What is Pro-poor Growth?

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Abstract: *This paper attempts to explain the concept of pro-poor growth, and argues that it represents a major departure from the "trickle-down"phenomenon. It proposes a new indicator—the pro-poor growth index—that measures the degree to which growth can be considered to be pro-poor. The new indicator is used to analyze the nature of economic growth in three countries, namely, Lao PDR, Thailand and Korea.*

Introduction

The renewed focus on poverty reduction as the principal goal of development has generated keen interest in the concept of "pro-poor growth". What it is and how it works have become hotly debated issues. The beginnings of this debate may be traced to the 1950s, but the World Bank's *Redistribution with Growth* (Chenery et al. 1974) set an important milestone. Although the phrase pro-poor growth was not commonly used then, the concept underlay discussions on ways to alleviate poverty in developing countries. Pro-poor growth was also implicit in "broad-based growth" that pervaded the *World Development Report 1990* (World Bank 1990). The ADB's *Fighting Poverty in Asia and the Pacific: The Poverty Reduction Strategy* (ADB 1999, 6) indicates that "growth is pro-poor when it is labor 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."

This paper attempts to explain the concept of pro-poor growth. It first reviews the earlier notion of "trickle-down" development, then argues why pro-poor growth represents a major departure from that approach. It next discusses the issue of the

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efficiency–equity trade-off, and points out that pro-poor policies and institutions could actually promote both equity and efficiency. The paper then goes on to develop an index of pro-poor growth that is applied to the empirical cases of Lao People's Democratic Republic, Republic of Korea (henceforth Korea), and Thailand. The paper concludes with some suggestions to facilitate the use of the proposed index.

Trickle-down Development

Trickle down was the dominant development thinking in the 1950s and 1960s. It implies a vertical flow from the rich to the poor that 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 poor benefit from economic growth only indirectly through a vertical flow from the rich. It implies that the proportional benefits of growth going to the poor will always be less. The incidence of poverty can diminish with growth even if the poor receive only a small fraction of total benefits.

However, it is also possible that high economic growth increases poverty. This can happen when inequality increases so much that the beneficial impact of growth is more than offset by the adverse impact of rising inequality. Bhagwati (1988) calls this "immiserizing" growth. He gives a scenario where the more affluent farmers adopt new seeds and raise grain production that results in lower prices. By contrast, the marginal farmers, who cannot adopt the new technology, find their stagnant output yielding even less income. Thus, the green revolution may immiserize the poor. This situation may be rare, however, because in the long run, the marginal farmers may also catch up with the new techniques. The more common case is where the poor farmers also benefit from economic growth but to a much smaller extent than the better-off ones.

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. An important implication of this research is that growth is good for the poor irrespective of the nature of growth. 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.

Dollar and Kraay suggest that governments need not follow pro-poor growth policies. They should simply maximize economic growth provided they avoid high inflation and maintain fiscal discipline. Although these findings provide a strong argument for the theory of trickle-down development, the conclusions are not convincing. Since the concepts and measurements of income, inequality, and poverty are

not consistent across countries, the results of the analysis do not seem robust. Cross-country regressions are generally indicative of average trends; individual country experiences can vary quite significantly.

Poverty Reduction and Pro-Poor Growth

Poverty reduction is about improving human well-being, in particular that of poor people. Well-being is about the life people live; what they can do or cannot do. Amartya Sen (1987) articulated the concept of well-being in terms of functionings and capabilities. Functioning is an achievement whereas capability is the ability to achieve. Thus, functionings are directly related to what life people actually live, whereas capabilities are connected with the freedom people have in their choice of life or functionings. Broadly, pro-poor growth can be defined as one that enables the poor to actively participate in and significantly benefit from economic activity. It is a major departure from the trickle-down development concept. It is *inclusive* economic growth. Its outcome should be that no person in society is deprived of the minimum basic capabilities. For instance, everyone should be adequately nourished, no child should be allowed to die prematurely, and people should be able to enjoy long and satisfying lives.

The poor have much lower well-being than the nonpoor because they lack the resources to satisfy the minimum basic necessities of life. The growth process that results from market forces generally benefits the rich proportionally more than the poor. This is because the rich have inherent advantages (e.g., human and material capital) in a market economy. Moreover, in many countries, governments knowingly or unknowingly adopt policies that are biased in favor of the rich. Consequently, the gap in well-being between the poor and the rich tends to persist, if not widen, over time. To foster the overall well-being of society, governments need to pursue policies that will reduce this gap.

