongly and, in a way, supplementing the state medical sector. In practice, private medical institutions have responded fairly well to the ever-increasing medical needs of the population; a very similar evolution has occurred in China (Witter 1997). An estimated 80% of spending on health is done by households; when combined with government spending, the total comes to 8% of GDP, a relatively high level by the standards of less-developed countries (World Bank 2000, p.68).

It remains true that the market economy has also given rise to some weaknesses and shortcomings in the medical sector: district-level hospitals are poorly equipped and funded, which creates worry among patients when it comes to selecting medical institutions for treatments. As they turn to provincial and central hospitals, these institutions in turn become overloaded.

The emergence of the market economy has also led to a wider gap between rich and poor, as chapters 1 and 2 show. Affluent families can afford the high fees demanded by private doctors, or by family doctors who make house visits. At the other end of the scale, the poor have to think twice before deciding to go to a modern medical institution, because they cannot afford it. Most often, then buy medicine at a pharmacy and take care of themselves without consulting a doctor; a recent World Bank (2000, p.68) report claimed that three-quarters of the poor rely on self diagnosis and self medication.

Best practice would be to develop systems of "pre-payment," such as medical insurance, supplemented with stronger government subsidies to ensure access for the poor (World Bank 2000, p.71), but financing mechanisms of this sort are still in their infancy in Vietnam (Nga 1999).

PROBLEMS TO BE ADDRESSED

This chapter aims to provide more details about the themes outlined above, documenting the current state of illness, and modeling who falls ill, who seeks treatment when they are ill, and how much they must pay when they seek medical care. Most of the information comes from the data gathered by VLSS93 and VLSS98.

Who is ill?

According to the VLSS98, 41.6% of individuals said they were ill (or injured) at some time during the four weeks prior to being surveyed. This is actually a higher rate that the one observed by VLSS93. However we do not believe that the country had become sicker during the five years between the

two surveys. A more plausible explanation is that the VLSS98 questionnaire had more detailed questions on such common indispositions as headaches, colds, and coughs. It is well known that more detailed questions tend to jog the memories of respondents, leading in this case to a higher level of self-reported illness.

Illness was most widespread in children aged 0-4 (50.5%), and in adults over 50. Conversely, the lowest illness rate is in the 15-24 age group, the prime period of human development, when individuals are almost impregnable to diseases. The pattern of illness, by age, emerges clearly in the age-illness profiles shown in Figure 10.1.

The illness rate for females (44.7%) was higher than for males (38.2%). One interpretation is that women are less able than men to withstand the impact of their environment. But there are other, more specific, reasons. In pregnancy, women undergo physical changes, which risk affecting their health. Women tend to work long hours, shouldering the bulk of household chores in addition to farm- and off-farm work, leaving less time for relaxation and recuperation.

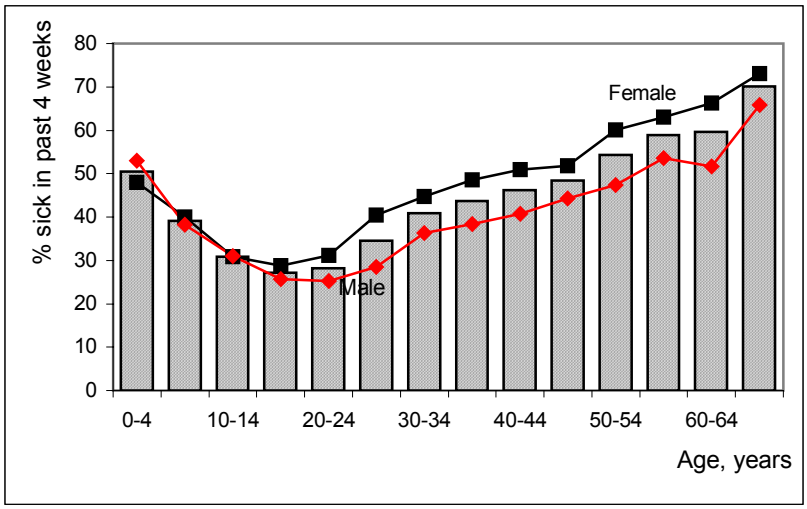


Figure 10.1
Percentage of people sick in 4 weeks prior to survey, by age, 1998

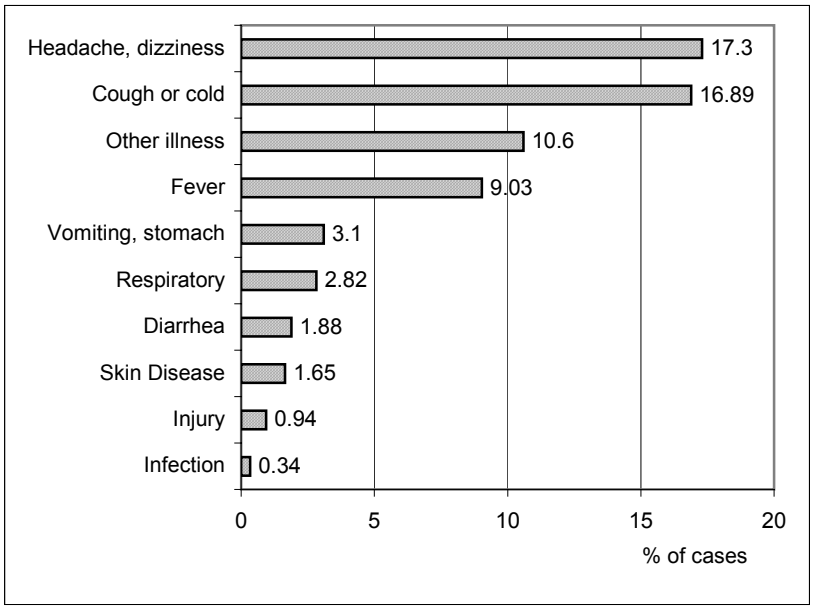
The proportion of people who were ill varies along a number of other dimensions. As a general rule, the illness rate in high-income groups is lower than in low-income groups, because the rich can afford food that is high in nutrients and vitamins, so they have better health. This pattern is found in the VLSS98 data: the illness rate is higher for individuals in the poorest expenditure per capita quintile (42.9%) than in the richest (39.3%).

Nearly all of the difference is accounted for by lower illness rates among rich males (34.8%) compared to poor males (41.1%); the rate for rich females (43.6%) is very similar to that found for poor females (44.6%). Illness rates are higher in rural areas (42.4%) than in urban areas (38.7%), due in large measure to the lower living standards, harsher environment, harder physical work, and lower educational levels of the countryside.

Types of illness

A breakdown of the types of illness, based on the VLSS98 data, is shown in Figure 10.2. Each bar in Figure 10.2 shows the percentage of people who reported having that symptom at some point during the four weeks prior to being interviewed. On average, sick people reported 1.55 separate ailments, so the sum of reported illnesses in Figure 10.2 (64.6%) exceeds the proportion of people who were sick (41.6%).

Figure 10.2
Types of illness reported by households in 1998, from VLSS98



The commonest ailment reported was headaches and dizziness (17.3%), closely followed by coughs and colds (16.9%). A substantial number of people reported having a fever (9.0%), which of course is a symptom of sickness that should properly be classified in one of the other categories. There were relatively few cases of injury (0.9%) and infection (0.3%).

These figures are useful in that they provide us with an idea of the prevailing pattern of the most common diseases. If they are to be effective, preventive measures should be geared to treating these ailments. Interestingly, this pattern differs significantly from that found in hospitals in 1997 and 1998, as detailed in Table 10.1.

A comparison of the VLSS98 data and the hospital reports points to a number of differences in the pattern of diseases. For instance, intestinal problems figure more prominently in the hospital figures, as do infections and surgical cases. One reason for the difference is that hospitals only see the most serious cases; seemingly simple indispositions such as a runny nose or headache are either self-treated at home or dealt with at a community or ward health station. Another difference is that the VLSS98 figures include "fever" as a category; in a hospital setting, fever cases would be properly diagnosed and allocated to the appropriate illness group.

Table 10.1
The most prevalent diseases reported by hospitals, 1997 and 1998

	The most prevalent diseases in:	
	1997	1998
	(number of cases reported by hospitals)	
Infected diarrhea	340,080	250,337
Pneumonia	300,915	238,127
Acute sore throat	221,845	
Bronchitis	212,791	209,434
Other respiratory problems	210,075	
Dental problems	205,739	
Dengue fever		186,573
Other infectious diseases	163,107	
Malaria	158,181	87,944
Trachoma	133,572	
High blood pressure		93,297
Stomach and duodenum ulcers		67,815
Pulmonary tuberculosis		66,223
Appendicitis		59,928

Source: Ministry of Health.

Sources of Medical Care

Where do people go for treatment when they are sick? The key figures from the 1998 VLSS are shown in Table 10.2. In the four weeks prior to the survey, 10.6% of all individuals visited a private medical institution; slightly less popular were state hospitals (7.6%), and commune/ward health clinics (6.6%). These figures were strongly influenced by the household's economic status: those in the top expenditure quintile were far more likely to visit a public hospital or private health professional than poorer

households. On the other hand poorer households were more likely to visit a health clinic.

There is a clear urban-rural divide. Households living in towns and cities were almost twice as likely to visit a hospital as their rural counterparts; rural households tended to go to health clinics instead. More households treated the illness at home in rural areas (3.0%) than in urban locations (1.8%).

Members of more affluent households are more likely to get professional treatment when they fall ill; the probability is 83% for those in the top quintile, and 70% for those in the bottom. In addition, the more affluent households have access to better health care; they are more likely to go to a government hospital or a private doctor, while poorer groups tend to see less-qualified health workers such as nurses at commune health centers.

Table 10.2
Percentage of sick individuals visiting health facility in 4 weeks prior to survey, 1998

	Expenditure per capita quintile						Location	
	Poor	Poor -mid	Mid	Mid-upper	Upper	**Total**	Rural	Urban
Govt. Hospital	3.7	5.4	7.4	9.3	12.6	**7.6**	6.3	12.5
Commune Health C.	7.9	7.9	7.9	6.2	2.6	**6.6**	7.8	1.7
Regional Polyclinic	0.5	0.3	0.8	1.0	0.5	**0.6**	0.6	0.7
Other govt. facility	0.1	0.1	0.4	0.5	0.6	**0.3**	0.3	0.5
Private	8.4	8.1	10.9	11.3	14.5	**10.6**	10.4	11.3
Traditional	2.1	1.9	2.0	2.8	2.6	**2.3**	2.4	1.9
Doctor's home visit	2.5	3.9	2.5	2.6	2.3	**2.8**	3.0	1.8
Pharmacy	52.6	62.0	63.9	60.0	61.4	**60.0**	58.6	65.2
Total	**70.3**	**80.1**	**82.2**	**81.4**	**83.0**	**79.3**	**78.2**	**83.5**

Source: VLSS98.

Spending on Health Care

Expenditure on health care and prevention averaged 175,700 dong ($12.55) per capita per year in 1998, constituting on average 5.3% of total family expenditure, as Table 10.3 shows. This information refers to all households, whether or not anyone was sick. After adjusting for inflation, it is remarkable that spending on health care and prevention remained essentially unchanged between 1993 and 1998 for all except for the richest fifth of the population.

The region with the highest average per capita expenditure on health was the Southeast (313,000 dong per person per year), where spending is almost four times as high as in the Northern Uplands (80,000 dong per capita). The disparity reflects, in part, the differences in incomes between these regions. However it may also reflect differences in the cost of medical services, in the desire for health care, and in geographic and climatic factors that influence health. It is noteworthy that families in the Southeast and the Mekong Delta spend substantially more on health care *in any given quintile*;

this means that households with equivalent overall expenditures actually devote more of their spending to health care in these regions than elsewhere.

Apart from geographic effects, household affluence appears to be the major influence on health spending: households in the top expenditure quintile spent 369,000 dong annually per capita on health care, almost seven times as much as those in the bottom quintile. When people's standard of living improves, they spend more dong on health care, even though they are less likely to be sick; however they do not necessarily devote a higher *proportion* of spending to health care, because it seems to reach a ceiling at about 5.5% of spending, as seen in the last row of Table 10.3. Poor households, not having the wherewithal to take care of themselves, both suffer more illness and yet spend less on health care. Some thought is needed to devise ways to reduce this inequity.

Spending on medical services in urban areas (255,000 dong per person per year) is higher than in rural areas (151,000 dong), despite the fact that the prevalence of illness is higher in the countryside.

Table 10.3
Household Spending on Health Care per capita (inc. health insurance), '000 dong, 1998

	Expenditure per capita quintile					**Total**
	Poor	Poor-mid	Mid	Mid-upper	Upper	
Rural	54.8	89.2	130.4	192.0	413.4	**150.7**
Urban	74.9	86.8	118.3	139.6	342.1	**254.9**
Northern Uplands	36.1	49.0	95.8	97.8	225.4	**79.5**
Red River Delta	52.4	89.9	113.8	154.8	324.2	**163.2**
North Central Coast	66.2	96.7	112.6	162.5	507.1	**154.7**
Central Coast	65.1	84.1	121.8	176.6	298.9	**155.8**
Central Highlands	43.3	75.5	123.4	180.7	255.5	**111.2**
Southeast	113.0	113.6	160.8	215.7	394.5	**312.8**
Mekong Delta	78.0	121.6	173.7	247.0	429.1	**221.3**
Total	**55.5**	**89.0**	**129.0**	**178.8**	**368.9**	**175.7**
Total as % all expend	4.5	5.0	5.6	5.7	5.5	**5.3**
Memo: Spending in 1993*	64.4	92.1	132.4	171.9	290.2	**154.7**

Notes: Penultimate row shows mean over households of the proportion of total spending that is devoted to health care and prevention. Figures for 1993 are in prices of 1998; the adjustment reflects inflation of 47.3% during the five-year period.
Source: VLSS98; Ha and Huong (1999) for 1993 figures.

A THREE-STEP ANALYSIS

We now analyze the issues of sickness, and subsequent health care, in a three-step analysis. First we apply a logistic regression model to determine what causes someone to fall ill. Then, given that someone is sick, what variables determine whether he or she will get health care. Third, given that someone seeks health care, how much do they pay for the care.

Who falls ill?

For this exercise we define a dependent variable that is set equal to one if an individual is sick, and to zero otherwise. It is natural to ask what variables influence the propensity to fall ill, or whether sickness strikes individuals in a purely random way.

The regression results are shown in Table 10.4, and refer to 1998. Given our earlier discussion, it will come as no surprise that age has an important influence on whether someone falls ill; the estimates indicate that the probability of becoming sick falls until the age of 18 and then rises.

What other variables matter? Holding all other variables constant, a household with an extra one million dong of expenditure per capita ($71) would find that the probability of its members falling ill would drop from, for instance, the average of about 40% to 38.8%, an appreciable but not overwhelming effect.

According to the regression results, men are only 87% as likely as women to report falling ill. Somewhat unexpectedly, people living in larger families are significantly less likely to fall ill, again holding all other variables constant.

Table 10.4
Logistic Model for 1998: Who fell ill in the 4 weeks prior to the survey?

	Coefficient	p-value	New probability after unit change, given initial probability of 0.400
*Dependent variable:*Fell ill? (Yes=1)			
Independent variables:			
Gender (M=1)	-0.231	0.000	0.346
Age	-0.022	0.000	10-11: .398/ 50-51: .408
Age squared	0.0006	0.000	
Expenditure per capita (million VND)	-0.052	0.001	0.388
Family size	-0.082	0.000	0.380
Geographic effects:			
Northern uplands	-0.312	0.007	0.328
Red River Delta	Reference		
North Central Coast	Reference		
Central Coast	Reference		
Central Highlands	0.411	0.001	0.501
Southeast	Reference		
Mekong Delta	Reference		
Constant	0.348	0.002	

Notes: 28,509 observations. F(7,178) = 113.47. The unit of observation is the individual.
Source: Based on VLSS98.

Geographic effects are important. Illness rates are highest in the Central Highlands, an area of considerable poverty where many villages are in remote locations. On the other hand it is surprising that the rate of reported illness in the rural areas of the Northern Uplands – also a poor and

remote area – is particularly low. It is not clear if this is because people are truly less ill in this area (other influences being held constant), or whether it just reflects differences in the perception of illness.

Who gets medical help?

Given that someone falls ill, do they get medical help? This is the question we now address, with the help of another logistic regression. Here the dependent variable is set equal to one if the sick individual gets professional medical attention (including a visit to a pharmacy), and to zero otherwise. Our procedure was to first estimate the regression with all potentially relevant independent variables, and then to exclude, one by one, any variables that were not statistically significant at the 10% level – a backwards stepwise algorithm. The estimates of the final and best equation are set out in Table 10.5.

Table 10.5
Logistic Model for 1998: Which sick people got medical attention?

	Coefficient	p-value	New probability after unit change, given initial probability of 80%
Dependent variable:			
Got medical attention? (yes=1)			
Independent variables:			
Gender (M=1)	-0.199	0.00	0.766
Age	0.005	0.01	0.801
Medical Insurance? (yes=1)	-0.168	0.09	0.772
Type of illness:			
Fever	0.433	0.00	0.860
Diarrhea	0.261	0.08	0.839
Injury	-0.330	0.08	0.742
Geographic effects:			
Northern uplands	-0.396	0.02	0.729
Red River Delta	Reference		
North Central Coast	Reference		
Central Coast	Reference		
Central Highlands	-1.198	0.00	0.547
Southeast	0.617	0.01	0.881
Mekong Delta	0.688	0.00	0.888
Constant	1.169	0.00	

Notes: 11,788 observations; these only include individuals who were sick in the 4 weeks prior to the VLSS98 survey. $F(10,175) = 12.37$, so the equation is statistically significant.
Source: Based on VLSS98.

The results contain some surprises. First, there is no difference between urban and rural households in the probability that a sick person gets professional medical attention, holding other influences constant. On the other hand regional effects are strong, with households in the Southeast and Mekong Delta regions being more likely to get attention, while those living

in the Northern Uplands and (especially) the Central Highlands are less likely to.

Also surprisingly, the living standard of the household does not appear to affect whether a sick person gets attention, although we will show below that it does affect the quality of the care that they receive.

As people become older, they are more likely to get professional help in the event of illness. This may be because old people are more aware of the seriousness of their condition, or less capable of recovering naturally. It is also true that children often have simple illnesses, which can be treated at home by experienced parents.

The nature of the illness has a significant effect on the probability of getting professional treatment. If the typical probability of getting medical care is 80%, then it rises to 86% if the person has a fever, and to 84% if he or she has diarrhea. Both fever and diarrhea are considered to be serious symptoms in Vietnam. On the other hand, people with injuries were somewhat less likely to get professional attention, holding other factors constant; this may be because some injuries are straightforward enough to treat at home (such as many sprains, cuts and bruises).

It is curious that households with medical insurance are *less* likely to get professional attention if someone falls ill. One possible explanation is that those with medical insurance are better off, and this variable is in effect picking up the effect of affluence. It is also possible that those with medical insurance are more careful about their health, and reported even minor ailments to the VLSS98 enumerators, ailments that would not necessarily warrant the trouble of professional treatment.

How much is spent on medical care?

When someone falls ill, how much is spent on medical services? The spending in question includes such items as medicine, travel, lodging (while caring for family members in a hospital, for instance), medical insurance, and the services of doctors and nurses.

The estimates of the determinants of (the log of) medical spending, for those who fall ill, are set out in Table 10.6. Older people spend more on health services than young, presumably because their conditions are typically more serious and more complex.

Families that are better off spend more on medical treatment; when per capita expenditure rises by a million dong, medical spending (per sick person) rises by 11.4%, equivalent to 20,000 dong ($1.43). This implies an expenditure elasticity of 0.38, which means that a 10% increase in expenditure per capita is associated with a 3.8% increase in medical spending. Thus although richer households spend more on caring for a sick member, they devote a lower *proportion* of total spending to caring for their sick than do poorer households. In this sense the cost of caring for the sick

is regressive, burdening the poor disproportionately heavily. In principle there is a system for waiving fees for very poor households, but in practice the procedures are slow and bureaucratic, and provide only limited relief (Tipping and Dung 1997).

Table 10.6
Estimates of the Determinants of Health Spending for sick people, 1998

	Coefficient	p-value
Dependent variable:		
log of expenditure on health care and prevention		
Independent variables:		
Age	0.008	0.00
Real per capita expenditure in million VND	0.108	0.00
Geographic effects:		
Northern uplands	Reference	
Red River Delta	Reference	
North Central Coast	0.227	0.02
Central Coast	0.357	0.00
Central Highlands	1.004	0.00
Southeast	0.364	0.00
Mekong Delta	0.291	0.00
Types of illnesses::		
Vomiting/stomach pains	0.515	0.00
Respiratory problems or asthma	0.605	0.00
Fever	0.423	0.00
Diarrhea	0.179	0.02
Skin diseases	0.157	0.08
Infection	0.481	0.06
Other	0.787	0.00
Injury	1.159	0.00
Constant	1.685	0.00

Notes: R^2=0.20. Number of observations: 9,585, including people who were sick in the past 4 weeks, and for whom health spending was non-zero.
Source: VLSS98.

There are some interesting geographic effects. Spending on treating a sick person is lower in the northernmost two regions of Vietnam than elsewhere than elsewhere; possibly these regions are best provided by government-subsidized care. Spending is particularly high in the Central Highlands, a relatively unhealthy region where the structural of state-supported health care centers is relatively underdeveloped (Barrett et al. 2001)

Although fever and diarrhea are the commonest ailments (after headaches), they appear to be relatively cheap to cure; perhaps that is one reason why households with these symptoms are especially likely to seek professional care. On the other hand injuries are expensive to treat, as are respiratory problems and stomach pains.

CONCLUSIONS

We end this chapter by summarizing our main findings and suggesting a number of policy directions.

First, women are more likely to report that they are sick than men; and children and the elderly are more prone to illness. It follows that the health care system needs to be oriented to serving these groups.

Second, respiratory infections are particularly widespread, especially among children. There may be a need to improve the programs that tackle acute respiratory infections.

Third, better-off households are less likely to get sick, and no more likely than anyone else to seek care when illness strikes. However, they spend more when a family member is sick, and they appear to have access to better quality health care. None of this is unexpected, but it does remind us of the need to ensure that people of all economic levels have adequate access to health care.

Fourth, the private sector makes up an increasing proportion of the health care infrastructure. It is important to encourage this sector, which complements the often-overstretched public sector.

Fifth, geography mattes. Households in the Central Highlands are particularly likely to fall ill and less likely to get attention; this appears to weed out the "minor" ailments, so that spending on sick household members is much higher in this region than anywhere else. Households in the Northern Uplands are least likely to report falling ill; they are also less likely to get professional medical care when ill, and spend relatively little treating their ailments. All of these factors are consistent with the fact that the Northern Uplands region is poor and relatively remote. Again, it is important that remote areas, and areas which are naturally unhealthy, have an adequate health infrastructure.

Despite quite radical changes in the health system over the past decade, the health status and life expectancy of the population do not appear to have worsened, and may have improved. Unlike many countries in the Former Soviet Union and Eastern Europe, Vietnam appears to have made the transition to a market economy without jeopardizing the health of the population. The challenge now is to ensure that the system provides a good level of basic services for everyone.

