



Munich Personal RePEc Archive

**Is Economic Growth Pro-Poor in  
Vietnam? Evidence from the Period  
1993-1998**

Nguyen, Cuong

10 June 2004

Online at <https://mpra.ub.uni-muenchen.de/85706/>  
MPRA Paper No. 85706, posted 05 Apr 2018 15:17 UTC

# Is Economic Growth Pro-Poor in Vietnam?

## Evidence from the Period 1993-1998

Nguyen Viet Cuong<sup>1</sup>

### Abstract

Economic reforms initiated in the late 1980s significantly changed the economy of Vietnam from severe crisis in the 1980s to high growth with an average annual rate of nearly 6% in Gross Domestic Product (GDP) per capita during the 1990s. These economic achievements in turn resulted in significant success in poverty reduction. Between 1993 and 1998, the percentage of the population that was poor declined considerably from 58.1% to 37.4%. This paper found that the “*growth with equity*” strategy that Vietnam chose to follow during the 1990s was partially successful. Although economic growth was pro-poor during the period 1993-1998, the poor still benefited proportionally less than the rich from economic growth. In addition, the benefits gained from overall economic growth differed considerably between different socioeconomic groups of the poor. On the whole, the poor in the urban areas, which are dominated by the Kinh majority and where the industrial and services sectors are concentrated, benefited proportionally much more than the poor in the mountainous and remote areas where ethnic minorities reside, and the rural areas where the agricultural sector dominates.

JEL classification: I31, I32, O15

Keyword: Pro-poor growth, poverty, inequality, household surveys, Vietnam.

---

<sup>1</sup> Master student in Wageningen University, the Netherlands.  
Email: [c\\_nguyenviet@yahoo.com](mailto:c_nguyenviet@yahoo.com)

## **1. Introduction**

To reduce poverty, economic growth constitutes a prerequisite. The positive effects of economic growth on poverty reduction are at the basis of the so-called trickle-down theory which emerged in the 1950s. It hypothesizes that the benefits of economic growth will automatically trickle-down to the poor through increased domestic activities, higher tax revenues, and government expenditures including transfers; hence there is no need for any specific instruments or complementary efforts to facilitate or secure the goal of poverty reduction. Numerous empirical studies justify a very strong relation between economic growth and poverty reduction. A recent study at the World Bank by Dollar and Kraay (2000) concludes that changes in mean income consistently play the main role in securing reduction in poverty. This positive relationship between poverty reduction and income growth holds in a sample of 80 countries over four decades. This empirical observation is not the end of the story, however. It raises the questions about what causes economic growth and why countries with similar rates of economic growth can have very different rates of poverty reduction.

Economic growth depends to a significant extent on the resources that a country possesses. Improvements in resources such as capital, population, natural resources, and technology will result in an increase in national output. Sound economic management also plays a very crucial role in sustaining economic growth. Appropriate economic policies such as openness to international trade, sound monetary and fiscal policies (reflected in moderate budget deficits and absence of high inflation), a well-developed financial system, and a suitably sized government are strongly conducive to economic growth (World Bank, 2001).

The positive role of economic growth in poverty reduction is now beyond dispute. However, the extent to which economic growth affects poverty depends on how income distribution changes within a country. The World Development Report 2000/2001 published by the World Bank shows that there can be a large variation in poverty reduction between countries which have experienced the same growth in per capita consumption. For a given rate of economic growth, poverty will fall faster in countries where the income distribution becomes more equal than in countries where it becomes less equal. It is clear that if economic growth leads to an income distribution biased in favour of rich regions within a country, the impact of such economic growth on poverty reduction will be very limited. In contrast, high economic growth in regions where the poor are concentrated will have large effects on poverty reduction.

In cases where inequality increases so much that its adverse impacts on the poor exceed the benefits they gain from economic growth, an absolute belief in trickle-down theory is not advisable for a strategy of poverty reduction. Instead, a strategy of pro-poor growth should be promoted. A policy of pro-poor growth not only focuses on economic growth, but also affects the pattern of income distribution so that the poor can benefit proportionally more than the rich from economic growth, which will reduce the welfare gap between the poor and the rich, and finally eliminate poverty.

Vietnam is an example of a country where the trickle-down hypothesis is supposed to hold for the 1990s. Economic reforms initiated in the late 1980s significantly changed the economy of Vietnam from severe crisis in the 1980s to high growth with an average annual

rate of Gross Domestic Product (GDP) per capita of nearly 6 percent during the 1990s. The fact that Vietnam has committed itself to follow the “*growth with equity*” strategy as a principle to the development path suggests that high economic growth would result in remarkable reduction in poverty. Indeed, various studies by the World Bank show that poverty, however measured, declined over the 1990s.<sup>1</sup> Between 1993 and 1998 there was a very striking reduction in poverty, with the ratio of the poor to the population decreasing from 58 percent to 37 percent.

There remain, however, several important unanswered questions about the impacts of economic growth on poverty. The contributions of economic growth and inequality to poverty reduction have not been empirically examined so far. The first question is: *To what extent has the high growth brought by the economic reforms actually been pro-poor in Vietnam?* Economic growth can be biased toward different regions or socioeconomic groups within a country. If rich regions benefit proportionally more than the growth rate, inequality will increase, and the positive impacts of economic growth on poverty will be mitigated. To reduce poverty, economic growth should focus on regions where the poor are concentrated. Thus, the second question is raised: *Has the economic growth been biased in favour of poor regions, and are there regions or socioeconomic groups that are lagging behind?* Vietnam considers poverty alleviation as a major policy goal, hence the third question is: *Are there strategies that lead to a higher degree of poverty reduction?*

Availability of detailed data sets on household incomes and expenditures for the years 1993 and 1998 from Vietnam Living Standard Surveys (VLSS) makes it possible to examine these questions. The period 1993-1998 represents a phase of high economic growth in the 1990s, and reflects the impacts of the main economic reforms, which were initiated in 1988 and were almost finished by 1992, on changes in poverty.

The main objective of this study is to analyze the impacts of economic growth and inequality on poverty reduction in Vietnam. In particular, it will examine the extent to which economic growth was pro-poor at the national and socioeconomic group levels in Vietnam during the period 1993-1998, and whether there is a need for a strategy of pro-poor growth. If it is concluded that a strategy of pro-poor growth is needed in the coming years, the study will continue to derive some policy implications.

This paper is organized in six sections. Section 2 will lay down the theoretical framework for the analysis of poverty in the following sections. Section 3 will review the analytical methods that will be used to examine the impacts of growth and inequality on poverty. Next, the two consecutive sections 4 and 5 will discuss empirical results of the study. These two sections make an effort to achieve the first four aims of the study which are stated in the previous section. Specifically, section 4 will try fulfill the first aim, then section 5 will focus on the second, third and fourth aims. Finally, some policy implications and conclusions (the fifth aim) will be drawn in section 6.

---

<sup>1</sup> For example, World Bank (2000c), and Glewwe et al. (2000)

## **2. Economic Growth, Inequality, Poverty and Pro-Poor Growth Strategy**

### **2.1. Economic Growth, Inequality, Poverty**

There is a broad consensus that poverty can impede economic growth. The poor have very low productivity due to ill-health and insufficient skills, which erodes the productive capacity of the economy. Furthermore, a severe constraint on collateral also prevents the poor from taking up loans in credit markets. Naturally the poor are less able to exploit opportunities for physical and human capital accumulation. This lowers the income growth rates, which in turn may increase the poverty.

The positive effects of the economic growth on poverty reduction have usually been motivated by the trickle-down theory which emerged in the 1950s. It implies that a vertical flow from the rich to the poor happens of its own accord. The benefits of economic growth go to the rich first, and then in the second round the poor begin to benefit when the rich start spending their gains. Thus the benefits of economic growth would automatically trickle-down to the poor through increased domestic activities, higher tax revenues, and government expenditure including transfers. There is no need for any specific instruments or complementary efforts to facilitate or secure the goal of poverty reduction.

Numerous empirical studies justify a very strong relation between economic growth and poverty reduction. Studies by Ahluwalia (1979), Fields (1980), Fields (1989), Demery and Squire (1995), Ravallion and Chen (1997) show that changes in the mean income consistently play the main role in securing changes in poverty. A recent study at the World Bank by Dollar and Kraay (2000) concludes that the income of the poor rises one-for-one with overall growth. This general relationship between the income of the poor and per capita GDP growth holds in a sample of 80 countries over four decades.

Although economic growth is said to be the engine of poverty reduction, it works more effectively in some situations than in others. The key factor that affects the impact of growth on poverty is the pattern of income distribution. It is obvious that an increase in inequality will lead to an increase in poverty through the main channels as follows. Firstly, high inequality can make economic growth less effective in reducing poverty. Intuitively, in an economy where inequality is persistently low, the poor will tend to obtain a higher share of the gains from economic growth than in an economy where inequality is higher. In empirical studies, Ravallion (1997) and Timmer (1997) found supportive evidence from cross-country distributional data that higher initial income inequality entailed a lower absolute elasticity of poverty to growth in average incomes. For example, a country with a Gini index of 0.25 can expect a growth elasticity of the headcount index of around  $-3.3$ , while for a country with a Gini index of 0.6, the elasticity is  $-1.8$  (Ravallion, 1997). Secondly, inequality can be a factor detrimental to economic growth, thereby impeding poverty reduction. In contrast to the Harrod-Domar model which predicted that greater inequality would lead to higher growth rates, the weight of theory in the 1990s has been in support of the negative relationship between inequality and economic growth. Some key arguments lie in the fact that inequality

gives rise to social conflicts and political instability, and less investment in human capital, which tend to reduce efficiency and investment level, hence economic growth.<sup>1</sup>

Besides the inequality component, the sectoral and regional composition of growth can influence the impacts that economic growth places on poverty. There is no dispute that growth in sectors of the economy or regions of the country where the poor are concentrated will have greater effects on poverty reduction than in other sectors or regions. For example, it is often argued that in developing countries where most of the poor live in rural areas and are involved in agriculture, high economic growth in agriculture will reduce poverty significantly, because it generates incomes for poor farmers, thereby increasing their demand for goods and services that can be easily produced by the poor. It is also supposed that if economic growth results in the expansion of blue-collar or low-skilled employment, the poor are more likely to benefit from the growth. Fallon and Hon (1999) in a cross-country study found that the more labour-intensive the growth pattern, the faster the decline in the incidence of poverty. Various country-specific and cross-country studies show that economic growth in the agricultural and tertiary sectors has a major effect on mitigating poverty, while economic growth in manufacturing sectors has a limited effect on poverty reduction.<sup>2</sup> Ames et al. (2001) also argues that although manufacturing growth is more important for overall growth, agricultural growth is more crucial for employment and poverty reduction.

However the link between sectoral growth and poverty reduction may be more complicated in the long-run. While faster growth in the agricultural sector or labour-intensive sectors may address the poverty problem in the short-run, reliance on agricultural activity may also intensify output variability, which in turn would contribute to increasing rather than decreasing poverty. A more diversified economy with vibrant industrial sectors might offer the best chance for sustainable economic growth, and hence consistent reduction in poverty.

In addition to the impact of different sectors on poverty, it is worth considering that the population distribution between regions and sectors also matters for the elasticity of poverty with respect to economic growth. In general, a change in the population distribution will shift the Lorenz curve. Urbanization is widely viewed as an effective factor in promoting rural non-farm economic growth by expanding the market size, which makes a considerable contribution to reducing poverty in rural areas as well as to decreasing inequality between rural and urban areas.

So far it is clear that economic growth is a necessary but not sufficient condition for poverty reduction. How strong a poverty-reducing effect economic growth has, depends on what happens to income distribution. The “trickle-down” development may not hold in some cases in which inequality increases so much to the extent that its adverse impacts on the poor exceed the benefits they gain from economic growth. This argument is partly based on a famous hypothesis proposed by Simon Kuznets in the 1950s that the distribution of income in a society follows an inverted U-shaped transformation in the process of economic growth. Inequality increases in the early stage of growth, and then decreases in the later stages as the per capita income increases.<sup>3</sup> Bhagwati (1968) proposed a theory of immiserizing growth, in

---

<sup>1</sup> For more arguments see Levin and Bigsten (2000), Goudie and Ladd (1999).

<sup>2</sup> See Thorbecke and Hong-Sang (1996), Timmer (1997), and Bourguignon and Christian (1998).

<sup>3</sup> See Kuznets (1955).

which the economic growth can bypass or even harm the poor. This model establishes some conditions which allow a possibility: growth can immiserize itself. The precise demonstration concerns an economy where increased productivity led to a sufficiently large deterioration in the terms of trade whose adverse effects outweigh the primary gain from growth. Bhagwati (1988) showed the anti-poor impact of immiserizing growth by sketching a scenario in which the more affluent farmers adopt new seeds and raise grain production that results in lower prices. In contrast, the marginal farmers, who are not able to adopt the new technology, find their stagnant output yielding even less income. Thus the green revolution which leads to agricultural economic growth may hurt the poor, thereby increasing poverty.

Even if the trickle-down development can bring about some benefits for the poor, there is no guarantee that such benefits are enough to reduce poverty significantly. The trickle-down development itself does not ensure an effective degree of poverty reduction due to economic growth. Economic growth that results from market forces generally benefits the rich proportionally more than the poor, because the rich have inherent advantages, for example, human and material capital, in a market economy. In addition, there is a time-lag from when the rich benefit until when the poor can raise their incomes owing to the increased spending of the rich. As a result, the poor may benefit less and later than the rich from economic growth, and poverty declines very slightly.