Promoting pro-poor growth requires a strategy that is deliberately biased in favor of the poor so that the poor benefit proportionally more than the rich.[1] Such an outcome would rapidly reduce the incidence of poverty so that those at the bottom end of the distribution curve of consumption would have the resources to meet their minimum basic needs.

[1]This is implicit in ADB's *Fighting Poverty in Asia and the Pacific* (1999), which favors policies and programs that benefit the poor more than the rich.

A pro-poor growth strategy entails the removal of institutional and policy-induced biases against the poor, as well as the adoption of direct pro-poor policies. For instance, discrimination on grounds of gender, ethnicity, and religion hurts the poor more than the rich; the same can be said of artificial barriers to entry into certain trades and professions, or into the formal labor market in general. Macro policies that tend to constrain pro-poor growth include such policies as overvalued exchange rates, big city-oriented industrial location policies, and public infrastructure spending biases toward urban areas and against rural areas. Similarly, there are micro policies that work against the poor's welfare. Examples are: monopoly powers enjoyed by some firms that result in high prices; subsidized public utilities (e.g., low water fees); state universities (low student fees) that benefit primarily the nonpoor; and housing policy (rent control) that limits housing supply.

Direct pro-poor policies are also required. These include adequate public spending for basic education, health and family planning services, improved access to credit, and the promotion of small and medium enterprises. A well-administered progressive tax system is also pro-poor. Typically, this means a heavier reliance on personal income taxation, which is progressive, rather than on indirect taxation, which is regressive.[2] Unfortunately, in many developing countries revenue generation depends much more on indirect than on direct taxes.

Equity and Efficiency Trade-Off

Critics would argue that a pro-poor growth strategy gives rise to distortions in the economy, resulting in inefficiencies or loss of growth. Such loss of growth may be so much that the overall well-being of society falls. This is the old argument of trade-off between equity and efficiency. Do pro-poor growth policies necessarily create inefficient outcomes? Probably not. More likely, it depends on specific policies implemented. If they do, then it may also be argued that pro-rich growth policies also create as many, if not more, distortions, thereby resulting in lower than optimum output. The issue of trade-off is closely related to the choice of a social welfare function. If the concern is more about the well-being of the poor, then greater weight must be given to those at the bottom of the distribution than those at the top. In such a situation, the contribution of efficiency to social welfare will be small. Thus, it may be reasonable to focus more on the equity aspects of pro-poor growth, though efficiency plays a critical role in poverty reduction policies. Nevertheless, the magnitude of its impact on social welfare compared with the gains that result from improved equity needs to be assessed.

[2] An indirect tax system can be made pro-poor by exempting those items that are consumed proportionally more by the poor than the rich.

It should also be pointed out that the removal or correction of the various anti-poor institutional constraints and policy-induced biases mentioned above may actually improve market efficiency besides promoting equity (Pernia and Quibria 1999). Likewise, social policy ensuring adequate provision of education and health services to the poor will improve their productivity and contribution to the economy.

Operationalizing Pro-poor Growth

How can the concept of pro-poor growth be made operational? When can one say that growth is pro-poor? And if so, to what degree? It would be a futile exercise to attempt to arrive at a single indicator of pro-poor growth because such growth relates to changes in people's well-being, which is multidimensional. Ideally, the measurement of pro-poor growth should incorporate all the capabilities that enhance human well-being. But this is hardly feasible. So, one needs to select the most important capabilities affecting the quality of life, using some value judgment. The next step is to construct indicators for each of the selected capabilities that describe different aspects of life. Each of these indicators should be able to reveal the degree to which economic growth is pro-poor with respect to a particular aspect. For instance, if as a consequence of economic growth, there is a marked improvement in poor people's utilization of health services, then such growth may be regarded as pro-poor. Similarly, if there is a significant reduction in child labor and an improvement in education, then such growth may be considered pro-poor because child labor is almost entirely concentrated among the poor.