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Chapter 11

Fertility Decline

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INTRODUCTION

As recently as 1979 the total fertility rate in Vietnam was 5.6; the total fertility rate (TFR) gives the number of children that a woman would have, hypothetically, during her lifetime if current age-specific fertility rates were to persist. By 1993 the TFR had fallen to 3.2, and in 1998 it reached 2.2; these numbers are drawn from the Vietnam Living Standards surveys of 1993 and 1998, and are consistent with the fertility rates computed from other sources, including census numbers, as Table 11.1 shows.

These figures imply that the total fertility rate fell by a remarkable 0.18 per year between 1979 and 1998. Outside Southeast and East Asia, very few countries have achieved such a rapid and sustained fall in fertility, although there is evidence of an acceleration in fertility decline in less-developed countries in the 1990s (Haughton 2000). In no other case has fertility fallen so rapidly in such a poor country (World Bank 1999, Table 26).

One is naturally prompted to ask what is behind Vietnam's recent drop in fertility. This question may be answered at two levels. First, what are the proximate causes of the fall in fertility, such as higher contraceptive use or later marriage? And second, what are the fundamental influences that work on these proximate causes, such as the determinants of contraceptive use?

In this chapter we attempt to answer both of these questions, using data for the period 1993-1998. Changes in fertility up to about 1993 have been well documented elsewhere (Ky and Xuyen 1997; Haughton 1997; Haughton and Haughton 1995). An accurate and complete comparison between the situations in 1993 and 1998 is possible because comprehensive household surveys of living standards were undertaken in both years, using similar questionnaires and well-designed sampling procedures. Fuller

details about the Vietnam Living Standards Surveys of 1992-93 (VLSS93) and 1997-98 (VLSS98) are available elsewhere (Vietnam: SPC/GSO 1994; Vietnam: GSO 1999).

Table 11.1
Evolution of the total fertility rate (TFR) since 1979

	TFR	Notes	Source
1979	5.6		Census
1992-93	2.9	Including child mortality, was 3.2.	VLSS93
1996-97	2.3		DHS 1997
1997-98	2.2	Refers to non-panel households only.	VLSS98
1999	2.0	Census undercounted children. Post-census enumeration survey found TFR of 2.3.	Census
Memo: Comparative figures			
c.1998	1.8	China	UNICEF 2000
c.1998	3.1	India	UNICEF 2000
c.1998	2.5	Indonesia	UNICEF 2000
c.1998	5.1	Nigeria	UNICEF 2000
c.1998	2.1	East Asia and Pacific	UNICEF 2000

Vietnam formulated a family planning policy in 1963, which advocated a two-to-three child norm, but the policy was not backed up with resources until 1972, when the government began to promote the use of IUDs (UNICEF 1994; Goodkind 1995; Nhiem 1999; Haughton 1997). Access to abortion was made easier after 1981. The National Council of Population and Family Planning, established in 1984, had set up provincial offices and village-level branches by the late 1980s. Teams of health workers visit villages and are expected to meet targets for IUD implantations (Nhiem 1999). In 1998 Vietnam adopted its one-or-two child policy, which advocated relatively late marriage and long spacing between births, and was backed up by penalties for violations and cash incentives for sterilizations. Contraceptive and abortion services are provided free, and family planning is promoted on billboards and in the media.

THE PROXIMATE DETERMINANTS OF FERTILITY

In this section we ask what were the immediate causes of fertility decline in Vietnam during 1993-1998. Although there are 11 intermediate ("proximate") variables that affect human reproduction (Davis and Blake 1956), some of these are of minor importance, which is why we follow the somewhat simpler approach set out by Bongaarts (1978) – an approach that has been applied in more than a hundred publications, and has stood the test of time quite well (Stover 1998).

We begin with the identity

$$TF \equiv \left(\frac{TF}{TM}\right) \times \left(\frac{TM}{TN}\right) \times \left(\frac{TN}{TFC}\right) \times TFC \qquad (1)$$

where *TF* is the total fertility rate, *TM* is the total marital fertility rate, *TN* is the total natural marital fertility rate (i.e. the marital fertility rate in the absence of contraception and abortion) and *TFC* is the total fecundity rate (i.e. the number of children per woman, after taking into account miscarriages, stillbirths, and natural sterility). Equation (1) is usually rewritten as

$$TF = C_m \times C_c \times C_a \times C_i \times TFC \qquad (2)$$

where C_m *(=TF/TM)* is an index of marriage, C_c is an index of contraceptive use, C_a is an index of induced abortion, and C_i *(=TN/TFC)* is an index of post-partum infecundability. Note that $C_c \times C_a = TM/TN$. Each index takes on a value between 0 (low fertility position) and 1 (high fertility position).

The purpose of decomposing the determinants, in the way done in (2), is to identify which are most important in driving changes in fertility. These determinants can then be examined more closely, and a behavioral model built to explain them. This approach only makes sense if the components of equation (2) are independent of one another. So, for instance, it is only sensible to focus on the role of contraceptive use in determining fertility if contraceptive use does not alter the other determinants (marriage age, abortion rate, total fecundity). This is not fully plausible, as Reinis (1992) emphasizes, but is a useful simplification nonetheless.

We now summarize the practical problems involved in estimating the components of equation (2) for Vietnam for 1993 and 1998; further details for 1993 are provided in Haughton (1997), and some suggested refinements in Stover (1998). The key equations are shown in Table 11.2.

The index of marriage (C_m) would be equal to one if all women aged 15-49 were married; roughly, the index shows the proportion of women of childbearing age who are married. The idea here is that childbearing is confined to marriage – a reasonable working assumption in Vietnam – and so if marriage becomes less prevalent, then fertility will decline.[15]

Between 1993 and 1998 the index of marriage fell sharply, from 0.57 to 0.47. This reflects the finding that fewer women were married, at any given age, in 1998 than in 1993. For instance, where 37% of 20-year-old women were married in 1993, this proportion had fallen to 25% by 1998; similarly, just 82% of 30-year-old women were married in 1998, down from 87% in 1993.[16] It is not clear what is behind this shift in the propensity to marry,

[15] The VLSS surveys only collected information on the fertility histories of *married* women; strictly speaking, this chapter is therefore about marital fertility. The extent of extra-marital fertility is therefore not known, although it is believed to be minimal.

[16] The 1998 figures are based on the 1,694 households that were *not* surveyed in both 1993 and 1998 – i.e. on non-panel households. This is because panel households are atypical in that by 1998 they had been in existence for at least five years. Thus the panel household data do not

but it is likely to be due in part to the fact that more women stay longer at school (during which period they typically do not marry). The rapid rise in the cost of housing in the urban areas between 1993 and 1998 may also have deterred some would-be couples from getting married early. This is an area that merits further investigation.

Table 11.2
Constructing the components of the Bongaarts model

C_m	Index of marriage	$C_m = \frac{\sum m(a) \times g(a)}{\sum g(a)}$ where $m(a)$ is the proportion of women of age a who are married and $g(a)$ is the age-specific marital fertility rate. The index would equal 1 if all women were married (i.e. if $m(a)=1$ for all a).
C_i	Index of post-partum infecundability	$C_i=20/(18.5+i)$ where i is the average duration in months of post-partum amenorrhea, and is assumed to be no less than 1.5.
C_a	Index of abortion	$C_a=TFR/(TFR + 0.4\times (1+u) \times TAR)$ where u is the contraceptive prevalence rate and TAR is the total abortion rate. Note that an abortion is assumed to avert less than one whole birth. The total abortion rate is analogous to the total fertility rate, and measures the number of abortions a woman would have in her lifetime if the current age-specific abortion rates applied.
C_c	Index of contraception	$C_c=1 - 1.08 \times u \times e$, where u is the contraceptive prevalence rate for married women, and e is the effectiveness of contraception. The adjustment factor (1.08) is designed to adjust for infecund women.

Sources: Bongaarts 1978; Haughton 1997; Stover 1996.

The index of contraception (C_c) would equal 1 if nobody used contraceptives. However modern contraceptives are widely used in Vietnam; an estimated 44% of non-pregnant married women aged 15-49 used modern contraceptives in 1993 and this proportion rose to 55% by 1998. Once the effectiveness of contraceptives is taken into account, this lowered the index of contraceptive use from 0.58 in 1993 to 0.48 in 1998. This is a large decrease, and in the next section we develop a formal model that attempts to explain who uses contraceptives. There we argue that much of the increase in contraceptive use cannot be attributed to changes in such variables as education or income, and is probably due in large measure to a change in attitudes towards childbearing.

The index of induced abortion (C_a) would be 1 if there were no abortions. This is not the case in Vietnam, however, where abortions are

provide information on the fertility of women in the first few years of marriage, an important omission in a study of demographic issues.

easy to get and (in principle) free. The biggest problem in measuring this variable is the unreliability of information. Although the VLSS questionnaires asked women about any abortions they had over the previous year, there is enough stigma associated with abortion (even in Vietnam) that women are likely to under-report the number of abortions they had. We nonetheless derived an abortion rate from the VLSS98 data and were able to compute C_a using the formula shown in Table 11.2. The reported abortion rate fell from 0.47 in 1993 to 0.34 by 1998; the abortion rate measures the number of abortions a women would have in a lifetime if she were to experience the current age-specific abortion rates. However the index of induced abortion did not change. This is a coincidence, the result of a higher abortion rate in 1993 (which lowers C_a) and a higher total fertility rate (which tends to raise C_a). The rise in contraceptive use between 1993 and 1998 may have allowed women to reduce the number of abortions they underwent.

The fourth component of the Bongaarts decomposition (equation (2)) is the index of post-partum infecundability (C_i). After giving birth, women are less likely to be fertile, particularly if they breastfeed their infants. The C_i index picks up this effect, mainly by relating it to the length of breastfeeding. Between 1993 and 1998 the period of lactation actually increased somewhat, which explains the reduction in this index over the period.

The full decomposition is shown in Table 11.3. For 1998 the fertility rate predicted by the model comes close to the rate actually observed; this is not the case for 1993, however, where the predicted rate is too high. It is clear from Table 11.3 that the drop in fertility was due, in equal measure, to the falling incidence of marriage and the rising use of contraceptives within marriage. In searching for the fundamental causes of fertility decline it is clearly important to look for explanations for the rise in contraceptive use, which we do in the next section.

CONTRACEPTIVE USE

In the previous section we showed that fertility fell substantially between 1993 and 1998, and about half of the decline is attributable to rising contraceptive use. Thus it is important to consider the determinants of contraceptive use in more detail. In this section we review the evidence on contraceptive use and knowledge in Vietnam, after which we specify and estimate a model that seeks to explain who uses contraception and who does not.

Of the 4,409 women who were asked in detail about their knowledge of contraception in 1997/98, only 24 said they had never heard about, or had no knowledge about, any contraceptive methods. Almost all the women interviewed said they knew about, or at least had heard about, IUDs (98%),

condoms (96%), and female sterilization (94%), although they were less aware of the pill (78%) and injectables (54%); further details are shown in Table 11.4. These knowledge rates are somewhat higher than in 1992/3. However the knowledge rates are probably overstated, because there is some evidence of a courtesy bias in the responses to the fertility part of the survey. Knowing the strong emphasis that Vietnamese officialdom puts on family planning, women appear to be overstating the zeal with which they inform themselves about, and use, contraception (Haughton 1997, Goodkind 1995).

Table 11.3
Decomposition of proximate determinants of fertility in 1993 and 1998

	1992-93	1997-98
Index of marriage (= C_m)	0.571	0.465
Index of contraceptive use (= C_c)	0.582	0.475
Index of induced abortion (= C_a)	0.913	0.913
Index of post-partum infecundability (= C_i)	0.757	0.718
Total Fecundity rate (= TFC)	15.3	15.3
Therefore: Predicted total fertility rate (= TF)	3.51	2.22
Compare with: Observed total fertility rate	2.85	2.24

Sources: VLSS93 and VLSS98.

An estimated 76.9% of non-pregnant married women aged 15-49 said they were using some form of contraception in 1998, up from 65.3% in 1993. Taken at their face value, these rates are remarkably high by world standards, as the comparative figures in Table 11.4 show. In fact they are too high to be plausible, as they (along with the other proximate determinants of fertility) imply that the total fertility rate should be much lower than it actually is. A more reliable guide to contraceptive use is the proportion of women who say they are using "modern" methods (IUD, sterilization, pill, condoms, injectables, diaphragm), which stood at 55.1% in 1998, up from 43.9% in 1993.

The most striking feature of Table 11.4, which gives a complete breakdown of the use rates for different types of contraceptive, is the continued heavy reliance on IUDs, used by 35.3% of ever-married women in 1993 and 38.4% in 1998. IUD use has reached a plateau, however, as women look for more satisfactory forms of contraception, and most of the *increase* in the use of contraceptives has come from greater emphasis on sterilization (up from 3.4% to 6.1%) and condoms (2.9% to 6.1%). Unlike in China, the pill is still not widely used, although the proportion of ever-married women taking it rose from 2.1% to 3.8% between the two surveys.

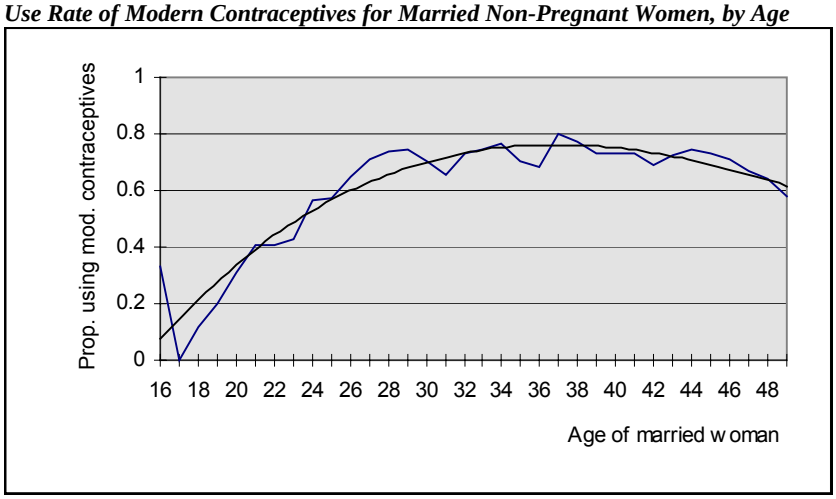
Not surprisingly, contraceptive use (modern plus traditional methods) within marriage rises with age, reaching a plateau of over 80% by the time a woman is in her early 30s, and only falling slightly once she is in her mid 40s; the pattern is shown in Figure 11.1, which displays both the actual use rates by age and a fitted quadratic curve.

Table 11.4
Proportion of non-pregnant married women knowledgeable about, or using, contraceptives

	Has heard about or knows about		Has used at some point		Is currently using	
	1993	1998	1993	1998	1993	1998
	(as % of non-pregnant ever married women aged 15-49)					
Any method of contraceptive	**91.0**	**99.5**	**67.6**	**84.1**	**65.3**	**76.9**
Modern method	**86.0**	**99.1**	**50.1**	**67.8**	**43.9**	**55.1**
of which:						
IUD	83.0	98.4	42.4	53.6	35.3	38.4
Sterilization - female	62.3	93.8	3.3	8.9	3.4	6.1
Sterilization - male		91.5		3.5		0.7
Condom	53.4	96.0	5.4	14.5	2.9	6.1
Pill	40.5	78.7	4.1	9.7	2.1	3.8
Injectables	23.7	53.9	0.8	1.8	0.3	0.2
Diaphragm, other modern method	12.7	14.5	0.1	0.3	0.0	0.0
Traditional method	**63.2**	**89.6**	**31.6**	**33.2**	**24.5**	**24.2**
of which:						
Rhythm method	47.4	84.6	19.1	23.8	14.4	15.8
Withdrawal	43.7	85.4	16.5	24.5	12.9	17.7
Herbs, other traditional method	16.1	13.0?	1.1	0.7	0.4	0.4
Other	41.9		11.1		7.9	
Memo: any method						
China						85
India						41
Indonesia						57
Nigeria						6

Sources: Based on VLSS1 and VLSS2. International figures from World Bank (1999).

Figure 11.1
Use Rate of Modern Contraceptives for Married Non-Pregnant Women, by Age



More unexpectedly, rural women (60.5%) are almost as likely to be using modern contraceptives as urban women (61.3%), and the difference is no longer statistically significant, as Table 11.5 shows. Contraceptive use is slightly less in the poorest expenditure quintile than at other expenditure

Table 11.5
Percentage of non-pregnant married women aged 15-49 who are using modern contraceptive methods

	1992-93		1997-98	
Total	**50.2**		**60.7**	
Urban	53.5	P=.08	61.3	P=.80
Rural	49.3		60.5	
Regions:				
Northern Uplands	49.1		66.9	
Red River Delta	60.5		69.3	
North Central Coast	55.5		64.3	
Central Coast	47.4	P=.00	60.8	P=.00
Central Highlands	23.2		32.7	
Southeast	42.8		55.3	
Mekong Delta	42.2		51.0	
Expenditure quintile				
Poor	39.4		58.0	
Poor-mid	50.4		65.6	
Middle	53.7	P=.00	58.8	P=.11
Mid-upper	55.3		60.9	
Upper	53.4		60.1	
Number of children				
One	39.3		44.8	
Two	57.7		67.1	
Three	56.9	P=.00	66.5	P=.00
Four	54.0		64.0	
Five	45.4		60.4	
Six or more	36.4		47.1	
Number of sons				
None	40.4	P=.00	54.3	P=.00
One or more	52.2		61.8	
Sample size	3,139		3,844	

Notes: Based on interviews with one married woman 15-49 per household. "P" is the p-value, so values below 0.1 indicate that the rates differ significantly across the categories in question.
Sources: VLSS93 and VLSS98.

levels, but this effect too is no longer statistically significant. Very high levels of contraceptive use are found in the Red River Delta, and the rate is comparatively low in the Central Highlands and Mekong Delta. These patterns have not changed much over the last five years.

Contraceptive use is more common for women with two or more children, and with at least one son. The effect of son preference remains strong, although it was somewhat less marked in 1998 than in 1993.

The figures in Table 11.5 are helpful, in that they point in the direction of the relevant variables. However they are not entirely satisfactory because they only allow one to look at one dimension – region, number of sons, and

Table 11.6
Logistic regression of determinants of use of modern contraception by married non-pregnant women, 1997/98 and 1992/3 compared

	1997/98		1992/93	
	Coefficient	p-value	Coefficient	p-value
Dependent variable: Woman uses modern contraception (yes=1)				
Independent variables:				
Mother				
Age of woman (years)	0.374	0.00	0.397	0.00
Age of woman squared	-0.006	0.00	-0.0065	0.00
Woman is working	0.351	0.03	-0.057	0.81
Years of education of mother	0.028	0.07	0.043	0.01
Household				
Years of education of husband	0.013	0.29	0.027	0.08
Real per cap expenditure	0.005	0.83	0.050	0.22
Male head of household (yes=1)	0.215	0.05	0.215	0.09
Religion: catholic? (yes=1)	-0.182	0.51	-0.692	0.00
Religion: none? (yes=1)	0.213	0.07	-0.228	0.04
Religion: other? (yes=1)*	-0.122	0.67	-0.393	0.16
Ethnicity: Chinese? (yes=1)	-0.488	0.04	-0.612	0.13
Ethnicity: other? (yes=1)**	-0.207	0.32	-0.351	0.02
Woman has at least one son	0.311	0.01	0.368	0.01
Woman has at least two sons	0.160	0.07	0.193	0.07
Number of children	0.040	0.30	-0.157	0.00
Geography				
Urban	0.210	0.13	-0.022	0.86
Northern Uplands	0.023	0.91	-0.295	0.04
Red River Delta	Reference		Reference	
North Central Coast	-0.166	0.46	-0.107	0.46
Central Coast	-0.209	0.31	-0.434	0.01
Central Highlands	-1.408	0.00	-1.188	0.00
Southeast	-0.380	0.03	-0.740	0.00
Mekong Delta	-0.529	0.00	-0.580	0.00
Constant	-6.472	0.00	-6.700	0.00
Memo: Number of observations	3,982		2,450	

Notes: * Omitted religious group is Buddhist. ** Omitted ethnic group is Kinh.
Source: Based on data from Vietnam Living Standards Surveys of 1997-98 and 1992-93.

so on – at a time. A better approach to disentangling the different influences on contraceptive use is to estimate a logistic regression. In this case the dependent variable is set equal to one if a woman uses a modern contraceptive method, and to zero otherwise. Table 11.6 shows the results

from estimating equations for 1993 and 1998 using an identical set of independent variables, and the magnitude of the most important effects is easier to grasp from the numbers presented in Table 11.7.

In analyzing these results several points are worth noting. First, the dependent variable considers the use of modern contraceptive methods only. This is because we suspect that most of the women who claim to be using traditional contraceptive methods are not seriously trying to prevent births, but are being courteous to the enumerator. And even when couples are using traditional methods conscientiously, the effectiveness of such methods is low.

The regression confirms many of the observations made earlier. Contraceptive use rises as women become older, peaking at the age of 31 before beginning to decline; this pattern hardly changed between 1993 and 1998. Working women were more likely to use contraception in 1993, but by 1998 this effect had vanished. The female labor force participation rate in Vietnam rose between 1993 and 1998, to a level that is exceptionally high by world standards (see chapter 8).

Table 11.7
Effect on contraceptive use of changes in the independent variables

	New probability of using contraception, if initial prob. was 0.55 and independent variable rises by one unit	
	1992 coefficients	1998 coefficients
Woman works (yes=1)	.635	.550
Mother is one year older (starting age 30)	.597	.599
Mother gets 1 more year of education	.557	.561
Father gets 1 more year of education	.553	.557
Household has at least 1 son	.625	.638
Household is in Central Highlands	.230	.271
Household is in Southeast	.445	.368

Source: Based on estimates in Table 11.6.

Education matters, although not a lot. When mothers have more education they are more likely to use contraception, an effect that appears to have become slightly stronger over time. The education of the father had a similar, if somewhat weaker, effect in 1998. It follows that as Vietnam continues to expand educational opportunities, this will naturally tend to raise contraceptive use further. However the effects are fairly modest; for every extra year of maternal education, contraceptive use rises by about one percentage point.

Son preference remains strong. For any given number of children, a woman who already has a son is substantially more likely to use contraception than a woman without a son. In 1998 the probability of using

contraceptives rose from 55% (our assumed baseline) to 64% if a woman had a son.

The effects of religion and ethnicity are less clear. Catholic households were somewhat less likely to use contraception than Buddhists in 1998, but no such effect was discernible in 1993. Households from ethnic minorities were substantially less likely to use contraceptives than the Kinh (plus Chinese) majority, even after controlling for regional and urban effects. It is possible that family planning campaigns are not pursued as vigorously in minority areas. In addition, many of the ethnic minority households have benefited little from the burst of economic growth that took place between 1993 and 1998 (Baulch et al. 2001) and so remain out of the economic and cultural mainstream.

Surprisingly, the standard of living of the household (as measured by expenditure per capita) does not have a statistically significant effect on contraceptive use. Also unusual is the finding that there does not appear to be an urban/rural divide in contraceptive use.