## **2.2. Pro-poor Growth and Pro-poor Strategy**

For maximizing positive effects on poverty reduction, instead of relying on “trickle-down” development, patterns of pro-growth should be promoted. A strategy of pro-poor growth does not only focus on economic growth, but also affects the pattern of income distribution so that the poor can benefit from economic growth proportionally more than the rich, which will reduce the welfare gap between the poor and the rich, and finally eliminate poverty.

Generally speaking, pro-poor growth can be considered as growth patterns that encourage greater participation of the poor, allowing them to benefit considerably from the process of economic growth. ADB (1999) indicates that growth is pro-poor when it is labour-absorbing and accompanied by policies and programs that mitigate inequalities and facilitate income and employment generation for the poor, particularly women and other traditionally excluded groups. Kakwani (2000) regarded pro-poor growth as a major departure from the “trickle down” development concept. It includes both indirect pro-poor policies, which make economic growth more favourable for the poor, and direct pro-poor policies such as the public provision of clean water, sanitation, health services, education, etc. Its outcome should be that no person in society is deprived of the minimum basic capacities.

Sustainable reduction of poverty entails pro-poor policies in many socioeconomic aspects, because poverty is an outcome of multidimensional processes, beyond the economic domain. With the amelioration of poverty as a target, the policies designed to achieve that target can be divided in two main classes (Bhagwati, 1988): (i) The indirect route, i.e., the use of resources to accelerate growth and thereby impact on the incomes and improvements in the living standards of the poor; (ii) The direct route, i.e., the public provision of minimum-needs-oriented staple foods, water and sanitation, education, housing, nutritional supplements and health, and transfers to finance private expenditures on these and other components of the living standards of the poor.

The primary distinction between the two approaches is between creating favourable conditions for the poor to increase their incomes and providing human and capital assets directly in kind or through cash to the poor.

In practice, a comprehensive pro-poor strategy involves multidimensional policies in both the direct and indirect routes, and the domination of an approach depends on each concrete situation. In addition to emphasis on generating a stable socioeconomic environment for economic growth and poverty reduction, various studies have stressed different pro-poor policies. Bhagwati (1988) raises great support for the New Economic Policy that aims at an export-promoting strategy and a regime of *laissez faire* as a pillar for economic growth in developing countries. He emphasizes the role of the removal of political economy constraints such as bureaucracy and corruption on both the direct and indirect route's ability to reach the poor more effectively. McKay (1996) suggests that pro-poor policies are "more likely to be labour-rather than capital-intensive and place emphasis on raising education and skill levels among the poor". Deininger and Squire (1997) recommend that it be a more equal distribution of assets, rather than income, that is important to raise the poor's incomes, reducing the incidence of poverty. Thus policies aiming at facilitating accumulation of productive assets by the poor should be encouraged.

World Bank (1996) gives support to emphasis on boosting growth in agriculture, remote poor regions, or urban slums where the poor tend to concentrate. Road construction and other projects in rural areas should be given preference over urban investments, and investments in primary education and health services should be stressed rather than universities and hospitals. Besides these direct policies, World Bank (2001) puts forward an idea of an administrative and institutional reform, whereby access of the poor to market opportunities and to public services is improved by making public administration, legal institutions, and public service delivery more efficient and accountable to all citizens, and by strengthening the participation of the poor in political processes and local decision-making. The pro-poor strategy proposed by the World Bank (2001) is also concerned with reducing vulnerability of the poor to economic shocks, natural disasters, ill health, and personal violence. This requires effective national action to manage the risk of economy-wide shocks and effective mechanisms to reduce the social and natural risks faced by the poor.

The pro-poor growth strategy proposed by Kakwani (2000) recommends the removal of institutional and policy-induced biases against the poor, as well as the adoption of direct pro-poor policies. Macro policies that tend to constrain pro-poor growth include such policies as overvalued exchange rates, big city-oriented industrial location policies, and public spending biases toward urban areas and against rural areas. Similarly, there are micro policies which are unfavourable for the welfare of the poor. For example, monopoly powers enjoyed by some firms may result in high prices that hurt the poor heavily. Subsidized public services such as state universities may benefit primarily the non-poor. Improvement in access of the poor to credit, and promotion of small and medium enterprises are usually suggested as plausible micro pro-poor policies. A well-administered progressive tax system is also beneficial to the poor. Direct policies include adequate public spending on basic education, health and family planning services.

One highly pro-poor strategy can be described as "*redistribution before growth*" which carries out radical redistribution of assets between the rich and the poor (Perkins et al.,



2001). The strategy begins with asset redistribution through confiscating properties of the rich, then assigning them to the poor. This model was successfully implemented in Taiwan and South Korea where large rural landholdings were broken shortly after World War II and development has proceeded rapidly and comparatively equally. However if the radical redistribution is repeated many times, it may cause political instability and fail to create efficient incentive for economic growth in the long term, because no one tries to work to be rich for the fear of repeated expropriation.

To avoid the unexpected outcomes of the “*redistribution before growth*” approach, the “*redistribution with growth*” strategy, which is combination of the indirect and direct approaches, has emerged as a tolerable solution. This strategy should try to shape the pattern of development so that low-income producer see improved earning opportunities and simultaneously receive the resources necessary to take advantage of them. Besides, attention is also paid to direct policies such as the provision of public services to help the poor get rid of poverty.

Pessimism about how fast economic growth, even when it is focused on poverty reduction, can improve the well-being of the poor leads to concern about “*basic human needs*” approach, which emphasizes direct pro-poor policies. The strategy requires two important elements for success. First, financing must be adequate to ensure that the commodities and services can be provided at costs affordable to the poor. Second, service networks are needed to distribute the public services in forms appropriate for consumption by the poor, especially in areas where the poor live.

### 3. Impact of Growth and Inequality on Poverty: Estimation Methods

#### 3.1. Poverty and Inequality Measures

##### *Poverty measures*

Popular measures of poverty are Foster, Greer and Thorbecke poverty indexes, which can be calculated using the following formula:

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^q \left[ \frac{z - x_i}{z} \right]^{\alpha} \quad (1)$$

where  $x_i$  is the welfare indicator such as income or consumption per capita, for poor person  $i$ ,  $z$  is the poverty line,  $n$  is the number of people in the sample population,  $q$  is the number of poor people, and  $\alpha$  can be interpreted as a measure of inequality aversion.

When  $\alpha = 0$ , the above equation reduces to  $q/n$ , the number of poor people in the population divided by the number of people in the sample population. This very commonly and simply used measure of the incidence of poverty is called the headcount ratio  $H$  or, when turned into a percentage, the headcount index  $H$ . The ratio  $H$  varies from 0 when there are no poor in a society to 1 when a whole society is poor.

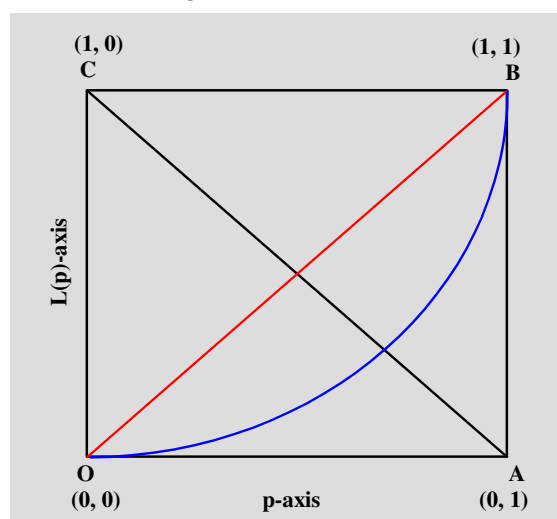
When  $\alpha = 1$ , the poverty gap index is produced, which shows the shortfall of the poor's income from the poverty line expressed as an average of all people in the population. The

range of the poverty gap index is from 0 to the value of  $H$ . If everyone gets rid of poverty, no one is poor, and the PG index equals 0. If there are poor, and the poor have no income at all, the poverty gap PG equals the headcount ratio  $H$ .

When  $\alpha = 2$ , the squared poverty gap index which is also called the FGT (Foster-Greer-Thorbecke) index  $P_2$  is produced. Like the poverty gap index PG, this index measures the severity (or intensity) of poverty, and ranges from 0, when there are no poor in a society, to the value of the headcount ratio  $H$ , when all of the poor have no income. This index gives more weight to poorer individuals. The poorer the person, the greater the weight given to his or her shortfall from the poverty line. Thus it takes into account income distribution among the poor, and satisfies both the monotonicity and transfer axioms.

Unlike some other poverty measures, these three poverty measures have a useful property of being additively decomposable, e.g. the national poverty index is equal to the weighted average of indices in rural and urban areas or different regions.

Figure 1: Lorenz curve



It is possible to calculate the three additive poverty indices without individual income if the specification of Lorenz curve, the mean income, and the poverty line are known. The Lorenz curve proposed by Lorenz in 1905 is widely used to represent and analyze the size distribution of income and wealth. Let's denote  $p$  as the cumulative proportion of income units, and  $L(p)$  as the cumulative proportion of income received by  $p$  when income units are arranged in ascending order of their income or consumption. The value of  $L(p)$  and  $p$  range from 0 to 1, and the value of  $L(p)$  is always less than or equal to the value of  $p$ . The Lorenz curve is defined as the relationship between the variables  $L(p)$  and  $p$  (Figure 1).

It should be noted that the Lorenz curve  $L(p)$  is monotonically increasing in  $p$  and convex to the  $p$ -axis (Kakwani, 1980). This implies that the fraction of income  $L(p)$  increases as the lowest fraction of the population  $p$  rises, and  $L(p)$  rises slower than  $p$  at first, but later it rises faster than  $p$ .

The three FGT poverty indices can be calculated based on the equation of the Lorenz curve, when the values of the mean income and the poverty line are known. Firstly, the headcount ratio  $H$  can be found as a solution to the following equation (Kakwani, 1980):

$$L'(H) = \frac{z}{\mu} \quad (2)$$

where  $\mu$  and  $z$  are the mean income and the poverty line, respectively.  $L'(H)$  is the first derivative of  $L(p)$  with respect to  $p$  at the  $H$  value.

Secondly, the poverty gap index is calculated as follows:

$$PG = I.H = \left(1 - \frac{\mu^*}{z}\right)H \quad (3)$$

where  $\mu^* = \mu \frac{L(H)}{H}$  denotes the mean income of the poor.

Finally, the squared poverty gap index  $P_2$  is obtained as the integral of  $\left[1 - \left(\frac{\mu}{z}\right)L'(p)\right]^2$  over the interval  $(0, H)$ , that is:

$$P_2 = \int_0^H \left[1 - \left(\frac{\mu}{z}\right)L'(p)\right]^2 dp \quad (4)$$

In summary, the above poverty measures can be fully characterized in term of the poverty line, the mean income and the Lorenz curve representing the structure of relative income inequalities:

$$P = P[z, \mu, L(p)] \quad (5)$$

This equation indicates that the level of poverty is directly determined by two key factors. Firstly, the level of poverty depends on the level of the mean income. It is reasoned that economic growth can change the mean income, thereby altering poverty. Secondly, given the factor of the mean income, the Lorenz curve, which presents the pattern of income distribution, also determines what level the incidence and severity of poverty stands at. Thus, there is an inherent relationship between poverty, growth and inequality. This will be discussed in the below section.

#### *Gini Index as Inequality Measure*

To measure the level of inequality, one can use various indices such as Gini index, Theil indices, the coefficient of variation, the relative mean deviation, and the standard deviation of logarithms of income.<sup>4</sup> Related to the approach of Lorenz curve, the Gini index is most widely

---

<sup>4</sup> For example see Kakwani (1980)

used. Graphically, it can be calculated by dividing the area between the diagonal line and the Lorenz curve by the area under the diagonal line of equality (see figure 2.1). Thus the further the Lorenz curve is from the line of equality, the higher the Gini coefficient.

Note that, because the value of the area under the diagonal is equal to 0.5, the value of the Gini index can be obtained by subtracting twice the area under the Lorenz curve from 1. That is:

$$G = 1 - 2 \int_0^1 L(p) dp \quad (6)$$

The Gini index can be calculated from the individual incomes in the population as follows:

$$G = \frac{1}{2n(n-1)\mu} \sum_{i=1}^n \sum_{j=1}^n |x_i - x_j| \quad (7)$$

where  $x_i$  is the income of the  $i^{\text{th}}$  person, and  $n$  is the total number of people in the population. The double sum in (7) can be hard to calculate if  $n$  is relatively large, and an equivalent but computationally more convenient form is:

$$G = \frac{n+1}{n-1} - \frac{2}{n(n-1)\mu} \sum_{i=1}^n \rho_i x_i \quad (8)$$

where  $\rho_i$  is the rank of individual  $i$  in the  $x$ -distribution, counting from the top so that the richest has the rank of 1.

The value of the Gini coefficient varies from 0 when everyone has the same income to 1 when one person has everything. The closer a Gini coefficient is to one, the more unequal the income distribution is. For most developing countries, Gini coefficients for expenditures or incomes range between 0.3 and 0.6.

### 3.2. Decomposition of Poverty Measures

#### *Static Decomposition*

Kakwani (1990) provided a widely used method to decompose a change in a poverty measure into two components – one relating to a change in average income and the other to income inequality using only one time period data.