Researchers at the Institute of Development Studies of the University of Sussex, United Kingdom attempted to arrive at a simple operational definition of pro-poor growth using a measure called the "poverty bias of growth" (McCulloch and Baulch 1999). It is "derived by subtracting changes in the poverty headcount[3] that occurred between any two periods under actual circumstances, from the change in poverty that would have occurred if all had gained equally" (McCulloch and Baulch 1999 as cited in Institute of Development Studies 1999, 3). This measure was applied to data from two Indian states, Andhra Pradesh and Uttar Pradesh. The results showed that both states achieved marked reductions in poverty incidence, depth, and severity between 1973 and 1989. However, the pro-poor distributional shift in Andhra Pradesh meant a poverty incidence reduction of one percentage point more than if all had benefited equally; by contrast, a worsening distribution in Uttar Pradesh reduced benefits to the poor by about 18 percent of the drop in poverty incidence that would have occurred had growth been evenly spread. This outcome

[3]The poverty headcount ratio is the proportion of the population with income or consumption expenditure below the poverty threshold. This may be based on either the national poverty line or the dollar-a-day poverty line.

shows that poverty reduction depends on the rate of economic growth as well as on changes in income distribution.

To understand, therefore, the impact of economic growth on poverty, one needs to measure separately the impact on poverty of changes in average income and in its distribution. In other words, one needs to decompose the total change in poverty into (i) the impact of growth when the distribution of income does not change, and (ii) the effect of income redistribution when total income does not change. The derivation of this decomposition is presented in the Appendix.

Suppose O is the proportional change in poverty when there is a positive growth rate of 1 percent. This can be decomposed into two components, O_g and O_I such that

$$O = O_g + O_I$$

where O_g is the pure growth effect and O_I is the inequality effect. O_g is the percentage change in poverty when the distribution of income does not change, whereas O_I is the change in poverty when inequality changes in the absence of growth. O_g will always be negative because positive growth always reduces poverty, with distribution remaining constant. O_I can be either negative or positive depending on whether growth is accompanied by improving or worsening inequality. This suggests that the degree of pro-poor growth can be measured by an index

$$\phi = \frac{\eta}{\eta_g}$$

ϕ will be greater than 1 when $O_I < 0$. Thus, growth will be pro-poor when $\phi > 1$, meaning that the poor benefit proportionally more than the nonpoor, i.e., growth results in a redistribution in favor of the poor. This would be the first-best outcome. When $0 < \phi < 1$, growth is not strictly pro-poor (i.e., growth results in a redistribution against the poor) even though it still reduces poverty incidence. This situation may be generally characterized as trickle-down growth. If $\phi < 0$, economic growth actually leads to an increase in poverty.

If O_I is negative, it means that growth has led to a change in the distribution of income in favor of the poor, thereby reducing poverty. Such a growth may be characterized as pro-poor. If O_I is positive, the change in income distribution is pro-rich: the rich benefit proportionally more than the poor.

During a recession, the observed growth rate is negative, resulting in an increase in the incidence of poverty, which means that O is positive and so is O_g. If there is no income redistribution due to recession, the incidence of poverty would increase by O_g percent (due to a 1 percent decline in the growth rate), whereas the actual increase in poverty is O percent. Thus, the recession will be pro-poor if $O <$

O_g and pro-rich if $O > O_g$. In this situation, the pro-poor growth index should be defined as

$$\phi = \frac{\eta_g}{\eta}$$

implying that the recession will be pro-poor if $\phi > 1$ and pro-rich if $\phi < 1$.

Empirical Illustrations

Lao People's Democratic Republic

Real GDP per capita in Lao PDR grew at an annual rate of 4.6 percent between 1992-1993 and 1997-1998. This impressive growth was, however, accompanied by a sharp increase in inequality. The proportion of poor people, as measured by the headcount ratio, nevertheless declined at an annual rate of 3.1 percent during the same period, meaning that on average a 1.0 percent growth rate led to a reduction in poverty incidence (poverty elasticity) of 0.7 percent. This reduction in poverty can be explained by two factors: (i) a pure growth effect of –3.2 percent, and (ii) a pure inequality effect of 2.6 percent. This means that if inequality had not increased, each 1.0 percent growth would have reduced poverty by 3.2 percent (Table 1).