On the other hand there are substantial regional differences; as one moves from north to south, contraceptive use falls, and it is also particularly low in the Central Highlands. A plausible explanation is that the government's family planning program is more vigorous and effective in the north than in the south of the country.

BIRTH SPACING

Vietnam's family planning program emphasizes the need to space out children, as well as to stop after one child (or at most two children). Thus another way to measure the influence of family planning measures is to focus on the time between one birth and the next. The basic idea is that the gap between one child and the next will be shorter for high-fertility women. The length of this gap – or more strictly, the hazard of having another child – can be related formally to the independent variables of interest.[17]

An advantage of estimating a hazards model of this type is that it measures outputs (space between births) rather than inputs (such as contraceptive use or abortions). In this sense it give a more accurate picture of the fertility situation. On the other hand, while a contraceptive use model looks at contemporary behavior, a hazards model reflects behavior in the past as well as the present, and so is inherently always somewhat out of date.

We have estimated four hazards models using the VLSS98 data, one each for households going from 2 to 3, 3 to 4, 4 to 5, and 5 to 6 children. The results are shown in Table 11.8 in the form of relative hazard rates;

[17] Here, as elsewhere in this chapter, we are using the term "hazard" in its technical sense; we do not wish to imply that having another child is in some way dangerous, risky or undesirable.

when the rate is greater than 1, then an increase in the independent variable increases the hazard of having another child, and when the rate is below 2, an increase in the independent variable is associated with a lower hazard of having another child. The statistically significant coefficients are shown in bold face, and essentially the same independent variables were used in every case.

Table 11.8
Hazards Rates for Parity Progression Models

	Relative Hazard of another child, starting with:			
	2 children	3 children	4 children	5 children
Characteristics of mother				
Is mother working? (yes=1)	**0.743**	**0.751**	0.880	0.815
Age of mother at time of birth, yrs.	**1.230**	1.053	1.002	0.988
Mother's age at birth, squared	**0.998**	1.000	1.001	1.001
Mother's age at marriage	**0.928**	**0.929**	**0.930**	**0.929**
Years of education achieved, mother	**0.975**	**0.967**	**0.958**	**0.958**
Household characteristics				
Years of education achieved, father	**0.987**	**0.982**	**0.973**	**0.964**
Male head of household? (yes=1)	1.094	**1.381**	1.295	1.537
Christian	1.033	**1.234**	1.212	1.121
Other religion (not Christian or Buddhist)	**0.839**	0.925	0.856	**0.793**
Chinese	0.924	0.783	0.638	0.965
Other ethnic group (not Kinh or Chinese)	0.925	1.119	0.915	0.870
Real household expenditure/cap (m dong)	**0.906**	**0.908**	**0.887**	**0.843**
Family has at least one son? (yes=1)	**0.791**	**0.685**	**0.666**	0.775
Family has at least two sons? (yes=1)	**0.736**	**0.592**	**0.613**	0.678
Family has at least three sons? (yes=1)		**0.731**	**0.611**	**0.544**
Family has at least four sons? (yes=1)			**0.580**	0.665
Family has at least five sons? (yes=1)				0.908
Geographic variables				
Urban? (yes=1)	**0.653**	0.877	0.914	0.886
Northern Uplands	**1.479**	**1.577**	1.281	1.474
Red River Delta		Reference region		
North Central Coast	**1.519**	**1.641**	**1.609**	1.209
Central Coast	**1.394**	**1.740**	**1.373**	1.543
Central Highlands	**1.888**	**2.133**	**1.922**	**2.059**
Southeast	**1.530**	**1.786**	**1.634**	**1.762**
Mekong Delta	1.134	**1.576**	1.323	1.332
Number of observations	3,120	2,123	1,245	700
Number of cases where next birth observed	2,096	1,255	707	411
Chi square/degrees of freedom	737.4/21	419.5/22	178.4/23	101.8/24

Note: If hazard rate exceeds one, an increase in the variable raises the hazard of another birth; otherwise it lowers it. Coefficients significant at 10% level or better are also shown in bold face.
Source: VLSS98.

From table 11.8 we see that 3,120 mothers had at least one child, and of these, 2,096 had gone on to have a third child by the time of the VLSS98 survey. Many of the effects are similar to those that were evident in the contraceptive use model, but there are some additional findings of interest.

Son preference appears again, and is strong. As soon as a household has a son it is less likely to go on to have another child, although this effect breaks down in large households (where the number of cases with no sons is too small to pick up accurate effects).

Working mothers have a lower hazard of another child. However, the direction of causality here is not clear: do mothers stop working to have a child? Or does having a child make it more necessary to stop working?

Women who marry late are also less likely to have additional children, even when controlling for the effects of age. This is at odds with what Haughton and Haughton (1995) found using the VLSS93 data, and is somewhat surprising because is its widely believed that women who marry late are likely to have children quickly in order to "catch up." We find no evidence of this catch-up effect for 1998. And except for the first hazard model (from two to three children), the age of the mother does not appear to be an important determinant of the hazard of bearing another child.

Better-off households are less likely to have another child. This appears to be at odds with our earlier finding that income is unrelated to contraceptive use. However, one possibility is that more affluent households are finding other ways to limit their families, for instance by making greater use of abortions.

There was no evidence of a rural/urban divide in contraceptive use, but the hazards model for going from two to three children does pick up a strong effect. Urban households are less likely to go on to have a third child, but beyond three children there does not appear to be an urban/rural divide.

The regional effects are clear: the Red River Delta stands out as having a low hazard rate; it is incontestably the region with the lowest fertility rate and highest use of contraception. Surprisingly, the other rice bowl area (the Mekong Delta) also appears to have a fairly low hazard rate, holding other effects constant. At the other end of the spectrum, the Central Highlands region again shows up as an area of high fertility.

A number of the effects that we expected to be important turned out to be relatively uninfluential, including the ethnicity of the household, the religion it professes (if any), and the gender of the head.

CONCLUSIONS

Fertility in Vietnam has now fallen to the replacement level, which means that population growth, now running at 1.5% annually, will continue to

decline and eventually cease. The country's population will stabilize within about a generation.

What is behind the drop in fertility? At one level the answer may be found in the "proximate" determinants of fertility. Between 1993 and 1998, a period of rapid fertility decline, about half of the fall was due to less and later marriage and the rest to increased contraceptive use by married women. Implicit in this explanation is the assumption that the relevant social social norms, and particularly the presumption that births take place within marriage, remained very stable.

This begs the question of what lies underneath the changes in marriage patterns and contraceptive use. To address this, we estimated a model of contraceptive use (an input into fertility) and a model of birth spacing (a measure of the "output"). It is worth briefly summarizing the key findings:

- Son preference remains at least as important as it was in 1993.
- Better-off households have a lower hazard of another child, holding other influences constant; oddly enough, they are not more likely to use contraception than other households.
- Urban households are more likely to stop after two children than are rural households, but this is the only important rural/urban division.
- The Red River Delta stands out as an area of very low fertility (and high contraceptive use). This is the most densely populated part of the country, and the region where the official family planning efforts have been most vigorous.
- More parental education, especially for mothers but also for fathers, is associated with lower fertility, but the effect is not very strong.

These influences are important, but they only go part of the way to explaining the decline in fertility. In Vietnam, as in many less-developed countries, there has been a revolution in attitudes towards family planning over the past three decades. Families have shifted from wanting a greater quantity of children to a smaller number of higher "quality" (i.e. healthier and better-educated) children. In Vietnam this change in thinking has been particularly rapid and must now be almost complete.

The analysis of this chapter has some implications for policy. The first is that the family planning program still relies very heavily on IUDs. Despite the rhetoric of choice, the approach to family planning has tended to be results-driven and somewhat authoritarian (Hull 1996, p.48). A more genuine menu of choice of contraception would improve the quality of family planning, and is still needed.

The second point of importance is that population growth has slowed down, and Vietnam is now on track to achieve zero population growth within about 25 years. Thus there is no compelling reason for the family planning program to push harder at reducing fertility – because this will

happen naturally under current arrangements; instead it could usefully concentrate on providing a better quality of service. The emphasis of policy is still on quantity rather than quality: the key element of the *Population Strategy 2001-2010* is to increase the use of contraceptives among married couples to 70% by 2010 (from 61% in 1998).

More education does appear to have the effect of reducing fertility, but at the margin the impact is now relatively modest in the sense that additional years of schooling do not reduce fertility very much.

Finally, over a time horizon of three or four decades, the combination of fewer children and longer life expectancy will put a greater burden on the young. In the foreseeable future Vietnam will need to begin to move towards a system of pensions, which would spread the burden of caring for the old more widely across society. As increasing numbers of old people find themselves without children who are in a position to support them, a new structure of social support will be required.

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Chapter 12

Credit

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INTRODUCTION

The formal credit market in Vietnam is still underdeveloped. This paper studies the role of the informal credit market as an answer to that weakness. According to household-level data from the Vietnam Living Standards Survey of 1997-98 – the source of almost all the quantitative results in this paper – monthly interest rates for household loans coming from the formal sector averaged 1.2%, but 3.6% for interest-bearing loans coming from an informal source. Furthermore the informal sector accounted for 52% of all household credit, as measured by the value of loans. This chapter describes and analyzes this important component of Vietnam's credit market.

Before going further, let us define some words that we use extensively along this paper. A loan is *formal* if the reported source of the loan is a private bank, the Bank for the Poor, another government bank, a cooperative, a poverty alleviation program, a job creation program or any other organized program involving credit. The informal sector consists of all other sources, including private money lenders, relatives, other individuals, and revolving credit associations.

Let us also mention the words *credit market failure* and *credit rationing.* Those two similar concepts refer to the definition used by Stiglitz and Weiss (1981). Credit rationing occurs when "among loan applicants who appear to be identical, some receive a loan and others do not, and the rejected applicants would not receive a loan even if they offered to pay a higher interest rate". In other words, among households who would be equally likely to default, some will not receive the loan, perhaps because they failed to provide any credible information about their abilities to reimburse their debts.

Previous work on this topic has tried to determine the existence of such rationing by studying commercial loan contracts and testing the hypothesis of interest rates stickiness as evidence of credit rationing (Berger and Udell 1992). There are two reasons why interest rates might not fully adjust, as in an open market: limited liability makes it harder for a lender to collect interest and principal (because the borrower might declare bankruptcy and thereby limit his liability); and asymmetric information, whereby the borrower knows more about his ability to repay than does the lender. With asymmetric information there is a danger that only those with poor credit risks will look for loans – the moral hazard problem. Because of the presence of moral hazard and limited liability, lenders are induced to require collateral, rather than merely increasing the interest rate, in order to fund risky project. In order to investigate the extent of these problems, Berger and Udell focus on the supply side in their search for evidence of credit market failure.

One main consequence of credit rationing is the inability of households to use the credit market in order to smooth consumption across states of nature. Therefore an answer to that problem can be intergenerational transfers. Cox and Japelli (1990) looked at the correlation between intergenerational transfers and credit rationing. They tested whether transfers were mostly oriented towards households that are more likely to be affected by credit rationing. However in their paper, people were considered as excluded from the credit market if they declared they were so. It is not obvious that this indicator describes accurately the population of households who truly face credit rationing.

Our approach, while still imperfect, is different. We look actual borrowing and lending by households and, rather than asking whether they believe they face credit rationing, we try to infer it from their observed behavior. The methodology used is set out in more detail below. This chapter also focuses on the structure of the informal credit market as a response to market failures that a weak formal sector cannot get rid of.

The main result of our study is that there is evidence of credit rationing: access to credit is restricted by a lack of collateral and a lack of reputation. This information failure gives birth to informal financial intermediaries, the "borrowing lenders" who constitute 46% of all informal lenders, and who borrow money from different sources and lend it to others. These lenders help fill the information gap by providing access to credit to those who cannot borrow from the formal sector, or would only be able to borrow at prohibitive interest rates.

BACKGROUND: THE FORMAL FINANCIAL SECTOR

The formal credit system in Vietnam relies almost entirely on the banking system. Non-bank financial intermediaries are now operating but their

influences are still very limited and restricted to urban areas.[18] A stock exchange opened in July 2000, but after a month of operating just four relatively small companies were listed.

The banking system includes the following institutions (State bank of Vietnam 1998):

- The State Bank of Vietnam (SBV), which serves as the country's central bank, and supervises the operation of the banking system.
- Four relatively large state-owned commercial banks, namely the Vietnam Bank for Agriculture and Rural Development (VBARD), the Vietnam's Commercial and Industrial Bank (Vietincombank), the Vietnam Bank for Foreign Trade (Vietcombank) and the Vietnam Investment and Development Bank (Vietindbank).
- The Housing Development Bank of the Mekong River Delta.
- The Bank for the Poor (VBP), which is closely associated with VBARD.
- 51 joint-stock commercial banks.
- 4 joint-venture banks.
- 29 foreign bank branches.
- 977 People's Credit Funds (PCFs).
- 50 credit cooperatives.

However, in rural areas, especially in the north of the country, there are only five formal credit institutions (VICB, VIDB, VBARD, VBP, PCFs), only three of which (VBARD, VBP, PCFs) provide loans to households. Other banks and foreign banks operate mainly in the cities. Credit co-operatives and joint-stock banks do business mostly in the South and in urban areas.

Many development and poverty alleviation programs also provide credit (see UNDP 1996 for details). NGOs mainly receive financial aid from unilateral donors. However, for the time being, we have little reliable data concerning their sources, activities and performances.

Bank reform

The evolution of Vietnam's banking system may be divided into four periods.

Up to 1988:

The State Bank of Vietnam (SBV) was the only entity in the financial system. The role of the SBV was limited to the execution of government decisions regarding resource allocation. During 1970-1989 many credit cooperatives operated. However, they only acted as saving agents of the SBV, although they were allowed to use their very small capital to provide

[18] There are 2 joint-stock finance companies, 3 corporation-subordinated finance companies, and 8 leasing companies. Quoted from State Bank of Vietnam (1998)

credit to (privileged) households. The overall saving rate was very low and investment was not based on domestic saving. For many years people lacked confidence in the banking system (Nghiep 1993), so deposits remained low. The credit market was reduced to financing state-owned enterprises (SOEs). Hence, in this period, the informal sector essentially satisfied all the private demand.

1988-1990:

The poor performance of the banking system prior to 1988 made it necessary to reform the banking system. In the wake of the đổi mới (renovation) drive initiated in 1986, the formal banking system was transformed into a two-tiered one in 1988.[19] However, in that period, the commercial banking system faced major challenges. The amount of overdue loans was huge, especially loans owed by state-owned enterprises (SOEs). Banks were weak and bureaucratic (Oanh and Phong 1996). In this period, the private sector had the right to borrow from commercial banks, but the borrowing procedures and conditions were cumbersome. Individuals did not dare to seek loans from the formal sector. Hence, the informal sector was still the most relevant credit provider for non-state demand.

1990-1998:

In order to solve some of the problems encountered by the banking system, two banking decrees were promulgated on May 23, 1990. They provided the legal framework for separating the central bank from the commercial banks, for diversified bank ownership, and for foreign bank participation. This led to the diversification of banking institutions that can be seen today.

The transition was difficult. With the liberalization of agriculture as well as small-scale trade and industry, the demand for loans rose sharply in 1989-90. Recently-formed credit cooperatives, many of which were essentially private banks, tried to meet this demand by first paying high interest rates to attract deposits. When it became clear that some of them were operating shell games, there was a run on the credit cooperatives and they collapsed in March 1990 (Wolff 1999, p.45). This explains the pattern shown in Figure 12.1, of a fall in the private share of loans between 1990 and 1991, followed by a subsequent rebound, which can be attributed to the effects of the reforms undertaken since 1988.

The collapse of the credit cooperatives seriously undermined confidence in the banking system, and helps explain why households have been so loathe to entrust their money to banks of any kind. A common measure of the depth of a financial system is the ratio of M2 (broad money, mainly bank deposits) to GDP. Figure 12.2 shows that M2/GDP for Vietnam has remained essentially low and flat, showing that the formal

[19] The Directive No. 53/HDBT of Board of Minister was effective on March 26, 1988.

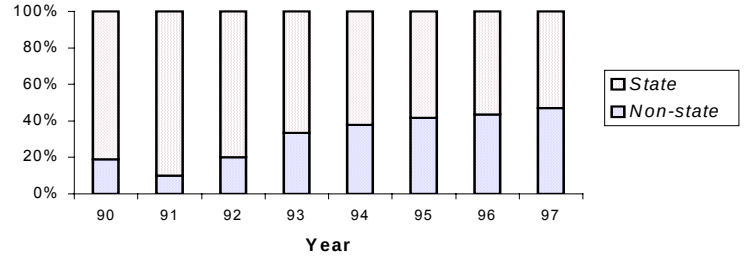
sector has had only limited success at mobilizing capital. It is worth noting that the ratio of broad money to GDP is far higher in China and Singapore than in Vietnam.

In 1998:

New laws on the roles and functions of the SVB, commercial banks and other credit institutions were implemented in 1998, to help the formal sector to develop.[20] Nevertheless, state-owned banking institutions still account for an estimated four-fifths of the formal credit market (Saito 1997). These institutions are still given many advantages, with tolerance of their bad debts and a flexible approach to collecting taxes from them. However, they are also used as a tool for the government to provide loans to priority projects and to subsidize industries.[21] This distorts the financial market, and the state-owned commercial banks do not have sufficient incentive to work independently. Moreover people still are not accustomed to using banking services, and so there are few personal bank accounts. Another reason for popular apprehension about putting money in a bank is that tax collectors have access to the information.

Meanwhile, almost every household loan from the formal sector, especially for rural households, is provided by VBARD or VBP. The People's Credit Funds, credit co-operatives and some private banks also lend to households, but just in small amounts. The informal sector, hence, still handles a large share of lending to households.

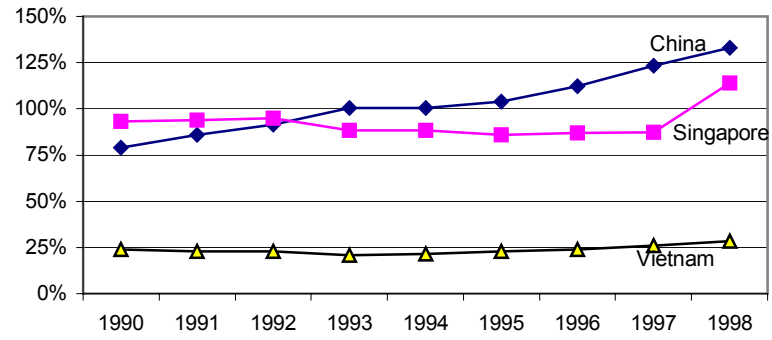
Figure 12.1: ***Structure of banking loans***



[20] The laws on SBV and Credit institutions took effect on October 1, 1998. The implementation of these laws ws carried out by Decision No. 324/98/QD-NHNN on September 30, 1998 and Decree No. 88/98/ND-CP on November 2th, 1998. Source: SBV, Annual Report 1998, p. 57.

[21] For example, in early June, 1999, the government pushed state-owned commercial banks to lend $400m. to some priority projects through the Ministry of Planning and Investment with interest rates "equal to or less than the commercial rates of foreign countries". Source: Economist Intelligence Unit (1999).

Figure12.2 ***M2/GDP for Vietnam, China and Singapore, 1990-98***



Source: World Bank, *World Financial Indicators*, CD-ROM, 2000.

THE HOUSEHOLD CREDIT MARKET

All the results presented below come from an analysis of survey data from the Vietnam Living Standards Survey of 1997-98 (VLSS98). The goal of VLSS98 was to collect complete and systematic data from a sample of 6,000 households, chosen to be representative of the material and cultural living standards of the country; further details are given in Chapter 1

We now present some results on the characteristics of Vietnam's household credit market. This part is divided into three sections. The first deals with the lending side and the second with the borrowing side. The last section focuses on a peculiarity in this market: some households lend money but they borrow at the same time.

Lenders

As Table 12.1 shows, 14.0% of households in the whole sample lend money. Richer people tend to lend more often, as do households in rural areas. This may be due to the relative efficiency of the formal sector in urban areas, or to a less widespread demand for household credit in the cities.

If we now look at the amount of money lent by households, rather than the number of loans, some interesting results appear. Richer people provide most of the informal credit (59.5%), and almost all urban informal credit comes from the upper quintile (see Table 12.2). Taken as a whole, rural households lend more than urban households do. The relative efficiency of banks may play a role in this difference.

Table 12.1
Percentage of households who lend, by quintile and urban/rural areas (%)

	Expenditure per capita quintile					Total	Avg. amt./ hh, '000 d
	Low	Low-mid	Middle	Mid-upr	Upper		
Urban	0.0	3.6	6.6	8.6	11.3	**9.3**	11,939
Rural	10.6	12.0	15.8	20.3	25.8	**15.4**	2,710
Total	**10.2**	**11.4**	**14.6**	**17.3**	**16.7**	**14.0**	
Avg. ./hh, '000 dong	890	1,141	3,269	2,685	8,901	**3,984**	

Sources: VLSS98; GSO(2000).

On average, formal loans have a duration of 19.0 months (or 18.6 months if weighted by value). This stands in contrast with informal loans, which have an average duration of just 3.0 months (or 9.9 months, if weighted by value, which means that the small informal loans are short and the large ones are longer). These durations are relatively long, well exceeding the rice crop cycle of just over three months, but falling short of what would be needed to finance long-term investments such as fruit orchards or coffee plantations.

Table 12.2
Origin of loans, weighted by value, 1998

	Expenditure per capita quintile					**Total**
	Low	Low-mid	Middle	Mid-upr	Upper	
Urban	0.0	0.0	0.6	2.0	37.5	**40.2**
Rural	2.9	5.0	11.6	18.3	22.0	**59.8**
Total	**2.9**	**5.0**	**12.3**	**20.2**	**59.5**	**100.0**

Source: VLSS98

To measure the determinants of lending, we built a logistic model in order to see what affects the probability of lending money. Thus the dependent variable is set equal to 1 if the household lends money, and to 0 otherwise. The results are set out in Table 12.3.

The influence of affluence is highly significant: richer households are more likely to lend money. Self-employed people are also significantly more likely to lend. Farmers tend to lend more frequently than wage earners. Furthermore, the amount of credit decreases as one goes South. This result may be driven by two considerations. Either supply decreases or demand decreases. In both cases, the higher level of development of Southern regions may be one explanation for this stylized fact. First, formal credit institutions might be working better and hence providing a cheaper source of loans than household loans. Second, investment opportunities as well as insurance mechanisms might be more efficient in the South so that savings and hence inter household lending is less widespread. However a

more advanced investigation of the determinants of lending would be necessary in order to provide more precise explanation of these findings.

Informal-sector credit does not usually require physical collateral. Only 1.1% of all loans (representing 4.4% of loans, by value) required physical collateral such as housing, land, or durable goods.

Positive interest rates are charged on 26.3% of all these loans (or 46.3% of loans as measured by the total value of money lent). The average weighted interest rate on interest-bearing loans is estimated to equal 2.8% per month. This is higher than the official State Bank ceiling interest rate, which as of July 30, 1999 stood at 1.5% per month. We thus arrive at our first interesting conclusion: even though many informal loans carry interest rates that are higher than loans from formal institutions, informal lenders still find demand for their loans.