From formula (5) in section (2.3.3.2), we know that the poverty measure  $P$  can be written as:

$$P = P(z, \mu, L)$$

where  $z$  is the poverty line,  $\mu$  is the mean income, and  $L$  is a vector of parameters fully describing the Lorenz curve. Inequality here is represented by the specification of the Lorenz curve. The level of poverty may change due to a change in the ratio of the mean income to the

poverty line, or due to a change in relative inequality  $L$ . The change in the poverty measures is expressed as:

$$dP = \frac{\partial P}{\partial \mu} d\mu + \frac{\partial P}{\partial L} dL \quad (9)$$

The change in poverty measures can be decomposed into two components: the change due to income growth when holding the distribution of income constant, and the change due to the effect of changes in the income distribution while keeping the total income of the society unchanged.

#### Growth component of poverty

Recall that the headcount ratio can be calculated from the equation:

$$L'(H) = \frac{z}{\mu}$$

Thus the elasticity of the headcount ratio with respect to the mean income  $\mu$  is given by:

$$\eta_H = \frac{\partial H}{\partial \mu} \frac{\mu}{H} = -\frac{z}{\mu^2 L''(H)} \frac{\mu}{H} = -\frac{z}{\mu H L''(H)} \quad (10)$$

where  $L''(H)$  is the second derivative of  $L(p)$  with respect to  $p$  at the value  $H$ .

The elasticity is interpreted as the percentage of the poor who cross the poverty line as a result of 1 percent growth in the mean income. This result is derived on the assumption that the relative income distribution measured by  $L(p)$  does not change.

For other FGT poverty indices, after some complicated mathematical manipulations, the elasticity with respect to  $\mu$  can be obtained as follows:

$$\eta_{P_\alpha} = \frac{\partial P_\alpha}{\partial \mu} \frac{\mu}{P_\alpha} = -\frac{\alpha(P_{\alpha-1} - P_\alpha)}{P_\alpha} \quad (11)$$

for  $\alpha \neq 0$ . This elasticity will always be negative because  $P_\alpha$  is a monotonically decreasing function of  $\alpha$ .

#### Inequality component of poverty

Economic growth increases the mean income of a population but at the same time may worsen the income inequality. Consequently, the total change in poverty will depend on which of these two components is dominant.

Kakwani (1990) obtained the formulas to calculate the elasticity of poverty with respect to inequality represented by the Gini index for alternative poverty measures as follows.<sup>5</sup> Firstly, for the headcount index:

$$\varepsilon_H = -\frac{(\mu - z)}{z} \eta_H \quad (12)$$

where  $\eta_H$  is the elasticity of poverty with respect to the mean income. It is worth noting that  $\varepsilon_H > 0$  only if  $\mu > z$  which implies that greater inequality leads to greater poverty on condition that the poverty line is less than the mean income of the distribution. In contrast, if  $\mu < z$ , an increase in inequality will result in a reduction in poverty.

For the other poverty FGT indexes:

$$\varepsilon_{P_\alpha} = \eta_{P_\alpha} + \frac{\alpha \mu P_{\alpha-1}}{z P_\alpha} \quad (13)$$

These elasticities can be interpreted as the percentage change in poverty indices due to a 1 percentage change in the Gini index.

#### *Dynamic Decomposition*

Datt and Ravallion (1991) also developed a very popular method to decompose the change in poverty during a period into components associated with growth, redistribution and a residual.

The growth component of a change in the poverty measure from the date  $t$  to the date  $(t + n)$  is defined as the change in poverty due to a change in the mean income, from  $\mu_t$  at the date  $t$  to  $\mu_{t+n}$  at the date  $(t + n)$ , while holding the Lorenz curve  $L$  constant at some reference level  $L_r$ . This means that the income distribution remains unchanged. Meanwhile the redistribution component is the change in poverty due to a change in the Lorenz curve, from  $L_t$  at the date  $t$  to  $L_{t+n}$  at the date  $(t + n)$ , while keeping mean income  $\mu$  at the reference level  $\mu_r$ . A change in poverty between dates  $t$  and  $(t + n)$  can be decomposed as follows:

$$P_{t+n} - P_t = P(z, \mu_{t+n}; L_{t+n}) - P(z, \mu_t; L_t) = G(t, t+n; r) + D(t, t+n; r) + R(t, t+n; r) \quad (14)$$

Growth Component	+	Redistribution Component	+	Residual Component
---------------------	---	-----------------------------	---	-----------------------

in which the growth and redistribution components are given by:

$$\begin{aligned} G(t, t+n; r) &= P(z, \mu_{t+n}, L_r) - P(z, \mu_t, L_r) \\ D(t, t+n; r) &= P(z, \mu_r, L_{t+n}) - P(z, \mu_r, L_t) \end{aligned} \quad (15)$$

---

<sup>5</sup> For algebraic manipulation see Kakwani (1990)

In each case the first two arguments in the parentheses refer to the initial and terminal dates of the decomposition period, and the last argument makes explicit the reference date  $r$  with respect to which the observed change in poverty is decomposed.

In general the residual would not vanish. For  $r = t$  the residual is rewritten as:

$$\begin{aligned}
R(t, t+n; t) &= (P_{t+n} - P_t) - G(t, t+n; t) - D(t, t+n; t) \\
&= [P(z, \mu_{t+n}, L_{t+n}) - P(z, \mu_t, L_t)] - [P(z, \mu_{t+n}, L_t) - P(z, \mu_t, L_t)] - [P(z, \mu_t, L_{t+n}) - P(z, \mu_t, L_t)] \\
&= [P(z, \mu_{t+n}, L_{t+n}) - P(z, \mu_t, L_{t+n})] - [P(z, \mu_{t+n}, L_t) - P(z, \mu_t, L_t)] \\
&= G(t, t+n; t+n) - G(t, t+n; t)
\end{aligned}$$

Similarly, it can be specified as:

$$R(t, t+n; t) = D(t, t+n; t+n) - D(t, t+n; t)$$

The residual can thus be interpreted as the difference between the growth (or redistribution) components evaluated at the terminal and initial Lorenz curves (or mean incomes) respectively. If the mean income or the Lorenz curve remains unchanged over the decomposition period, then the residual vanishes. This is very unlikely for most of the empirical works.

The choice of the reference is arbitrary, and the reference point does not even need to be historically observed. Kakwani and Pernia (2000) use both the initial date and the terminal date as the reference points to calculate growth and redistribution components, and then take the averages of those component values as follows:

$$G(t, t+n) = \frac{1}{2} [P(z, \mu_{t+n}, L_t) - P(z, \mu_t, L_t) + P(z, \mu_{t+n}, L_{t+n}) - P(z, \mu_t, L_{t+n})]$$

$$D(t, t+n) = \frac{1}{2} [P(z, \mu_t, L_{t+n}) - P(z, \mu_t, L_t) + P(z, \mu_{t+n}, L_{t+n}) - P(z, \mu_{t+n}, L_t)]$$

This choice of the reference will make the residual equal zero because  $R(t, t+n; t) = -R(t, t+n; t+n)$ .

The initial date of the decomposition is a natural choice of a reference, and this is what Ravallion (1991) uses in his empirical work.

Finally, it should be noted that the main drawback of the dynamic decomposition is that it cannot decompose a change in poverty over a long period, in which poverty could decline to zero. For instance, suppose the incidence of poverty measured by the headcount index (H) is slightly higher than zero (e.g. 5%) at the initial date  $t$ , and there is a substantial increase in the mean income during a period from the date  $t$  to the date  $(t+n)$ . If there had been no change in income distribution, the incidence of poverty would have declined rapidly to zero between the dates  $t$  and  $(t+n)$ . However, inequality is supposed to increase so much that the actual incidence of poverty at the terminal date  $(t+n)$  remains higher than zero (e.g. 5%). In this case, if the incidence of poverty  $P(z, \mu_{t+n}; L_r)$  at the terminal date  $(t+n)$  is considered

equal to zero, the decomposition will not capture exactly the impacts of growth and inequality on the reduction in poverty.

### 3.3. Growth and Inequality within Groups and Total Poverty

#### *Static Method*

Based on the elasticity of poverty with respect to growth, Kakwani (1990) obtained a method to examine how changes in income growth and inequality of population groups affect total poverty. He started from the formula of decomposition developed by Foster et al. (1984). Suppose that the entire population is divided into  $m$  non-overlapping groups along ethnic, geographic, demographic, socioeconomic or other lines. Then the FGT class of poverty measures  $P_\alpha$  given in (2.1) can be decomposed as follows:

$$P_\alpha = \sum_{i=1}^m \frac{n_i}{n} P_{\alpha i} = \sum_{i=1}^m f_i P_{\alpha i} \quad (16)$$

where  $P_{\alpha i}$  is the additive poverty measure of the  $i$ -th group,  $n$  and  $n_i$  are the total population size and the  $i$ -th group population size, respectively, and  $f_i$  is the population share of  $i$ -th group, hence:

$$\sum_{i=1}^m f_i = 1 \quad (17)$$

This makes it possible to calculate the contribution  $c_{\alpha i}$  of each group poverty to the total poverty:

$$c_{\alpha i} = f_i \frac{P_{\alpha i}}{P_\alpha} \quad (18)$$

It should be noted that Foster et al. (1984) point out that the Sen measure and other ones are not well suited for poverty analysis by group, since they violate the axiom of group monotonicity in certain cases. The group monotonicity axiom requires group and total poverty to move in the same direction when incomes in a given group change. If a poverty measure indicates that there is an increase in poverty in group  $i$  due to a change in income of that group, this poverty measure must also indicate an increase in poverty in the population.<sup>6</sup>

Kakwani (1990) also obtained the elasticity of the total or national poverty with respect to the mean income of the  $i$ -th group as:

$$\eta_{P_{\alpha i}}^* = \left( f_i \frac{P_{\alpha i}}{P_\alpha} \right) \eta_{P_{\alpha i}} = c_{\alpha i} \eta_{P_{\alpha i}} \quad (19)$$

---

<sup>6</sup> For detailed elucidation see Foster et al. (1984)



where:

$$\eta_{P_{\alpha i}} = \frac{\partial P_{\alpha i}}{\partial \mu_i} \frac{\mu_i}{P_{\alpha i}} \quad (20)$$

is the elasticity of i-th group poverty measure with respect to the mean income of the i-th group. Equation (19) is useful to examine how the economic growth within various groups of the population affects national poverty while holding inequality constant within groups.

It can also be shown that:

$$\eta_{P_{\alpha}} = \sum_{i=1}^m \left( f_i \frac{P_{\alpha i}}{P_{\alpha}} \right) \eta_{P_{\alpha i}} = \sum_{i=1}^m \eta_{P_{\alpha i}}^* \quad (21)$$

Where  $\eta_{P_{\alpha}}$  is the elasticity of total poverty to the mean income of the whole population. This equation shows how the effects of group growth on poverty add up to the total growth effect on poverty.

Similarly, the effect of change in the Gini index of the i-th group on total poverty can be measured by the following formula:

$$\varepsilon_{P_{\alpha i}}^* = \left( f_i \frac{P_{\alpha i}}{P_{\alpha}} \right) \varepsilon_{P_{\alpha i}} = c_{\alpha i} \varepsilon_{P_{\alpha i}} \quad (22)$$

where  $\varepsilon_{P_{\alpha i}}$  is elasticity of poverty in the i-th group with respect to its inequality.

Inequality effects of all groups on poverty add up to the total inequality effect on poverty, that is:

$$\varepsilon_{P_{\alpha}} = \sum_{i=1}^m \left( f_i \frac{P_{\alpha i}}{P_{\alpha}} \right) \varepsilon_{P_{\alpha i}} = \sum_{i=1}^m \varepsilon_{P_{\alpha i}}^* \quad (23)$$

The elasticity of total poverty with respect to the i-th group inequality  $\varepsilon_{P_{\alpha i}}^*$  indicates, given income growth, by what proportion total poverty in the population will change if the Gini index in the i-th group changes by 1 percent.

### *Dynamic Method*

The dynamic method is used to analyze impacts of within-group growth and inequality on total poverty during a period. Based on the additive characteristic of the FGT poverty measures, the change in total poverty during a period can be decomposed into changes in group poverty.  $P_{it}$  is used to denote the FGT measures for group i with the population share  $f_i$  at the date t<sup>7</sup>, and

---

<sup>7</sup> For simplicity, symbol  $\alpha$  is omitted in the notation of the FGT class of the poverty indices.

there are  $m$  exclusive groups in the total population. The change in the poverty between the initial date  $t$  and the terminal date  $(t + n)$  can be simply decomposed as follows:

$$P_{t+n} - P_t = \sum_{i=1}^m (P_{i(t+n)} f_{i(t+n)} - P_{it} f_{it}) \quad (24)$$

Then it is possible to calculate the percentage contribution of the  $i$ -th group to reduction in total poverty during the period from the date  $t$  to the date  $(t + n)$ :

$$\pi_i = \frac{P_{i(t+n)} f_{i(t+n)} - P_{it} f_{it}}{P_{t+n} - P_t} \times 100 \quad (25)$$

If there is a decline in poverty in the  $i$ -th group, the sign of this index is negative. In contrast, if poverty in the  $i$ -th group increases, making a contribution to rising total poverty, then the sign of the index becomes positive.

