

---

# Growth, Inequality, and Poverty: An Introduction

Nanak Kakwani, Brahm Prakash, and Hyun Son

---

***Abstract.** The paper provides a summary of all the papers in this special volume. It also gives a brief theoretical introduction to the subject of growth, inequality, and poverty, including the neoclassical growth and new growth theories. It discusses the relationship between growth and inequality, and presents empirical evidence that argues that growth does not lead to inequality. The reverse causation from inequality to growth is also examined. The Dollar and Kraay methodology, which concludes that growth is good for the poor, is also reviewed. Finally, the paper argues that the emphasis on pro-poor growth policies will reduce poverty more rapidly than simple reliance on the trickle down effect. However, poverty reduction with growth also depends on initial inequalities and assets.*

---

## Economic Growth

**E**conomic growth rates differ widely between countries. The old growth theory that predicted a convergence of growth rates has been questioned by various empirical analyses based on cross-country growth experiences. Instead, empirical evidence shows a tendency toward divergent growth rates across countries. For most developing countries in sub-Saharan Africa, gross domestic product (GDP) per capita fell by 15 percent between 1980 and 1998, while those in Latin America recorded an average growth rate of 6 percent. Moreover, Asian economies have shown spectacular growth performance that is even higher than Latin American economies throughout the period. Why do growth rates differ widely between economies during the same period of time? This has spurred new research that returns to growth issues including the new growth theory (NGT) and empirical works explaining growth performances for the last two decades. In explaining different levels of income and growth rates across nations, NGT has drawn the most attention in the economic literature.

---

Nanak Kakwani is a professor in the University of New South Wales; Brahm Prakash is director of the Poverty Reduction and Social Development Division, Regional and Sustainable Development Department of the Asian Development Bank; and Hyun Son is a Ph.D. student in the University of New South Wales.

The orthodox neoclassical growth theory by Solow (1957, 1994) made a controversial prediction on the convergence of per capita income across countries after controlling for factors such as savings rates, population growth, and so forth. This conditional convergence hypothesis suggests that a country that initially has a lower level of per capita income grows faster because it has less per capita capital relative to the steady state level, and thus a higher marginal return to capital and a higher rate of per capita growth. This hypothesis can explain quite considerably the differences in per capita incomes across countries through variations in the savings rate and population growth. However, recent empirical evidence suggests that factors such as endogenous technical progress, human capital accumulation increasing returns to research and development (R&D), and government policies might have a stronger and better explanatory power in determining the variation in per capita income across countries (Barro and Sala-i-Martin 1995). These factors are in fact the central themes of the endogenous growth theories established on the basis of neoclassical economics.

The NGT takes into account positive externalities stemming from private efforts on R&D, which improves the stock of knowledge in the economy as a whole (Romer 1986, 1994). Unlike the neoclassical theory, technology is incorporated as an endogenous variable in the modern growth theory. In the NGT economic world, long-run economic growth can be achieved through increasing returns to scale at the level of society, with these returns coming from investment in R&D at the firm level. Overall, R&D contributions to the total stock of technology or knowledge will give rise to a higher growth rate. This in turn raises an important policy implication in favor of free international trade across nations, which may encourage R&D across countries. It further implies that investment in R&D can make labor more mobile across countries.

Another crucial source of economic growth that is highlighted by the NGT is skills and knowledge of the labor force. These skills and knowledge enhance the productivity of factors of production through activities such as education and on-the-job training. Barro (1989), Lucas (1988), and Romer (1990) argue that investment in human capital leads to increases in efficiency of labor, which in turn results in output growth.

Skilled labor has positive effects on the productivity of both capital and labor. The NGT, following from the Solow model, argues that investment in human capital, generated from savings, increases the future market value of labor. The accumulation of human capital through education and on-the-job training helps to avoid physical capital from diminishing its returns, and makes possible the continuing growth of an economy.

For instance, the rapid growth of the economy of Republic of Korea (henceforth Korea) is due largely to the nation's high level of education. As argued by Young (1995) and Nelson and Pack (1999), coupled with factor accumulations in physical

capital and labor force, an increase in human capital through improved educational levels accounts for the fast economic growth experienced by Korea. The proportion of the Korean workforce with a secondary education has tripled between the mid-1960s and mid-1990s. This high level of education has enabled the labor force to absorb rapid changes in technology. Moreover, education has played a pivotal role in improving productivity in agriculture and industry within the Korean economy.

In the framework of NGT, government policies are also important in determining economic growth in the long run. A change in the tax structure that makes savings more attractive may promote incentives to invest in education or training, which will have large and sustained effects on the growth rate of an economy as a whole through the increased efficiency of factors of production. Well-established intellectual property rights encourage research and development within the economy, which will speed up economic growth through the spill-over effects of R&D on the overall stock of knowledge. Moreover, through open market policies such as deregulation of exports and financial markets, the mobility of factors of production across countries acts to strengthen economic growth.

In summary, endogenous growth theories attempt to explain the nonconvergence of per capita income levels between developing and developed countries in terms of the allocation of resources and the amount of resources devoted to research and development (Temple 1999). Moreover, the new theories explore possible determinants of long-run growth, with emphasis on the roles of technology, international free trade, human capital, returns to scale, externalities, and so forth. Further, the new growth theory offers the important insight that economic institutions and government policies play crucial roles in determining long-run growth.

Economic growth is closely interrelated and intertwined with inequality and poverty. The interrelationship between the three phenomena reflects the pattern of growth, which can differ from country to country. Recognizing the diversity of individual country experiences, it may still be possible to make some general observations about the relationship between growth, inequality, and poverty.

### **Growth and Inequality**

Kuznets (1955, 1963) undertook research to find the determinants of the long-run levels and trends in income inequality and the relationship between economic growth and income inequality. He postulated that inequality in income distribution worsens initially when economic development takes off and then improves in the mature stage of industrialization. This hypothesis is now popularly known as "inverted U-shaped pattern of income inequality"—inequality first increasing then decreasing with economic development. This hypothesis assumes that the economy consists of a low mean income and low inequality in the rural agricultural sector and

a high mean income with high inequality in the urban industrial sector. It also assumes that migration occurs from the rural sector to the urban sector, which increases aggregate inequality.