Table 12.3
Logistic Model of the Determinants of Household Lending

	Coefficients		Estimated probability of lending when independent variable changes by one unit, and initial probability is 0.10	0.15
Dependent variable:				
Household lends money? (Y=1)				
Independent variables:				
At least one household member:				
Earms wages (Y=1)	-0.11		0.09	0.14
Is self-employed (Y=1)	0.36	***	0.14	0.20
Farms (Y=1)	0.09		0.11	0.16
Expenditure quintile				
Low	-		-	-
Low-mid	0.26	*	0.13	0.19
Middle	0.69	***	0.18	0.26
Mid-upper	1.05	***	0.24	0.34
Upper	1.46	***	0.32	0.43
Urban? (Yes = 1)	-0.88	***	0.04	0.07
Geographic effects				
Northwest Mountains	0.73	***	0.19	0.27
Northern Uplands	0.89	***	0.21	0.30
Red River Delta	1.15	***	0.26	0.36
North Central Coast	0.94	***	0.22	0.31
Central Coast	-0.45	*	0.07	0.10
Central Highlands (reference)	-		-	-
Southeast	-0.26		0.08	0.12
Mekong Delta	-0.66	*	0.05	0.08

Notes: Based on 5749 observations. Pseudo R^2=0.08. * indicates a 15% confidence level ** indicates a 5% confidence level *** indicates a 1% confidence level.
Source: VLSS98.

Borrowers

We now turn to households who were borrowing money at the time of the survey. We see in Table 12.4 that approximately half the surveyed population borrows money. Poorer households are more likely to borrow than richer ones.

Farmers are generically borrowers before harvest periods, and so we expect the percentage of households who borrow to be higher in rural than in urban areas. The figures confirm this; 55% of rural households borrow, compared to 37% in urban areas.

Rich households may borrow less frequently, but when they do borrow, the sums are large. Whether this is because they are able to borrow more (supply), or whether they can put the money to better use (demand) is not clear, although we suspect that both influences are at play here.

Table 12.4
Percentage of households who borrow, by quintile and urban/rural areas (%)

	Expenditure per capita quintile					Total	Avg. per hh, '000d
	Low	Low-mid	Middle	Mid-upr	Upper		
Urban	58.4	50.1	44.0	43.2	30.8	**37.3**	8,540
Rural	58.8	58.1	55.3	48.6	47.1	**54.8**	2,754
Total	**58.8**	**57.5**	**53.9**	**47.2**	**36.8**	**50.8**	3,696
Avg. amt./hh, '000 dong	1,395	2,083	2,770	3,963	11,112	3,696	

Sources: VLSS98; GSO(2000).

Table 12.5 summarizes the data on the *value* rather than the *number* of loans. Two thirds of all household borrowing is in rural areas, with a surprisingly even allocation across quintiles. This stands in clear contrast with the urban areas, where virtually all borrowing is done by rich households.

Table 12.5:
Percentage breakdown of amount borrowed, 1998

	Expenditure per capita quintile					**Total**
	Low	Low-mid	Middle	Mid-upr	Upper	
Urban	0.2	0.8	1.4	5.0	25.8	**33.3**
Rural	9.9	12.3	14.9	16.3	13.3	**66.7**
Total	**10.1**	**13.2**	**16.3**	**21.4**	**39.1**	**100.0**

Source: VLSS98.

Given the wide extent of borrowing, it is interesting to investigate the sources of loans. From whom do borrowers borrow, and at what interest rates? Table 12.6 sets out the sources of the loans.

State-owned commercial banks constitute the single most important source of household credit, accounting for 29.1% of all loans, or 39.4% of the value of lending. In the formal sector, which supplies almost half of the value of all loans, 99% of the loans carry positive interest rates. In the informal sector, friends, relatives and other individuals are the main sources of credit; 85% of the loans coming from relatives are interest-free.

The weight of each sector – formal and informal – in lending is almost equal. One interpretation is that the formal sector does not supply enough credit to satisfy all of the demand. Perhaps a better way to frame the issue is to suggest that contracts issued by formal institutions do not allow some households to have access to formal credit and therefore leads them to go to the informal credit market.

By looking at interest rates, we are able to understand better the trade-off between the formal and informal sectors. Table 12.7 gives weighted average interest rates by source. Two figures are given for each source: an overall interest rate, which takes every loan into account, and a restricted interest rate, which considers only positive-interest-rate loans.

Table 12.6
Sources of loans (by value), and percentage charging interest

	Proportion of loans, by value		% of loans charging interest	
Formal Loans		**48.1**		**99**
Government banks	39.4		100	
Poverty programs	6.1		94	
Private institutions	1.4		92	
Other programs	1.2		93	
Informal Loans		**51.9**		**40**
Private money lenders	8.9		93	
Relatives	21.9		15	
Other individuals/sources	21.1		44	
Total		**100.0**		**68**

Source: VLSS98.

Relatives are the single cheapest source of loans, at least as measured by the interest rate attached to the loans; we do not have information on the hidden costs, such as social and other obligations that such loans might carry with them. If we confine our attention to interest-bearing loans we see that formal loans are much cheaper (at least in the sense of bearing a lower interest rate) than informal loans. Why then are households willing to pay such high interest rates to informal lenders, in order to obtain loans? Put another way, why pay 4.2% per month for a loan if another loan is available at an interest rate of 1.3%?

Table 12.7
Monthly interest rates, by type of loan

	Average monthly interest rate	
	All loans	Interest-bearing loans
Formal Loans	1.2	1.2
Government banks	1.3	1.3
Poverty programs	1.0	1.1
Private institutions	1.5	1.5
Other programs	0.9	1.0
Informal Loans	1.4	3.6
Private money lenders	3.9	4.2
Relatives	0.4	2.6
Other individuals/sources	1.5	3.4

Source: VLSS98.

A loan is a contract, which consists of an amount, a length, an interest rate and possibly collateral requirements. Therefore if households agree to pay higher interest rates, this implies that either no formal loan is available in the area they are living, or they do not meet one of the other requirements of the contract, or the cost in terms of time and paperwork is too high for formal loans.

Below we explore the hypothesis that households are charged a higher interest rate because they fail to provide credible information about their ability to reimburse the loan. But before getting to that point, we first consider an original feature of Vietnam's credit market: "borrowing lenders," who are households that borrow and lend at the same time.

Borrowing lenders

A most striking finding is that among all household lenders, 46% *borrow* from a third party. They account for 18% of individual credit demand and provide 48% of informal credit supply. Who are these borrowing lenders, and what is their role in the credit market? What can economically explain the existence of such agents?

There are several possible explanations for the simultaneous borrowing and lending. Lending households may be faced with unexpected cash needs: an unforeseen event such as illness, a funeral, or drought, could create an immediate need for cash. The household cannot call in the money it lent before the due date, and therefore has to borrow from a third party. Similar smoothing devices have been observed in Nigeria also (see Udry (1995)), where loan maturities were an instrument to smooth consumption across time and states of nature.

A second explanation is that borrowing lenders are individuals who have access to formal credit and so have access to low interest loans. Then they can lend the money they borrowed to third parties, possibly making

profit. These borrowing lenders may be thought of as financial intermediaries, in a market that otherwise fails to satisfy the whole demand for credit. Without such intermediaries there would be credit rationing and the market would fail to supply loans to some creditworthy households. If those arbitrageurs reduce the extent of the market failure, this improvement may be offset in part by their ability to extract part of the monopoly rent that information acquisition confers on them.

To assess the financial intermediation role they might play, we look at the loan sources of borrowing lenders, to see whether they differ from those of the borrowing population as a whole. Table 12.8 compares the distribution of loans according to sources between the non-lending borrowers and the population of borrowing lenders.

The results show little difference in the patterns of borrowing. If borrowing lenders do not borrow from poverty programs, they go even less to government banks or private credit institutions. They borrow less from relatives (17.2% versus 23.0%) and much more from "other individuals/sources" (34.3% versus 18.2%). Therefore we see that financial intermediation occurs mainly *within* the informal sector.

Table 12.8
Sources of loans (by value), for borrowing lenders and other borrowers

	Borrowing lenders		Other borrowers	
Formal Loans		40.7		49.7
Government banks	36.8		40.0	
Poverty programs	2.6		6.8	
Private institutions	0.6		1.6	
Other programs	0.7		1.3	
Informal Loans		59.3		50.3
Private money lenders	7.7		9.1	
Relatives	17.2		23.0	
Other individuals/sources	34.3		18.2	
Total		100.0		100.0

Notes: Borrowing lenders are households that simultaneously borrow and lend money; "other borrowers" do not lend money. The whole population consists of 2768 borrowers, borrowing 4311 loans. The lending sub-population consists of 339 borrowing lenders borrowing 540 loans.
Source: VLSS98.

This result suggests that borrowing lenders are not necessarily more likely to have access to formal credit. It just points to the existence of a large and complex informal market, which seems to exist independently of formal institutions. We are not able at this point to decide what the primary role of those borrowing lenders is. Borrowing lenders were borrowing at an average interest rate of 1.3% a month and lending at a rate of 2.6%, which allows them to make an average monthly gross profit (in real terms) of

140 000 VND[22]. To the extent that the borrowing lenders act as arbitragers, the interest premium they receive may be thought of as an informational rent; but to the degree that they provide insurance, then the interest differential is best thought of as an inventory risk premium.

A MODEL OF CREDIT RATIONING

The previous section summarized some of the characteristics of borrowers and lenders. We saw that the existence of household financial intermediaries can be explained by credit market failures. But are they enough to solve the problem of credit rationing?

To answer the question, we need to address the issues more formally. In the sections that follow we set out a model, which we then estimate and interpret.

A Formal Model of Credit Rationing

Our goal is to find what variables determine the quantity of money that households borrow. At first sight it might seem that this could be done easily, by regressing the amount borrowed on a set of relevant independent variables. Unfortunately this will not work. This is because, considering all households together, we face a sample selection problem: information on loan amounts is obviously available only for those who do lend or borrow. Therefore regression coefficients are likely to be biased downward if we do not take this selection issue into consideration.

Instead we proceed as follows. Let us consider the relationship between lenders (formal or informal) and borrowers as a principal-agent relationship with incomplete information. The agent (i.e. borrower) has to provide credible information about his ability to reimburse the loan. This is not easy. Would-be borrowers will of course say they can service their loan payments, but such statements cannot be accepted at face value. The problem is that credit rationing will occur when the agent has not managed to overcome this information issue, and to determine whether the borrower will repay.

We may therefore assume that households who do not have access to credit have information problems, the lack of collateral and lack of reputation being the most significant. More formally,

A. A given household *i* has access to credit if and only if

$$(P) = \alpha + \beta\ Collateral + \gamma\ Reputation + \delta\ Other$$

[22] Average interest rate is weighted by real loan amounts. The sub-sample we are referring to consists of borrowing lenders who lend at positive interest rates: this corresponds to 81 observations.

is such that (P) > 0. The variables *Collateral*, *Reputation* and *Other* are further described below. We now suppose that a household's borrowing depends on its characteristics, so

B. Considering the amount of money borrowed, we assume that

$$\textit{Loan amount} = f[\textit{household characteristics}],$$

subject to (P) ≥ 0. Testing the hypothesis of credit rationing consists of testing the significance of the coefficients of *Collateral* and *Reputation* variables in equation A.

We approach the problem by estimating a variant of the Heckman sample selection model. This may be thought of as a two-step procedure, where we first estimate a probit equation to determine who borrows (equation A), and then using these results to form the Inverse Mills Ratio, which is used to correct for sample selection bias in an equation that determines the amount borrowed (equation B).

In practice we applied the maximum likelihood procedure used by STATA (1997). More specifically, the equations we estimate may be written as:

$$\text{AMOUNT} = a + b*[\text{AREA}]^{1/2} + c*[\text{DURABLE}]^{1/2} + d*\text{EDUC\_EXP} + e*\text{OCCUP} + \text{error term}$$

subject to

$$\alpha + \beta_1*[\text{DURABLE}]^{1/2} + \beta_2*[\text{AREA}]^{1/2} + \gamma_1*[\text{DURABLE}]^{1/2}*\text{REPUTATION} + \gamma_2*[\text{AREA}]^{1/2}*\text{REPUTATION} + \delta*\text{OTHER} + \text{error term} \geq 0.$$

The error terms are assumed to be normally distributed with zero means.

The AMOUNT variable measures the value of a loan, deflated to the prices of January 1998, and after adjusting for differences in prices across regions. Households that lend are not counted as being credit constrained, and for them we set AMOUNT equal to zero.

The variable AREA is a measure of the area of non-residential land owned by the household, adjusting for land quality (see chapter 13 for further details on how this is done). Information on this variable is available for 4,250 households (3,909 rural, 341 urban); we consider that missing observations correspond to landlessness.

The most difficult variable to measure is a household's reputation for servicing its loans. We construct a variable called REPUTATION that is set equal to 1 when the current loan is the first loan contracted, and is otherwise zero.

Several other variables feature in these equations. NORMAL measures the value of household holdings of durable assets (not counting the house, which we believe that lenders would not be willing to seize in the event of a default). There are also measures of the educational level of the head of household (EDUC), the main occupational categories, and regional dummy variables. The estimation results are set out in Table 12.9.

Table 12.9
Regression estimates of determinants of the amount borrowed, Heckman model

Principal regression	Coefficient	Probit regression	Coefficient
Dependent variable:		*Dependent variable:*	
Amount borrowed		Does household borrow? (y=1)	
Independent variables		*Independent variables*	
$AREA^{1/2}$	397	$AREA^{1/2}$	0.28***
		$AREA^{1/2}$*REPUTATION	0.38***
$DURABLE^{1/2}$	1783***	$DURABLE^{1/2}$	-0.10***
		$DURABLE^{1/2}$*REPUTATION	0.61***
EDUC_EXP	1.2 ***	EDUC	0.03***
OCC_SELF	317	URBAN (Yes=1)	-0.29***
OCC_AGRI	-2372***	AGE	-0.01***
OCC_WAGE	-1320 **		

Notes: This regression is based on 5824 observations.
* indicates significant at 20% confidence level
** indicates significant at 5% confidence level
*** indicates significant at 1% confidence level

Variables:
AREA: quality-adjusted area of non-residential land per household.
DURABLE: value of durables per household (excluding house).
EDUC_EXP: spending on education per household.
OCC_SELF: =1 if at least one household member is self-employed.
OCC_AGRI: =1 if at least one household member works in agriculture.
OCC_WAGE: =1 if at least one household member works for a wage.
REPUTATION: = 1 if the loan is the first loan contracted.
EDUC: the number of years of schooling of the most-educated household member.
AGE: age of head of household, in years.

Determinants of who gets loans

If we look at the results of the probit estimation, we have highly significant coefficients. The amount of land that a household owns is clearly a determinant of access to (or use of) credit. However the negative sign on the amount of durable goods is counterintuitive; it says that households with more durable goods are less likely to borrow, despite having collateral (in the form of the durable goods). On the other hand a reasonable interpretation is that the more durable goods a household has, the more affluent it is, and the less it needs to borrow. Thus the fact that a household does not borrow does not necessarily mean that it is credit-constrained.

Reputation interacts with collateral in an interesting way. The estimates show that first-time borrowers are more likely to borrow if they have collateral (in the form of land and/or durable goods). Put another way, owning assets becomes positively relevant when there is no credit history.

The results hint at the existence of a credit market failure due to information issues. Collateral and reputation are positively correlated with the probability of having access to credit. The failure arises when households that could surely service their loans are unable to borrow

because they lack collateral, or have not yet developed a good reputation for servicing their loans.

It is not hard to understand why formal institutions do not provide credit to a large part of the population. What we have now shown is that although informal-sector financial intermediaries do allow more people to have access to credit, credit rationing remains highly significant.

Determinants of loan amounts

For those who do have access to credit, land area and durable goods holdings have a positive impact on the amount borrowed. A larger area of non-residential land is associated with higher investment needs and therefore can explain the correlation. On the supply side, a larger land area also corresponds to less-risky investments and a higher degree of commitment by the potential borrower.

Similarly a higher amount of durable goods is highly correlated with expenditure per capita (correlation coefficient of 0.72) which arguably is associated with a larger demand of credit. From the supply side, this also corresponds to a higher commitment on the part of the borrower.

The results are interesting in that they show highly significant differences in the amounts borrowed, depending on the activities of household members. Self-employed households borrow the largest amounts, which is not surprising, due to the nature of their activities, which call for investment. Wage workers borrow more (per loan) than farmers, possibly because the income stream of wage-earners is more stable, and hence less risky to lenders, than that of farmers.

Finally, education expenditure has a significant and positive impact on loan amounts. It is possible that this is because some households need to borrow substantial sums to pay for tuition and other expenses.

CONCLUDING REMARKS

This paper is based on data from the Vietnam Living Standards Survey of 1997-98. A description of the informal credit market reveals that 55.1% of borrowers go to an informal source – relatives, friends, other individuals – although interest rates from these sources are often much higher than from formal lenders.

Thus it becomes interesting to ask why so many people stay out of the formal credit market. For instance, do ceiling interest rates imposed by the government have a selection effect on potential borrowers, by not making it worthwhile to lend in risky cases?

Our key result is that there is evidence of credit rationing. Some households, for information reasons, do not have access to credit. Lack of collateral and absence of reputation restrict access to credit. However, just

because a household does not borrow is no assurance that it is credit constrained. Therefore our results are contingent on the definition we used. A refinement would consists of discriminating between people who do not borrow because they do not need to do so, and people who do not borrow because they cannot do so.

Another original discovery is the existence of households who borrow and lend at the same time. Those individuals seem to be an answer to credit market failure by allowing some credit-constrained households to borrow from them. This phenomenon is not negligible, as it concerns 46% of informal lenders and 48% of the total money lent by the informal sector. Is there a relationship between the existence of those agents and the weaknesses of the formal sector? Do ceiling interest rates have a screening effect so that those intermediaries are the only way to get access to credit? Further research is needed in order to answer these questions.

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Chapter 13

Tax Incidence

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INTRODUCTION

In 2000, the most recent year for which data are available, the government of Vietnam collected taxes and fees equivalent to 17.0% of GDP (EIU 2001b). This tax burden is broadly in line with that found in other countries in Southeast and East Asia, and relatively high for a country as poor as Vietnam (Haughton 1997).

It is not clear how the tax burden is distributed across households. For instance, do poor households pay relatively less tax than rich, or northern households less than southern? In this paper we suggest some answers by estimating the incidence of taxation by household, using data from the Vietnam Living Standards Survey of 1997/8.

The first purpose of this paper is to document the extent and nature of local taxes. This is essential if one is to form an opinion as to whether these taxes are unduly onerous or not.

The second reason for looking at the incidence of taxation is that the information is important in the formulation of tax policy. In refining the tax system, the Ministry of Finance needs to know how the burden of any proposed changes falls on rich and poor households.

The most important sources of government revenue are set out in Table 13.1. For the corporation profits tax, and also for most of the other fees and taxes levied on corporations, as well as the natural resources tax and even the personal income tax (where there are very few observations), it is not possible to trace the incidence satisfactorily. However in the cases of indirect taxes - the turnover tax, special consumption (excise) tax, and import and export duties - as well as the agricultural and self-employment taxes, which collectively account for 48.5% of total government revenue (see Table 13.1), it is possible to trace the incidence on households, and this

is what we do in the paper. To the best of our knowledge this is the first study to use microeconomic data to address the issue of tax incidence in Vietnam.

In what follows we take each of the main areas of taxation in turn – agricultural taxes and fees, taxes on unincorporated businesses, excise taxes, and indirect taxes – and in each case first set out the essential theory of tax incidence, followed by a discussion of the evidence. A more formal discussion of the incidence effects of these taxes is relegated to an appendix.

All the numbers are drawn from the Vietnam Living Standards Survey of 1997-98 (VLSS98). A total of 5,999 households were interviewed between December 1997 and December 1998, using a questionnaire that runs to 115 pages. This household questionnaire asked several questions about the agricultural and other taxes paid by individuals, and this is the first source of information that we use ("household tax data"). The sampling process used to choose the households, although complex, was worked out carefully, and so sampling weights have been computed for each household and are used in all the calculations reported below.

The household questionnaire was complemented with a community questionnaire, which provides information on the taxes and fees paid to the commune by each household, drawn from the records of the commune. This is the second source of data reported below ("commune tax data").

Table 13.1
Sources of Government Revenue, 1999

	% of total government revenue	
Taxes on imports and exports	22.5	**48.5**
Turnover tax (now VAT)	18.8	
Special consumption tax (excises)	4.6	
Agricultural land use tax	2.6	
Corporation Profits tax	22.2	
Natural resource tax	5.8	
Personal income tax	2.2	
Other taxes	9.4	
Grants	2.7	
Other revenue	9.2	
All taxes	100.0	

Note: Based on budgeted revenue for 1999.
Source: World Bank/ADB/UNDP 2000, p.156.

RURAL TAXES

Theory

Rural households pay a bewildering array of taxes, fees and "contributions." The most important single *tax* is the agricultural land tax, levied at rates that vary by land quality. There is also a modest residential land tax.

Taxes.

The agricultural tax is a levied on agricultural land, and an effort is made to adjust the tax rate for the natural productivity of the land. The key point here is that it is reasonable to assume, as a first approximation at least, that the tax is not related to improvements that have been made to the land. A tax on improvements (e.g. on houses) would require a different analysis, because such a tax would discourage efforts to improve the land, and so would be inefficient.

It can be shown (Appendix 1A) that the burden of a pure tax on land falls entirely on the owners. Formally, the state owns all the land in Vietnam, but there is a well-established system of usufruct ("land-use") rights; analytically, owning the use-rights is equivalent to owning the land itself.

Fees

Fees differ from taxes, in principle at least, in that they are paid in return for a service. Thus households that irrigate their fields pay an irrigation fee. Other fees include those for land protection (to maintain dikes), for veterinary services, and for plant protection services. In practice, many fees are only very loosely linked to services received, and in such circumstances they take on the same essential characteristics as taxes. On the other hand when fees are paid in return for services, then they should not impose any burden on the payer, who is getting something valuable (water, protection from insects) in return for the payment. In this chapter we do not include fees that are paid for schooling or for health care.

Contributions

Contributions are similar to taxes, in the sense that they are obligatory and are not linked to any benefits that the contributor might receive as a result. Vietnamese households are expected to supply 10 days of labor to the public good every year. The labor is used to mend dikes, repair roads and canals, and generally go towards the upkeep of public infrastructure. Individuals have the option of paying a tax instead of contributing their labor, and those who are better off tend to choose the cash option. There are also a variety of funds - for poverty alleviation, community development, road construction,

electrification, national disasters, and the like - to which households are expected to contribute.

Many of the contributions are head taxes, which means that they depend only on whether the individual is alive and able-bodied. The burden of such taxes falls entirely on the individual, unless they can escape the tax by moving out of the area.

Evidence

Vietnam is still a largely agricultural country. According to the VLSS98, 59% of households are active in agriculture;[23] and the sector generated 23% of GDP in 2000, a relatively high proportion by world standards (EIU 2001a).