The equation (14) that decomposes the change in poverty measures into growth and redistribution components can be applied for each group  $i$ :

$$P_{i(t+n)} - P_{it} = G_i(t, t+n; r) + D_i(t, t+n; r) + R_i(t, t+n; r)$$

Growth Component	Redistribution Component	Residual Component
---------------------	-----------------------------	-----------------------

The percentage contribution of growth to poverty reduction within the  $i$ -th group can be expressed as:

$$\theta_i = \frac{G_i(t, t+n; r)}{P_{i(t+n)} - P_{it}} \quad (26)$$

Combining (25) with (26), we can calculate the percentage contribution of the  $i$ -th group growth to the change in total poverty as follows:

$$\rho_{Gi} = \pi_i \cdot \theta_i = \frac{P_{i(t+n)} f_{i(t+n)} - P_{it} f_{it}}{P_{t+n} - P_t} \times \frac{G_i(t, t+n; r)}{P_{i(t+n)} - P_{it}} \times 100 \quad (27)$$

$\rho_{Gi}$  can be interpreted as the percentage contribution of economic growth within the  $i$ -th group to the change in total poverty during the period. A greater value of  $\rho_{Gi}$  means a larger contribution of the  $i$ -th group growth to the change in poverty of the whole country.

Similarly, the impact of inequality and residual components of the  $i$ -th group on the total poverty can be calculated as follows:

$$\rho_{Di} = \pi_i \cdot \frac{D_i(t, t+n; r)}{P_{i(t+n)} - P_{it}} \times 100 = \frac{P_{i(t+n)} f_{i(t+n)} - P_{it} f_{it}}{P_{t+n} - P_t} \times \frac{D_i(t, t+n; r)}{P_{i(t+n)} - P_{it}} \times 100 \quad (28)$$

and:

$$\rho_{Ri} = \pi_i \cdot \frac{R_i(t, t+n; r)}{P_{i(t+n)} - P_{it}} \times 100 = \frac{P_{i(t+n)} f_{i(t+n)} - P_{it} f_{it}}{P_{t+n} - P_t} \times \frac{R_i(t, t+n; r)}{P_{i(t+n)} - P_{it}} \times 100 \quad (29)$$

These indices can be interpreted as percentage contributions of changes in inequality and residual factors of the i-th group to the change in total poverty. The indices will be negative or positive, depending on the signs of inequality and residual components in formula (14), and whether there is a poverty reduction in the i-th group during the period.

### 3.4. Pro-poor Degree of Growth

Kakwani and Pernia (2000) offered an index to measure the degree of pro-poor growth during a period. Suppose there is an increase in income per capita. If there is no change in income distribution, the incidence of poverty will be reduced. In this case the pro-poor index is equal to the ratio of the change in poverty under the assumption that there is no change in income distribution to the actual change in poverty. It can be expressed as follows:<sup>8</sup>

$$\phi = \frac{P_{t+n} - P_t}{G(t, t+n; r)} = \frac{P_{t+n} - P_t}{P(z, \mu_{t+n}, L_r) - P(z, \mu_t, L_r)} \quad (30)$$

where  $[P(z, \mu_{t+n}, L_r) - P(z, \mu_t, L_r)]$  is the change in poverty due to the growth effect as indicated in section (3.2.2.1), and  $(P_{t+n} - P_t)$  is the actual change in poverty.

Recall equation (14):

$$P_{t+n} - P_t = \underbrace{G(t, t+n; r)}_{\text{Growth Component}} + \underbrace{D(t, t+n; r)}_{\text{Redistribution Component}} + \underbrace{R(t, t+n; r)}_{\text{Residual Component}}$$

The combination of (14) and (30) gives:

$$\phi = \frac{P_{t+n} - P_t}{G(t, t+n; r)} = \frac{G(t, t+n; r) + D(t, t+n; r) + R(t, t+n; r)}{G(t, t+n; r)} \quad (31)$$

The growth component G is always negative, because an increase in the mean income  $\mu$  will always lead to a decrease in poverty when relative inequality remains unchanged.

In the meantime the redistribution component D can be either negative or positive. To explain the effect of the distribution component on the poor, let us assume that the residual R in (31) equals zero, then (31) becomes:

$$\phi = 1 + \frac{D(t, t+n; r)}{G(t, t+n; r)} \quad (32)$$

<sup>8</sup> Kakwani and Pernia (2000) used the proportional change to calculate the pro-poor growth index, but I found that the absolute value change is also suitable for calculation of this index and does not change its meaning.

If the redistribution component is negative, it means that the growth results in a new income distribution in favour of the poor, thereby reducing poverty unequivocally. The value of  $\phi$  will be greater than 1, and such a growth can be characterized as strictly pro-poor. In contrast if the redistribution is positive, the change in income distribution is pro-rich. If the  $\phi$  value lies between 0 and 1 ( $0 < \phi < 1$ ), there is still reduction in poverty. The poor also benefit from growth, but the rich benefit proportionally more than the poor. This situation may be generally characterized as trickle-down.

During a recession, we can suppose that poverty tends to increase because of a decrease in the mean income. The growth component  $G$  turns out to be positive, implying that the incidence poverty will rise if there is no change in income distribution. The recession will be pro-poor if the actual change in poverty ( $P_{t+n} - P_t$ ) is smaller than the increase in poverty due to the decrease in income per capita  $G(t, t+n; r)$ . In contrast, the recession will not be pro-poor if the increase in poverty ( $P_{t+n} - P_t$ ) is larger than the growth component  $G(t, t+n; r)$ . In this recession situation, the pro-poor index should be defined as:

$$\phi = \frac{G(t, t+n; r)}{P_{t+n} - P_t} = \frac{P(z, \mu_{t+n}, L_r) - P(z, \mu_t, L_r)}{P_{t+n} - P_t} \quad (33)$$

The recession will be pro-poor if  $\phi > 1$ , and not pro-poor or pro-rich if  $\phi < 1$ .

Based on some initial empirical results, Kakwani and Pernia (2000) arrived at the following value judgements regarding the pro-poor growth index  $\phi$ . If

$\phi < 0$  growth is anti-poor.

$0 < \phi \leq 0.33$  growth is weakly pro-poor.

$0.33 < \phi \leq 0.66$  growth is moderately pro-poor.

$0.66 < \phi \leq 1.0$  growth is pro-poor.

$\phi > 1.0$  growth is highly pro-poor.

In general, the proposed index measures the degree of “pro-poorness” and should be used as a tool to maximize the extent of poverty reduction.

## 4. Economic Growth and Poverty Patterns in Vietnam

### 4.1. Data Source

The analysis of poverty and microeconomic issues in this study relies heavily on the use of a household data set from the 1993 and 1998 Vietnam Living Standards Surveys (VLSS). These surveys were implemented by the General Statistical Office (GSO) of Vietnam with funding from SIDA (Sweden) and UNDP, and technical assistance from the World Bank. These surveys provide data on a wide range of topics, including expenditures and incomes;

education; health, fertility and nutrition; employment; migration; housing; agricultural activities; small household businesses, credit and savings. In addition to the household questionnaires, the surveys also included commune questionnaires (for rural areas only), price questionnaires and, for 1998, modules on school and health facilities. The two survey samples were selected to be representative of the national as well as provincial levels.

The VLSS93 was undertaken between October 1992 and October 1993, with the sample covering 4800 households. Data from this survey sample can be used without further weighting. The second survey VLSS 1998 was started in December 1997 and completed by November 1998. Although the sample selection was based primarily on the original sample of the VLSS93, there are two significant differences that should be noted when using VLSS98. Firstly, because of additional funding available, the sample size in VLSS98 was extended to 6000 households, with 1200 additional ones obtained from the sample of the Multi-purpose Household Survey (MPHS) <sup>9</sup>. Secondly, unlike VLSS93, the sample in VLSS98 was not selected proportional to the number of households or population per region, thus sampling weights must be applied when calculating poverty and inequality measures using VLSS98 to ensure that the results are not biased.

For the analysis of poverty in developing countries and in most government statistics the absolute poverty line is most widely used. There are two absolute poverty lines which are calculated by the GSO and the World Bank: the food poverty line and the overall poverty line. Households on the lower poverty line – the food poverty line – have per capita expenditures which allow them to consume 2100 calories a day, but with no allowance for essential non-food expenditures. Thus any non-food expenditure made by households on or below this poverty line is at the expense of an adequate nutritional intake. The overall poverty line that is referred to most frequently in government statistics and international comparison has an allowance for essential non-food consumption such as clothing and housing. Households on or above the overall poverty line therefore have per capita expenditures which are sufficient to cover nutritional needs and basic non-food needs. The poverty line in 1993 and 1998 is 1160 and 1790 thousand VND, respectively.

## **4.2. Economic Growth and Poverty Reduction**

The economic reform has liberated the labour force, and made considerable use of the potentials of the agricultural and large population economy. As a result, the Vietnamese economy has rapidly grown and overcome its period of serious crisis. The outstanding achievements are clearly demonstrated by the high economic growth rates. GDP per capita during the period 1991-2000 increased at an annual average rate of 5.9% . Especially, from 1992 to 1997 the annual growth rate in GDP per capita stood at a record level of 7%. However, the economy saw a slowdown in 1998 and 1999 due to adverse impacts of the regional financial and monetary crisis. Although economic growth in these two years decreased to half of what it was in the previous years, it still compared favorably with the regional average for

---

<sup>9</sup> This survey has been conducted annually by GSO of Vietnam since 1994. MPHS covered a narrower range of topics (including household expenditure and incomes, education, health, housing and other assets, and the ownership of durable goods) than the two VLSS surveys but had a much larger sample size (45000 households in 1994 to 1997, and 25000 households after 1997) designed to produce provincially representative statistics. However, the large size of the MPHS sample has led to delays in the processing, analysis and dissemination of the data that it collected.

Southeast Asia (2.9% annually).<sup>10</sup> The picture of the economy becomes gradually brighter in 2000 and 2001. Owing to the strong performance of industry and export, economic growth improved to 6.1% in 2000 and is estimated at 6.4% for 2001.

During the period 1993-1998, poverty declined in both rural and urban areas (Table 1). There were relatively striking decreases in all poverty indices for both areas. The incidence of poverty decreased from 24.9% to 9.2% in the urban areas and from 66.4% to 45.5% in the rural areas. The poverty depth that is measured by indices I, PG and P<sub>2</sub> also experienced a significant reduction in both areas. This means that the poor at the bottom of the expenditure scale in both urban and rural areas achieved improvements in expenditures during the period 1993-1998.

Table 1: Changes in poverty indices by socioeconomic groups, 1993-1998

	Headcount Index (H) (percent)		Poverty Gap Index (PG)		Squared Gap Index (P <sub>2</sub> )	
	1993	1998	1993	1998	1993	1998
All Vietnam	58.1	37.4	0.185	0.095	0.079	0.036
<i>Urban/Rural</i>						
Urban	24.9	9.2	0.064	0.017	0.024	0.005
Rural	66.4	45.5	0.215	0.118	0.092	0.044
<i>Regions</i>						
Northern Uplands	78.6	58.6	0.268	0.168	0.118	0.065
Red River Delta	62.8	28.7	0.188	0.057	0.073	0.018
North Central	74.5	48.1	0.247	0.118	0.105	0.041
Central Coast	49.6	35.2	0.168	0.106	0.079	0.047
Central Highlands	69.9	52.4	0.263	0.191	0.139	0.096
Southeast	32.7	7.6	0.092	0.013	0.037	0.004
Mekong Delta	47.1	36.9	0.138	0.082	0.056	0.027
<i>Ethnic Groups</i>						
Kinh Majority	53.9	31.1	0.160	0.071	0.064	0.024
Ethnic Minorities	86.4	75.2	0.347	0.242	0.176	0.106
<i>Head's occupation</i>						
Agriculture	68.4	48.0	0.224	0.128	0.098	0.049
Industry	45.3	26.7	0.120	0.057	0.043	0.019
Services	27.8	12.8	0.073	0.025	0.027	0.008
No Work	43.5	27.7	0.138	0.065	0.057	0.022

Source: Author's estimates from VLSS93 and VLSS98

Within each area, poverty is often much higher and more severe in agricultural groups than in non-agricultural groups. Agriculture, forestry and fishery, which are developed from a very low-productivity base and deeply affected by natural conditions, cannot bring high and sustainable income for farmers. In turn, low income prevents farmers from gaining access to capital and sufficient quantity and quality of land, as well as competent agricultural knowledge and skills to raise their productivity. Within the urban areas, the headcount index in the agricultural group is 17.6%, and other poverty indices are all higher than those in the non-agriculture group. The same story occurs within the rural areas. Although poverty in agricultural groups declined significantly from 70.9% to 49.4% during the period 1993-1998, it remains too high compared with the incidence of poverty of 32.3% in non-agricultural groups in the same rural areas.

<sup>10</sup> See ADB (2000).

In spite of the impressive poverty reductions in both urban and rural areas, poverty in Vietnam remains a predominantly rural problem. Within rural areas, lacking sufficient education facilities, sources of information, means of transportation and other infrastructure accesses, the poor see few opportunities of diversification of livelihoods beyond farm employment. About 77% of people are still dependent on agricultural work.<sup>11</sup> As a result, nearly one half of rural people live in poverty, while in the urban areas only about one-tenth of the population suffers from poverty. With an 80% share of the whole population in 1993, the rural areas contributed 91.5% of the poor in the country. The migration from the rural to the urban areas reduced the share of the rural population slightly from 80.1% to 77.6%, but its contribution to the total poverty incidence as well as the total poverty depth increased, for the poverty incidence from 91.5% up to 94.5%; for the poverty gap PG from 93.1 up to 96.4; and for the poverty  $P_2$  index from 93.3% up to 94.8%. This shows that the rate of poverty reduction in the rural areas was much lower than that in the urban areas during 1993-1998. The higher poverty indices PG,  $P_2$ , and the expenditure gap ratio I in rural area indicate that poverty is much deeper and more severe in the rural than in the urban areas.

