

TECHNICAL NOTE 2

Two sides of the poverty reduction coin— why growth and distribution matter

This year the *Human Development Report* presents new data and simulations on income, exploring the relationship between economic growth, redistribution and income poverty. Chapter 1 focuses on the international level, looking at global distribution and exploring the implications of different growth patterns for poverty reduction. The chapter draws on a global income distribution model prepared for *Human Development Report 2005* (Dikhanov 2005). The model is used to explore how different growth and distribution scenarios to 2015 might have a bearing on poverty. Trend growth projections and the \$1 a day poverty line are used to determine how many fewer people would be living in poverty with a pro-poor growth pattern with the income of poor people growing at twice the average rate. Chapter 2 shifts from the global to the national level. Household expenditure surveys are used to plot income distribution patterns for three countries. Starting from the prevailing distribution, a forward-looking projection is developed to consider the impact on poverty of pro-poor growth patterns, with the income of the poor—defined as the population living below the national poverty line—rising at twice the national average.

The scenario exercises illustrate the potentially large scale benefits for poverty reduction of small changes in distribution in favour of the poor. However, the simulations used are stylized exercises. They cast some light on how the interaction of economic growth with different distribution patterns can influence prospects for poverty reduction. By definition, simulations do not help identify the specific strategies that might achieve the optimal growth distribution patterns for maximizing the speed of poverty reduction. That does not mean that the simulations in chapters 1 and 2 have no implications

for policy. As the global modeling exercise in chapter 1 demonstrates, creating conditions under which the world's poor people capture a larger share of future growth would create an enabling environment for accelerated poverty reduction. The same applies at a national level. As the pro-poor growth simulations here demonstrate, modest gains in the income share of the poor can shorten the time horizon for halving poverty. One of the central messages that emerges for policy-makers is that distribution matters both for the Millennium Development Goals and for wider poverty reduction efforts.

World income distribution

The global income distribution model used in chapter 1 provides an estimate of global income distribution for 1970–2000. These estimates are supplemented with two forward-looking scenarios for 2015. The first scenario looks at poverty in 2015 on a distribution-neutral growth projection—that is, with national income distribution held constant over time. The second scenario assumes that the income of the poor grows at twice the average rate until 2015. The scenarios are based on 1990–2002 trends in GDP growth and UN population projections for 2015. The simulations highlight the impact of different growth patterns on income inequality and income poverty. Additionally, the model looks at the dimensions of the income transfer that would be required to eliminate \$1 a day poverty.

Data and methodological issues

Dikhanov (2005) is a model of world inequality accounting. It provides an approximation for global income inequality, which is narrower than a model of wealth accounting because it

does not take into account ownership of productive assets, which might be seen as a primary source of economic power and a determinant of income inequality. Nor does it take into account the notional value of non-market goods and services delivered by governments.

In effect, world inequality accounting attempts to capture income inequality among all individuals in the world. The exercise involves combining income distribution within countries and comparing incomes across countries. Global income is taken to be the sum of the reported, as well as estimated and imputed, personal consumption expenditure from national accounts data of all countries in the World Bank database. Thus national accounts data, rather than data from household surveys, are used to determine average incomes in each country. National accounts data are more suitable for comparison over time. However, such data are incomplete because they do not include the informal economy and certain categories of income. This makes it possible to scale up national accounting exercises to arrive at a global income using consistent methodology across countries. Personal consumption expenditure differs from standard GDP or GNI measurement in that it excludes some national accounting items, such as savings by firms and governments. The current exercise uses a polynomial interpolation to approximate a continuous distribution from the information provided by the underlying data.

Applying distributional information from the income and consumption surveys to average incomes yields an approximation, in national currencies, of each individual's income. For international comparisons these incomes must be converted into the same currency. Because exchange rates do not take into account price differential between countries, international comparison requires adjustments. The model converts personal consumption expenditure values in local currency into international dollars using 1999 purchasing power parities (PPPs). The PPP methodology collects information on prices through the International Comparison Program, which surveys the price for a basket of goods across more than 100 countries. An important debate has developed in recent years

over the use of PPP adjustments, specifically in relation to the \$1 a day poverty line. This debate is not revisited here. Interested readers should see the list of readings at the end of this note.

Some countries lack the national accounts information needed to scale up from the national level to the global level. To obtain global totals, gap-filling procedures involving imputation were used. The techniques are detailed in notes to *World Development Indicators 2001* (World Bank 2001). Imputation procedures are applied to a relatively small group of countries, with standard national accounting providing data for over 80 percent of the global personal consumption expenditure and population.

World inequality accounting makes it possible to derive various regional subaggregates of global distribution, as well as the share of global income accounted for at each percentile level, regardless of the country in which individuals live. That is, the model creates a hypothetical world in which all people can be lined up in a single distribution, regardless of where they live. The shape and regional decomposition of the distribution is set out in chapter 1.