The basic data on agricultural taxes are shown in Table 13.2, for households that were active in agriculture in the VLSS98 survey. The first row shows total household expenditure, and this is followed by information on the total amount of agricultural taxes, fees and contributions paid by the household. This information comes from the tax records of the commune, and was collected by the community questionnaire. This information is likely to be more reliable than the numbers reported by households of the amount of taxes that they paid during the year prior to being surveyed; indeed these self-reported payments (shown on the second last line of Table 13.2) are only about two-thirds of the amounts recorded as having been received by the commune.

From the third row of table 13.2 we see that all the levies combined amounted to 3.7% of household expenditure, on average. Almost a third of all agricultural households are paying at least 5% of their expenditures to cover agricultural levies, and one household in twenty is paying more than 10% of its spending for these taxes, fees and contributions.

The data are broken down by quintile; in the "low" quintile are the poorest fifth of all households, as measured by the level of expenditure per capita. The total taxes, fees and contributions paid by households varied from 292,000 dong ($21) per household in the lowest quintile to about twice this level for households in the top quintile.

For the poorest three quintiles, agricultural levies take close to 4% of expenditure; this falls to 3.5% in the mid-upper quintile and 2.5% for agricultural households in the top fifth of the overall expenditure distribution. Thus agricultural taxes are regressive, in the sense that they impose a smaller proportionate burden on rich than on poor households.

Some, although not all, of the agricultural levies are related to the amount of land that a household "owns." It is therefore instructive to relate

[23] Official figures show agricultural employment accounting for 63% of the workforce in 2000; the figures reported in the text refer to households rather than workers.

taxes, fees and contributions to the amount of land that a household has. In Table 13.2 we have two measures of land; the first is the amount of annual land for which the household has the use rights, and the second is a quality-adjusted measure of land, where the inherent quality of the land is taken to be in proportion to the value of the paddy tax assigned to it. Agricultural levies total 510,000 dong ($36) per hectare on average, a relatively substantial amount.

Table 13.2
Total Agricultural Taxes and Fees per Household, for Households Active in Agriculture, by Expenditure per capita Quintile, 1998

	Low	Low-mid	Mid-dle	Mid-upr	Upper	**All**
	(in '000 dong p.a.)					
Expenditure/household	7,474	9,796	11,745	14,694	22,844	**11,670**
Agric. Taxes etc./household	292	423	479	510	574	**432**
Ag. Taxes as % of expenditure	3.9	4.3	4.1	3.5	2.5	**3.7**
% of h'h paying ag. taxes						
of >10% of expenditure	5.8	7.3	5.5	2.9	2.9	**5.3**
of >5% of expenditure	31.4	36.7	34.0	24.6	14.3	**30.6**
Land worked per h'hold (ha.)						
All land	0.72	0.74	0.71	1.08	1.03	**0.85**
Quality adjusted land	0.62	0.71	0.76	0.96	1.31	**0.85**
Ag. taxes etc./ha. all land	409	569	676	474	559	**510**
Ag. taxes etc./ha. qual. adj. land	469	594	631	530	439	**510**
Memo:						
Expenditure/capita	1,180	1,723	2,225	3,016	4,816	**2,203**
Ag. taxes etc./hh, hh q'aire*	197	304	344	358	324	**300**
% of all hh that are active in ag.	79.3	79.7	72.2	59.3	23.5	**58.7**

Note: Tax data are from community questionnaire, except for last row, which is from household questionnaire.
Source: Based on VLSS98.

As one moves from poor to rich agricultural households the quantity, and especially the quality, of land rises. The taxes, fees and contributions paid *per hectare of land* by poor, and by rich, agricultural households is lower than that paid by households in the middle of the income distribution. It is possible that poor households are benefiting from tax concessions. The relatively low tax rate for the richest farmers is more surprising, and may be partly related to the imperfect way in which we adjusted land for its quality.

There is significant regional variation in the incidence of agricultural levies, as Table 13.3 shows; they take more than 4% of household expenditures in the Red River and Mekong Deltas and in the North Central and Central coast regions, while elsewhere they take 3% or less of spending. The pattern appears to be that agricultural taxes, fees and contributions are relatively high in those parts of the country that rely heavily on rice cultivation, but are much more modest elsewhere. The low figure for farmers in the Southeast region is because a substantial part of the earnings

of these households comes from non-agricultural sources, raising the denominator (expenditure) without increasing the numerator (agricultural taxes paid).

Table 13.3
Total Agricultural Taxes and Fees per Household, for Households Active in Agriculture, by Region, 1998

	Expend /capita	Expend /h'hold	Ag. taxes /h'hold	Tax/ expend.	Memo: % of hh paying as ag. taxes & fees: >10% of expend.	>5% of expend.
	('000 dong/capita)			*%*	*('000 dong/capita)*	
Northern Uplands	1,789	9,886	293	3.0	1.8	15.7
Red River Delta	2,351	10,592	456	4.3	8.0	43.0
N. Central Coast	2,016	10,711	449	4.2	8.6	44.4
Central Coast	2,381	12,857	523	4.1	2.5	35.1
Central Highlands	1,919	11,952	352	3.0	2.5	20.9
Southeast	3,482	19,860	349	1.8	2.1	8.2
Mekong Delta	2,319	13,125	539	4.1	6.4	27.3
All Vietnam	**2,203**	**11,670**	**432**	**3.7**	**5.3**	**30.6**

Source: Based on VLSS98.

A more complete breakdown of the taxes, fees and contributions is given in Table 13.4; of the total, 52% of the payments are for taxes, 25% for fees, and the remaining 23% for contributions. Two items are particularly important – the agricultural land tax (45% of all revenue) and irrigation fees (21% of revenue). The importance of irrigation fees helps explain why agricultural levies are relatively important in rice-growing areas, which rely heavily on irrigation.

As one goes from the poorest to the richest expenditure quintile, total agricultural levies approximately double, as do most of the individual components, including the agricultural and residential land taxes, the irrigation fee, and the community development fund contributions. Two exceptions are worth noting. The corvee labor fund hits all households about equally, which means that it is regressive in that it represents a relatively greater burden for poor than for rich households; the land protection fee follows a similar pattern. At the other extreme, the electrification fund is progressive, in that it falls relatively more heavily on rich households than poor. Overall, however, agricultural taxes fall relatively more heavily on the poorest three-fifths of the population.

TAXES ON NON-FARM BUSINESS

Theory

Non-farm household enterprises are common in Vietnam. In 1998, 10% of adults worked full-time in such businesses, with a further 14% working on a

part-time basis (Vijverberg and Haughton 2001). Individuals who are self-employed off the farm, or who hire workers, are liable for license fees as well as a variety of taxes on turnover and profit.

Table 13.4
Breakdown of Agricultural Taxes and Fees per Household, by Expenditure per capita Quintile, 1998

	Low	Low-mid	Mid-dle	Mid-upr	Upper	**All**
	(in '000 dong p.a.)					
Total, taxes+fees+contributions	292	423	479	510	574	**432**
Taxes						
Agricultural land tax	134	188	211	231	260	**194**
Residential land tax	10	12	15	17	18	**14**
Other taxes	4	4	9	35	50	**15**
Fees						
Irrigation fee	55	92	108	99	100	**89**
Plant protection fee	2	4	3	3	3	**3**
Land protection fee	10	9	7	7	7	**8**
Veterinary fee	0	0	0	0	0	**0**
Security fee	5	6	7	7	7	**6**
Other fees	6	7	8	4	2	**6**
Contributions						
Corvee labor fund	25	29	27	27	21	**27**
Defense labor fund	2	2	3	3	4	**2**
Medical fund	1	1	1	1	1	**1**
School fund	12	14	13	15	21	**14**
Poverty alleviation fund	1	1	1	1	0	**1**
Community development fund	6	9	14	10	19	**10**
Road construction fund	12	15	18	14	17	**15**
Electrification fund	14	23	34	33	52	**27**
Natural disaster fund	2	2	2	2	2	**2**
Other contributions	5	5	5	4	4	**5**

Source: Based on VLSS98.

The incidence of a tax on business profits depends on the attractiveness of the alternative uses of the capital that the owner sinks into the business. There is still substantial reluctance in Vietnam to putting money into bank accounts, and many households are believed to hold substantial amounts of gold and dollars. Where this is the most attractive alternative, a tax on business profits will fall fully on the investor, who cannot easily run away from the tax by putting the money to productive use elsewhere. As the financial system deepens over time, a tax on the profits of small businesses will increasingly be shifted forward onto consumers, but this is probably occurring only to a limited extent at present.

To the extent that taxes are not on pure profits – and they are in practice largely based on turnover – then there may still be some scope for shifting the tax onto consumers, in which case the burden would not fall entirely on the producer.

For instance, we argue below that the burden of a tax on importable goods (i.e. goods that are being imported, or could easily be imported) falls fully on the consumer. For instance, suppose the tax on sugar is 50%. The sugar that is imported at a pre-tax price of 40 cents/kilo will now sell for 60 cents. The local producer also has to pay the tax, but will be able to charge a higher price, effectively passing on the tax to the consumer.

In the case of exportable goods (i.e. goods that are being exported, or could easily be exported), a turnover tax that is applied when the good is sold domestically, but not when it is exported, will also be passed on to consumers. If a farmer can export coffee for $1.50 per kilo, and there is a turnover tax for local sales of 10%, then the price for local consumers will rise to $1.65; otherwise the farmer would export all of the coffee, and sell none at home (assuming that licencing requirements and other impediments do not thwart these efforts).

Where goods are non-tradable, which is the case for many services, the tax is likely to fall in part on the producer and be shifted in part onto consumers, as discussed in Appendix 2 and illustrated in Figure A.2a. However, our working assumption is that the taxes levied on non-farm business are borne by the owner, although we recognize that this probably overstates the extent to which the tax incidence falls on owners.

Evidence

The relevant data on household business taxes, for households that operate non-farm businesses, are summarized in Table 13.5. The first point to note is that about 18% of households operate non-farm enterprises, but these households are overwhelmingly concentrated in the top quintile of the expenditure distribution. For households in the top quintile that operate an enterprise, income from the business covers fully 59% of their expenses and so is their dominant source of revenue. Owning and operating a business may not be easy, but it does appear to hold the promise of greater affluence.

Taxes on non-farm enterprises come to 9% of household expenditure, on average. This is more than double the tax rate on agriculture (which was 3.7% of expenditure; see Table 13.2). However in contrast with the levies on agriculture, the taxes on business are progressive – amounting to 11% of expenditure for households in the top quintile, and about 5% for all other households.

One may look at business taxes in other ways. They come to 1.8% of turnover, and 15.9% of business income. This last measure may be the best indicator of the burden of these taxes because it is appropriate to relate the business tax bite to the income earned from the operation of the business.

Table 13.5
Business Taxes per Household, for Households Active in Business, by Expenditure per capita Quintile, 1998

	Low	Low-mid	Mid-dle	Mid-upr	Upper	**All**
	(in '000 dong p.a.)					
Business taxes/household	402	714	542	949	4,132	**2,398**
Tax relative to hh expenditure						
Expenditure/household	9,883	12,502	12,440	18,262	36,614	**25,529**
Tax as % of expenditure	4.1	5.7	4.4	5.2	11.3	**9.4**
Tax relative to business turnover						
Business turnover/hh	17,973	49,645	56,951	58,542	212,345	**130,308**
Tax as % of turnover	2.2	1.4	1.0	1.6	2.0	**1.8**
Tax relative to business income						
Business income/hh	3,710	6,955	6,355	8,681	23,352	**15,131**
Tax as % of business income	10.8	10.3	8.5	10.9	17.7	**15.9**
Memo:						
Expenditure/capita	1,343	1,743	2,242	3,113	6,700	**4,535**
% of hh that are active in bsnss.	3.3	4.2	4.0	11.1	79.5	**18.2**

Note: Tax data are from the household questionnaire.
Source: Based on VLSS98.

The regional breakdown of taxes on non-farm household enterprises is shown in Table 13.6. The most interesting finding is that these taxes represent a higher share of household expenditures in the Southeast region (centered on Ho Chi Minh City) and the Mekong Delta than elsewhere in the country. In part this is because taxes there are somewhat high relative to turnover or to business income, but it is also because a higher proportion of

Table 13.6
Business Taxes for Households Active in Business, by Region and Sector, 1998

	Expend /capita	Expend /h'hold	Tax paid, business	Tax/ expend.	Tax/ turnover	Tax/bus. income
	('000 dong/capita)			*(percentages)*		
Region						
Northern Uplands	3,090	15,633	988	6.3	1.6	13.5
Red River Delta	4,604	23,412	1,360	5.8	0.8	10.7
N. Central Coast	3,284	19,128	1,504	7.9	2.7	19.2
Central Coast	4,071	24,253	1,917	7.9	1.8	12.1
Central Highlands	2,749	18,323	1,111	6.1	1.9	13.6
Southeast	7,517	44,240	5,066	11.5	2.4	18.6
Mekong Delta	4,044	22,526	2,904	12.9	2.2	17.8
Sector						
Ag. & forestry	3,322	23,527	1,755	7.5	3.4	9.4
Mining	2,040	12,823	461	3.6	4.7	9.7
Industry	4,854	28,951	2,769	9.6	2.2	17.3
Commerce	4,609	25,275	2,558	10.1	1.5	17.2
T'port, Commns.	4,,385	24,937	2,125	8.5	5.1	13.6
Other services	5,296	25,847	1,251	4.8	3.9	9.5
All Vietnam	**4,535**	**25,529**	**2,398**	**9.4**	**1.8**	**15.9**

Source: Based on VLSS98.

household income in these areas comes from non-farm enterprises. Business taxes appear to be particularly low in the Red River Delta (centered on Hanoi).

Table 13.6 also breaks down business taxes by sector. There are more businesses in the trade and commerce sector than in all the other sectors combined. This is also the sector where the tax represents the lowest percentage of turnover – which is not surprising, given the low markups that characterize trade – and the highest ratio of tax to household expenditures. Both trade and industry are relatively heavily taxed, when the tax is shown as a proportion of business income.

EXCISE TAXES

Theory

An excise tax – called a "special consumption tax" in Vietnam – is a tax on the sale of a named good, in contrast to generalized sales taxes such as a turnover tax or a value-added tax. Traditionally the goods that have been most heavily hit with excise taxes are alcoholic beverages, cigarettes and tobacco, and motor fuels such as gasoline (Bolnick and Haughton, 2001).

Vietnam also taxes these goods heavily. As of 1998, when the Vietnam Living Standards survey was undertaken, the average effective tax rate on cigarettes was 45% of the pre-tax price; for alcoholic beverages the rate was 92%, and for gasoline it was 42.83%.

Who actually bears the burden of these taxes? In principle, if enough information were available, one should develop a complete model of the economy, put the tax in place, and trace through the effects on consumption and production. In practice one is driven to use a simpler approach, based on a partial equilibrium analysis like the one shown for the sugar market.

As shown in Appendix 2, the extent to which the tax burden falls on producers and on consumers depends on the relative shapes of the demand and supply curves. This is where even this simpler approach runs into difficulty, because the own-price elasticities of demand and supply and need to be estimated for every commodity, a difficult and time-consuming process that is usually only worth the trouble for the major excisable commodities (Haughton 1998).

A more feasible approach is to assume that the (long-run) supply curve is horizontal. For goods that are importable, and for most manufactured items, this is a defensible simplification. If the price of, for instance, a television were to rise, then manufacturers would quickly seize the profit-making opportunity to sell more televisions, and the price would be pushed back down to where it started (assuming that this is a "constant cost" industry, which is plausible for most manufacturers).

In this case the tax is entirely shifted onto the consumer, who now bears its full burden. This is our working assumption – i.e. that the tax on cigarettes, for instance, falls on smokers rather than on the producers. Here we are also implicitly assuming that there is no tax evasion; this is certainly an oversimplification – for instance large quantities of cigarettes are smuggled into the country via Cambodia – but we do not have enough information on evasion to be able to adjust for it. If we could take tax evasion into account we would find that the burden of taxation would be somewhat smaller than is calculated here, although probably not by much, since the cost of evading taxes (for instance by smuggling) itself raises the cost of the goods to consumers.

It is conventional to assume that home-produced goods impose no burden on the household, because they are not taxed, although this too should be thought of as a reasonable and convenient simplification rather than the whole truth.[24]

This approach, which has been applied to Ghana by Younger (1993) and to Madagascar by Sahn and Younger (1998), only measures the direct incidence of indirect taxes. Thus the effect of a tax on sugar is measured by looking at household spending on sugar. However a tax on sugar will affect the price of anything that uses sugar, such as cakes, candies, jams and soft drinks. The full incidence of a tax on sugar can only be calculated by tracing the effect of this tax on the price of all sugar-using goods, and then measuring household spending on these goods. This requires an input-output table and merits a separate study.

Evidence

The relevant information on excise taxes is shown in Table 13.7. For each household we had a measure of their spending on cigarettes, alcoholic beverages, and gasoline; from this information we used the statutory tax rates to infer how much tax each household paid for these items. Note that there is a significant (but unavoidable) omission here, which is the amount of excise tax collected on goods purchased when eating out – such as beer consumed in a restaurant.

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[24] Suppose the tax on sugar is 50%, raising the retail price from 40 cents to 60 cents per kilo. A household that would have bought sugar at 40 cents/kilo might manufacture its own sweeteners if it has to pay 60 cents/kilo for sugar. If the home-produced sweeteners cost, say, 55 cents per kilo to produce, then the household is in effect incurring a burden of 15 cents per kilo as a result of the tax. This is a real cost, without the government getting any corresponding benefit in the form of revenue, and it reflects the "excess burden" (i.e. efficiency cost) of the tax. The measures of the tax burdens on households are simplifications because they ignore these excess burdens. The excess burden of the sugar tax discussed in the text is shown by triangle BEA in Figures A2a and A2b.

Table 13.7
Excise Taxes by Expenditure per capita Quintile, 1998

	Low	Low-mid	Mid-dle	Mid-upr	Upper	**All**
	(in '000 dong/capita unless otherwise noted)					
Expenditure	1,172	1,726	2,234	3,060	6,268	**2,893**
Spending on excisable goods	31	50	72	115	284	**110**
Tax paid on excisable goods	12	19	26	41	99	**39**
Tax as % of total expenditure	1.0	1.1	1.2	1.3	1.6	**1.4**
Cigarettes						
Spending	18.8	29.1	45.1	62.2	124.2	**55.9**
Excise tax paid	5.8	9.0	14.0	19.3	38.6	**17.3**
Tax as % of total expenditure	0.49	0.52	0.63	0.63	0.62	**0.60**
Beer and alcohol						
Spending	10.8	16.0	18.5	24.9	57.6	**25.6**
Excise tax paid	5.7	8.3	9.7	13.0	30.1	**13.3**
Tax as % of total expenditure	0.49	0.48	0.43	0.42	0.48	**0.46**
Gasoline						
Spending	1.1	4.4	8.6	27.8	102.5	**28.9**
Excise tax paid	0.3	1.3	2.6	8.3	30.7	**8.7**
Tax as % of total expenditure	0.03	0.08	0.12	0.27	0.49	**0.30**

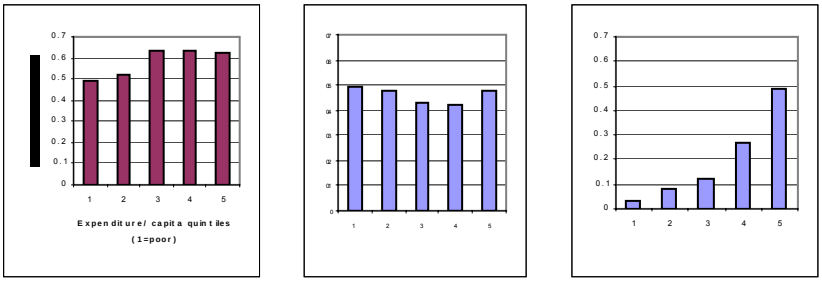
Source: Based on VLSS98.

On average, 0.6% of household spending went to pay taxes on cigarettes, with the rate being closer to 0.5% for low-income households. Thus this tax is slightly progressive, as Figure 13.1, panel 1, also shows. On the other hand the tax on beer and alcohol is proportional, with poor and rich alike devoting about 0.46% of their spending to this tax.

The tax on gasoline is highly progressive (see Figure 13.1, panel 3), taking up a miniscule amount of the spending of low-income households (who cannot afford motorbikes or motorized boats) but a significant fraction of the spending of better-off households. This is consistent with the

Figure 13.1
Excise Tax Collections as % of Expenditure, by Expenditure Quintile, 1998

Cigarettes | Beer and Alcohol | Gasoline



findings of Andrianomanana et al. (1998) for Madagascar and Younger (1993) for Ghana, but outside of these studies there is little evidence on the incidence of petroleum taxes in other less-developed countries.

There are interesting regional effects in the pattern of spending on excisable goods, as Table 13.8 shows. Relative to household expenditure, excise taxes are relatively high in the Central Highlands, where incomes are low but spending on cigarettes and gasoline is substantial. There is a discernable north-south divide: there is high spending in the south on cigarettes and gasoline, while purchases of beer and alcohol are relatively robust in the north, particularly relative to the fairly low income levels there.

INDIRECT TAXES

Theory

An excise tax is an example of an indirect tax, in contrast to a direct tax such as the personal income tax or corporate income tax that hits income "directly." The incidence of other indirect taxes, including the turnover tax (and its successor, the value-added tax that came into effect on January 1, 2000), is broadly as explained above. In other words, if supply is infinitely elastic, the tax is shifted onto consumers; if supply is not perfectly elastic, then the burden of the tax is shared between producers and consumers.

Table 13.8
Excise Taxes by Region, 1998

	Expend /capita	Spending, excisable goods	Tax paid, excisable goods	Tax /total expend.	Memo: Spending on Cigar-ettes	Beer and Alc'l	Gas-oline
	('000 dong/capita)			*%*	*('000 dong/capita)*		
Northern Uplands	2,021	51.1	20.6	1.02	16.9	23.0	11.2
Red River Delta	3,027	92.0	35.7	1.18	39.0	34.6	18.4
N. Central Coast	2,288	65.1	24.8	1.08	28.6	22.5	14.0
Central Coast	2,798	127.2	44.3	1.58	73.3	24.1	29.8
Central Highlands	2,053	98.7	35.1	1.71	49.0	22.2	27.6
Southeast	5,268	264.2	89.8	1.70	127.2	41.8	95.2
Mekong Delta	2,667	107.9	36.0	1.35	71.5	13.2	23.2
All Vietnam	**2,893**	**110.3**	**39.4**	**1.36**	**55.9**	**25.6**	**28.9**

Source: Based on VLSS98.

Import tariffs are a special case. They are often levied because it is relatively easy to control the movement of goods at a country's borders. They are also used to protect domestic producers, by discouraging imports. The important point here is that import tariffs hurt consumers, who now have to pay higher prices for the imported goods, or for domestically-produced substitutes. Appendix 3 explains this logic in more detail. As

before, our working assumption is that the burden of indirect taxes falls onto consumers.

Evidence

This is the most speculative part of the chapter, because our analysis is based on strong assumptions. We assume that:

- The whole burden of indirect taxes is born by consumers;
- Prices in a country rise and fall by the full extent of any tariffs on imports; and
- All goods in a given category (e.g. beer) are subject to tax.