In explaining his hypothesis, Kuznets emphasizes the structural change that occurs in the course of economic development. As an economy progresses the importance of industry tends to expand, shifting from the primary agricultural sector to the modern industrial sector that includes manufacturing and services. During this economic transition, labor productivity in the modern sector is higher than in the agricultural sector so the per capita income of the modern sector is also expected to be higher. As a result, inequality between the two sectors increases in the initial stages of economic development and later declines.<sup>1</sup>

The Kuznets hypothesis was able to explain the relationship between inequality and economic growth for the industrialized countries until the 1970s. Notwithstanding that Kuznets himself was inconclusive on the hypothesis, numerous studies that support the hypothesis have been produced. These studies began with Kravis (1960), followed by, among many others, Oshima (1962) who “fully confirmed” the Kuznets finding, Adelman and Morris (1971), Paukert (1973), Ahluwalia (1974, 1976) who deemed the hypothesis as a “stylized fact”, Robinson (1976) who said that the hypothesis was an “economic law”, and Ram (1988).

With the emergence of numerous cross-country studies in the 1970s, Kuznets’s hypothesis had acquired the status of modern paradigm (Saith 1983). The curve has important implications for formulating poverty reduction strategies. If inequality rises at the early stage of development, it is possible that growth alone will not be sufficient to alleviate poverty at least in the foreseeable future, or growth may completely bypass the poor. The emphasis then should be placed on direct poverty reduction policies even if they amount to sacrificing some growth.

In the 1980s, the paradigm began to be questioned. Anand and Kanbur (1984) criticized the studies that supported the Kuznets hypothesis on the grounds that they used defective data and questionable methodology. More recently, Oshima (1994) concluded that the Kuznets relationship “is all, but absent in present-day Asian countries”. Recently compiled data set on international inequality by Deininger and Squire (1996) has provided an opportunity to make a deeper enquiry into this subject. This data set is much larger and of higher quality containing 682 observations on the Gini index for 108 countries. Analyzing this high-class data set, Deininger and Squire (1998) conclude that there exists no support for the Kuznets hypothesis of inverted U-shaped curve. When tested on a country-by-country basis, they found that 90 percent of the countries investigated did not validate the Kuznets hypothesis.

There is also a slightly modified “dynamic version” of the Kuznets hypothesis, which postulates that inequality increases as the rate of growth of income goes up. It

---

<sup>1</sup>See Kakwani (1988) for a detailed discussion of this model. He derives the conditions under which the Kuznets curve will exist.

means that under faster growth rates, the poor will receive proportionally lower benefits of growth than the rich. Fields (1989) did not find any systematic relationship between changes in inequality and the rate of growth of income. Using their higher-quality data, Deininger and Squire (1998) also investigated the relationship between changes in inequality and rate of economic growth. They conclude that there appears to be little systematic relationship between growth and changes in aggregate inequality. Periods of growth were just as often associated with increases in inequality as they were with declines.

The paradigm seems to have evaporated. There exists no solid evidence of increase in inequality with economic growth. Ravallion and Chen (1997) have in fact provided an evidence of declining inequality with economic growth. Looking at a sample of 64 changes in inequality and economic growth between 1981 and 1994, they found a negative correlation between economic growth and changes in inequality. This correlation disappears, however, when they exclude the transition economies of Eastern Europe and Central Asia. Most recent research seems to suggest that inequality as measured by the Gini index has remained stable over time in a large number of countries (Li et al. 1998). It means that economic growth tends to neither increase inequality nor decrease it. This result clearly has important implications for poverty reduction. It implies that rapid economic growth will generally be accompanied by a rapid reduction in poverty.

### **Reverse Causation: Inequality to Growth**

Is inequality good or bad for growth? This issue has attracted much attention in the economic literature. In the views put forward in the older economic literature, economies with unequal distribution of income will supposedly grow faster than those economies with equal income distribution. This thinking is based on the standard economic theory that marginal propensity to save is higher for the rich than for the poor. Thus, economies with higher inequality of income or wealth are likely to have higher rates of savings, which translate into high investment and thus output growth.

Similarly, neoclassical theory provides a linkage between inequality and economic growth. Changes in the tax structure that have a direct influence on savings can change growth rates depending on changes in the ratio of capital to labor. In this framework, returns to savings determine people's motives to accumulate income or wealth, which changes the distribution of income or wealth. Therefore an economy with a regressive income tax that makes society more unequal through income redistribution may offer strong incentives for the rich to save or accumulate their wealth and thus induce faster output growth. Here the rapid rate of economic growth is traded off with higher inequality of income or wealth.

Another argument for a positive relationship between growth and inequality is based on the issues associated with attitudes toward the risk of costly investment projects. Heavy investment in physical and human capital not only generates high costs but also requires risk taking. Thus, generally only rich people can bear to take on the risk of high costs so these are the people who can exert a big push to new investment projects that have potential to promote economic growth.

These arguments have been criticized heavily by recent empirical studies. For instance, Korea has experienced both high growth in GDP per capita together with low and stable inequality for the last three decades. In contrast, Thailand's growth performance has been impressive in comparison to other countries in Asia as well as outside Asia, but inequality has remained high throughout the development process. Overall, today a consensus is emerging toward a view that high inequality reduces growth rates as argued by Aghion et al. (1999). The main policy implication that emerges from their study is that "when capital markets are imperfect, there is scope for re-distributive policies, which are also growth-enhancing". This study also points out the importance of sustained redistribution. As suggested by this study, a one-time reduction in after-tax inequality that would foster investment incentives and growth in the short run would result in an upsurge in inequality as a consequence of technical progress it induces. What is, therefore, needed is to have permanent redistribution policies in order to both control the level of inequality and foster growth. Thus, the future research should focus on designing and implementing such policies.

On the whole, the consensus emerging is that the relationship between inequality and the growth rate of GDP per capita depends on the equal initial distributions of physical and human capital, how the process of growth affects the returns to those assets, and on the effectiveness of redistribution policies through tax and transfer systems (Frank and Webb 1977, Lipton and Ravallion 1993, Aghion et al. 1999).