Table 1: **Growth and Inequality Effects on Poverty Reduction, Lao PDR**

	Poverty Incidence				Explained by		Pro-poor
Indicators	**1992-1993**	**1997-1998**	**Annual % Change**	**Poverty Elasticity[a]**	**Growth**	**Inequality[b]**	**Growth Index[c]**
Headcount Ratio	45.0	38.4	-3.1	-0.7	-3.2	2.6	0.21
Poverty Gap Ratio	11.3	10.3	-1.8	-0.4	-4.2	3.8	0.09
Severity of Poverty	4.2	4.0	-0.9	-0.2	-2.9	2.7	0.07

[a] Percent change in poverty incidence with respect to percent change in real GDP per capita.
[b] As measured by the Lorenz curve.
[c] Extent of poverty reduction (poverty elasticity) explained by pure GDP growth effect.

Thus, economic growth in Lao PDR has been slightly pro-poor; increasing inequality has reduced the impact of growth on poverty by 2.6 percent. The index of pro-poor growth can be derived by dividing the overall effect on poverty of –0.7 percent by the pure growth effect of –3.2 percent. This gives a value of 0.21 for

the poverty headcount ratio, implying that growth has only been weakly pro-poor. It is interesting to note that the value of the index is even smaller for the poverty gap[4] (0.09) and severity of poverty[5] (0.07), suggesting that the benefits of growth have been flowing even less to those far below the poverty line.

In Lao PDR, the poor are heavily concentrated in rural areas. It is expected, therefore, that economic growth in rural areas will be more pro-poor than in urban areas. This is borne out by the results of analysis given in Table 2. The pro-poor growth index for the headcount ratio is 0.22 for rural areas, while it is 0.12 for urban areas. The results for the poverty gap ratio and severity of poverty ratio show that growth has contributed to an increase in poverty in urban areas. This stresses the point that growth is not necessarily always good for the poor.

Table 2: **Growth and Inequality Effects on Poverty Reduction in Urban and Rural Areas, Lao PDR, 1992-1993 to 1997-1998**

Indicators	Poverty Elasticity[a]	Explained by		Pro-poor Growth Index
		Growth	Inequality	
Headcount Ratio				
Urban	-0.6	-4.7	4.1	0.12
Rural	-0.8	-3.6	2.8	0.22
Total	-0.7	-3.2	2.6	0.21
Poverty Gap Ratio				
Urban	0.1	-5.8	5.9	-0.01
Rural	-0.7	-4.7	4.0	0.14
Total	-0.4	-4.2	3.8	0.09
Severity of Poverty				
Urban	0.6	-6.2	6.8	-0.10
Rural	-0.6	-2.6	2.0	0.22
Total	-0.2	-2.9	2.7	0.07

[a]Percent change in poverty incidence with respect to percent change in urban and rural incomes per capita.

Thailand

Thailand achieved remarkable economic growth over the two decades prior to the Asian financial crisis. The consequence was a rapid decline in the incidence of

[4]The poverty gap ratio is the product of the headcount ratio and the average amount by which the per capita income or expenditure of the poor falls short of the poverty line expressed as a proportion of the poverty line.

[5]The severity of poverty is a measure that gives greater weight to poorer individuals: the poorer the person, the greater the weight given to his or her income shortfall from the poverty line; thus it takes into account income distribution among the poor.

poverty. However, the pace of poverty reduction would have been much faster if income distribution had improved or at least not worsened (Table 3). For instance, had inequality stayed constant between 1988 and 1992, a 1 percent growth in the economy would have reduced the incidence of poverty by 3.25 percent or better, but the actual reduction in poverty was only around 1 percent. The corresponding value of the pro-poor growth index was about 0.3. Nevertheless, it is commendable that the pro-poor growth index increased markedly to 0.64 for the headcount ratio in 1994-1996, the period before the crisis (Figure 1).