Given these assumptions, we took the tax rates from the official list of customs duties (which includes excise and other tax rates); the main items are listed in Table 13.9. We then applied these tax rates to the amounts that households spent on these items, according to VLSS98. The results are summarized in Table 13.10, and cover all goods except purchases of major durables.

Table 13.9
Selected tax rates on consumption items, 1998 (%)

	Turnover tax rate*	Import tariff		Turnover tax rate	Import tariff
Flour	4	3	Alcohol, beer	47.2	42.5
Noodles	4		Kerosene		15
Meat		10	Soap, detergent	4	
Lard, cooking oil	5	4	Fabric	4	25
Salt		10	Clothing	4	25
MSG		40	Shoes	6	
Sugar		25	Cement	18	
Milk	20	7	Bricks	6	
Bike tires		40	Gasoline		42.8
Cigarettes	45		Beverages	4	20
Phone	10		Motorbikes		50

Notes: * Also includes special consumption (excise) tax.

The most striking finding is that indirect taxes are essentially proportional, in that they extract about 4% of spending from poor and rich households alike. This is somewhat surprising, because taxes are only collected on goods and services that are purchased, and the households in the poorest quintile devote a smaller proportion of their expenditure to cash purchases (63%) than do those in the top quintile (95%). Thus the tax rate faced by the poor *on their purchases* is about 6.5%, while it is just 4.2% for the rich. In other words, the goods purchased by poorer households tend to be more highly taxed than those bought by the more affluent. We should emphasize that this finding is somewhat tentative, and it is possible that if

spending on durable goods were included, then indirect taxation would no longer be proportional.

Table 13.10
Indirect Taxes by Expenditure per capita Quintile, 1998

	Low	Low-mid	Mid-dle	Mid-upr	Upper	**All**
	(in '000 dong unless otherwise noted)					
Expenditure/household	6,608	8,844	10,379	13,255	25,587	**13,596**
Expenditure/capita	1,185	1,730	2,240	3,068	6,449	**3,120**
Estimated indirect tax/h'hold	273	390	400	549	1,027	**554**
Tax as % of total expenditure	4.1	4.4	3.9	4.1	4.0	**4.1**
Memo items:						
Home consumption	2,432	2,698	2,462	2,141	1,207	**2,142**
So: % of spending untaxable	36.8	30.5	23.7	16.2	4.7	**15.8**
And: taxable spending	4,175	6,147	7,917	11,114	24,380	**11,454**
Tax as % of taxable spending	6.5	6.3	5.1	4.9	4.2	**4.8**

Source: Based on VLSS98.

OVERALL TAX INCIDENCE

It is possible to combine the effects of the taxes discussed above to get a measure of overall tax incidence, and we do this with the help of Table 13.11. We started with estimated indirect taxes, which already include the excises on cigarettes, alcohol and gasoline. Then we add the taxes on agriculture and non-farm household enterprises, adjusting for the proportion of households in each quintile who pay these taxes. We find that taken together, these taxes eat up 8.5% of household spending. This is consistent with our earlier observation that we can only measure the incidence of about half of all taxes, and collectively these taxes bring in about 8.5% of GDP annually.

Table 13.11
Summary of Taxes by Expenditure per capita Quintile, 1998

	Low	Low-mid	Mid-dle	Mid-upr	Upper	**All**
	(in '000 dong unless otherwise noted)					
Expenditure/household	6,608	8,844	10,379	13,255	25,587	**13,596**
Estimated indirect tax/h'hold	273	390	400	549	1,027	**554**
Agric. Taxes & fees/h'hold	232	337	346	302	135	**254**
Business taxes/household	13	42	46	146	1,270	**352**
So: All taxes & fees/h'hold	**518**	**769**	**792**	**997**	**2,432**	**1,160**
All Taxes as % of expenditure	7.8	8.7	7.6	7.5	9.5	**8.5**
Memo: Expenditure/capita	1,185	1,730	2,240	3,068	6,449	**3,120**

Source: Based on VLSS98.

Overall, there is some evidence of progressivity in the tax system, most notably at the upper end of the expenditure distribution; households in the top quintile paid tax that averaged 9.5% of their total spending, and this does

not include taxes on durable goods, or personal income tax (which affects too few people to be observable in the VLSS98 sample). While the agricultural tax is, by and large, regressive, this is more than offset by the progressivity of taxes on non-farm household enterprises.

These results, even if somewhat tentative, have some interesting implications. First, the elasticity of the tax system in Vietnam is probably close to or slightly above one; in other words, when GDP (and hence incomes and spending) rises by 10%, tax revenue is likely to rise by about 10% too, assuming no changes in the tax code. This follows from the essential proportionality of the tax structure. It is desirable to have a tax system with an elasticity of one or more, because in practice it means that the government will not endlessly tinker with tax rates in an effort to raise enough revenue, because the revenue will tend to come in automatically as the economy expands.

The government is actively considering reducing, and eventually abolishing, the agricultural land tax; the main reason for its hesitation is that local and provincial governments rely heavily on the proceeds of this tax. Our analysis shows that repealing this tax would help poor households more than rich, and so would improve the (after-tax) distribution of spending in the country. On the other hand even if the agricultural land tax were abolished, this would leave more than half of rural levies untouched, and so would only partially lift the tax burden of rural households. The proliferation of fees and contributions also contributes to a lack of transparency in local taxation.

Vietnam has a personal income tax, but as a practical matter it mainly applies to people working at foreign-invested enterprises. As countries grow and develop the personal income tax becomes easier to collect as well as more important; most developed countries have found that it is the single most important element in introducing progressivity into a tax system. The evidence to date suggests that there is very limited progressivity in the other parts of Vietnam's tax structure.

Throughout this chapter our emphasis has been on one dimension of taxation, which is how the burden falls on poor versus rich households. There are of course other important issues – the efficiency and stability of taxes, their buoyancy, and their neutrality. These too need more attention than they have received to date; there is a substantial research agenda ahead for the tax system of Vietnam.

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APPENDIX 1: INCIDENCE OF A TAX ON LAND

The incidence of a pure tax on land may be seen in Figure A.1. The demand curve shows the amount that farmers or others are willing to pay in order to rent the land for a year. The supply curve is vertical, because the quantity of land is essentially fixed. Now impose a tax on land. Demanders will not be willing to pay more to rent the land, because they are already paying as much as they can bear. So the tax needs to be subtracted from the demand curve to determine the amount of rent paid to the owner. In Figure A.1 the original demand curve is D_0, and with the tax it is shifted down to D_1 ($=D_0-T$). The rental paid by the demanders is still area P_0-E-Q_0-0, but of this the government now gets P_0-E-B-P_1 and the landowners keep the rest. The important point is that the burden of a pure tax on land is borne entirely by the owner of the land.

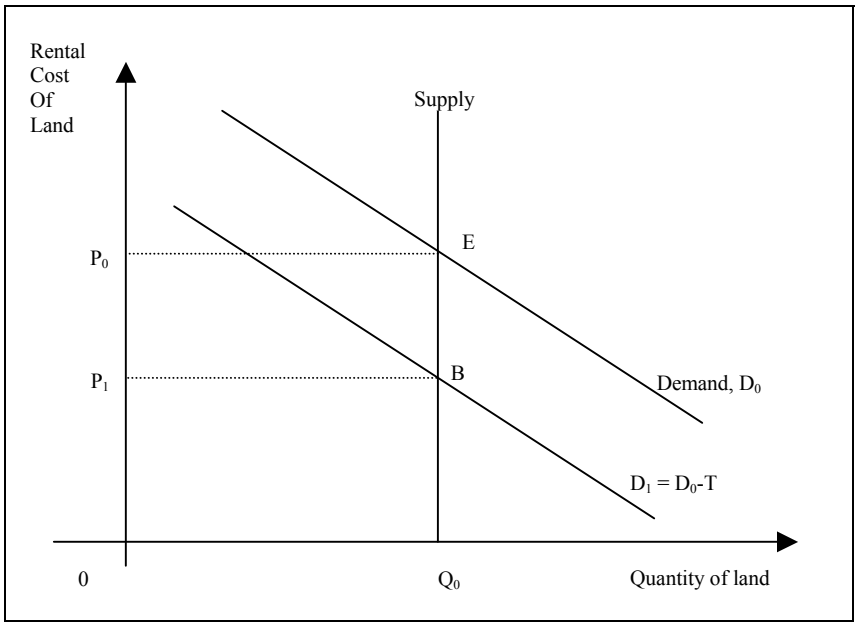


Figure A.1. ***Incidence of a Tax on Land***

APPENDIX 2: INCIDENCE OF AN EXCISE TAX

Consider a tax of *t*% on the value of a good such as sugar. Who actually bears the burden of this tax?

In the simplest case we may proceed as follows. Figures A.2a and A.2b show the same demand curve for sugar, labeled D_1. In Figure A.2a the supply curve for sugar (S_1) is upward sloping, meaning that a higher price is needed in order to induce producers to provide more sugar. This supply curve reflects the (marginal) costs of producing sugar. When a tax on sugar is put in place, it may be though of as raising the cost of putting sugar into the market. Thus the supply curve is shifted vertically upward by the amount of the tax, to $S_1(1+t)$.

As a result of the tax, the price to the consumer rises from P_0 to P^d_1, but of this, the producer gets just P^s_1 (= P^d_1-t × P^s_1). The higher demand price causes the quantity bought to fall, from Q_0 to Q_1. The government collects revenue equal to the shaded rectangle P^d_1-A-B-P^s_1. Note that the burden of the tax falls both on suppliers, who now get a lower price and sell less, and also on consumers, who must pay more and so buy less. Formally the loss to consumers is given by the area P^d_1-A-E-P_0 and the loss to producers by P_0-E-B-P^s_1.

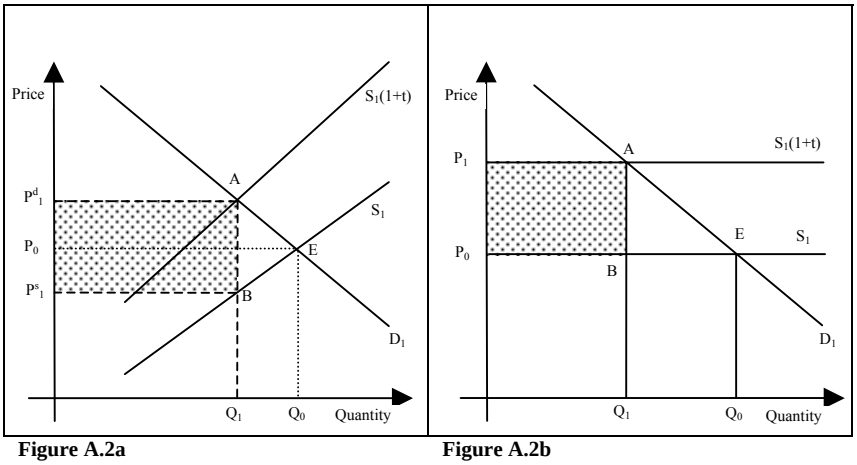


Figure A.2a
Tax with Upward-sloping Supply

Figure A.2b
Tax with Horizontal Supply

The extent to which the tax burden falls on producers and on consumers depends on the relative shapes of the demand and supply curves, but this information is often unavailable. A more feasible approach is to assume that the supply curve is horizontal, which is plausible for most manufactured goods and services.

This case is illustrated in Figure A.2b. When a tax of *t*% is put in place, the price paid by the consumer will rise from P_0 to $P_0(1+t)$ (=P_1), or by the full amount of the tax. The tax is completely shifted forward onto the consumer, who now bears its full burden. Suppliers sell fewer units (Q_1 instead of Q_0) but still receive P_0 for each unit sold. The government gets revenue equivalent to the shaded area P_1-A-B-P_0. Formally, the burden on consumers is measured by their loss of consumer surplus, or by P_1-A-E-P_0.

In practice this burden on consumers is usually approximated by P_1-A-B-P_0, which is straightforward to calculate because it only requires information on the amount spent on the good by the household and the tax rate, and so avoids the need to estimate demand elasticities. The tax burden on household *j*, for good *i,* is then given, approximately, by

$$B_{ij} \approx t_i \times X_{ij}/(1+t_i)$$

where X_{ij} is the amount spent by household *i* on item *j*. The total indirect tax burden on the household is measured by summing the burden over all goods and services, to yield $B_j = \Sigma_i B_{ij}$. When the tax burden is summed up over all households, one gets total tax revenue (R), so $R = \Sigma_j B_j$. This is the approach taken in analyzing the effects of excise taxes and of turnover taxes in this chapter.

APPENDIX 3: THE INCIDENCE OF IMPORT TAXES

When taxes are imposed on imports, they hurt domestic consumers. We develop this analysis formally with the help of an import tax on sugar, as shown in Figures A.3a and A3.b.

When the tax is put in place, the price to consumers may rise from the CIF (cost, insurance, freight) import price (P_0) by the full amount of the tariff, and so to P_1 (=P_{cif}(1+t), see Figure A.3a). In this case consumers lose the area P_1-A-E-P_0. This area may be approximated by P_1-A-B-P_0 and calculated in the same manner as proposed above for excise taxes. If there is an excise and/or turnover tax, then this needs to be included on top of the effects of the import tariff. Note that although consumers lose substantially from the import tariff, much (but not all) of this loss is offset by a gain to local producers (of P_1-F-H-P_0) and the government in the form of revenue (F-A-B-G).

A difficulty arises in the case where the domestic price does not rise by the full extent of the tariff. The situation is shown in Figure A.3b. Consumers lose P_1-A-E-P_0 in this case. In order to measure the size of this loss it would be necessary to compare the actual domestic price (P_1) with the international price (P_{cif}), a difficult task. Instead we assume, unless we have other relevant information, that the domestic price in Vietnam rises by half of the amount of the tariff. This is because many tariffs are so high that they have choked off (legal) imports completely, and the domestic price must be lower than the import price plus tax. The second reason is that the smuggling of consumer goods is rampant, particularly for such items as cigarettes, alcohol, sugar and motorbikes. This keeps the domestic price below the level of the tariff-inclusive world price.

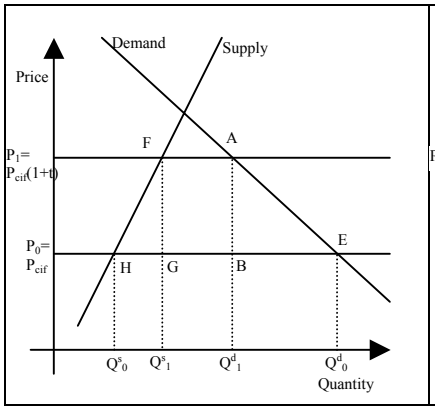


Figure A.3a
Import Tariff: Full Price Rise

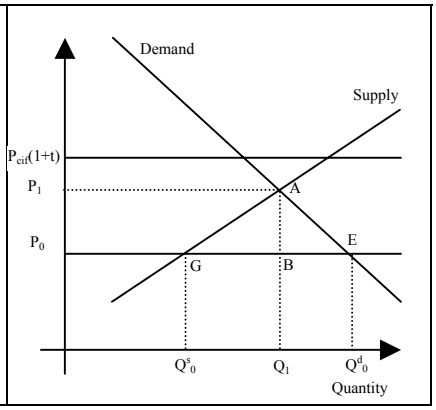


Figure A.3b
Import Tariff: Partial Price Rise

Chapter 14

Correlates of Living Standards: A Graphical and Statistical Analysis

Joel Deichmann
Dominique Haughton
Nguyễn Phong
Phùng Đức Tùng

INTRODUCTION

The purpose of this study is to discuss correlates of living standards in 1993 and 1998, based on data from the Vietnam Living Standards Surveys (VLSS).

Even though Vietnam is still a poor country, with GDP per capita estimated at $400, the policy of *Renovation (Đổi Mới*) initiated by the Vietnamese Communist Party since the mid 1980s led to remarkable achievements in economic and social areas, including progress in hunger eradication and poverty alleviation. This chapter quantifies the improvements in living standards of households, as measured by expenditure per capita, between 1993 and 1998. Household expenditures in the VLSS surveys are defined as expenditures and consumption on food and nonfood items such as education, medical services, self-produced products; durable goods, power, water supply, garbage, and housing.

It is helpful to divide the correlates of living standards and poverty into two: geographic variables, and household variables. From the literature we know that people who live in geographically remote areas, or in rural areas, tend to be poorer. Living standards are also generally lower for households that are larger, that belong to non-dominant ethnic groups, that are headed by an older or female head, or where the adults in the household have achieved only modest levels of education.

However in linking these variables to the level of expenditure per capita, we don't usually know the correct functional form which relates these variables to (the log of) expenditure per capita, and it is in general relatively difficult to identify interactions between independent variables.

In addressing this issue, the chapter first presents a descriptive analysis using graphical and geographical tools. It then estimates statistical models

for (the log of) expenditure per capita, using two methodologies that are relatively new to econometrics but are quickly gaining momentum: CART (Classification and Regression Trees) and MARS (Multiple Adaptive Regression splines). We present CART and MARS models for 1993 and 1998, and MARS models for the bottom and top expenditure quintiles in 1998.

DATA AND METHODOLOGY

This study uses data from the Vietnam Living Standards Surveys of 1992-93 (VLSS93) and 1997-98 (VLSS98). The surveys were undertaken by the General Statistical Office of Vietnam, with financial support from the United National Development Programme (UNDP) and the Sweden (SIDA), as well as technical assistance from the World Bank.

The VLSS surveys sampled 4,800 households in 1993 and 5,999 in 1998. Nine-tenths of the households surveyed in 1993 were re-interviewed in 1998. The surveys are based on the methodology tested and developed by the Living Standards Measurement Program of the World Bank. Aside from household income and expenditure, which are the main topics of the surveys, the surveys also include questions related to education, health, housing, durable goods, employment, farm and non-farm production, and anthropometrics. Data on all these topics were collected for each household. Therefore, the VLSS surveys provide data that are rich enough to allow one to draw a comprehensive picture of living standards, of which the status of poverty is one aspect.

We note that while the 1993 sample is self-weighting, all analysis using the 1998 data, including graphs and maps, must be weighted to take into account the sampling design of VLSS98.

PREVIOUS STUDIES

There are numerous papers that discuss how to set poverty lines, and how to calculate poverty rates and other measures of poverty (e.g. the recent overview by Haughton 2001). The key point is that in order to set poverty lines, and in particular to compare poverty rates at different points in time, one needs to evaluate prices of goods as accurately as possible. Unfortunately, prices are extremely noisy or even missing in some cases, and thus so are the resulting poverty rates (Glewwe and Phong 2001). Possible solutions to this problem are suggested in Ravallion (1996), but in a recent paper Szekely et al (2000) are pessimistic about the prospects for measuring in a way that may be compared consistently and accurately among countriew and over time.

Given that poverty measures are somewhat fragile, it makes sense to look at expenditure per capita for all households, rich and poor, and to try to

identify the determinants of expenditure per capita. The conventional approach has been to regress (the log of) expenditure per capita linearly on a set of independent variables. In some cases the independent variables have been transformed in order to catch non-linearities, and some attempts have been made to identify significant interactions (Dollar and Litvack 1998; Dollar and Glewwe 1998; Minh 1999; Duong and Trinh 1999).

However there is a problem: the relationship between living standards and their determinants is likely to be highly non-linear, and may very well depend on where one lies on the expenditure per capita spectrum. For instance, it is conceivable that returns on education could be smaller (or larger) for the bottom expenditure quintile than for the whole sample.

With this in mind, we proceed as follows. First, we present a descriptive analysis of poverty and expenditure per capita that is based on graphs and maps rather than on tables. The idea is to give a quick sense of how expenditure per capita is related to a number of key variables individually, and how these relationships have changed between 1993 and 1998. For this reason, we present our graphs and maps for 1993 and 1998 side by side and with the same scale to facilitate comparison. To the best of our knowledge, no such graphical analysis has been published using the VLSS data.

Second, we present statistical models that use CART and MARS, modeling techniques that are becoming popular among econometricians and that make it possible automatically, and thus rapidly, to identify non-linearities in the dependence between the log of expenditure per capita and independent variables, as well as interactions between independent variables.

But first it is helpful to provide some background on government policies towards poverty alleviation and raising living standards, which is the subject of the next section.

GOVERNMENT ANTI-POVERTY PROGRAMS

The World Summit on Social Development held in Copenhagen in 1995 declared a commitment to realizing the goal of hunger and poverty eradication in the world through National Plans of Action as well as international cooperation to be a moral, social, political and economic requirement for humanity.

At this summit the Vietnamese government undertook the challenge of eradicating hunger in Vietnamese households by 2000, of improving people's life and gradually reducing the number of poor households in order to end all poverty by 2010, with poverty defined according to current criteria.

Aware of these commitments, the Eighth National Party Congress held in 1996 set forth the country's socio-economic development tasks for 1996-

2000, which identified the goal of reducing the proportion of poor households in the whole country to 10% by 2000. During the first two or three years of the plan, the focus was on the eradication of chronic hunger.

To this end, the Prime Minister of Vietnam approved the National Target Programme on Hunger Eradication and Poverty Reduction (HEPR) with nine key projects as follows:

1. Infrastructure development and population relocation.
2. Sedentarization, resettlement, migration and new economic zones.
3. Credit for the poor.
4. Production support and development of off-farm activities.
5. Providing production instructions for the poor and agricultural forestry and fishery extension.
6. Training HEPR and poor communes' staff.
7. Supporting ethnic minority people in extreme difficulties.
8. Healthcare support for the poor.
9. Educational support for the children of poor households.

In order to deepen the HEPR program, with a focus applied to the poorest people and areas, the Prime Minister of Vietnam has also approved a socio-economic development programme in remote and upland communes with extreme difficulties. The policy of the Vietnamese Party and Government is not to provide direct subsidies to households. Instead it supports and facilitates the development of production and access to social services to help the poor get out of hunger and poverty by themselves and participate in the community's development.

Proceeding from this viewpoint, in recent years the Vietnamese Government has introduced its policy of hunger eradication and poverty reduction through the following national socio-economic development programmes:

- *Programme 327:* a five million ha reforestation project
- *Programme 773:* land reclamation in riparian and coastal areas
- *Programme 120:* job creation
- The sedentarization and resettlement programme
- Setting up the Bank for the Poor to provide credit to poor households.

These aforementioned programmes have helped generate jobs and income for hundreds of thousands of poor households to help them escape from hunger and poverty by themselves.

Together with the implementation of economic development programmes to generate jobs, the Government has also implemented National Programmes on social development to help the poor get better access to social services. The most important of these are the programs on:

- Illiteracy elimination and the universalization of primary education.
- The elimination of dangerous social and epidemic diseases.
- Population and family planning.

- Malnutrition prevention and the provision of care for children faced with extreme difficulties.
- HIV/AIDS prevention.
- Drug control.
- Cultural development in remote and mountainous areas.
- Increasing television and radio coverage to remote and mountainous areas.

During the three consecutive years from 1996 to 1998, despite numerous economic difficulties, the central budget for HEPR through the above-said programmes increased by over 12% per year on average. In 1999 and 2000, the Vietnamese government continued to intensify the HEPR efforts by providing more financing for the above-mentioned programmes and focusing on the most disadvantaged communes in remote and mountainous areas. In 1999, 1000 among the most disadvantaged communes were provided financial support amounting to 400 million VND ($28,700) per commune on average and in 2000 the number of communes supported was 1,866. To this end, the state budget for HEPR in 2000 was twice that of 1996.