### **Growth and Poverty**

A view held widely in development economics is that the benefits of rapid economic growth rates diffuse automatically across all segments of society. This view is based on the trickle-down theory that was the dominant development thinking in the 1950s and 1960s. It implies a vertical flow from the rich to the poor that happens in the ordinary course of economic functioning. 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 poor benefit from economic growth only indirectly through a vertical flow from the rich. This implies that the proportional benefits of growth going to the poor will always be less. Still it was believed that growth will rapidly reduce poverty. Thus the main concern of

economists in the 1950s and 1960s was to enhance growth by means of increasing savings and investments. By the early 1970s, the trickle-down theory lost some of its shine. The basic needs approach became the dominant thinking among economists and the international organizations, particularly the World Bank and the International Labour Organisation.

Recent cross-country analyses show that growth and poverty reduction are strongly positively correlated, or in other words, growth and poverty reduction go hand in hand. The countries that have experienced high growth over a sustained period have made a greater reduction in poverty. Ravallion and Chen (1997) show that a 10 percent increase in the mean standard of living leads to an average reduction of 31 percent in the proportion of the population below the poverty line. This result indicates that growth can reduce poverty incidence very rapidly. Why then has there been so much skepticism of the “trickle down” phenomenon in the post-1970 period? A simple answer to this question is that the cross-country analysis is indicative of average trends, while individual country experiences can vary quite significantly. In many countries, the high incidence of poverty persisted despite having decent growth rates. It is the slower rate of poverty reduction in many countries that has generated keen interest in the concept of pro-poor growth.

The degree of poverty depends on two factors: average income and income inequality. An increase in average income reduces poverty and an increase in inequality increases it. Economic growth increases average income (or consumption), but at the same time it may be accompanied by increasing or decreasing inequality. The increase (decrease) in inequality implies that the proportional benefits received by the poor are less (more) than those of the non-poor. Thus, in strict terms, growth is pro-poor when it is accompanied by a reduction in inequality.

The pro-poor growth reduces poverty more rapidly than nonpro-poor growth. It has been found that there can be large variation in poverty reduction for the same growth rate in per capita GDP. It means that some countries have a more pro-poor growth than others. What explains these differences? If growth is accompanied by increase in inequality, then poverty reduction will be slower with the same growth rate. In some cases, inequality effect may dominate over the growth effect and poverty may even increase with growth. The empirical evidence shows that such situations are rare. The incidence of poverty can be reduced even if growth is accompanied by an increase in inequality. This situation may be characterized as “trickle down” phenomenon.

Recent empirical studies have found that the rate of poverty reduction with growth also depends on initial inequalities in income and assets. Using cross-country regressions, Ravallion (1997) estimated poverty elasticity with growth with different levels of initial inequality. He found that poverty elasticity, which measures the responsiveness of poverty with respect to growth, is lower, the higher is the initial level of inequality. A country with a Gini index of 0.25 is likely to have a poverty

elasticity of  $-3.3$ , which implies that a growth rate of 1 percent will reduce the incidence of poverty measured by the percentage poor by 3.3 percent, while one with a Gini index of 0.6 is likely to have a poverty reduction of 1.8 percent. These results clearly show that the initial inequality of income is very important in explaining differences in rate poverty reduction in different countries. Deininger and Squire (1998) also reached the similar conclusion that “initial inequality hurts mainly the poor, but not the rich.” They argue that this finding is consistent with the theoretical literature that emphasizes credit rationing and the inability of the poor to undertake productive investments as mechanisms through which the effects of initial inequality and growth may be transmitted.

### **Growth is Good for the Poor: A Critique of the World Bank Study**

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. Economic growth over a period of four decades has not changed the relative inequality; the proportional benefits of growth going to the poor are the same as those enjoyed by the nonpoor. Thus the authors make a strong case for growth-maximizing policies concluding, “growth generally does benefit the poor and that anyone who cares about the poor should favor the growth-enhancing policies of good rule of law, fiscal discipline, and openness to international trade” (Dollar and Kraay 2000).

The Dollar-Kraay study suggests that governments need not follow pro-poor growth policies. They should simply maximize economic growth provided they avoid high inflation and maintain fiscal discipline. Not surprisingly, the study has generated a heated debate on the role of economic growth in reducing poverty. An Oxfam policy paper (Oxfam 2000) has made a severe attack on the conclusions emerging from the Dollar-Kraay study. It says, “Growth is good for the poor reflects an ideological hankering for a return to the golden age of free market economics in the 1980s. Openly supported by some northern governments, it is an attempt to radically change the direction of development policy” (Oxfam 2000). These strong sentiments have been expressed more due to ideological bias than to facts. It would be more appropriate to evaluate the Dollar-Kraay study on the basis of an objective assessment of its methodology. This is what is attempted here.

Dollar and Kraay estimate the variants of the following regression of the logarithm of per capita income of the poor on the logarithm of per capita income:

$$\bar{y} = \alpha_0 + \alpha_1 \bar{x} + \alpha_3 X + \varepsilon \quad (1)$$

where  $\bar{y}$  is the logarithm of per capita income of the bottom 20 percent of the population and  $\bar{x}$  is the logarithm of per capita income of the whole population and  $X$  is the vector of other determinants of the mean income of the poor and  $\varepsilon$  is the unobserved error term. The parameter  $\alpha_1$  is the elasticity of the mean income of the poor with respect to the mean income of the whole population. A value of  $\alpha_1=1$  indicates that growth in total mean income is translated one-for-one into growth in mean income of the poor. Here, the poor are defined as those who belong to the bottom 20 percent of the population.