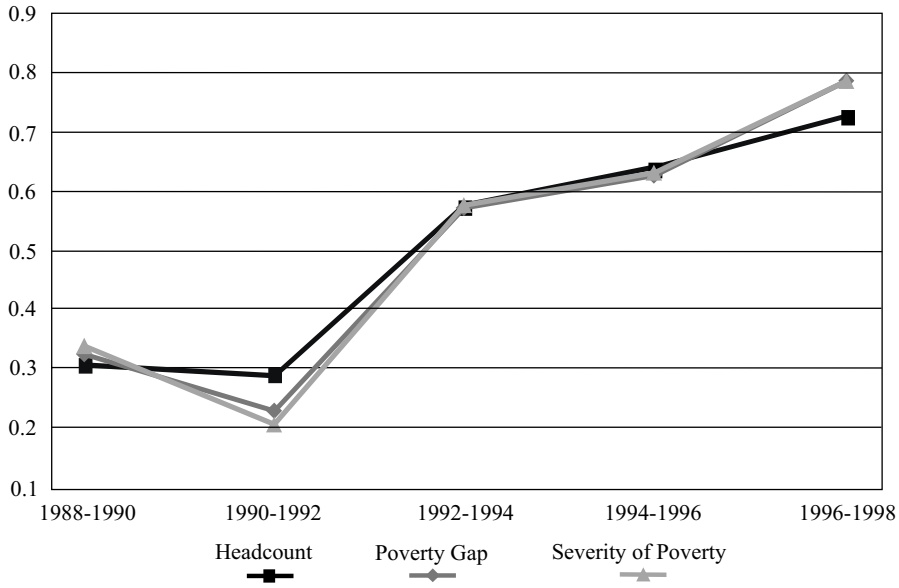
Table 3: **Growth and Inequality Effects on Poverty Reduction, Thailand**

Indicators	Poverty Elasticity	Explained by		Pro-poor Growth Index
		Growth	Inequality	
Headcount Ratio				
1988-1990	-0.99	-3.25	2.26	0.31
1990-1992	-1.08	-3.77	2.69	0.29
1992-1994	-2.29	-3.96	1.68	0.58
1994-1996	-3.12	-4.88	1.75	0.64
1996-1998	6.50	4.74	1.76	0.73
Poverty Gap Ratio				
1988-1990	-1.46	-4.50	3.04	0.33
1990-1992	-1.10	-4.85	3.75	0.23
1992-1994	-2.97	-5.20	2.23	0.57
1994-1996	-3.61	-5.77	2.16	0.63
1996-1998	7.59	5.96	1.63	0.79
Severity of Poverty				
1988-1990	-1.77	-5.27	3.50	0.34
1990-1992	-1.12	-5.56	4.44	0.20
1992-1994	-3.38	-5.87	2.49	0.58
1994-1996	-4.04	-6.42	2.38	0.63
1996-1998	8.38	6.61	1.77	0.79

In the aftermath of the financial crisis that erupted in mid-1997, the high positive growth rates achieved by the Thai economy prior to 1996 reversed sharply into negative growth in 1998. Consequently, the monotonic improvement in the poverty incidence achieved until 1996 halted abruptly, and the number of poor increased from 11.4 percent of the total population in 1996 to about 13 percent in 1998 (Kakwani 1999). Did the economic crisis hurt the poor more than the nonpoor? The results in Table 3 show that if the crisis were inequality-neutral, a 1 percent reduction in per capita income would have increased the percentage of poor by 4.74 percent, but the actual increase was 6.5 percent, which resulted in a pro-poor growth index of 0.73. Thus, the economic crisis adversely affected the poor proportionally more than the nonpoor (though the higher value of the index during the crisis implies that the

relative disadvantage for the poor seems somewhat less than during the preceding period of high growth). This result casts some doubt on the study by Dollar and Kraay (2000), which concluded that the incomes of the poor did not fall more than proportionately during the crisis.

Figure 1: **Pro-poor Growth Index, Thailand**



Korea

Korea is frequently cited as a country with rapid economic growth, low inequality, and virtually full employment. Rapid economic growth over a long period has also contributed to a substantial reduction in the incidence of poverty (Figure 2 and Table 4). The number of poor declined from 39.6 percent in 1990 to 8.6 percent in 1997. This steep fall suddenly reversed when the economic crisis hit Korea, with the number of poor jumping to 19 percent in 1998. The impact of the crisis was more severe in Korea than in Thailand, though Korea is currently recovering faster than any of the other economies severely affected by the crisis.