These efforts have helped improve the living standards of Vietnamese people; the incidence of poverty has decreased considerably from 1993 to 1998, as shown in Table 14.1.

Poverty rates

Two poverty lines are commonly used in Vietnam: a low poverty line (the food poverty line) and a higher poverty line (the general poverty line). The food poverty line is defined as the cost of buying enough food to provide 2,100 Calories per person per day. The general poverty line is determined by adding the costs of non-food commodities to the food poverty line - essentially the non-food spending by households in the middle expenditure quintile in 1993. People having a level of expenditure per capita lower than these poverty lines are considered to be poor (food poor and general poor respectively).

These results set out in Table 14.1 are very important because they show that in just 5 years the food poverty rate and the general poverty rate decreased by almost 10 and 20 percentage points respectively. Moreover the incidence of poverty fell in all regions of the country. This reflects achievements in economic development as well as achievements in creating equitable opportunities for the development of all communities.

In trying to understand why poverty has fallen and living standards have improved, it is helpful to set out more detailed information on per capita expenditure levels, which we do in the next section.

Table 14.1
Poverty Rates by Region, 1998

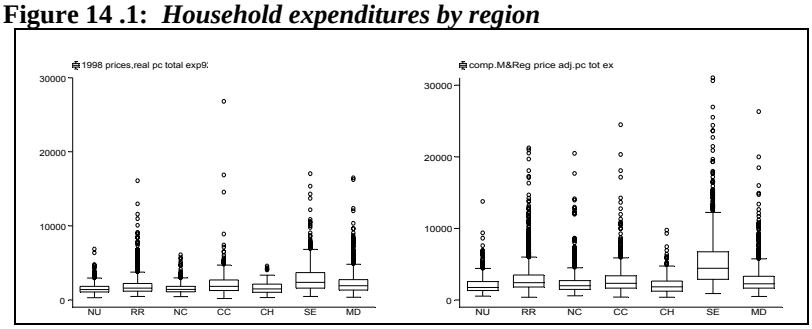
	Food Poverty Rate		General Poverty Rate	
	1993	**1998**	**1993**	**1998**
Northern Mountains	37.6	29.2	78.6	58.6
Red River Delta	25.9	7.5	62.9	28.7
North Central Coast	35.5	19.0	74.5	48.1
South Central Coast	22.0	17.4	49.6	35.2
Central Highlands	32.0	31.5	70.0	52.4
North East South	10.3	1.8	32.7	7.6
Mekong River Delta	17.7	11.3	47.1	36.9
All Vietnam	**24.9**	**15.0**	**58.2**	**37.4**

Sources: Based on VLSS93 and VLSS98.
Note: Figures show percentage of individuals below the poverty line.

DESCRIPTIVE ANALYSIS

Figure 14.1 shows that overall, during the 1993-1998 period, expenditure per capita increased in every region of the country. The figure shows a series of box plots, one for each of the regions; as one reads from left to right, the regions go from north (NU = Northern Uplands) to south (MD = Mekong Delta). The vertical axis shows expenditure per capita, here as elsewhere truncated at 30 million dong ($2,150) per capita per year in order to eliminate outliers. The horizontal line running through the middle of each box represents median expenditure per capita. The boxes themselves run from the bottom to the top of the interquartile range, which means that half of all the observations fall into this range. Outliers are shown as small circles.

Figure 14 .1: ***Household expenditures by region***



The same story emerges, in graphic form, from Map 14.1. It shows that the lowest category of expenditure per capita (under 900 thousand VND

per capita, found only in Region 3 (North Central) in 1993) had disappeared by 1998. At the same time, in 1998, new high expenditure categories appeared for Region 2 (Red River Delta), Region 4 (Central Coast), and Region 6 (Southeast). Region 6 including Ho Chi Minh City made

Map 14.1. ***Household expenditures by region***

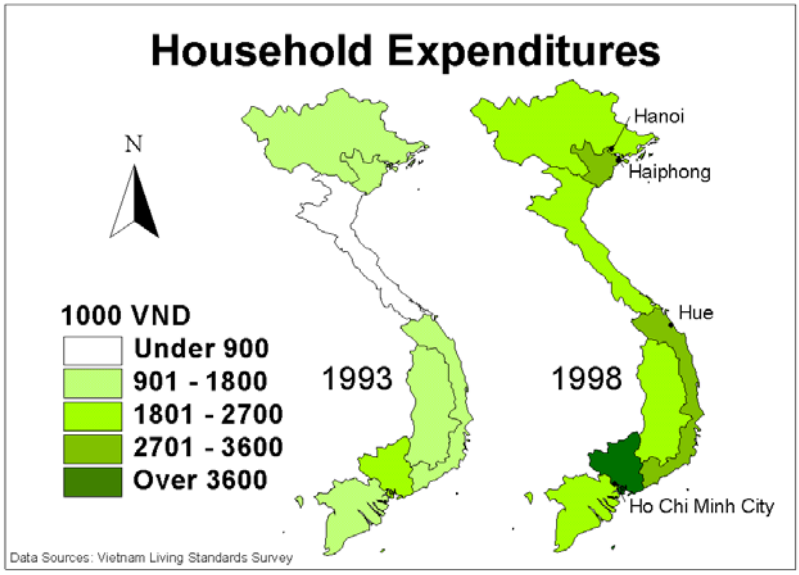
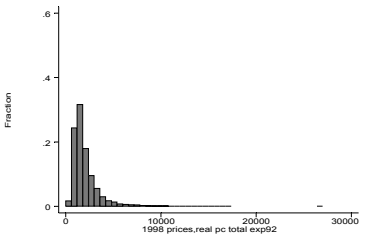
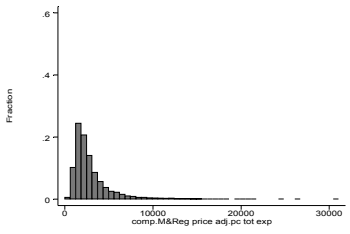


Figure 14.2: ***Real per capita expenditures***



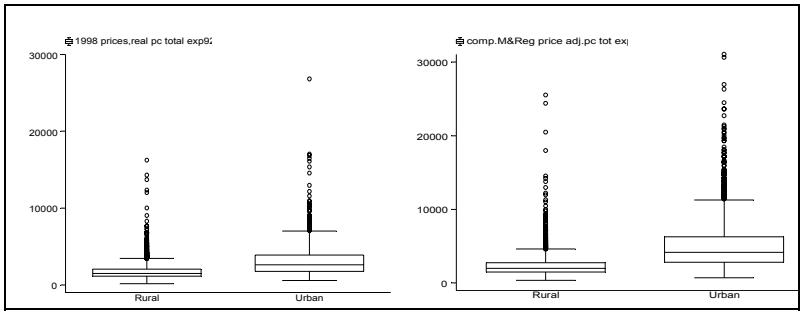
HISTOGRAM OF 1993 REAL PER CAPITA EXPENDITURE (1998 prices)



HISTOGRAM OF 1998 REAL PER CAPITA EXPENDITURE (1998 prices)

considerable progress, leading the country in expenditure level. Region 2 (Red River Delta) and especially Region 6 (Southeast) improved their living standards much more than other regions.

Figure 14.3: ***Real per capita expenditures, by urban/rural***



Map 14.2: ***Household expenditures and urbanization***

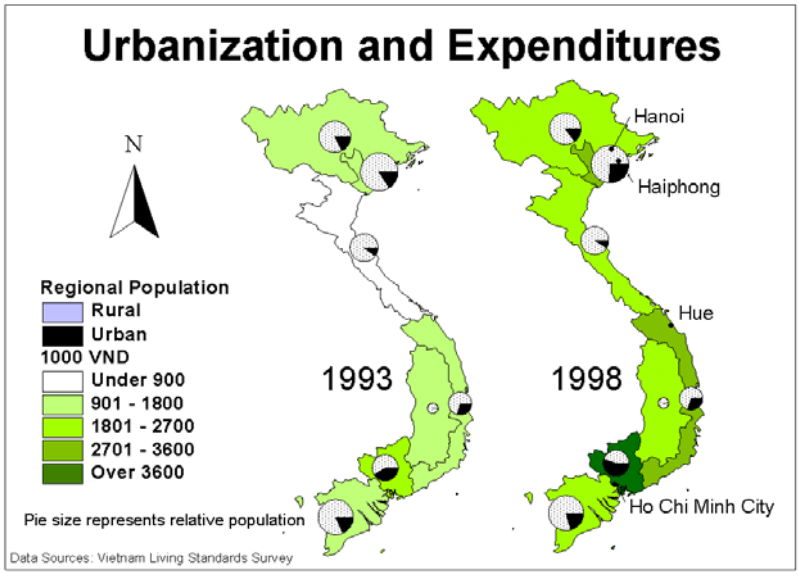
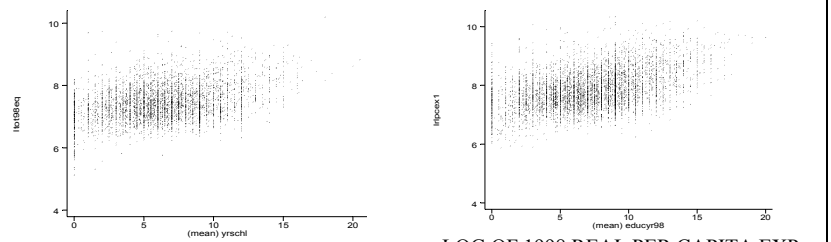


Figure 14.2 shows that the distributions of real per capita expenditure (expressed in 1998 prices) for both 1993 and 1998 are right skewed. Interestingly, skewness (but not variance – i.e. inequality) decreased slightly from 1993 to 1998 (from 4.13 to 4.02) as the distribution moved to the right.

Figure 14.4 shows a positive relationship between real per capita expenditure (in January 1998 prices) on the horizontal axis, and the average number of years of schooling of adult household members on the vertical axis. We also see that the slope of a least squares line through the data would be higher in 1998, implying that returns on education have increased in 1998, as one would expect in an expanding economy.

Figure 14.4: ***Real per capita expenditures and education***

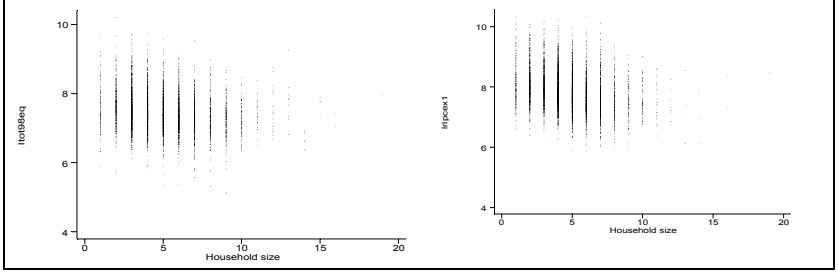


LOG OF 1993 REAL PER CAPITA EXP. VERSUS AVG. YEARS OF EDUCATION OF ADULT MEMBERS OF HHOLD

LOG OF 1998 REAL PER CAPITA EXP. VERSUS AVG YEARS OF EDUCATION OF ADULT MEMBERS OF HHOLD

In Figure 14.5 we can see that overall, expenditure per capita decreases with household size, more steeply in 1998 than in 1993.

Figure 14.5: ***Real per capita expenditures and household size***



In Figure 14.6 we see that living standards improve with the diploma attained by the head of household. In addition, the level of living standards improvement between 1993 and 1998 tends to rise with the diploma level.

Figure 14.7 shows that expenditure per capita is highest for heads of household aged around 40-50.

Figure 14.6: ***Real per capita expenditures and diploma of household head***

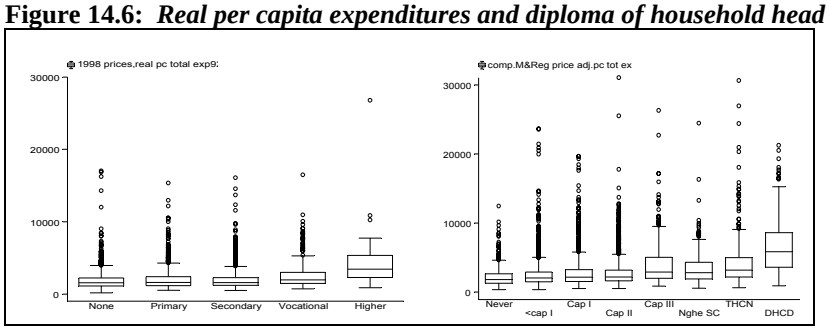


Figure 14.7: ***Real per capita expenditures and age of head of household***

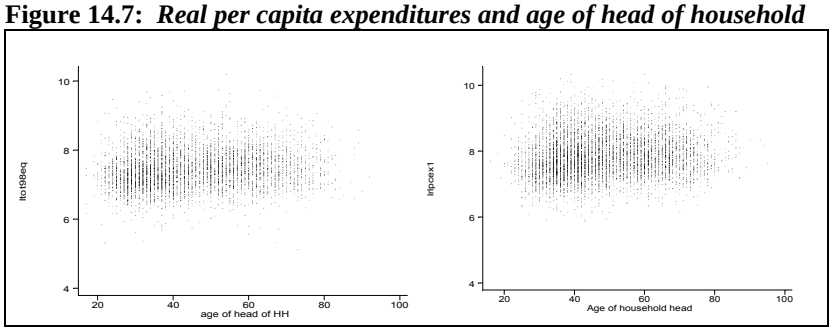
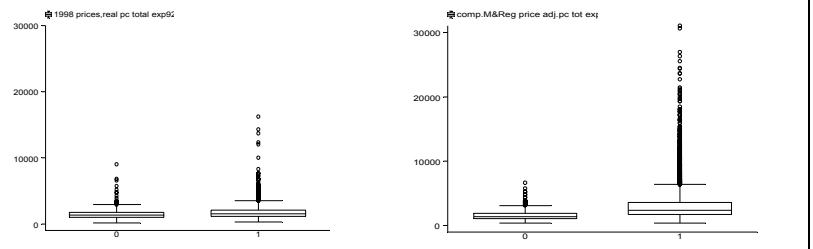


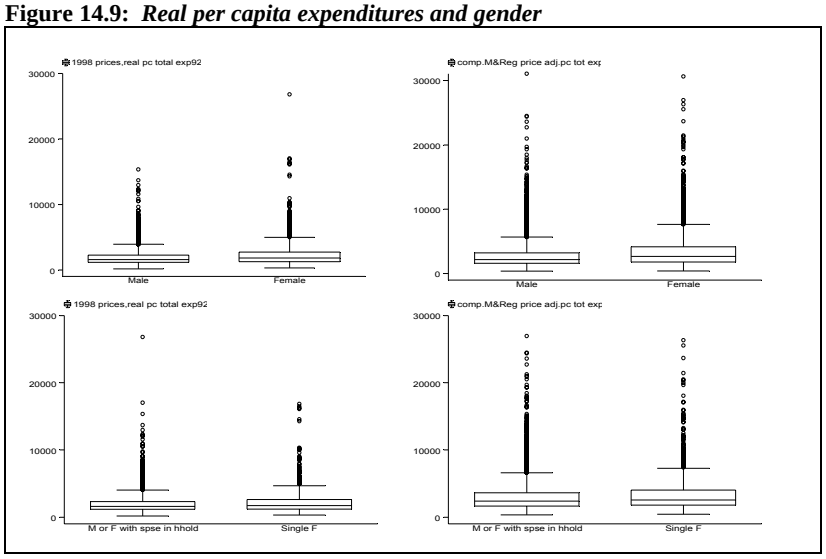
Figure 14.8 shows that the difference in living standards between areas with electricity and no electricity widened in 1998. The higher the electricity use rate, the higher the mean expenditure per capita.

Figure 14.8: ***Real per capita expenditures and electricity***



At first sight one might think that female-headed households are better off but this effect is reduced if one looks at households headed by women without a spouse at home, as Figure 14.9 shows.

Figure 14.9: ***Real per capita expenditures and gender***



CART AND *MARS* MODELS

The Classification and Regression Trees (CART) methodology, introduced by Breiman et al., is used here in an exploratory way to identify important predictors of (the logarithm of) expenditure per capita in 1993 and 1998, both expressed in January 1998 prices, as well as important interactions. We recall here the main features of this technique:

- CART divides a data set into segments with as little variability as possible in the dependent variable.
- It then uses the independent variables, continuous or categorical, to split the sample. It uses binary splits such as $X \leq C$, where X is any continuous independent variable and C any value taken by X, or for instance X=2,6 versus X=1,3,4,5, where X is categorical with values coded 1-6.
- Among all possible candidate splits, CART selects the split that minimizes the within sum of squares in the two new nodes.
- CART creates a list of trees from the smallest tree with only one node to the largest tree with as many nodes as observations, and then selects the tree that predicts the dependent variable best on an independent test sample.

The CART methodology was used in Haughton and Haughton (1997) to model measures of malnutrition in Vietnamese children based on data from VLSS93, and in Haughton et al. (2001) to model jumps in living standards (up or down) of at least two quintiles, but aside from these

citations, we are not aware of other instances where CART or MARS have been used to analyze VLSS data. However there is a large general literature on CART; for a useful source, see Salford Systems at www.salford-systems.com.

CART Model For 1993

The CART tree for 1993 is presented in Figure 14.10, and shows the following interesting features.

The first split involves farming households (with a mean log(exp/cap) of 7.302, standard deviation of .462) and non-farming households (mean log(exp/cap) of 7.794, standard deviation of .584). This implies a difference of 63.6% in the geometric mean expenditure per capita between farming and non-farming households as one might expect.

Farming households then split by ethnic background, with the geometric mean expenditure/capita for Kinh/Hoa households about 40% higher than for the minority non Kinh/Hoa households. For minority households, the mean number of years of education of adult members of household, and the proportion of children in the household seem to matter, while for the Kinh/Hoa (farming) households, a North/South divide emerges (regions 1,2 and 3, and regions 4,5,6,7).

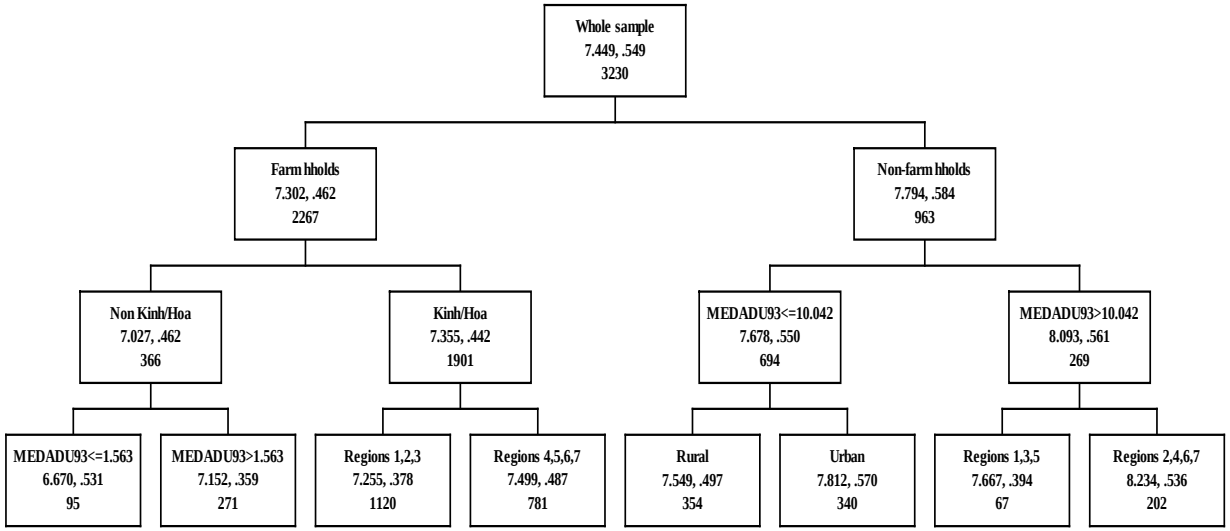
The MARS methodology

Multiple Adaptive Regression Spline (MARS) models have only recently been used by social scientists; see De Veaux et al. (1993) for a good introduction, albeit in the context of chemical engineering, and Sephton for an example of using MARS to forecast recessions. MARS models are very flexible, and can in principle approximate any functional form. We may think of MARS as helping to automate the model-building process, and to do this it proceeds as follows:

- For each continuous independent variable, MARS creates a piecewise linear function with too many change points (knots) to begin with, and then prunes unnecessary knots by a backward procedure.
- For each categorical variable, MARS arranges categories for the best fit possible.
- MARS looks for suitable interactions between independent variables.
- MARS ends up with a collection of Basis Functions, which are transformations of independent variables taking into account non-linearities and interactions.
- MARS then estimates a least-squares model with its Basis Functions as independent variables .

In the next sections we estimate MARS models for expenditure per capita in 1993 and 1998, and for the bottom and top quintiles separately for 1998.