The regression equation (1), when estimated using ordinary least squares method (OLS) gives a poverty elasticity of 1.06, which is just significantly greater than 1. An important implication of this result is that the economic growth is generally pro-poor; a 1 percent increase in the mean income of the total population will increase the mean income of the poor by more than 1 percent. If this result were generally true, then there would not exist any poverty at least in East Asia, which has enjoyed very high growth rates during the past three decades. Interestingly, when a refined instrumental variable method is used, the elasticity falls to 0.96, which makes the growth not so pro-poor. The authors rejected this elasticity on the grounds that it is much less precisely estimated because the instruments used were not very strong. The authors then estimated the regression equation in first differences and found an elasticity of 1.02 using OLS and a larger elasticity of 1.06 using the instrumental variable method. The authors accepted the larger elasticity on the grounds that the instrumental variable method gave more precise results when the first difference equation is used. The authors' preferred estimation method is the one, which, combining the level and difference equations in the system estimation, gives a poverty elasticity of 1.05. It is difficult to accept how one could combine level and difference equations into a system of equations. One can either use the level equation or the difference equation depending on what assumptions are made about the serial correlation in the error term. If the error term in the level equation is a white noise, then the level equation is appropriate. If the error term follows a random walk, then the difference equation is more appropriate. Surely, both assumptions cannot hold in the same data.

In the cross-country regressions, the problem of heteroscedasticity is unavoidable. This problem occurs because the variance of error term is not constant across observations. The countries vary widely with respect to their population. And, therefore, the variance of error term will also vary across countries because of differences in population. The appropriate method to estimate regression equations is the weighted least squares with weight proportional to the population. The Dollar-Kraay study uses the unweighted method of estimation, which gives equal weight to every country irrespective of their population. Thus, a tiny country with a population of one million gets the same weight as countries like People's Republic of China and

India with a population of more than one billion. It would be interesting to see how the conclusions change when the weighted estimation is used.

The dependent variable in the Dollar-Kraay study is the logarithm of per capita income of the bottom 20 percent of the population. This variable is estimated by multiplying the income share of the poorest quintile by the mean income of the total population divided by 0.2. The Deininger-Squire data set, which is used in their study, does not provide the income shares of the quintiles for many countries. Thus the per capita income of the poorest quintile could not be estimated for about one fourth of the countries included in the study. However, the Gini index was available for all the countries in the data set. Dollar and Kraay used a lognormal approximation to estimate the per capita income of the bottom quintile for those countries for which income shares of quintiles were not available. Given a lognormal distribution of income, the per capita income of the bottom quintile is estimated as (Aitchinson and Brown 1966):

$$\bar{y} = -\gamma G + \bar{x}, \quad (2)$$

where  $G$  is the Gini index, which lies between 0 and 100 and  $\gamma = 0.036$ . Note that this is a linear approximation to an exact one but the difference between them may be very small. An important point to be made is that the two-parameter lognormal distribution does not generally fit the income distributions so it is now seldom used. This approximation may thus give biased estimates of the poverty elasticity.

Although theoretically the Gini index lies between 0 and 100, in practice, it does not take such extreme values. Looking at the cross-country data, it is reasonable to say that the Gini lies in the maximum range between 25 to 65 percent. It means that the maximum range for the variable  $-\gamma G$  will be between  $-2.34$  to  $-0.9$ , while  $\bar{x}$  will vary widely across the countries because of the wide disparity of income between the countries. Thus, if the variable  $-\gamma G$  is regressed on  $\bar{x}$  and  $X$ , the coefficient of  $\bar{x}$  will approach 0, irrespective of whether inequality increases or decreases with income. Since the elasticity of  $\bar{y}$  with respect to  $\bar{x}$  is always equal to 1, which means that the poverty elasticity obtained by regressing  $\bar{y}$  as defined in (2) will always be close to 1, irrespective of whether inequality increases or decreases with income across the countries. Thus, Dollar and Kraay may have obtained the poverty elasticity of one because of the bias introduced by the lognormal approximation they used. When they dropped the countries for which no lognormal distribution was used, the poverty elasticity falls to 0.96, which is not significantly different from 1 but still lower than 1. Thus, their results are not as powerful as they make out to be.

## **Overview of the Papers**

### **Measurement, Policy, and Diversity**

The first paper in this volume by Robert Eastwood and Michael Lipton (Eastwood and Lipton 2000) provides a comprehensive description of pro-poor growth and its relationship with poverty reduction. The paper covers an extensive portion of the growth–poverty debate, discussing different attempts at measurement of inequality and poverty reduction in the literature. While highlighting the relative merits and limitations of these major studies, the paper keeps a focused perspective on the policy aspects of the problem.

Eastwood and Lipton examine closely the methods and results of the main measurements studies. They illustrate problems of definitions and measurements and how these hamper a more useful interpretation of the statistical findings. They begin by commenting on the choice of poverty lines—whether national, dollar a day, or measuring relative poverty. They also point out the issues that arise out of unreconciled sources of growth and poverty data, e.g., household surveys, national accounts, consumption expenditure and income, etc. The bulk of discussion however focuses on elasticity of connection between mean per capita GDP and mean income of the poor however measured and they highlight several aspects of this relationship lucidly.

The authors feel that there is an excessive concentration of growth–poverty relationships across the entire sample, often including developed, transitional, and developing countries together. This is capable of clouding the effects, and precluding appropriate policy inferences; hence implying that a separate analysis of these by country types or policy regimes is preferable. They say, “...a pro-poor growth path is not fully distinguishable, analytically or empirically, from a pro-poor growth path of poverty reduction or of low-end equalization.” Nevertheless Eastwood and Lipton go on to outline the areas where there are clear grounds for consensus, and where nothing definitive can be said about the growth and poverty relationship.

Finally, Eastwood and Lipton also assess the effect of different degrees and types of initial inequalities in determining the relationship between the rate of growth and the pace of poverty reduction. In conclusion they suggest that a less aggregated and more micro-based and causal structural analysis of pro-poor growth might help policy makers in delineating the policies favoring growth, equality, and poverty reduction.

### **Is Economic Growth Good for the Poor?**

The second paper in this volume is by James E. Foster and Miguel Székely (Foster and Székely 2000). They conclude that the incomes of the poor do not grow

one-for-one with increases in average income. Their study is based on 144 household surveys from 20 countries over the last quarter century. They followed a somewhat different methodology from that of Dollar and Kraay. They tracked low incomes based on Atkinson's (1970) class of "equally distributed equivalent income" function, which they call "general means", whereas Dollar and Kraay use the mean income of the bottom quintile to measure the standard living of the poor.