Topographically, Vietnam is a very diverse country, with seven well-defined agroecological zones. These range from the remote and poorly endowed zones of the Northern Mountains area bordering China and the North and South Central Coast regions, through the Central Highlands, to the fertile, irrigated regions of the Red River Delta in the North and the Mekong Delta in the South. The extent of poverty declined in every region over the period 1993-1998, regardless of the poverty index used, but some regions experienced faster declines than others. The largest reduction in poverty occurred in the Red River Delta with a drop of 34 percentage points in the headcount index from 62.8% to 28.7%. In 1993, it ranked fourth out of the seven regions in terms of the incidence of poverty, but by 1998 it had moved to second in the rankings, following the Southeast where the incidence of poverty also dropped impressively from 32.7% to 7.6% during this period. In contrast, the Central Coast and the Mekong Delta saw only moderate declines in the poverty incidence, with a decline of 14.4 percentage points for the former and only 10.2 percentage points for the latter. The relatively poor performance of the Mekong delta may reflect the fact that Typhoon Linda struck the Mekong Delta in November 1997, which underscores the vulnerability of Vietnam households to risk (Glewwe et al., 2000).

Of seven regions, the three regions Northern Uplands, North Central, and the Central Highlands suffered from the highest and most severe poverty during the period 1993-1998. Although the poverty reductions were striking, the Northern Uplands still showed a high poverty incidence of 58.6%, the Central Highlands 52% and the North Central 48.1%. The depth of poverty measured by the expenditures gap ratio I, and poverty indices PG, and  $P_2$  remained much more serious than in other regions. The persistence of severe poverty in the Northern Uplands and Central Highlands results from many constraints which these regions face in participating in the growth process. One inherent constraint is a harsh natural environment which limits agricultural development and hinders access to infrastructure for people in these regions.

---

<sup>11</sup> Households in the survey are classified into agricultural and non-agricultural households. Agricultural households are defined as households that participate in agricultural self-employment activities (including agro-forestry, tree cultivation). Non-agricultural households are households that do not participate in any agricultural self-employment activity.

As for the contribution to total poverty, the Northern Uplands, the Mekong Delta, together with the North Central Coast accounted for 67% of the poor in Vietnam in 1998, despite their population share of 53% (Table 2). The most serious is the increase in the contribution of the Northern Upland. Its share in the population increased from 15.6% to 17.9%, but its share in the number of the poor in the whole country increased remarkably from 21.1% to 28.0% over the period 1993-1998. Its contribution to the total poverty depth also increased from 22.6% to 31.7% and from 23.3% to 32.3% for the poverty indices PG and P<sub>2</sub>, respectively. At the other extreme, the richest region Southeast, with a population share of 12.8%, made up only 2.6% of the total number of poor in 1998. The Central Highlands accounted for only 5.1% of the poor in Vietnam in 1998, though 52.4% of its population was poor. This is because this region had a very small share in the population which was equal to 3.7% in 1998.

There are 54 ethnic groups in Vietnam, of which the lowland ethnic Vietnamese, known as Kinh, are the dominant group and make up about 85% of the population. These are mostly located in upland areas which are related to the problems of remoteness, inadequate infrastructure and physical and social isolation. Between 1993-1998, poverty among the Kinh majority as well as ethnic minorities was reduced. The poverty rate for the Kinh majority fell sharply from 53.9% to 31.1%, and for ethnic minorities declined from 86.4% to 75.2%. The poverty depth in 1998 indicated by the poverty indices PG, P<sub>2</sub>, and the expenditures gap ratio I was smaller than that in 1993 for both the Kinh majority and ethnic minorities.

Table 2: Contribution to total poverty by socioeconomic groups, 1993-1998 (%)

	Contribution to the H Index		Contribution to the PG Index		Contribution to the P <sub>2</sub> Index		Population Share	
	1993	1998	1993	1998	1993	1998	1993	1998
All Vietnam	100	100	100	100	100	100	100	100
<i>Urban/Rural</i>								
Urban	8.5	5.5	6.9	4.0	6.0	3.1	19.9	22.4
Rural	91.5	94.5	93.1	96.4	93.3	94.8	80.1	77.6
<i>Regions</i>								
Northern Uplands	21.1	28.0	22.6	31.7	23.3	32.3	15.6	17.9
Red River Delta	23.3	15.0	22.0	11.8	20.0	9.8	21.6	19.6
North Central	16.4	17.8	17.1	17.1	17.0	15.7	12.8	13.8
Central Coast	10.1	10.1	10.8	11.9	11.9	14.0	11.9	10.7
Central Highlands	3.8	5.1	4.5	7.4	5.6	9.9	3.2	3.7
Southeast	7.1	2.6	6.3	1.8	5.9	1.4	12.6	12.8
Mekong Delta	18.1	21.2	16.7	18.6	15.9	16.1	22.4	21.5
<i>Ethnic Groups</i>								
Kinh Majority	80.5	71.5	75.2	64.2	70.4	57.3	86.9	85.9
Ethnic Minorities	19.5	28.5	24.6	35.9	29.2	41.5	13.1	14.1
<i>Head's occupation</i>								
Agriculture	78.5	79.0	80.8	82.9	82.7	83.7	66.7	61.5
Industry	6.9	7.1	5.8	6.0	4.8	5.3	8.9	10.0
Services	6.6	6.3	5.4	4.8	4.7	4.1	13.7	18.3
No Work	8.0	7.6	8.0	7.0	7.7	6.2	10.7	10.2

Source: Author's estimates from VLSS93 and VLSS98

However, poverty remains prevalent and persistent among the ethnic minority population. Seven out of every ten persons in this group is still living in poverty. Poverty was substantially more severe in ethnic minorities than in the Kinh majority. The squared poverty gap P<sub>2</sub> for ethnic minorities in 1998 is equal to 0.106, which is more than four times as much as its value of 0.024 for the Kinh majority. As a result, ethnic minorities constituted a much



higher percentage of the poor in the population. In 1992 they made up 13.1% of the overall population, but 19.5% of the poor. Although, their share in the total population increased slightly to 14.1% in 1998, their share in the total number of the poor increased rapidly to 28.5%. More seriously, its contribution to the total poverty depth rose to a very severe level of 35.9% for the index PG and 41.5% for the index P<sub>2</sub>.

## **5. Economic Growth and Poverty: Decomposition Results**

### **5.1. Expenditure Growth and Inequality Changes**

The reforms and rapid economic growth brought about significant rises in expenditures for nearly all socioeconomic groups, which led to strikingly widespread reduction in poverty. Table 3 shows that between 1993 and 1998 per capita expenditures increased substantially by 40.7% (an average annual rate of about 7%). However, the rate of expenditures growth was different for various socioeconomic groups.

The rate of expenditure growth in the urban areas was more than twice the rate in the rural areas, which made the gap in expenditures per capita between two areas increase almost twice as much (from 1366 to 2663 thousand VND). The ratio of urban to rural expenditures per capita rose from 1.8 to 2.2. This is because the rural areas are dominated by the agricultural sector which had a lower growth rate than industrial and services sectors located mostly in the urban areas.

By region, the richest region the Southeast experienced the highest growth rate of expenditures per capita, namely 76.5%. The Mekong Delta has the lowest growth rate of 17.3%. Despite the relatively high per capita expenditures growth rate of 31.3%, the North Upland is still the poorest region in the country. The expenditure ratio of the richest to the poorest region saw an upsurge from 1.9 to 2.6.

While Kinh majority enjoyed an increase of 43.4% in per capita expenditures, ethnic minorities only obtained a growth rate of 20.8% in per capita expenditures. More seriously, expenditures per capita in ethnic minorities remain lower than the poverty line. As a result, the ratio of the Kinh majority to ethnic minorities expenditures per capita increased from 1.6 to 1.9.

By sector, as expected, the industrial group achieved the highest growth rate of expenditures per capita of 49.1%, followed by the services sector with a growth rate of 47.6%, while the agricultural group saw a smaller increase of 26.6%. This reflects the fact that the state and direct foreign investments concentrated mainly on the industrial and service sectors. Thus the gap in per capita expenditures between the agricultural group and the others rose relatively rapidly. For example, the ratio in expenditures per capita of the services group, which has the highest expenditures per capita among the sectoral groups, to the agricultural group rose from 1.7 to 2.0.

Table 3: Expenditure growth and inequality change during 1993-1998

	Mean Expenditure (Jan. 1998 Price, thousand VND)		Change in mean expenditure (%)	Gini Index		Change in Gini Index (%)
	1993	1998		1993	1998	
All Vietnam	1964.2	2763.8	40.7	0.329	0.350	6.4
<i>Urban/Rural</i>						
Urban	3058.2	4829.4	57.9	0.337	0.340	0.9
Rural	1692.3	2166.4	28.0	0.278	0.271	-2.5
<i>Regions</i>						
Northern Uplands	1462.4	1920.0	31.3	0.243	0.275	13.2
Red River Delta	1890.7	2938.0	55.4	0.310	0.321	3.5
North Central	1507.1	2196.6	45.8	0.243	0.288	18.5
Central Coast	2052.9	2641.4	28.7	0.327	0.333	1.8
Central Highlands	1556.1	1941.7	24.8	0.312	0.311	-0.3
Southeast	2844.5	5019.4	76.5	0.358	0.341	-4.7
Mekong Delta	2161.7	2535.9	17.3	0.314	0.296	-5.7
<i>Ethnic Groups</i>						
Kinh Majority	2069.8	2968.1	43.4	0.324	0.343	5.9
Ethnic Minorities	1262.3	1524.3	20.8	0.252	0.240	-4.8
<i>Head's occupation</i>						
Agriculture	1653.6	2094.0	26.6	0.277	0.267	-3.6
Industry	2392.7	3567.2	49.1	0.332	0.388	16.9
Services	2865.0	4229.1	47.6	0.337	0.338	0.3
No Work	2391.2	3389.3	41.7	0.356	0.366	2.8

Source: Author's estimates from VLSS93 and VLSS98

By region, the two regions that had the lowest inequality and mean expenditures in 1993, Northern Uplands and North Central, experienced the highest increases in inequality in the period 1993-1998, while the other regions saw slight changes in inequality.

By economic sector, except the industrial group within which the Gini index rose from 0.33 to 0.39, no groups experienced much change in inequality. Similar to the rural areas, inequality within the agricultural group decreased slightly with the Gini index declining from 0.28 to 0.27.

Finally, it should be emphasized that no general relationship between growth and inequality change within socioeconomic groups was found. Some groups experienced an increase in inequality, while the others saw a decrease in inequality. There is no clear evidence for Kuznet's hypothesis that inequality will increase and then decrease with economic growth. For the urban-rural economy, the increase in inequality between 1993 and 1998 mainly came from a rise in inequality between urban-rural areas, not from a rise in inequality within urban-rural areas (World Bank, 2000).

## 5.2. Impacts of Economic Growth and Inequality on Poverty

### *Poverty Elasticity to Growth and Inequality*

Responses of poverty to economic growth and inequality are estimated by applying the Kakwani method of static decomposition. To compute the poverty elasticities for the headcount ratio H, it is necessary to estimate the Lorenz curve. The procedure for this estimation is presented in appendix 3.

The results of poverty elasticity with respect to the mean expenditure and the Gini index by socioeconomic groups in the two years 1993 and 1998 are given in Table 4 and 5.3. The following conclusions can be drawn from these tables.

Firstly, Table 4 shows that poverty became more responsive to mean expenditure in 1998 as compared to 1993. In 1998, the absolute value of the poverty elasticity to mean expenditure is greater than unity for all poverty indices in all socioeconomic groups, which implies that poverty should decrease faster than the rate of expenditure growth, provided the growth process does not lead to an increase in inequality. Poverty in socioeconomic groups which have higher expenditures per capita and low levels of poverty is generally more sensitive to changes in mean expenditure. In other words, when the incidence and severity of poverty is low, a small increase in growth can lead to a relatively large decline in poverty.

Table 4: Elasticity of poverty to mean expenditure

	Headcount Ratio (H)		Poverty Gap Index (PG)		Squared Gap Index (P <sub>2</sub> )	
	1993	1998	1993	1998	1993	1998
All Vietnam	-1.227	-1.833	-2.141	-2.937	-2.684	-3.278
<i>Urban/Rural</i>						
Urban	-2.066	-3.505	-2.891	-4.412	-3.333	-4.800
Rural	-1.195	-1.942	-2.088	-2.856	-2.674	-3.364
<i>Regions</i>						
Northern Uplands	-0.88	-1.354	-1.933	-2.488	-2.542	-3.169
Red River Delta	-1.161	-2.564	-2.340	-4.035	-3.151	-4.333
North Central	-1.031	-1.927	-2.016	-3.076	-2.705	-3.756
Central Coast	-1.396	-1.82	-1.952	-2.321	-2.253	-2.511
Central Highlands	-0.959	-1.452	-1.658	-1.743	-1.784	-1.979
Southeast	-1.734	-4.119	-2.554	-4.846	-2.973	-4.500
Mekong Delta	-1.639	-2.215	-2.413	-3.500	-2.929	-4.074
<i>Ethnic Groups</i>						
Kinh Majority	-1.356	-2.208	-2.369	-3.380	-3.000	-3.917
Ethnic Minorities	-0.561	-1.029	-1.490	-2.107	-1.943	-2.566
<i>Head's occupation</i>						
Agriculture	-1.152	-1.887	-2.054	-2.750	-2.571	-3.224
Industry	-1.439	-2.213	-2.775	-3.684	-3.581	-4.000
Services	-2.099	-3.274	-2.808	-4.120	-3.407	-4.250
No Work	-1.445	-2.002	-2.152	-3.262	-2.842	-3.909

Source: Author's estimates from VLSS93 and VLSS98

Secondly, the impact of expenditure growth on the severely poor is larger than its impact on the moderately poor. The absolute value of the poverty elasticity to mean expenditure is higher for the additive poverty measures which attach greater weight to the poorest. That is, the absolute magnitude of the poverty elasticity for the P<sub>2</sub> index is higher than for the PG index, and than for the H ratio.