Figure 2: **Percent of Poor in Korea**

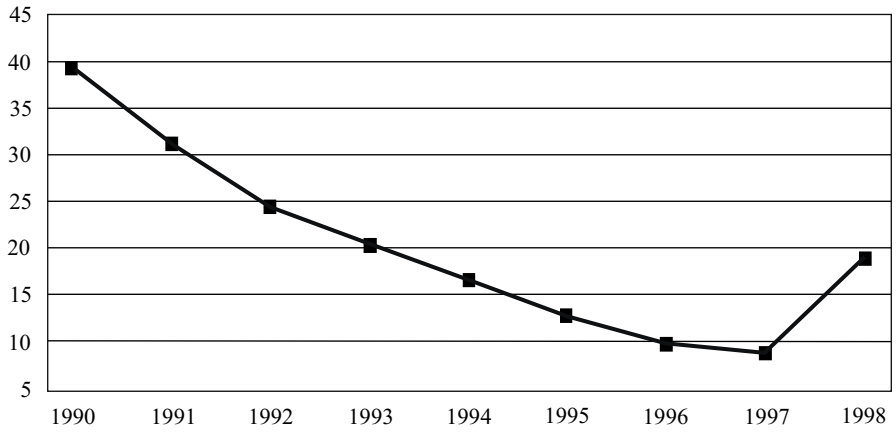


Table 4: **GDP per Capita Growth Rate and Poverty Incidence, Korea**

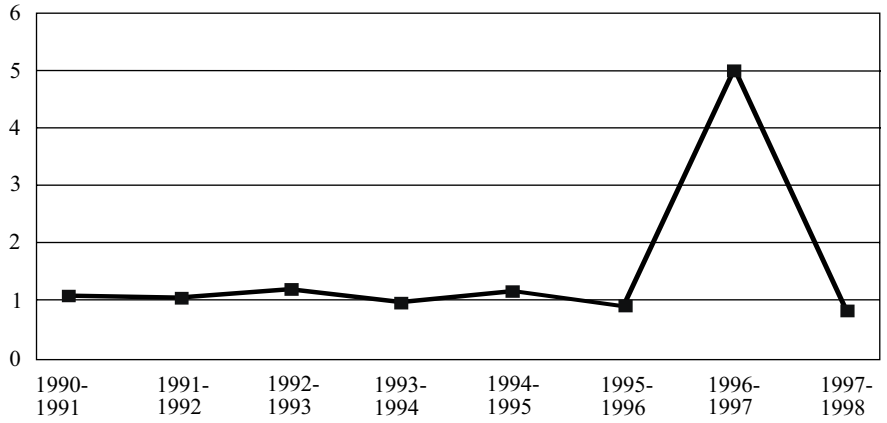
Year	GDP per Capita Growth Rate	Poverty Incidence	Poverty Gap	Severity
1990	—	39.56	9.61	3.37
1991	10.05	31.31	7.08	2.40
1992	4.05	24.46	5.36	1.76
1993	4.95	20.49	4.18	1.32
1994	7.54	16.52	3.24	0.98
1995	8.50	12.65	2.40	0.72
1996	5.98	9.61	1.78	0.53
1997	1.79	8.64	1.59	0.46
1998	-6.87	18.99	4.21	1.46

The results in Table 5 show that economic growth in Korea has generally been highly pro-poor, as indicated by the pro-poor index with most of the values close to or greater than 1. It is noteworthy that in 1996-1997 the index shot up to 5.05 for the headcount ratio (Figure 3). This is the period when economic growth began to slow sharply but the incidence of poverty continued to fall markedly. This is because the distribution of consumption became more equal, contributing to a reduction of 4.8 percent in the number of poor. During the crisis in 1997-1998, the pro-poor growth index for the headcount ratio was 0.84, suggesting that the poor were proportionally more adversely affected than the nonpoor. Moreover, during the same period, the values of the pro-poor growth index for the poverty gap and severity of poverty were 0.76 and 0.69, respectively, implying that the ultra poor suffered proportionally even more.