Foster and Székely raise an important methodological issue of tracking down the income of the poor; in other words, how can the standard of living of the poor be measured? In the poverty literature, the traditional method is to first specify a poverty line below which a person is identified as poor, and then measure the aggregate deprivation suffered by those who are identified as the poor. Thus, the measurement of poverty involves two distinct issues, namely, identification and aggregation. It is the aggregation issue that has attracted most attention in the literature.

The percentage of the population falling below the poverty line, or the head-count ratio, is the most widely used measure of poverty. This ratio does not reflect the intensity of poverty suffered by the poor. It was Sen's (1976) seminal paper that pointed out that all the poor below the poverty cannot be treated alike. Some poor are poorer than others, so the poor should be given different weights depending on the degree of deprivation suffered by them. This paper led to a large literature on poverty measurement (see for instance Kakwani 1980; Clark, Hemming, and Ulph 1981; and Foster, Greer, and Thorbecke 1984).

The traditional poverty measures are estimated on the basis of a pre-specified poverty threshold. For instance, in the cross-country studies, Ravallion (2000) employs absolute standards of \$1 and \$2 a day to identify the poor and then aggregates using the most common poverty measures. So some degree of arbitrariness is always involved in specifying the poverty thresholds. Foster and Székely, therefore, question this approach by asking "why should an income slightly higher be ignored, just because it is above the arbitrary cutoff that is employed?" Dollar and Kraay measured poverty by the mean income of the bottom 20 percent of the population. This is a relative approach to measuring poverty and can hardly be justified as a coherent line of separation between the poor and nonpoor.

Foster and Székely employ a social welfare approach to measuring poverty, wherein different individuals in the society receive different weights depending on the objectives of the society. If the objective is to reduce poverty, then the poorer persons receive greater weight than the richer persons. An aggregate poverty measure is basically a social welfare function, in which the poor receive all the weight and nonpoor do not receive any weight. But in such a function, one needs to identify exactly who is poor and who is nonpoor. Foster and Székely argue that there is no need to arbitrarily partition the population into poor and nonpoor groups. The weighting scheme can be continuous, in which the nonpoor also receive positive weight, which may be made as small as one wishes.

The general means are derived from the Atkinson's (1970) idea of equally distributed equivalent level of income, the level which, if received by every individual, would result in the same level of social welfare as the actual income distribution. Atkinson assumed that the social welfare function is utilitarian and every individual has exactly the same utility function. Under these assumptions, the equally distributed equivalent level of income  $x^*$  is given by

$$u(x^*) = \frac{1}{n} \sum_{i=1}^n u(x_i)$$

where  $n$  is the number of individuals in the society and  $u(x_i)$  is the utility derived by an individual with income  $x_i$ . In order to make the social welfare function homogeneous of degree one, the utility function has to be homothetic. A class of homothetic utility function is of the form

$$\begin{aligned} u(x) &= A + B \frac{x^\alpha}{\alpha}, & \alpha \neq 0 \\ &= A + B \log_e x, & \alpha = 0 \end{aligned}$$

Under this utility function, the equally distributed equivalent level of income denoted by  $x_\alpha^*$  is obtained as

$$\begin{aligned} x_\alpha^* &= \left( \frac{1}{n} \sum_{i=1}^n x_i^\alpha \right)^{\frac{1}{\alpha}}, & \alpha \neq 0 \\ &= \exp \left( \frac{1}{n} \sum_{i=1}^n \log_e(x_i) \right), & \alpha = 0 \end{aligned}$$

$x_\alpha^*$  is the general mean. It is a legitimate measure of social welfare.  $\alpha$  is a parameter, the value of which determines the weight given to income of different individuals in the society. If  $\alpha=1$ , the general mean is equal to the mean income of the society, which is a social welfare function in which every individual in the society receives the same weight. If the society's concern is more with the poor, then the value of  $\alpha$  should be smaller than one. The smaller the value of  $\alpha$ , the larger is the weight given to the poor.

Using a cross-country regressions methodology, Foster and Szekely computed the elasticity of the general mean  $x_\alpha^*$  with respect to the ordinary mean income, denoted by  $\bar{x}$  for values of  $\alpha$  equal to 0, -1, -2, -3, and -4. Thus, five separate regressions in first differences were estimated. The empirical results they obtained are striking. They found that the lower the value of  $\alpha$ , the smaller the elasticity. This means that the greater the weight attached to the incomes of the poorest individuals, the smaller the gain from growth. The values of elasticity for  $\alpha$  equal to 0, -1, -2, -3,

and -4 were 1.08, 0.93, 0.77, 0.36, and 0.33, respectively. These empirical results clearly show that the poor gain proportionally much less than the average individual. These results are at odds with the results obtained by the Dollar-Kraay study, which has attracted so much attention. Thus, this study casts doubt on the result that income of the poor rises one-for-one with overall growth.

### **Growth Versus Inequality Reduction Strategies**

The third paper in this volume by Nanak Kakwani (Kakwani 2000a) has a simple message that all countries cannot have the same policies. For some countries, growth-maximizing policies may be adequate but for others, there may be a need to have pro-poor growth policies with a focus on reducing inequality. His paper addresses the issue of ex-ante choice of development strategy for a specific country.

As pointed out earlier, the degree of poverty depends upon two factors: average income and income inequality. The increase in average income reduces poverty and the increase in inequality increases it. Thus, the change in poverty can be decomposed into two components: one is the growth component relating to change in mean income, and the other is the inequality component relating to change in inequality. The magnitudes of the two components provide the relative sensitivity of poverty reduction to growth and inequality. It is obvious that if the growth component dominates over the inequality component, then growth-maximizing policies may be adequate in achieving a rapid reduction in poverty. If the inequality component dominates, then the policies that are pro-poor and thus reduce inequality should be adopted.