Figure 14.10: ***CART tree for 1993 (mean and standard deviation on second line, number of observations on third line); partial (first 4 levels)***



MARS Model For 1993

The MARS Basis Functions for 1993 are given below

```
Basis Functions
===============

BF1 = ( TOTLAND > .);                        Essentially an urban/rural division
BF2 = ( TOTLAND = .);
BF3 = max(0, TOTLAND - 300.000) * BF1;         Totland intervenes in rural areas
BF4 = max(0, 300.000 - TOTLAND ) * BF1;                    Note the knot at 300
BF5 = max(0, MEDADU93 - 1.000);                              Note the knot at 1
BF6 = max(0, 1.000 - MEDADU93 );
BF7 = max(0, PROCHILD - 0.111);                            Note the knot at .111
BF8 = max(0, 0.111 - PROCHILD );
BF9 = ( REG7 = 4 OR REG7 = 5 OR REG7 = 6 OR REG7 = 7);
BF11 = max(0, HHSIZE - 3.000);                                 Note the knot at 3
BF12 = max(0, 3.000 - HHSIZE );
BF13 = ( REG7 = 2 OR REG7 = 6) * BF2;            Urban areas in regions 2 and 6
BF15 = ( ETHNGRP = 3) * BF6;                    Education for ethnic minorities

Y = 7.300 - 0.255 * BF1 + .120078E-04 * BF3 + .623215E-03 * BF4
          + 0.055 * BF5 - 0.177 * BF6 - 0.461 * BF7 + 0.693 * BF8          Model
          + 0.332 * BF9 - 0.038 * BF11 + 0.106 * BF12
          + 0.344 * BF13 - 0.451 * BF15;

model LTOT98EQ = BF1 BF3 BF4 BF5 BF6 BF7 BF8 BF9 BF11 BF12 BF13 BF15;

R-SQUARE = .442 (compared to .37 in Haughton et al. book, chapter 9)
```

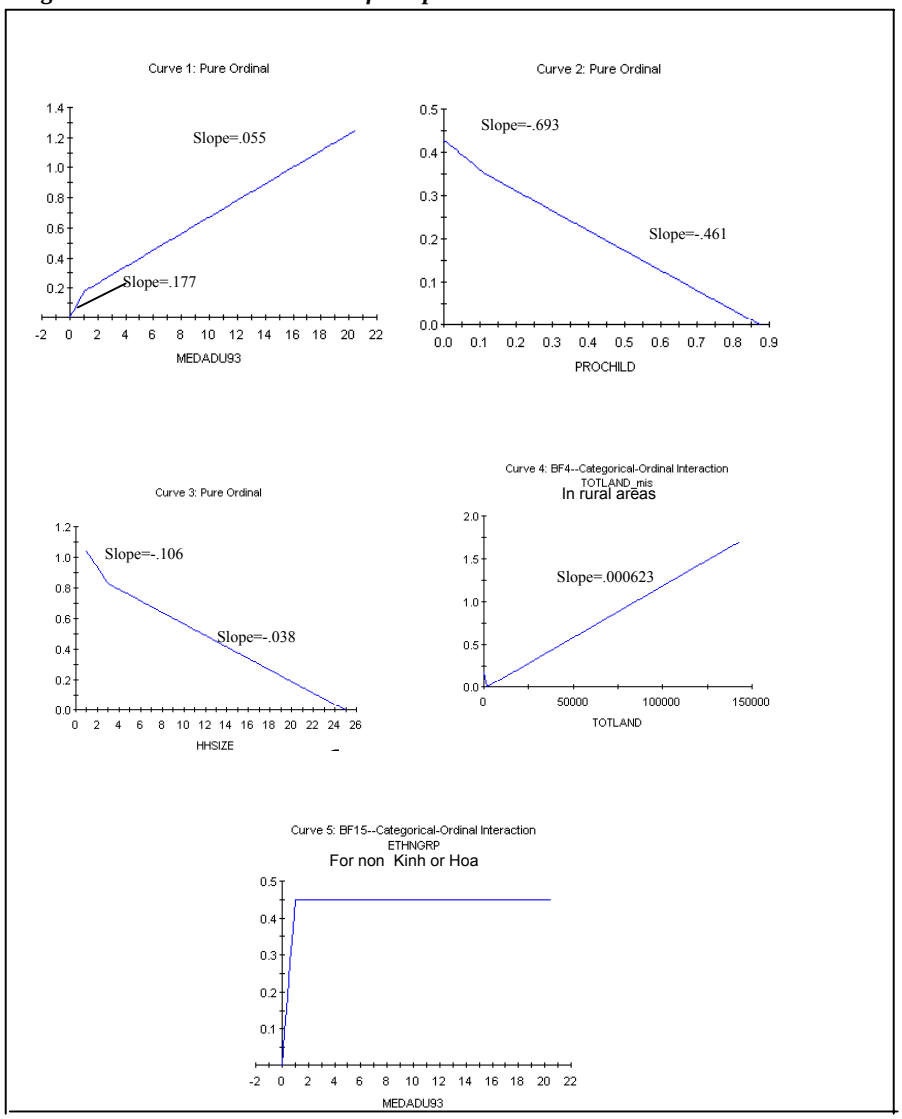
The corresponding graphs in Figure 14.11 represent the contributions of independent variables to the model. We see that when education rises from 0 (i.e. illiterate) to 1, the increase in expenditure per capita rises more sharply than when the years of education rise from x to x+1 subsequently (slopes of .177 and .055 respectively). The negative effect of increasing household size is steeper (slope = -.106) for household sizes between 0 and 3 than for higher household sizes (slope = -.038).

Note that the positive effect of the total amount of land intervenes in rural areas only. This variable is missing for most urban households (because that information was not collected for those households); MARS takes these missing values into account automatically. Note the positive South effect (Basis Function BF9) and its positive coefficient .332, and the additional positive effect of urban parts of regions 2 (where Hanoi is located) and 6 (where Ho Chi Minh City is located). Finally we note the additional positive effect of one year of education (compared to 0) for ethnic minorities (non Kinh or Hoa).

The model is quite parsimonious, involving rather few variables, and has an R-square of .442, compared to an R-square of .37 in a model for the logarithm of expenditure per capita that did not include any non-linearities or interactions

(Minh 1999). The basis functions are significant at level .05 (of course, the sample size is quite large at 4797 observations).

Figure 14.11: ***Contributions of independent variables to the 1993 MARS model***



CART Model For 1998

The CART tree for 1998 is presented in Figure 14.12. The tree has some similarities to the 1993 tree but some interesting new features emerge. The first split is an urban/rural split, with a mean log(exp/cap) of 8.365 for urban households (standard deviation of 28.682) and of 7.612 for rural households (standard deviation of 25.201), implying a difference of 112% in geometric mean expenditure per capita for urban and rural households. Note that the CART analysis for 1998 is weighted, and CART uses frequency weights, the only possible option, at least with the software we used (Salford Systems). This explains the large sample sizes on the tree and the large standard deviations.

Rural households then split by ethnic background, with the geometric mean expenditure/capita for Kinh/Hoa households about 48% higher than for the minority non Kinh/Hoa households. Regional effects appear for minority rural households, which were not present in 1993, with regions 4 and 5 worse off by about 32% (with respect to geometric mean expenditure per capita).

For minority households, the mean number of years of education of adult members of household, and the occurrence of natural disaster seem to matter, while for the Kinh/Hoa (rural) households, important factors include education, proportion of children in the household, and the type and sector of the job of the head of household. Note the positive effect of region 6 (splits in nodes 9 and 13).

MARS Model For 1998

The MARS basis functions for 1998 are given below

```
 Basis Functions
===============

BF1 = ( URBAN98 = 0);
BF3 = max(0, MEDUCADU - 10.500);                              Note knot at 10.5
BF4 = max(0, 10.500 - MEDUCADU );
BF5 = max(0, PROCHILD - 0.111);
BF7 = ( REG7 = 6);                                          Southeast stands out
BF9 = max(0, HHSIZE - 3.000);                                     Note knot at 3
BF10 = max(0, 3.000 - HHSIZE );
BF11 = ( REG7 = 4 OR REG7 = 5 OR REG7 = 7);
BF13 = (HDWKTYPE = 3 OR HDWKTYPE = 5 OR HDWKTYPE = 6 OR HDWKTYPE = 8
       OR HDWKTYPE = 9);           All types of job (including no work) except
                              for state, coop, all foreign, non farm self employment
BF15 = (ELECTRIC = 0);

Y = 8.444 - 0.341 * BF1 + 0.074 * BF3 - 0.062 * BF4 - 0.591 * BF5
          + 0.568 * BF7 - 0.050 * BF9 + 0.168 * BF10 + 0.216 * BF11       Model
          - 0.149 * BF13 - 0.215 * BF15;

model LRLPCEX1 = BF1 BF3 BF4 BF5 BF7 BF9 BF10 BF11 BF13 BF15;

R-SQUARE = .561
```

Figure 14.12: ***CART tree for 1998 (mean and standard deviation on second line, number of observations on third line); partial (first 4 levels)***

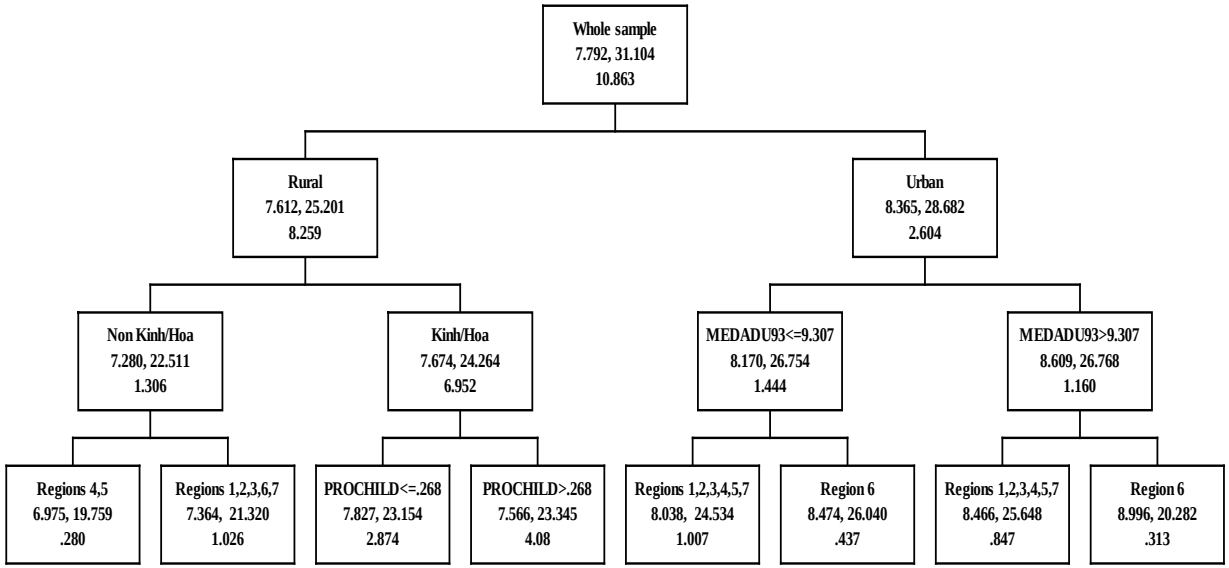
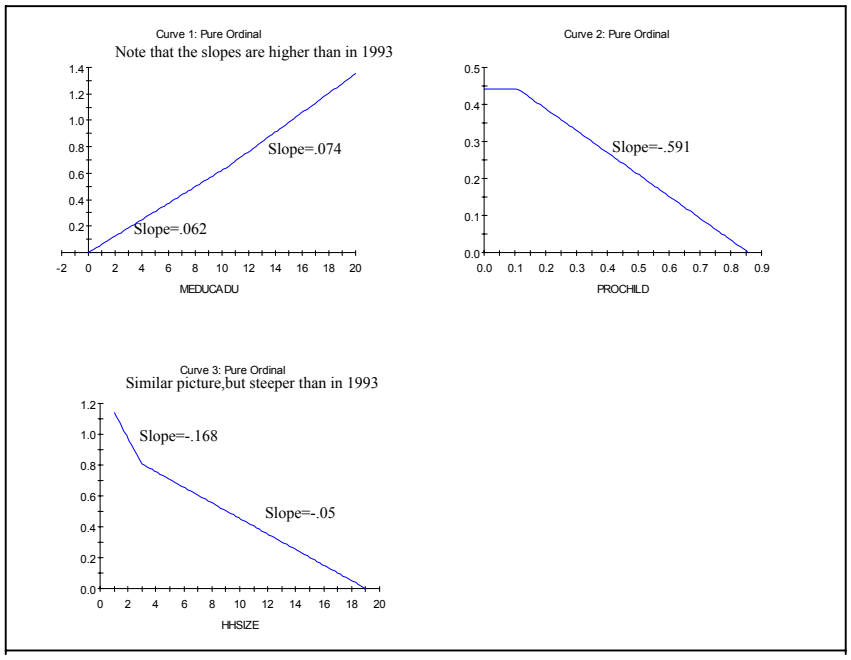


Figure 14.13: ***Contributions of independent variables to the 1998 MARS model***



The corresponding graphs in Figure 14.13 represent the contributions of independent variables to the model. We find positive effects for education, and negative effects for household size as in 1993, but the slopes are steeper in 1998. A strong positive urban effect emerges as expected, and a positive South effect (with an additional positive effect for region 6). Interestingly, the type of job of the head of household now intervenes in the model, with a positive effect for state, cooperative, all-foreign, and non-farm self-employment jobs as well as for non-working heads of household.

MARS Model for Households in the Bottom Quintile in 1998

If we restrict ourselves to the bottom quintile to see what the determinants of (the log of) expenditure per capita are for the poorest, we find that the model obtained by MARS is more complicated and involves interactions, which means

that the effect of variables such as education will depend on the values of other variables (such as household size). On the other hand, when we restrict ourselves to the top quintile, the MARS model is much simpler, as we will see below.

The MARS Basis Functions and graphs with contributions of variables for this model are as follows:

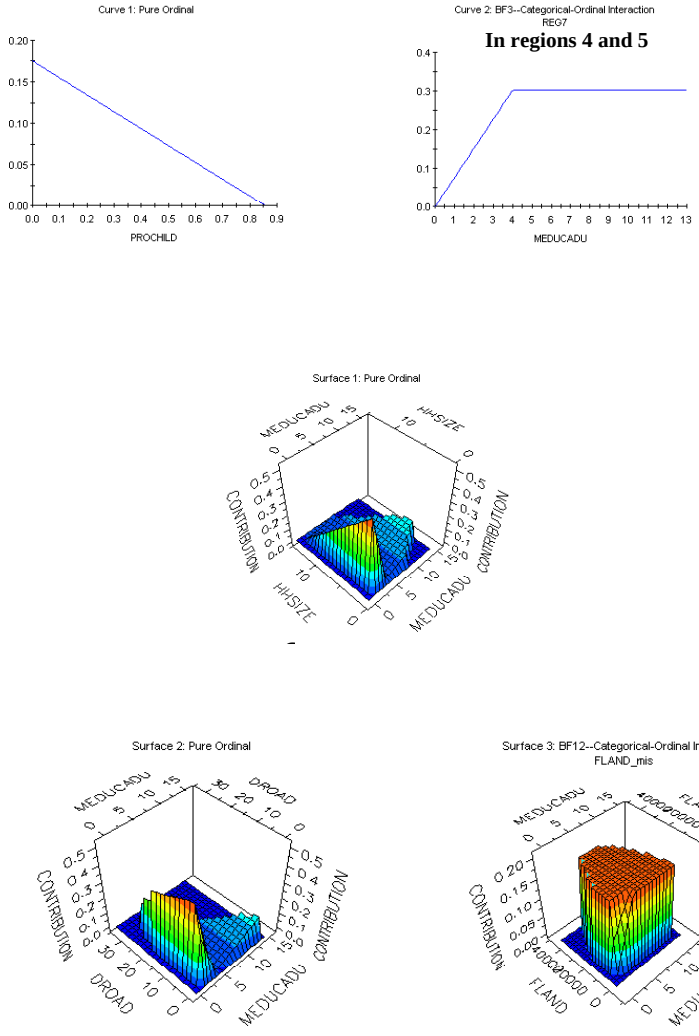
```
 Basis Functions
 ===============

 BF1 = max(0, MEDUCADU - 4.000);
 BF2 = max(0, 4.000 - MEDUCADU );                                  Note knot at 4
 BF3 = ( REG7 = 4 OR REG7 = 5) * BF2;   Interaction between region and education
 BF5 = max(0, PROCHILD - .293174E-07);
 BF6 = ( REG7 = 4 OR REG7 = 6 OR REG7 = 7);
 BF8 = max(0, HHSIZE - 1.000) * BF2;    Interaction between hhsize and education
 BF9 = ( FLAND > .) * BF2;
 BF12 = max(0, 7110.000 - FLAND ) * BF9;                    Interaction between
                                                        forest land and education
 BF13 = max(0, DROAD - 2.000) * BF2;                          Interaction between
                                                   distance to the road and education
 BF14 = max(0, 2.000 - DROAD ) * BF2;                              Note knot at 2

 Y = 7.060 + 0.016 * BF1 + 0.156 * BF2 - 0.076 * BF3 - 0.204 * BF5
           + 0.071 * BF6 - 0.012 * BF8 - .121983E-04 * BF12                Model
           - 0.002 * BF13 - 0.028 * BF14

  model LRLPCEX1 = BF1 BF2 BF3 BF5 BF6 BF8 BF12 BF13 BF14

R-SQUARE = .255
```

We see, as one might expect, a decrease in (the log of) expenditure per capita as the proportion of children in the household increases, and in regions 4 and 5, and an additional (above and beyond other education effects in the model) positive effect of increasing the mean number of years of education of adult members of household (up to 4 years). Surface 1 (in Figure 14.14) plots the part of the estimated equation for the log of expenditure per capita that involves the two variables HHSIZE and MEDUCADU. This means that up to a constant, Surface 1 plots .016 BF1 + .156 BF2 - .012 BF8. We can see on the right hand side of the surface, the positive incremental effect of one more year of education from 4 upwards. We also see a sharp decrease in the log of expenditure per capita as household size increases for small numbers of years of education. The negative effects of HHSIZE disappear for higher MEDUCADU. The peak for very low values of HHSIZE and MEDUCADU might seem surprising, but there are very few such observations in the sample (16 with HHSIZE less than or equal to 2 and MEDUCADU = 0).

Surface 2 plots the contribution of DROAD and MEDUCADU, so, up to a constant, Surface 2 plots .016 BF1 + .156 BF2 - .002 BF13 - .028 BF14. Note

that the effect of the distance to the nearest road on the log of expenditure per capita disappears when the mean number of years of education for adult members of household is at least 4. If the mean number of years of education is less than or equal to 4, the estimated decrease in log of expenditure per capita corresponding to an increase in the distance to the road from 3 to 4 km for example equals .002 (4 – MEDUCADU).

Figure 14.14: ***Contributions of independent variables to the 1998 MARS model for the bottom quintile***

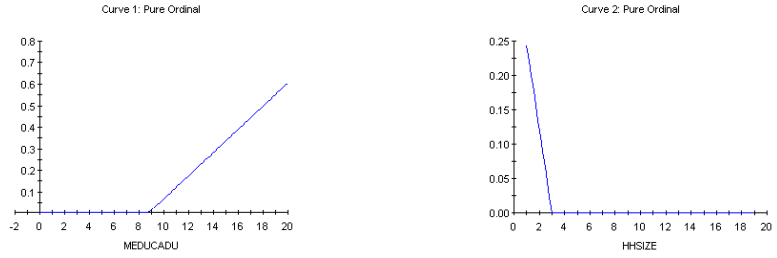


MARS Model for Households in the Top Quintile in 1998

Interestingly, the model for the top quintile is much simpler. The MARS Basis Functions for this model, and graphs of contributions of independent variables to the model, are given below:

```
Basis Functions
===============

BF1 = ( FACTORY = .);                  Essentially a rural/urban dummy variable
BF3 = max(0, MEDUCADU - 8.750);                                  Note knot at 8.75
BF6 = max(0, 3.000 - HHSIZE );                                     Note knot at 3
BF7 = ( REG7 = 6);                     Note positive effect of southeast region

Y = 8.384 + 0.210 * BF1 + 0.054 * BF3 + 0.122 * BF6 + 0.161 * BF7;        Model

model LRLPCEX1 = BF1 BF3 BF6 BF7;

R-SQUARE = .257
```

Figure 14.15:
Contributions of independent variables to the 1998 MARS model for the top quintile



We see a positive incremental effect for mean numbers of years of education of adult members of household beyond 8.75, a negative effect for household sizes increasing up to 3, and rather strong positive effects for urban, and region 6 (Southeast).

CONCLUSIONS

In this chapter, we have documented the improvements in living standards for Vietnamese housholds between 1993 and 1998. Our descriptive analysis gave

snapshots of the relationship between expenditure per capita and a number of important variables, such as education, taken one by one. For example, we saw that returns to education became higher in 1998, and the decrease in (the log of) expenditure per capita with each additional household member was greater in 1998 than in 1993.

However, it became clear from our CART and MARS models that the relationship between expenditure per capita and indicators such as education, household size, land availability, etc is in fact more complicated than a one-variable-at-a-time descriptive analysis might suggest. Indeed this relationship can be non-linear, and the effect of one independent variable on expenditure per capita can depend on the value of another variable (interaction). For example, we found that the returns to education tend to differ by region or ethnic group.

Not surprisingly, we found that geography matters. Urban households are better-off overall, particularly in regions 2 (around Hanoi) and 6 (around Ho Chi Minh City). The south of the country is better off than the north. And ethnic minority households are particularly poor in regions 4 and 5 (the central highlands and coast).

Household effects are strong too. Even one year of exposure to schooling has a marked effect on per capita expenditure, especially for minority households. Additional years of education are helpful everywhere, an effect that became more marked by 1998. Larger households are also poorer, particularly once household size exceeds 3. And in rural areas, greater land availability is associated with higher living standards.

The mechanism that explains expenditure per capita for households in the poorest quintile is more complicated, and involves more interactions, than for the top quintile or for the overall sample. This suggests that efforts to help the poor may need to be qualitatively different than policies that are aimed at raising living standards across the board.

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APPENDIX: LIST OF VARIABLES

AGE	Age of head of hhold
ANUALAND	Annual crop land (in square meters)
COMPED98	Diploma level of head of hhold (1998) 0 None 2 Less than primary 3 Primary 4 Lower secondary 5 Upper secondary 6 Vocational 7,9 Higher education
DEPEND	Proportion of dependents in hhold
DIPHEAD	Diploma level of head of hhold: 0 none 1 Primary 2 Secondary 3 Vocational 4 Higher
DISASTER	Number of disasters in the last 5 years (1993)
DPRISCHL	Distance to primary school
DROAD	Distance to the road (in km)
DSECHOL	Distance to the nearest secondary school
EDUCYR98	Number of years of education of head of hhold (1998)

ETHNGRP	Ethnicity: 1 Kinh 2 Hoa 3 Non Kinh or Hoa
FACTORY	Factory within 10 km of community? 1 yes 0 no
FARM	Farming hhold: 1 yes 0 no
FLAND	Forest land (in square meters)
HDJBSECT	Sector of job of head of hhold (1998) 1 Leadership 2 Service 3 Agriculture 4 Industry 5 Other 6 No work
HDWKTYPE	Type of job of head of hhold 1 State 2 Cooperative 3 Private 4 All foreign 5 Mixed 6 Other 7 Non-farm self-employed 8 Farm self-employed 9 No work
HHSIZE	Household size
HWSIDE	Head works outside the home 1 yes 0 no
IPFSPY	Road is impassable for part of the year 1 yes 0 no
LOWSDIS	Distance to nearest lower secondary school (in km)
MAINSELF	Main job of head of hhold is self-employed 1 yes 0 no
MEDADU93	Mean number of years of education of adult members of hhold (1993)
MEDUCADU	Mean number of years of education of adult members of hhold (1998)
NEWSEX	1 Male head of hhold, or Female with spouse at home 2 Female head of hhold, no spouse at home
OTHERLAND	Other land (in square meters)
PELAND	Perennial land (in square meters)
PRIMDIS	Distance to nearest primary school (in km)
PROCHILD	Proportion of children in the hhold
PROMBWK	Proportion of working members of hhold
REG7	Region (1-7)
SEX	Gender of head of hhold 1 Male 2 Female
SJHEAD	Sector of job of head of hhold (1993) 0 No work 1 Agriculture 2 Industry 3 Leadership and science 4 Other
TOOTHERD	Average number of years when more than 10% of crops are lost due to other disasters in the past 6 years
TOTDROUG	Average number of years when more than 10% of crops are lost due to droughts in the past 6 years
TOTFLOOD	Average number of years when more than 10% of crops are lost due to floods in the past 6 years
TOTLAND	Total land (in square meters)
TOTPET	Average number of years when more than 10% of crops are lost due to pests in the past 6 years
TOTYPHOO	Average number of years when more than 10% of crops are lost due to typhoons in the past 6 years
TWHEAD	Type of work of head of hhold (1993) 0 No work 1 Farming 2 State 3 Private
UPSDIS	Distance to nearest upper secondary school (in km)
URBAN92	Urban in 1992-3 1 yes 0 no
URBAN98	Urban in 1998 1 yes 0 no
WATERLAND	Water land (in square meters)
YRSCHL	Number of years of education of head of hhold (1993)

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