Table 5: Elasticity of poverty to inequality

	Headcount Ratio (H)		Poverty Gap Index (PG)		Squared Gap Index (P <sub>2</sub> )	
	1993	1998	1993	1998	1993	1998
All Vietnam	0.164	0.997	1.419	3.142	2.625	4.871
<i>Urban/Rural</i>						
Urban	1.717	5.951	4.233	10.189	6.431	13.546
Rural	-0.048	0.408	0.877	1.811	1.814	3.128
<i>Regions</i>						
Northern Uplands	-0.162	0.098	0.461	1.253	1.166	2.375
Red River Delta	0.095	1.644	1.274	4.229	2.423	6.062
North Central	-0.153	0.438	0.554	1.926	1.304	3.307
Central Coast	0.286	0.866	1.604	2.579	2.871	4.145
Central Highlands	-0.098	0.123	0.727	1.232	1.612	2.337
Southeast	1.187	7.431	3.433	11.547	5.404	13.727
Mekong Delta	0.411	0.923	1.856	2.875	3.237	4.531
<i>Ethnic Groups</i>						
Kinh Majority	0.270	1.453	1.671	3.883	2.996	5.894
Ethnic Minorities	-0.170	-0.153	0.246	0.539	0.806	1.322
<i>Head's occupation</i>						
Agriculture	-0.072	0.320	0.810	1.637	1.716	2.887
Industry	0.576	2.197	2.510	5.651	4.233	7.957
Services	1.461	4.461	3.651	7.977	5.764	10.516
No Work	0.595	1.789	2.297	4.808	3.992	7.280

Source: Author's estimates from VLSS93 and VLSS98

Thirdly, as for the poverty elasticity to inequality, the pattern of inequality impacts on poverty is similar to the pattern of expenditure growth. Poverty became more sensitive to inequality in 1998 as compared to 1993, and the negative impact of inequality on the severely poor was larger than its impact on the moderately poor (Table 5). Besides, it should be noted that in 1993, the headcount ratio H for some socioeconomic groups such as the rural region or ethnic minority group responded negatively to inequality, that is an increase in inequality will lead to a decline in the incidence of poverty. This is because in these groups, the mean expenditure is lower than the poverty line. However, the poverty elasticity to inequality for the poverty gap PG and squared gap index P<sub>2</sub> was positive in 1993, indicating an adverse impact of inequality on poverty.

Finally, the incidence of poverty is more elastic to expenditure growth than inequality, whereas the opposite is true for the depth and severity of poverty. That is, if both expenditure growth and the Gini index increase by 1%, then the incidence of poverty will decrease, while the depth and severity of poverty will rise. This suggests that the very poor will be most seriously affected if there is an increase in inequality.

#### *Impacts of Growth and Inequality on Poverty during 1993-1998*

The significant poverty reduction during the period 1993-1998 comes from two components: expenditure growth and expenditure redistribution. The estimation of the actual impacts of these components on poverty relies on the dynamic decomposition method developed by Datt and Ravallion (1991). There are two points worth noting in applying this method for Vietnam. Firstly, it is possible to calculate the growth, redistribution (inequality), and residual

components by estimating the Lorenz curves, the mean expenditure, and the poverty line as indicated in section (2.3.3) of section 2, or by using directly disaggregated data on expenditures. With the available VLSS data, it is more convenient to use the latter way. The techniques for calculation are presented in detail in appendix 4. Secondly, the absolute value of the residual component is found to be much smaller than that of the growth component, but relatively large compared to the absolute value of the redistribution component. As a consequence, the decomposition result for the redistribution changes substantially as one alternates between the initial year (1993) and the final year (1998) as the reference year. Thus, like Kakwani and Pernia, I use both the initial and final year as the reference and simply take an average of the related components, thereby making the residual component vanish.

Table 6 shows several noteworthy findings. Firstly, the most obvious is that the growth component dominates the redistribution component for all poverty measures in all socioeconomic groups. This finding confirms the major role played by economic growth in poverty reduction in Vietnam during the period 1993-1998. For the whole country, if there had been no change in income distribution (that is, the inequality as well as residual would equal zero), the incidence of poverty would have declined more strikingly, by 25.3 percentage points instead of 20.7 percentage points.

Secondly, the redistribution component for the whole country as well as all socioeconomic groups has a relatively small value. For the whole country, the slight increase in inequality made the incidence of poverty increase by 4.6 percentage points. However, the size of the redistribution component becomes larger relative to the total change in poverty as one moves from the H index to PG and  $P_2$  indices. This reinforces the conclusion from the static decomposition that the poorest were the most seriously affected by an increase in inequality.

Thirdly, there are several interesting points in the pattern of the redistribution by socioeconomic group. Let us take the rural areas as an example. As usual, a decline in inequality will lead to a decrease in poverty and vice versa. Yet, within the rural areas the Gini index decreased slightly from 0.278 to 0.271, but the sign of the inequality component for all poverty measures is positive. It is not very surprising that a decrease in inequality made the headcount index increase, because the rural mean expenditure in 1993 was lower than the poverty line (Table 3). But the poverty gap and squared gap measures should have decreased slightly rather than increased, although very negligibly. To examine whether the Lorenz curves for the rural areas in 1993 and 1998 intersected, it is better to draw them in the same picture (Figure A.1 in appendix). In fact, they did not intersect. Thus errors in calculation is the main reason for those increases in the gap and squared gap measures. However these errors are very small and can be acceptable.

Table 6: Growth and inequality decomposition of change in poverty, 1993-1998

	Headcount Ratio (H) (in percent)			Poverty Gap Index (PG)			Squared Gap Index (P <sub>2</sub> )		
	Change in Poverty	Growth Comp.	Inequal. Comp.	Change in Poverty	Growth Comp.	Inequal. Comp.	Change in Poverty	Growth Comp.	Inequal. Comp.
All Vietnam	-20.7	-25.3	4.6	-0.0893	-0.1144	0.0251	-0.0432	-0.0563	0.0131
<i>Urban/Rural</i>									
Urban	-15.8	-18.7	3.0	-0.0466	-0.0560	0.0094	-0.0189	-0.0227	0.0038
Rural	-20.8	-21.2	0.4	-0.0968	-0.0980	0.0012	-0.0480	-0.0484	0.0004
<i>Regions</i>									
Northern Uplands	-20.0	-21.4	1.4	-0.1000	-0.1254	0.0254	-0.0535	-0.0682	0.0147
Red River Delta	-34.1	-36.4	2.3	-0.1304	-0.1477	0.0173	-0.0556	-0.0660	0.0104
North Central	-26.5	-31.7	5.3	-0.1284	-0.1621	0.0337	-0.0644	-0.0824	0.0180
Central Coast	-14.4	-17.7	3.3	-0.0615	-0.0751	0.0136	-0.0316	-0.0374	0.0058
Central Highlands	-17.6	-19.2	1.5	-0.0721	-0.0834	0.0113	-0.0440	-0.0478	0.0038
Southeast	-25.1	-24.2	-0.9	-0.0782	-0.0715	-0.0068	-0.0334	-0.0300	-0.0035
Mekong Delta	-10.2	-11.8	1.6	-0.0567	-0.0498	-0.0070	-0.0291	-0.0224	-0.0070
<i>Ethnic Groups</i>									
Kinh Majority	-22.7	-27.2	4.5	-0.0889	-0.1113	0.0224	-0.0402	-0.0513	0.0111
Ethnic Minorities	-11.3	-11.9	0.7	-0.1056	-0.0968	-0.0089	-0.0697	-0.0587	-0.0111
<i>Head's occupation</i>									
Agriculture	-20.4	-20.0	-0.4	-0.0960	-0.0928	-0.0033	-0.0488	-0.0466	-0.0023
Industry	-18.6	-27.7	9.1	-0.0629	-0.1046	0.0417	-0.0243	-0.0455	0.0212
Services	-15.0	-18.4	3.5	-0.0485	-0.0575	0.0090	-0.0190	-0.0234	0.0044
No Work	-15.9	-20.3	4.5	-0.0731	-0.0905	0.0174	-0.0354	-0.0439	0.0085

Source: Author's estimates from VLSS93 and VLSS98

In other socioeconomic groups, a decrease in inequality results in a decline in poverty as expected. For instance, within the Mekong Delta a small decline in inequality with a 5.7% decrease in Gini index made the headcount index increase by 1.6%, but contributed to reducing the poverty gap index by 0.007, the squared gap index by 0.007. Similarly, a decline in inequality within the ethnic minorities led to an increase in the incidence of poverty, and a decrease in the depth and severity of poverty. These findings confirm a major weakness of the headcount ratio in measuring poverty.<sup>12</sup> Thus merely using the headcount ratio as a poverty measure can lead to serious mistakes in poverty analysis.

### 5.3. Socioeconomic Groups and National Poverty

#### *Group Contribution to National Poverty Reduction*

Different rates of economic growth and inequality changes within socioeconomic groups lead to different contributions to the reduction in national poverty. Table 7 calculates the percentage contribution of growth and inequality by various socioeconomic groups to the reduction in national poverty. If the whole country itself is considered to contribute 100% to its reduction in poverty, then the growth component contributes positively 122.2%, while the inequality contributes negatively 22.2% to that reduction in poverty.

The remarkable reduction in total poverty came mainly from economic growth within the rural areas with a contribution of 87.5% to the reduction in the poverty incidence. This is

<sup>12</sup> This is called violation of transfer axiom which is discussed in section (2.3.2.1) of section 2.

because poverty in Vietnam remains a predominantly rural problem. Thus high growth in the rural areas will lead to a great decrease in national poverty. The economic growth in the urban areas was much less effective in reducing the national poverty. Its contribution to the reduction in national poverty was just one-fifth of the rural areas' contribution.

Among regions, spectacular expenditure growth in the Red River Delta leads to its highest contribution of 40.8% to the reduction in the incidence of total poverty. However its contribution to the severity of total poverty is smaller at 34.0% (the growth component for the  $P_2$  index). Meanwhile, within the Northern Uplands the growth component for the H index is 9.1% and for the  $P_2$  index 20.2%, which indicates that the role of this region's growth was quite modest in reducing the incidence of national poverty, but more significant in making national poverty less severe.

Similarly, expenditure growth for ethnic minorities made a negligible contribution of 3.7% to the reduction in the incidence of national poverty, but a greater contribution of 15.7% to reduction in the severity of national poverty. Generally, the major source of the poverty reduction was the expenditure growth for the Kinh majority.

Table 7: Subgroup contribution to change in total (national) poverty, 1993-1998

	Headcount Ratio (H)			Poverty Gap Index (PG)			Squared Gap Index ( $P_2$ )		
	Change in Poverty	Growth Comp.	Inequal. Comp.	Change in Poverty	Growth Comp.	Inequal. Comp.	Change in Poverty	Growth Comp.	Inequal. Comp.
All Vietnam	100.0	122.2	-22.2	100.0	128.1	-28.1	100.0	130.3	-30.3
<i>Urban/Rural</i>									
Urban	14.0	16.6	-2.7	9.9	11.9	-2.0	8.4	10.1	-1.7
Rural	86.0	87.5	-1.7	90.1	91.2	-1.1	91.6	92.3	-0.8
<i>Regions</i>									
Northern Uplands	8.6	9.1	-0.6	13.1	16.5	-3.3	15.9	20.2	-4.3
Red River Delta	38.3	40.8	-2.5	32.8	37.2	-4.4	28.6	34.0	-5.3
North Central	14.0	16.8	-2.8	17.1	21.6	-4.5	18.1	23.2	-5.1
Central Coast	10.3	12.6	-2.3	9.6	11.7	-2.1	10.0	11.8	-1.8
Central Highlands	1.4	1.6	-0.1	1.5	1.8	-0.2	2.2	2.3	-0.2
Southeast	15.2	14.6	0.5	11.0	10.1	0.9	9.7	8.7	1.0
Mekong Delta	12.6	14.5	-1.9	15.0	13.2	1.8	15.6	12.0	3.7
<i>Ethnic Groups</i>									
Kinh Majority	96.7	115.8	-19.2	87.3	109.3	-22.0	81.4	103.8	-22.4
Ethnic Minorities	3.5	3.7	-0.2	12.8	11.7	1.1	18.7	15.7	3.0
<i>Head's occupation</i>									
Agriculture	77.7	76.1	1.5	79.1	76.5	2.7	81.2	77.5	3.7
Industry	6.6	9.8	-3.2	5.6	9.3	-3.7	4.5	8.5	-4.0
Services	7.0	8.7	-1.6	6.2	7.3	-1.1	5.2	6.3	-1.2
No Work	8.8	11.3	-2.5	9.1	11.3	-2.2	9.0	11.2	-2.2

Source: Author's estimates from VLSS93 and VLSS98

By sectoral groups, the agricultural group's growth is the most effective component in reducing national poverty. This reinforces the success of agricultural reforms in poverty alleviation. If agricultural growth had achieved the same growth rate as the other sectors, the total poverty would have decreased faster over the period 1993-1998. Expenditure growth in the other groups made similar contributions to the total poverty reduction. However, growth in

the “no work” group was slightly more important in reducing the depth and severity of total poverty.