Kakwani develops a methodology to measure the tradeoff between inequality and growth, which shows how much growth is needed in order to offset the adverse impact of an increase in inequality on poverty. He derives the inequality-growth tradeoff index (IGTI), which is equal to the negative of the ratio of inequality to growth elasticity of poverty. If, for example, IGTI is equal to 3.0, it means that a 1 percent increase in the Gini index will require a growth rate of 3 percent in order to offset the adverse impact of increase in inequality. It also means that by following a pro-poor strategy, if we can reduce the Gini index by 1 percent, then this strategy is equivalent to having an additional 3 percent growth rate. This suggests that the larger the IGTI, the greater will be the benefits of following pro-poor strategy that would reduce inequality. Thus, the magnitude of the IGTI can give an indication of what development strategy a country should follow.

In addition to the methodological aspect, the paper also provides empirical analyses based on four nations that face different stages of economic development: Korea, Lao PDR, Philippines, and Thailand. These countries provide an interesting comparative study as to which economy is more effective in reducing poverty by

choosing between growth-enhancing strategy and pro-poor growth strategy that takes into account inequality.

To begin with, IGTI computed for Thailand indicates that pro-poor policies may be prescribed as a remedy to reduce poverty. In general, Thailand is said to be a country with high inequality and rapid economic growth. On average, the economy has exceeded its growth in GDP per capita over an annual rate of 6 percent for the last two decades. However, the inequality of income (or consumption) has been extremely high at the same time, surpassing the Gini index of 48 percent. Large regional disparity within the country is frequently blamed for its high aggregate inequality. Uneven distribution of income in Thailand seems to have offset the benefits of fast economic growth in terms of poverty reduction. Consequently, the rate of poverty reduction has been much slower than expected. Growth-maximizing policies alone will not be sufficient to achieve a rapid reduction in poverty.

Unlike Thailand, Korea is known to be a nation with high economic growth and low inequality. Similarly, Lao PDR is often cited as an egalitarian society (World Bank 1995, Kakwani 2000). Although Korea and Lao PDR exhibit different stages of economic development today, they have one common aspect that their society is relatively equal. As IGTI shows, these countries with low inequality have much lower payoff for choosing a pro-poor strategy in reducing poverty. In fact, the payoff is far outweighed by that derived from a growth-enhancing policy. To reduce poverty rapidly, thus, Korea and Lao PDR may be advised to follow a growth-enhancing policy instead of a pro-poor growth policy.

The Philippines's performance in both growth and poverty reduction has not been as good as that of Korea and Thailand. While its growth rate has been much lower, the Philippines has maintained a high level of inequality and also high incidence of poverty. Kakwani suggests that a mixture of growth and pro-poor policies may be deemed appropriate.

The paper also investigates a hypothesis as to whether the initial level of inequality matters in choosing an appropriate policy option in reducing poverty. After carrying out simulations on the data from the four countries, he arrives at a general conclusion that countries with low initial inequality will have a greater poverty reduction payoff from growth, whereas countries with high initial inequality will have a greater poverty reduction payoff from pro-poor growth policies. In addition, Kakwani makes a point that pro-poor policies are in particular effective in reducing ultra poverty. Thus, if the focus of policymakers is on reducing ultra poverty, then pro-poor policies that reduce inequality combined with better access to social services should be of greater benefit.

### **Growth Strategies and Poverty Reduction**

The fourth paper by Siddiqur Rahman Osmani (Osmani 2000) gives a comprehensive discussion on the overall relation between growth and poverty. Based on the findings of early studies, he acknowledges the existence of a strong and positive relation between the two. Nevertheless, he does not agree with the view that maximizing growth is a development policy option that leads to maximum poverty reduction. Instead, he emphasizes the importance of the growth pattern that will reduce the rate of poverty in society.

Osmani defines a growth strategy as a set of policies designed to promote economic growth by allocating resources, either by molding the structure of incentives, or directly by redistributing resources between different sectors of production as well as between different owners of factors of production. A given growth strategy will lead to a certain rate of growth and a certain distribution of income depending on how the resources are allocated. Thus, a “pattern of growth” emerges and it is the “pattern of growth” that determines the degree of poverty reduction achieved by a country.

Using a simple stylized model, Osmani argues that the strategy of maximizing the rate of growth will not always induce the most pro-poor pattern of growth. In his model, he assumes that growth can be achieved by the accumulation of either human or physical capital, and the pattern of growth will depend on the differential factor intensities. He further assumes that any increase in the rate of savings will change the income distribution in favor of the rich. Using these assumptions, he arrived at the following propositions.

- (i) Up to a point, growth can be accelerated with little or no worsening of income distribution by following a growth strategy that relies relatively heavily on human capital accumulation. But as the growth rate is pushed further, inequality will have to rise because growth will then have to rely on physical capital.
- (ii) If the rate of growth is pushed too far, the faster growth may eventually lead to slower reduction of poverty, depending on how steeply inequality happens to rise and how far the rate of growth is pushed.
- (iii) Other things remaining the same, lower initially inequality enhances an economy’s opportunity to pursue high growth rates without pausing in the rate of poverty reduction.

The model does not talk about the concentration of savings that plays a crucial role in determining inequality as well as poverty in the process of economic development. Although the model provides a linkage between savings and inequality and poverty, it seems to underestimate the importance of the overall distribution of

savings across individuals in society. As an economy develops, the concentration of savings falls, which implies that additional savings can be generated without worsening of inequality (Kakwani and Son 2001).

In the paper, Osmani discusses three growth strategies: outward-oriented trade and industrial development, agriculture-led growth, and redistributive reform.

It is commonly believed that free trade promotes faster growth and possibly poverty reduction. However, empirical evidence in this respect is not clear. The opening up of trade regimes in Latin America has recently led to widening wage inequality between the unskilled and skilled labor force. Since the poor are more likely to be unskilled, the export-oriented policy has failed to induce greater benefits to the poor than the rich. On the contrary, the experiences of East Asia have demonstrated that an outward-looking trade strategy has been the engine of their economic success and thus led to rapid poverty reduction over time. Overall, it is hard to establish a firm relation between trade liberalization and poverty reduction, and the causation between the two. This issue should be looked into more carefully depending on individual country experiences.