Table 5: **Growth and Inequality Effects on Poverty Reduction, Korea**

Indicators	Poverty Elasticity	Explained by		Pro-poor Growth Index
		Growth	Inequality	
Headcount Ratio				
1990-1991	-2.33	-2.19	-0.14	1.06
1991-1992	-6.10	-6.00	-0.10	1.02
1992-1993	-3.57	-3.05	-0.52	1.17
1993-1994	-2.85	-3.01	0.16	0.95
1994-1995	-3.14	-2.74	-0.40	1.14
1995-1996	-4.60	-5.36	0.76	0.86
1996-1997	-5.97	-1.18	-4.78	5.05
1997-1998	11.48	9.63	1.85	0.84
Poverty Gap Ratio				
1990-1991	-3.03	-2.92	-0.12	1.04
1991-1992	-6.89	-7.56	0.67	0.91
1992-1993	-5.04	-3.76	-1.28	1.34
1993-1994	-3.38	-3.52	0.14	0.96
1994-1995	-3.51	-3.15	-0.36	1.11
1995-1996	-5.01	-6.04	1.03	0.83
1996-1997	-6.25	-1.34	-4.90	4.64
1997-1998	14.15	10.73	3.42	0.76
Severity of Poverty				
1990-1991	-3.37	-3.38	0.01	1.00
1991-1992	-7.71	-8.60	0.89	0.90
1992-1993	-5.85	-4.23	-1.62	1.38
1993-1994	-3.93	-3.94	0.01	1.00
1994-1995	-3.68	-3.50	-0.18	1.05
1995-1996	-5.02	-6.59	1.57	0.76
1996-1997	-7.90	-1.47	-6.43	5.38
1997-1998	16.80	11.64	5.16	0.69

Figure 3: **Pro-poor Growth Index, Korea**



Conclusion

This paper has attempted to explain the concept of pro-poor economic growth. It also proposes a new indicator—the pro-poor growth index—that measures the degree to which growth can be deemed pro-poor. The data requirements are not too demanding, so it can easily be applied.

The new indicator has been used to analyze the nature of economic growth in three countries, namely, Lao PDR, Thailand, and Korea. The results indicate that growth in Korea has generally been highly pro-poor. By comparison, growth in Lao PDR and in Thailand has not been strictly pro-poor, although it has resulted in considerable poverty reduction. The implication is that poverty reduction would have been even faster if the governments had followed pro-poor policies, or avoided policies with adverse consequences on income distribution. As expected, growth in rural areas has been more pro-poor than in urban areas. The paper further finds that the economic crisis inflicted proportionally more harm on the poor than on the nonpoor in these three countries.

The pro-poor growth index can be utilized to formulate pro-poor policies at both the macro and micro levels. The index can be calculated for any sector or region within a country. It can be used to monitor whether a particular sector or region is experiencing pro-poor growth. It could also allow one to assess the impact of a project on pro-poor growth.

However, imposing an index value that is greater than 1 (i.e., strictly pro-poor), though ideal, may be too stringent. Based on our initial empirical results, we arrive at the following value judgments regarding the pro-poor growth index (ϕ). If

$\phi < 0$, growth is antipoor;
$0 < \phi \leq 0.33$, growth is weakly pro-poor;
$0.33 < \phi \leq 0.66$, growth is moderately pro-poor;
$0.66 < \phi < 1.0$, growth is pro-poor; and
$\phi \geq 1.0$, 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. In the selection of projects, the objective should be to maximize the pro-poor growth index by minimizing any adverse distributional effects. For instance, one may consider adopting an investment project with an economic internal rate of return of less than 12 percent but that results in highly pro-poor growth.

It should be borne in mind that the inequality in distribution can change in multiple ways depending on how one weighs different individuals in society. In evaluating whether growth is pro-poor, our focus has been on that part of income distribution that most affects the poor. The Gini index gives maximum weight to those individuals who are near the mode of income distribution. Thus, we do not

regard it to be a good tool to measure the degree of pro-poor growth. The new index presented here is superior to the Gini index in analyzing the issue of pro-poor growth.