Finally, it should be noted that inequality within regional and sectoral groups had negligible impacts on total poverty. But the total inequality did affect poverty quite adversely, especially the depth and severity of poverty. It reduced the positive impact of economic growth on poverty reduction by 22.2% and 30.3% for the incidence and severity of poverty, respectively.

#### *Response of National Poverty to Growth and Inequality Within Socioeconomic Groups*

To achieve the target of total poverty alleviation after the year 1998, socioeconomic policies should focus on regions or sectors which have high elasticities of total poverty with respect to growth and inequality. Table 8 presents elasticities measuring the responses of national poverty to economic growth and inequality changes within socioeconomic groups for the year 1998. It shows that total poverty is much more elastic to growth and inequality in the rural areas than in the urban areas. Expenditure growth in the rural areas is nearly ten times as efficient as in the urban areas if the policy goal is to reduce the incidence of national poverty. Maintaining a low level of inequality within the rural areas also plays an important role in alleviating national poverty, especially the severity of poverty. Similarly, the national poverty elasticity to growth and inequality is greater in the agricultural group than in other sectoral groups.

By region, the incidence of national poverty is most elastic to the Mekong Delta’s growth, while the severity of national poverty is the most sensitive to the Northern Uplands’ growth. Besides, high economic growth and a decrease in inequality in the Red River Delta and North Central region can also lead to a substantial decline in the level of national poverty.

Table 8: Elasticity of total (national) poverty to mean expenditure and inequality of subgroups, in the year 1998 (in percent)

	Headcount Ratio (H)		Poverty Gap Index (PG)		Squared Gap Index (P <sub>2</sub> )	
	Growth Component	Inequality Component	Growth Component	Inequality Component	Growth Component	Inequality Component
All Vietnam	-183.3	99.7	-293.7	314.2	-327.8	487.1
<i>Urban/Rural</i>						
Urban	-19.3	32.7	-17.7	40.8	-14.9	42.1
Rural	-183.5	38.6	-275.3	174.5	-319.0	296.7
<i>Regions</i>						
Northern Uplands	-37.9	2.8	-78.8	39.7	-102.4	76.8
Red River Delta	-38.5	24.7	-47.5	49.7	-42.5	59.4
North Central	-34.3	7.8	-52.7	33.0	-59.0	52.0
Central Coast	-18.4	8.7	-27.7	30.8	-35.1	57.9
Central Highlands	-7.4	0.6	-13.0	9.2	-19.5	23.1
Southeast	-10.7	19.3	-8.5	20.2	-6.4	19.5
Mekong Delta	-47.0	19.6	-65.0	53.4	-65.7	73.1
<i>Ethnic Groups</i>						
Kinh Majority	-157.9	103.9	-217.0	249.3	-224.3	337.5
Ethnic Minorities	-29.3	-4.4	-75.7	19.4	-106.5	54.9
<i>Head's occupation</i>						



	Headcount Ratio (H)		Poverty Gap Index (PG)		Squared Gap Index (P <sub>2</sub> )	
	Growth Component	Inequality Component	Growth Component	Inequality Component	Growth Component	Inequality Component
Agriculture	-149.1	25.3	-227.9	135.6	-269.9	241.7
Industry	-15.7	15.6	-22.1	33.9	-21.1	42.0
Services	-20.6	28.1	-19.8	38.4	-17.3	42.8
No Work	-15.2	13.6	-22.8	33.6	-24.4	45.4

*Source: Author's estimates from VLSS93 and VLSS98*

As for the ethnic minority group, its growth is not very significant in reducing the incidence of total poverty as compared to the Kinh majority group's growth, but very important in alleviating the severity of total poverty. This implies that the poor in the ethnic minorities are extremely poor, though they account for only a small amount of the total number of the poor throughout the country.

#### **5.4. Degree of Pro-poor Growth**

The first part of Table 9 estimates the pro-poor index within socioeconomic groups. The value of pro-poor indices for all Vietnam is around 0.8, indicating that in general, economic growth during the period of 1993-1998 was actually pro-poor. However, the poor, especially the poorest, still benefited proportionally less than the rich. The pro-poor index for Vietnam is smaller for the poverty gap index (0.78) and the squared gap index (0.77) than for the headcount ratio (0.82), which implies that the benefits of growth were flowing less to the poorest because of the increase in inequality.

There is a relatively small gap in the pro-poor index between socioeconomic groups. Within-group economic growth in the rural areas was more pro-poor than in the urban areas. A similar story also holds for the sectoral groups. Economic growth within the agricultural group is highly pro-poor, while within the industrial group, economic growth is just moderately pro-poor.

By region, the poor in the Mekong Delta and Southeast experienced the benefits from within-group economic growth proportionally more the rich. In contrast, the high increase in inequality within the Northern Highlands and the North Central made economic growth less beneficial to the poor, especially the poorest.

Economic growth within the ethnic minority group was also pro-poor. The pro-poor index for the poverty gap and squared gap measures is larger than one, indicating that the poorest benefited proportionally more than others in this group.

In comparison with two Asian countries Laos and Thailand, economic growth in Vietnam can be considered successful in reducing poverty. However, its pro-poor degree was only half of that in South Korea.

Table 9: Pro-poor index for economic growth during 1993-1998

	Pro-poor index of subgroup growth			Pro-poor index of overall (national) growth		
	Headcount ratio (H)	Poverty gap index (PG)	Squared gap index (P <sub>2</sub> )	Headcount ratio (H)	Poverty gap index (PG)	Squared gap index (P <sub>2</sub> )
All Vietnam	0.82	0.78	0.77	0.82	0.78	0.77
<i>Urban/Rural</i>						
Urban	0.84	0.83	0.83	1.15	1.14	1.14
Rural	0.98	0.99	0.99	0.73	0.72	0.72
<i>Regions</i>						
Northern Uplands	0.94	0.80	0.79	0.77	0.65	0.63
Red River Delta	0.94	0.88	0.84	1.22	1.14	1.09
North Central	0.84	0.79	0.78	0.91	0.87	0.86
Central Coast	0.82	0.82	0.85	0.60	0.61	0.62
Central Highlands	0.92	0.86	0.92	0.64	0.57	0.60
Southeast	1.04	1.09	1.12	1.58	1.68	1.76
Mekong Delta	0.87	1.14	1.30	0.39	0.53	0.59
<i>Ethnic Groups</i>						
Kinh Majority	0.83	0.80	0.78	0.87	0.84	0.83
Ethnic Minorities	0.95	1.09	1.19	0.53	0.62	0.66
<i>Head's occupation</i>						
Agriculture	1.02	1.04	1.05	0.71	0.70	0.70
Industry	0.67	0.60	0.53	0.77	0.70	0.63
Services	0.82	0.84	0.81	0.92	0.93	0.91
No Work	0.78	0.81	0.81	0.80	0.83	0.82

Source: Author's estimates from VLSS93 and VLSS98

## 6. Conclusions

The economic reforms adopted since the late 1980s have brought about spectacular economic growth for Vietnam, with an average annual rate of about 7% in GDP per capita during the period 1993-1998. These economic achievements in turn resulted in significant success in poverty reduction. Between 1993 and 1998, the ratio of the poor to the entire population declined strikingly by 20.7 percentage points from 58.1% to 37.4%. All socioeconomic groups experienced reduction in the incidence and severity of poverty. The incidence of poverty in the urban areas decreased by 15.8 percentage points from 24.9% to 9.2%, while the rural areas experienced a decline in the poverty incidence of 21.2 percentage points from 66.4% to 45.5%. Among the seven regions, the decline in the incidence of poverty varied from 10.2 percentage points in the Mekong Delta to 34.1 percentage points in the Red River Delta.

Poverty in Vietnam is found to be highly sensitive to economic growth. Poverty should decrease faster than the rate of economic growth provided that the process of economic growth does not lead to an increase in inequality. However, the severity of poverty is more responsive to inequality than economic growth. This implies that if there is an increase in inequality, the extremely poor people will be most seriously affected.

In fact, between 1993 and 1998, while high economic growth had substantial positive impacts on poverty reduction, an increase in inequality (with the Gini index rising from 0.33 to 0.35) mitigated those impacts of growth on poverty reduction. The empirical results show that

if there had been no change in inequality, the incidence of poverty would have decreased by 25.3 percentage points instead of 20.7 percentage points. Moreover, it is also found that the increase in inequality had larger adverse impacts on the poorest than on the poor.

The “*growth with equity*” strategy that Vietnam chose to follow during the 1990s was partially successful. Although economic growth was pro-poor during the period 1993-1998, indeed, the poor still benefited proportionally less than the rich from economic growth. Overall economic growth was biased in favour of the rich regions. In addition, the benefits of overall economic growth differed considerably between different groups of poor people. On the whole, the poor in the urban areas, which are dominated by the Kinh majority and where the industrial and services sectors are concentrated, benefited proportionally more than the poor in the remote areas where ethnic minorities reside, and in the rural areas where the agricultural sector dominates.

As a result, poverty is still prevalent and persistent in the rural areas, and especially serious for ethnic minorities. For instance, ethnic minorities, whose share in the whole population was 14% in 1998, accounted for 29% of the total number of the poor throughout the country. When the shortfall of the poor’s income from the poverty line is taken into account, the squared gap index which measures the severity of poverty is produced. Analytical results of this index show that the contribution of ethnic minorities to the severity of national poverty was as high as to 42% in 1998.

In the coming years, the government needs to launch a strategy of pro-poor growth if it wants to achieve the goal of reducing the incidence of poverty to 5% in the year 2010. In such a pattern of pro-poor growth, the economy has to attain not only its target of an annual growth rate of 7%, but inequality should also remain unchanged so that the poor will benefit proportionally the same as the rich from economic growth. The analytical results of the study suggest several directions for this strategy.

Firstly, the fact that poverty in Vietnam remains prevalent and persistent in the rural, mountainous and remote areas suggests that pro-poor policies including direct and indirect policies should focus strongly on these areas. Reducing poverty in the rural areas requires increasing the rural income through creating more off-farm employment and raising agricultural productivity. In doing so, the following general measures should be included:

(1) Measures promoting the private and foreign sectors: eliminating barriers to business entry by simplifying or removing business licenses; removing the dual pricing system between domestic and foreign enterprises and implementing the revised foreign investment law; promoting the privatization of State-owned enterprises.

(2) Measures strengthening the banking sector: improving and restructuring the regulatory and supervisory framework for banking activities to ensure that capital will be lent to the investments with highest returns instead of to unprofitable state enterprises in the form of a subsidy; resolving non-performing loans; conducting annual independent audits.

(3) Measures supporting agriculture: giving farmers much more information on production techniques and market; allowing farmers favourable access to credit

services; creating supporting physical infrastructure such as a better irrigation system, high quality seeds, fertilizers; encouraging the growth of agro-industry and facilitating access to international market.

(4) Measures promoting migration from low-growth regions (the rural and remote areas) to high-growth regions (the urban areas): providing the poor with information on urban life and employment opportunities; reducing barriers to migrants from the rural to urban areas.

(5) Measures benefiting the poor directly: providing education, vocational training and healthcare services; improving the rural infrastructure.

Secondly, among the seven regions in Vietnam, promotion of economic growth and inequality reduction should be focused in regions to which national poverty is highly responsive. To reduce total poverty, economic growth should be promoted within the Northern Uplands, Mekong Delta, North Central, and Red River Delta (these regions are named according to the elasticity of the severity of total poverty to within-region growth from the highest to lowest value), while inequality within the Southeast, the Mekong Delta, and the Red River Delta should be reduced. General pro-poor policies such as promotion of agricultural productivity and off-farm employment, and provision of secondary education and basic health-care services are strongly recommended to benefit the poor and reduce inequality between as well as within regions in Vietnam.<sup>13</sup>

To this end, a question is raised: How should particular economic growth and pro-poor policies focusing on each socioeconomic group be formulated to achieve the Vietnamese government's target of poverty reduction by the year 2010? The answering of the question requires further study about specific economic conditions and poverty patterns of different socioeconomic groups and regions. Finally, it should be noted that the pattern of high economic growth without an increase in inequality seems quite ambitious in the context of the increasing gap between the poor and the rich in Vietnam. However South Korea achieved a pro-poor index of 1.71 during the period 1993-1998. Thus, to attain a highly pro-poor growth it is desirable to examine in more detail the policies that led to highly pro-poor growth in South Korea and how these can be applied to the case of Vietnam.<sup>14</sup>

---

<sup>13</sup> Pro-poor policies were discussed in section (2.4) of section 2, and more specific pro-poor policies for Vietnam can be found in World Bank (1998), World Bank (2000c), UNDP(2000), and World Bank (2001a).

<sup>14</sup> Other countries such as Taiwan, Hong Kong, and Singapore also achieved highly pro-poor growth during the 1980s and 1990s.

## References

ADB (1999), *Fighting Poverty in Asia and the Pacific: The Poverty Reduction Strategy*, Manila: Asian Development Bank.

ADB (2000), *Asian Development Outlook 2000*, Asian Development Bank.

Ahluwalia, M., Carter, N. and Chenery, H. (1979), "Growth and Poverty in Developing Countries". *Journal of Development Economics*, Vol. 6, 1979 page: 299-341.