To a great extent, the paper is in favor of trade liberalization for developing countries, which is a common view including the one shared by many international organizations. However, this view should not underestimate the initial cost the poor might have to bear when the domestic market is liberalized. When a domestic economy opens up to the world economy, many measures prevailing under protectionism naturally have to be lifted. In this process, the poor are more vulnerable compared to the rich. Under a free trade regime, for instance, the prices of tradable commodities in the domestic market become equivalent to that in the world market, thus their prices will naturally rise relative to nonexportable commodities. As a result, the poor will be worse off because they have to pay more for tradable goods but charge less price for nontradable goods. In this respect, the poor are not insulated from trade liberalization.

Osmani also suggests that for developing nations that still heavily rely on the primary agriculture sector, an agriculture-led growth policy works better for poverty reduction. It is generally believed that agricultural development through changes in technology has benefited most of the poor in an absolute sense. This strategy seems to be more effective when the economy does not have high inequality, regional disparity in particular. If the society has uneven regional development, for example in Thailand, then an agriculture-led growth strategy through technical progress and accelerated agricultural commercialization is likely to worsen the existing regional disparity and increase poverty in the society. In order to achieve a more egalitarian society coupled with poverty reduction, an agriculture-led growth strategy should be implemented in a way that regional disparity is narrowed down.

The paper also addresses the significance of pro-poor complementary policies in addition to free trade to reinforce growth and poverty reduction. Land reforms and

education may compensate the poor who are disadvantaged from external shocks such as trade liberalization. As Osmani argues, distributive land reforms rather than collective ones can be more effective in raising the incomes of the poor and thus reducing poverty. This channel can in turn create employment opportunities for the poor who are likely casual and unskilled workers.

Coupled with redistributive land reforms, education can provide an important tool for the poor to expand their employment opportunities and increase their earnings capacity. Hence, a well-targeted educational scheme for the poor is of paramount importance to facilitate the process of poverty reduction. Public goods such as primary education should be provided in a way that the poor in rural areas should benefit much more than middle and upper classes in urban areas. There should be an educational policy whose benefits flow to rural areas and to poor people. This provision of human capital eventually increases productivity of the economy as a whole.

The paper does not touch upon the importance of social safety nets in reducing poverty. Through poverty reduction strategies proposed by Osmani, the poor will mostly benefit from employment creation and improvement in human capital. However, there are always some groups of people who will be left behind, who deserve special attention from government, a social safety net to meet their basic needs on a daily basis. These include the elderly, sick, disabled, and other vulnerable groups. A carefully drafted fiscal policy that considers safety nets for the needy will outweigh the cost that the society has to pay for high poverty in the future.

### **Sectoral Composition of Growth and Poverty Reduction**

The fifth paper by Peter Warr (Warr 2000) explores the relationship between economic growth and poverty reduction in six Asian countries, namely India; Indonesia; Malaysia; Philippines; Taipei China; and Thailand. The analysis is based on time series data covering the period from the 1960s to the 1990s. These economies were chosen for their wide geographical coverage and for the availability of data on aggregate poverty incidence covering a significant number of years.

Warr takes the view that the rate of economic growth is a significant determinant of the rate at which poverty declines over time. However, the effectiveness of growth as an engine of poverty reduction varies from country to country depending on the country's sectoral composition of growth. The main objective of the paper is to test the hypothesis whether the sectoral composition of growth in addition to the rate of growth has an impact on poverty reduction.

The paper shows that the sectoral composition of growth differs considerably among six countries. For instance, agriculture's contribution to overall growth was quite high in Indonesia and Thailand. However, it was low in India; Philippines; and especially Taipei China. If the hypothesis that the sectoral composition of growth

matters for poverty reduction, then the different countries should have different rates of poverty reduction for the same rate of economic growth. To test this hypothesis the following model is estimated:

$$\Delta P = \alpha + \beta (y-n)$$

where  $\Delta P$  is the change in the percentage of poor and  $y$  and  $n$  are the growth rates of aggregate real income and population, respectively. The constant term  $\alpha$  captures the impact of factors other than growth, which also influence change in poverty, while  $\beta$  measures the responsiveness of growth rate of per capita GDP on change in the poverty incidence. The intercept and slope dummies were included in the model in order to take account of the country differences in the sectoral growth rates. The model was estimated using the pooled time series data for different economies.

The regression results showed that the slope coefficient  $\beta$  is negative and significant at the 1 percent level, which is not a surprising result. A high positive correlation between economic growth and poverty reduction has been accepted as a common occurrence. What is surprising in the paper is the result that slope dummies for individual countries are all insignificant. This indicates that the change in poverty incidence for a given rate of economic growth is the same for all six economies. Since six economies vary considerably with respect to their sectoral growth composition, the constancy of the slope coefficient implies that the sectoral composition of growth has no role to play in poverty reduction. Thus, Warr concludes “the overall rate of growth is apparently the overwhelmingly important determinant of the rate of poverty reduction—regardless which sector of the economy actually generates the growth.” This conclusion is at odds with the conventional wisdom that agricultural growth is more pro-poor than growth in industrial and services sectors. If growth is concentrated in sectors from which poor people are more likely to get their incomes, such as agriculture growth, surely such growth will have greater impact on poverty reduction. Osmani in the previous paper advocates an agriculture-led growth policy, which is widely believed to work better for poverty reduction.

Realizing that his conclusion is counterintuitive, Warr rightly pointed out “further research would be needed before any generality could be attributed to result of this kind.” One possible reason for his unconventional result could be that his model did not control for other factors that could influence poverty reduction, which could have created an omitted variable bias. There could have also been a simultaneity bias caused by reverse causality. If Warr’s results are confirmed, their implications are enormous and will surely have an impact on the current thinking about poverty reduction policies.