Appendix
Growth and Inequality Components of Poverty

Suppose θ is a poverty measure that is fully characterized by the poverty line income, the mean income, and the Lorenz curve (which is a general measure of relative inequality), then

$$\theta = \theta\,(z,\ \mu,\ L(p))$$

where z is the poverty line, μ is the mean income of the society, and $L(p)$ the Lorenz function, which is interpreted as the percentage share of income enjoyed by the bottom p percent of the population; p varies from 0 to 1. We try to explain the percentage change in poverty between period 1 (base year) and period 2 (terminal year) in terms of growth and inequality components. Let us write the total proportional change in poverty between period 1 and 2 as P_{12} given by

$$P_{12} = Ln\ [\theta\,(z,\ \mu_2\ ,\ L_2(p))] - Ln[\theta\,(z,\ \mu_1\ ,\ L_1(p))]$$

where μ_1 *and* μ_2 are the mean incomes in years 1 and 2, respectively, and $L_1(p)$ *and* $L_2(p)$ are the Lorenz curves for years 1 and 2, respectively. Note that mean incomes μ_1 *and* μ_2 are adjusted for price changes between the two periods but the poverty line is fixed in each period.

The pure growth effect is defined as the proportional change in poverty when the mean income changes but the relative income distribution measured by the Lorenz curve remains unchanged. Similarly, the pure inequality effect is defined as the change in poverty when the Lorenz curve changes but the mean income at constant prices remains constant.

Let us denote the growth effect by G_{12} and the inequality effect by I_{12} between years 1 and 2. Moreover, we postulate that there must exist a relationship between the proportional change in poverty, on one hand, and growth and inequality effects on the other. Thus, we have

$$P_{12} = f\,(G_{12}\,,\ I_{12})$$

Kakwani (2000) has attempted to determine a similar functional form by proposing a set of intuitively rational axioms. Using this methodology, we arrive at the following expressions for the growth and inequality effects:

$$G_{12} = \tfrac{1}{2}\,[Ln\,[\theta\,(z, \mu_2\,, L_1(p))] - Ln[\theta\,(z, \mu_1\,, L_1(p)) + Ln\,[\theta\,(z, \mu_2\,, L_2(p))] - Ln[\theta\,(z, \mu_1\,, L_2(p))]]$$

and

$$I_{12} = \tfrac{1}{2}\,[Ln\,[\theta\,(z, \mu_1\,, L_2(p))] - Ln[\theta\,(z, \mu_1\,, L_1(p))] + Ln\,[\theta\,(z, \mu_2\,, L_2(p))] - Ln[\theta\,(z, \mu_2\,, L_1(p))]]$$

which immediately give

$$P_{12} = G_{12} + I_{12}$$

which shows that the total proportional change in poverty is equal to the sum of growth and inequality effects.[6]

Pro-poor Growth Index

Suppose that there is a positive growth rate of g_{12} percent between periods 1 and 2, then poverty elasticity can be defined as

$$\eta = P_{12} / g_{12}$$

which is the proportional change in total poverty when there is a positive growth rate of 1 percent. Likewise, we may define

$$\eta_g = G_{12} / g_{12}$$

$$\eta_I = I_{12} / g_{12}$$

where η_g is the proportional change in poverty when there is a positive growth rate of 1 percent provided the relative inequality does not change, and η_I is the proportional change in poverty when inequality changes but the real mean income does not change. Having said that, we can write

$$\eta = \eta_g + \eta_I$$

which shows that the proportional change in poverty caused by a 1 percent positive growth rate in the economy is the sum of the two factors: η_g is the income effect of growth on poverty and η_I is the inequality effect on poverty, which is caused by the change in inequality.

The income effect of growth on poverty, η_g , is always negative, which implies that growth will always reduce poverty when the relative inequality does not change. The inequality effect, η_I , can be either negative or positive. If η_I is negative, it means that growth has led to a change in the distribution of income in favor of the poor, thereby reducing poverty unequivocally. Such a growth

[6] Datt and Ravallion (1992) proposed a similar decomposition that had an additional residual term. It is not clear what meaning can be given to the residual term and therefore, one cannot define a pro-poor index as neatly.

can be characterized as pro-poor. If η_I is positive, the change in income distribution is pro-rich: the rich benefit proportionally more than the poor. This suggests that we can have as an index of pro-poor growth

$$\phi = \eta / \eta_g$$

ϕ will be greater than 1 if $\eta_I < 0$, which means that growth is strictly pro-poor. If $0 < \phi < 1$, it means that $\eta_I > 0$ but poverty still declines due to growth. This situation may be generally characterized as trickle-down. If $\phi < 0$, economic growth in fact badly hurts the poor and leads to an increase in poverty.

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