Ames, B., Brown, W., Devarajan, S., and Izquierdo, A. (2001), "Macroeconomic Policy and Poverty Reduction", *Poverty Reduction Strategy Paper*, Sourcebook Chapter 6, 2001, World Bank.

Arrow, K. J. (1962), "The Economic Implications of Learning by Doing", *Review of Economic Studies*, 29(1962), page: 155-173.

Bhagwati, J. N. (1968), "Distortions and Immiserizing Growth: A Generalization", *Review of Economic Studies*, Vol. 35, No. 104.

Bhagwati, J. N. (1988), "Poverty and Public Policy", *World Development*, 16(5), page: 539-654.

Datt, G. and Ravallion, M. (1991), "Growth and Redistribution Components of Changes in Poverty Measures: A Decomposition with Applications to Brazil and India in the 1980s", *Living Standard Measurement Study*, Working Paper No. 83.

Deininger, K. and Squire, L. (1997), "Economic Growth and Income Inequality: Reexamining the Links", *Finance and Development*, March.

Demery, L. and Squire, L. (1995), *Poverty in Africa: an Emerging Picture*, Washington, DC, World Bank.

Dollar, D. and Kraay, A. (2000), *Growth Is Good for the Poor*, Development Research Group, Washington, D.C., World Bank.

Fallon, P. and Hon, V. (1999), *Poverty and Labor-Intensive Growth*, Note Prepared for World Development Report 2000/2001, World Bank.

Fields, G. (1980), *Poverty, Inequality, Development*, New York, Cambridge University Press.

Fields, G. (1989), *Changes in Poverty and Inequality in Developing Countries*, World Bank Research Observer, Vol. 4.

Foster, J., Greer, J., and Thorbecke, E. (1984), "A Class of Decomposable Poverty Measures", *Econometrica* Vol.52, 1984, page: 761-765.

General Statistical Office (various years), *Statistical Yearbook*, Hanoi: Statistical Publishing House.

Glewwe, P., Gragnolati, M., and Zaman, H. (2000), “Who Gained from Vietnam's Boom in the 1990s? An Analysis of Poverty and Inequality Trends”, *Poverty and Human Resources*, Development Research Group, World Bank.

Kakwani, N. C. (1980), *Income Inequality and Poverty: Methods of Estimation and Policy Applications*, World Bank Research Publication, Oxford University Press.

Kakwani, N. C., and Pernia, E. M. (2000), “What is Pro-poor Growth?”, *Asian Development Review*, Asian Development Bank.

Perkins, Dwight H., Steven Radelet, Donald R. Snodgrass, Malcolm Gillis, and Michael Roemer (2001), *Economics of Development*, W.W. Norton & Company, Inc.

Ravallion, M. (1992), “Poverty Comparisons: A Guide to Concepts and Methods”, *Living Standard Measurement Study*, Working Paper No. 88, World Bank.

Ravallion, M. (1997), “Can High-Inequality Developing Countries Escape Absolutely Poverty?”, *Policy Working Paper* No. 1775, World Bank.

Ravallion, M. and Chen, S. (1997), “What Can New Survey Data Tell Us about Recent Changes in Distribution and Poverty?”, *World Bank Researcher Observer*, Vol. 11.

Ravallion, M., and Datt, G. (1999), *When Is Growth Pro-poor? Evidence from the Diverse Experiences of India's States*, World Bank.

Theil, H. (1967), *Economics and Information Theory*, Amsterdam, North Holland.

Timmer, C. P. (1997), *How Well Do the Poor Connect to the Growth Process?*, Consulting Assistance on Economic Reform Discussion Paper 178, Cambridge, Mass: Harvard Institute for International Development.

Villasenor, J., and B. C. Arnold (1989), “Elliptical Lorenz Curve”, *Journal of Econometrics* 40, page: 327-338.

World Bank (1996), *Taking Action to Reduce Poverty in Sub-Saharan Africa – An Overview*, World Bank, Washington, DC.

World Bank (2000), *Vietnam Development Report 2000: Attacking Poverty*, Hanoi, Vietnam. Available via internet at: <http://worldbank.org.vn>

World Bank (2001), *World Development Report 2000/2001: Attacking Poverty*, Oxford University Press.

## **Appendix**

## Estimation of the Lorenz Curve

To calculate the poverty elasticity to the mean expenditure for the headcount ratio by formula (10) and (12) in section 3, it is necessary to estimate the Lorenz curve. In empirical studies, there are many functional forms that can be used to estimate the Lorenz curve. The well-known classical Pareto Lorenz curve is:

$$L(p) = 1 - (1-p)^{\frac{\gamma-1}{\gamma}} \quad \text{with } \gamma > 1 \quad (\text{A.1})$$

The model proposed by Kakwani and Podder (1973) produces a Lorenz curve of the type:

$$L(p) = x^\delta \exp[-\eta(1-x)] \quad \text{with } 1 < \delta < 2, \eta > 0 \quad (\text{A.2})$$

Meanwhile, the Lorenz curve for the lognormal distribution can be specified as follows:

$$\phi[L(p)] = \phi(p) - \sigma \quad (\text{A.3})$$

where:

$$\phi[L(p)] = \frac{\log x - \mu - \sigma^2}{\sigma} \quad (\text{A.4})$$

$$\phi(p) = \frac{\log x - \mu}{\sigma} \quad (\text{A.5})$$

In this function of the Lorenz curve, only the parameter  $\sigma$  needs to be estimated.<sup>1</sup>

Kakwani (1981) developed an equation of the Lorenz curve:

$$L(p) = p - \theta p^\gamma (1-p)^\delta \quad (\text{A.6})$$

where  $\theta, \gamma, \delta$  are the parameters, which are assumed to be greater than zero and need to be estimated.

An alternative functional form of the Lorenz curve which is also widely estimated in empirical analysis was introduced by Villasenor and Arnold in 1989. This so-called generalized quadratic Lorenz equation can be expressed as:

$$L(p)[1-L(p)] = a[p^2 - L(p)] + bL(p)(p-1) + c[p - L(p)] \quad (\text{A.7})$$

where a, b, and c are the parameter to be estimated.

There are two points that should be taken into account when the Lorenz curve is estimated in order to calculate the poverty measures:

Firstly, the estimated Lorenz curve has to satisfy the theoretical conditions for a valid Lorenz curve. These conditions have been mentioned in section 2. They are:

$$(1) 0 \leq L(p) \leq 1$$

---

<sup>1</sup> For more details on this function, see Heerink (1994).

(2)  $L(p)$  is a monotonically increasing function in  $p$ .

(3)  $L(p)$  is convex to the  $p$ -axis.

Secondly, although it is very easy to obtain a goodness of fit for a smooth function such as a Lorenz curve, that does not mean that it will give accurate estimates of poverty measures (Ravallion, 1992). The accuracy depends greatly on the particular functional specification used, and some tend to dominate others on many data sets. Ravallion (1992) gives a suggestion that the two best models for estimating the poverty measures are the Kakwani (1980) model, and the generalized quadratic model of Villasenor and Arnold (1989).

### Estimations of Growth, Redistribution, and Residual Components

It is possible to calculate the growth, redistribution (inequality), and residual components by estimating the Lorenz curves, the mean expenditure, and the poverty line as indicated in section 2, or by using directly disaggregated data on expenditures

According to the first way, once the Lorenz curve has been estimated, the poverty measures can be obtained. Datt and Ravallion (1991) derived formulas to calculate the poverty measures for the parametric specifications of the Lorenz curve in the Kakwani (1980) model, and the generalized quadratic model developed by Villasenor and Arnold (1989). The results are given in the following tables.

Table A.1: Poverty measures for Kakwani Lorenz curve

Equation of the Lorenz curve	$L(p) = p - \theta p^\gamma (1-p)^\delta$
Headcount ratio (H)	$\theta H^\gamma (1-H)^\delta \left[ \frac{\gamma}{H} - \frac{\delta}{1-H} \right] = 1 - \frac{z}{\mu}$
Poverty gap index (PG)	$P_G = H - \frac{\mu}{z} L(H)$
FGT index ( $P_2$ )	$P_2 = \left(1 - \frac{\mu}{z}\right) \left[ 2PG - \left(1 - \frac{\mu}{z}\right) H \right] + \theta^2 \left( \frac{\mu^2}{z^2} \right) \left[ \gamma^2 B(H, 2\gamma - 1, 2\delta + 1) - 2\gamma\delta B(H, 2\gamma, 2\delta) + \delta^2 B(H, 2\gamma + 1, 2\delta - 1) \right]$
Note	$B(k, r, s) = \int_0^k p^{r-1} (1-p)^{s-1} dp$ $L(p^*)$ denotes the Lorenz curve for the poor



Table A.2: Poverty measures for the generalized quadratic Lorenz curve

Equation of the Lorenz curve	$L(p)[1 - L(p)] = a[p^2 - L(p)] + bL(p)[(p-1)] + c[p - L(p)]$ or: $L(p) = -\left(\frac{1}{2}\right) \left[ bp + e + (mp^2 + np + e^2)^{\frac{1}{2}} \right]$
Headcount ratio (H)	$H = -\left(\frac{1}{2m}\right) \left\{ n + r \left( b + 2\frac{z}{\mu} \right) \left[ \left( b + 2\frac{z}{\mu} \right)^2 - m \right]^{\frac{-1}{2}} \right\}$
Poverty gap index (PG)	$PG = H - \left(\frac{\mu}{z}\right) L(H)$
FGT index (P <sub>2</sub> )	$P_2 = 2PG - H - \left(\frac{\mu}{z}\right)^2 \left[ aH + bL(H) - \left(\frac{r}{16}\right) \ln \left( \frac{1-H/s_1}{1-H/s_2} \right) \right]$
Note	$e = -(a + b + c + 1)$ $m = b^2 - 4a$ $n = 2be - 4c$ $r = (n^2 - 4me^2)^{1/2}$ $s_1 = (r - n)/(2m)$ $s_2 = -(r + n)/(2m)$ $L(p^*)$ denotes the Lorenz curve for the poor

Once the parameters of the Lorenz curve of a certain form, for instance the Kakwani form, have been estimated, all of these poverty indices can be calculated according to the formulas given in Table A.1. Then the growth component is calculated by changing the mean income  $\mu$  from  $\mu_t$  at the date  $t$  to  $\mu_{t+n}$  at the date  $(t + n)$  while fixing the parameters  $\theta, \gamma, \delta$  of the Kakwani Lorenz curve at the reference date  $r$ . In contrast, the redistribution can be derived by altering the parameters  $\theta, \gamma, \delta$  from the date  $t$  to the date  $(t + n)$ , and at the same time keeping the mean income  $\mu$  unchanged at the reference date  $r$ . Finally the residual component is obtained by taking the sum of the growth component and the redistribution component from the actual change in the poverty measures.

The second way is more simple and convenient when the disaggregated data are available. As suggested by Bob Baulch at the Institute of Development Studies, University of Sussex, United Kingdom, the growth and inequality components can be calculated directly from the data on expenditures per capita.

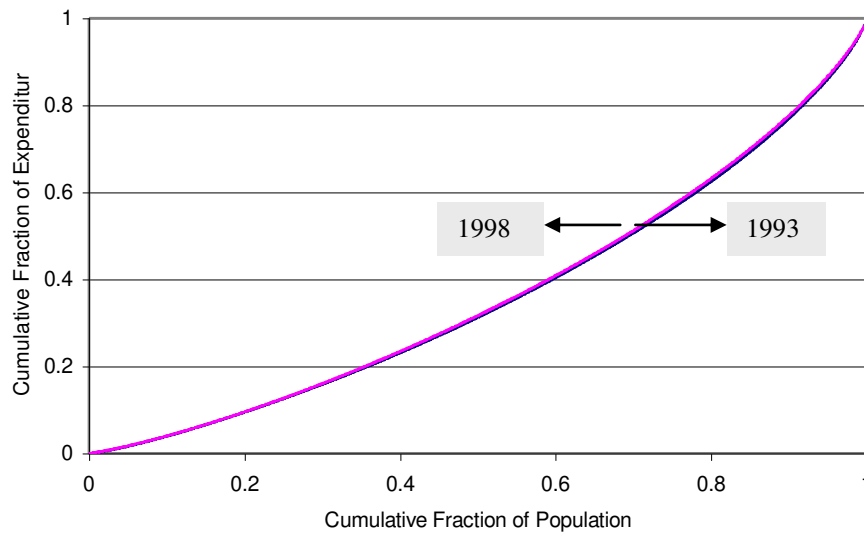
To estimate the growth component, expenditures per capita in the initial year are multiplied by the growth rate of expenditures per capita between the initial and final years, then the so-called forwarded incidence of poverty is calculated based on these obtained data. If inequality did not change, this incidence of poverty would be the incidence of poverty in the final year. Thus, the growth component is obtained by subtracting the actual incidence of poverty in the initial year from the forwarded one.

Similarly, to estimate the inequality (redistribution) component, expenditures per capita in the final year are divided by the growth rate of expenditures per capita between the initial and final years, then the so-called backwarded incidence of poverty is calculated based

on these obtained data. If the mean expenditure did not change, this incidence of poverty would be the incidence of poverty in the final year. Thus, the inequality component is obtained by subtracting the actual incidence of poverty in the initial year from the backwarded one.

Finally the residual component is obtained by taking the sum of the growth component and the redistribution component from the actual change in the poverty measures.

Figure A.1: Lorenz curve for the rural area



Source: Author's estimate from VLSS93 and VLSS98