## References

- Adelman, I., and C. T. Morris, 1971. *Economic Growth and Social Equity in Developing Countries*. Stanford, CA: Stanford University Press.
- Aghion, P., C. Eve, and C. Garcia-Penalosa, 1999. "Inequality and Economic Growth: The Perspective of the New Growth Theories." *Journal of Economic Literature* XXXVII, December:1615-60.
- Ahluwalia, M. S., 1974. "Income Inequality: Some Dimensions of the Problem." In H. Chenery et al., *Redistribution with Growth*. Oxford: Oxford University Press.
- , 1976. "Inequality, Poverty and Development." *Journal of Development Economics* 3(4):307-42.
- Aitchinson, J., and J. A. C. Brown, 1966. *The Lognormal Distribution*. Cambridge: Cambridge University Press.
- Anand, S., and S. M. R. Kanbur, 1984. "The Kuznets Process and the Inequality-development Relationship." *Journal of Development Economics* 40:25-52.
- Barro, R. J., 1989. "Fertility Choice in a Model of Economic Growth." *Econometrica* 57(2, March):481-501.
- Barro, R. J., and X. Sala-I-Martin, 1995. *Economic Growth*. New York: McGraw-Hill.
- Deininger, K., and L. Squire, 1996. "Measuring Income Inequality: A New Data-base." *World Bank Economic Review* 10(3):565-91.
- , 1998. "New Ways of Looking at Old Issues: Inequality and Growth." *Journal of Development Economics* 57:259-87.
- Dollar, D., and A. Kraay, 2000. Growth is Good for the Poor. Working Paper, World Bank, Washington, D. C.
- Eastwood, R., and M. Lipton, 2000. "Pro-poor Growth and Poverty Reduction: Meaning, Evidence, and Policy Implications." *Asian Development Review*. This issue.
- Fields, G. S., 1989. "Changes in Poverty and Inequality in the Developing Countries." Mimeographed.
- Foster, J E., and M. Székely, 2000. "How Good is Growth?" *Asian Development Review*. This issue.
- Kakwani, N., 1980a. *Income Inequality and Poverty: Methods of Estimation and Policy Applications*. New York: Oxford University Press.
- , 1980b. "On a Class of Poverty Measures." *Econometrica* 48(2):437-46.
- , 2000a. "Growth and Poverty Reduction: An Empirical Analysis." *Asian Development Review*. This issue.
- , 2000b. "Poverty in Lao PDR." Asian Development Bank. Mimeographed.
- Kakwani, N., and H. Son, 2001. "Economic Growth, Inequality, and Poverty: Korea and Thailand." In D. Newman and M. Asher, eds., *Public Sector Policy in Asia: Key Issues in Finance, Governance, Technology, and the Environment*. Westport USA: Greenwood Publishing Group, Inc. for the National University of Singapore.
- Kravis, I. B., 1960. "International Differences in the Distribution of Income." *Review of Economics and Statistics* 42:408-16.
- Kuznets, S., 1955, "Economic Growth and Income Inequality." *American Economic Review* XLV:1-28.
- , 1963. "Quantitative Aspects of the Economic Growth of Nations: Part VIII, Distribution of Income by Size." *Economic Development and Cultural Change* 11:1-80.

- Li, Hongyi, L. Squire, and H. F. Zou, 1998. "Income Inequality is not Harmful for Growth: Theory and Evidence." The World Bank, Washington, D.C. Mimeographed.
- Lipton, M., and M. Ravallion, 1993. *Poverty and Policy*. Working Paper No. 1130, The World Bank, Washington, D.C.
- Lucas, R. E., 1988. "On the Mechanics of Development Planning." *Journal of Monetary Economics* 22(1, July):3-42.
- Nelson, R. R., and H. Pack, 1999. "The Asian Miracle and Modern Growth Theory." *The Economic Journal* 109(July):416-36.
- Oshima, H., 1962. "International comparison of Size Distribution of Family Incomes with Special Reference to Asia." *Review of Economics and Statistics* 44:439-45.
- , 1994. "Kuznets Curve and Asian Income Distribution." In T. Mizoguchi, ed., *Making Economies More Efficient and More Equitable: Factors Determining Income Distribution*. Economic Research Series No. 29, The Institute of Economic Research, Hitotsubashi University. Tokyo: Oxford University Press.
- Osmani, S. R., 2000. "Growth Strategies and Poverty Reduction." *Asian Development Review*. This issue.
- Oxfam GB Policy Paper, 2000. "Growth with Equity is Good for the Poor." Available: <http://www.oxfam.org/policy/papers/equity/fullequity00/htm>.
- Paukert, F., 1973. "Income Distribution at Different Levels of Development: A Survey of Evidence." *International Labour Review* 108(2):97-125.
- Ram, R., 1988. "Economic Development and Income Inequality: Further Evidence on the U-curve Hypothesis." *World Development* 16(11):1371-1376.
- Ravallion, M., 1997. "Good and Bad Growth: The Human Development Reports." *World Development* 25(5, May):631-8.
- Ravallion, M., and S. H. Chen, 1997. "What Can New Survey Data Tell Us About Recent Changes in Distribution and Poverty?" *World Bank Economic Review* 11(2):357-82.
- Robinson, S., 1976. "Sources of Growth in Less Developed Countries." *Quarterly Journal of Economics* 85(3):391-408.
- Romer, P. M., 1986. "Increasing Returns and Long-run Growth." *Journal of Political Economy* 94(5, October):1002-37.
- , 1990. "Endogenous Technological Change." *Journal of Political Economy* 98(5, October):Part II, S71-S102.
- , 1994. "The Origins of Endogenous Growth." *Journal of Economic Perspectives* 8:3-22.
- Saith, A., 1983. "Development and Distribution: A Critique of the Cross-country U-hypothesis." *Journal of Development Economics* 13(3):367-82.
- Solow, R., 1957. "Technical Change and the Aggregate Production Function." *Review of Economics and Statistics* 39:312-20.
- , 1994. "Perspectives on Growth Theory." *Journal of Economic Perspectives* 8:45-54.
- Temple, J., 1999. "The New Growth Evidence." *Journal of Economic Literature* XXXVII(March):112-56.
- Young, A., 1995. "The Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience." *Quarterly Journal of Economics* 110(3):641-80.
- Warr, P., 2000. "Poverty Reduction and Economic Growth: The Asian Experience." *Asian Development Review*. This issue.
- World Bank, 1995. *Lao PDR Social Development Assessment and Strategy*. The World Bank, Washington, D.C.