Simulations and results

Much heat has been generated by the debate on globalization and inequality. Polarized conclusions have been reached with regard to both trend and attribution. Studies employing different techniques and data sources have reached divergent conclusions on whether global income inequality is increasing or decreasing and on the precise role played by globalization. World inequality accounting does not resolve the global inequality debate, though it does call into question claims that globalization has been accompanied by income convergence (as claimed by some supporters of global integration) or by rapid divergence (as claimed by others). The model used in chapter 1 finds that overall inequality, as measured by the Gini coefficient, has changed little, from 67 in 1970 to 68 in 2000. This shift is probably smaller than the margin of error introduced by the data, and is thus insignificant.

As indicated earlier, the 2015 simulation compares two different growth paths for 2002–15. Both simulations use a similar growth

projection. For countries with positive growth, trends for 1990–2002 are projected forward to 2015. For countries and regions with negative growth, positive future growth is assumed based on regional averages for the period 2000–06 as set out in *Global Economic Prospects 2005* (World Bank 2005).

In the first simulation the model assumes that within-country distribution stays constant—that is, increments to growth are shared to reflect the current distribution. The second assumes that the income of people below an annual income of \$700 (2000 PPP US\$), an amount roughly equivalent to the \$1 a day poverty line, would grow at twice the rate of the population as a whole. The income growth rate of the rest of the population would be adjusted downward to keep the average income growth rate the same as in the first simulation. This pro-poor growth simulation results in 253 million fewer people living in poverty in 2015. However, much of the reduction is concentrated in East Asia and South Asia, rather than Sub-Saharan Africa, reflecting the higher average growth trends for the first two regions. The conclusion: growth and distribution matter a great deal in defining poverty reduction prospects.

National income distribution and poverty reduction

In any country the rate at which poverty declines is primarily a function of two variables: the economic growth rate and poor people's share of growth. There are complex variations within this interaction in, for example, the depth of poverty or the distance measured in income terms from the poverty line. The overall effect of growth on poverty incidence will be determined by distribution below the poverty line, as well as distribution between poor people and non-poor people. If there is a large concentration of poverty just below the line, increases in income for this group will have a large impact on poverty incidence. However, large relative increases in income for groups that are further from the poverty line produce only small reductions in the incidence of poverty. It also has to be borne in mind that any poverty threshold

is, to some degree, an artificial construct that provides a partial indicator for measuring the dynamic processes associated with poverty.

Exercises and results

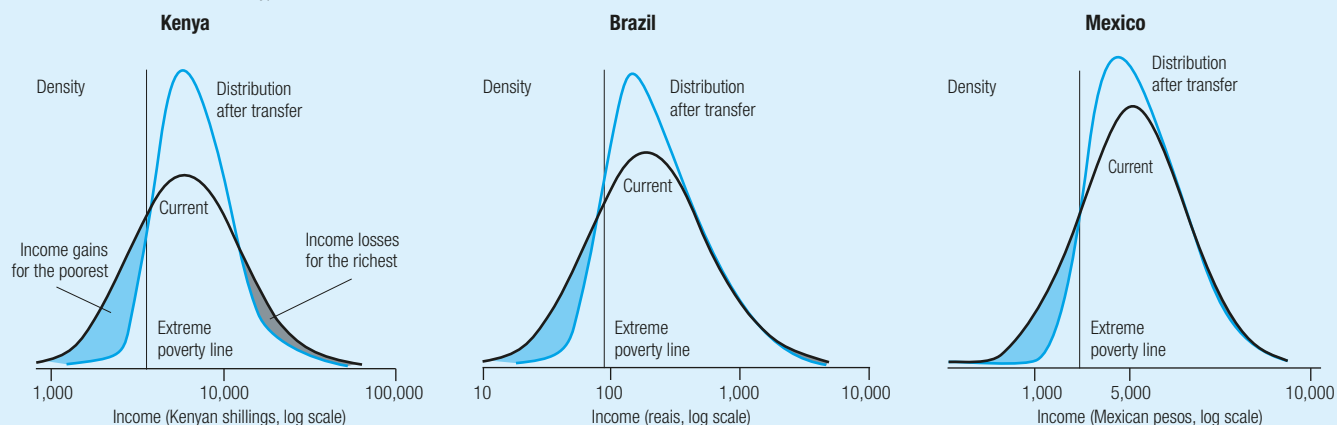
In chapter 2 kernel density curves are constructed for income distribution in Brazil, Kenya and Mexico. These distribution data are used in two exercises. The first considers the effect of a hypothetical transfer from top to bottom of the distribution. This is a stylized exercise, but it draws attention to a central characteristic of countries with large concentrations of poverty at one end of the distribution and wealth at the other: small transfers would substantially reduce poverty. The second exercise builds on a global income distribution simulation. It uses the national income distribution data as the basis for a simulation that examines the effect of two different growth scenarios on poverty reduction. Projecting forward trend growth rates, it simulates the impact on poverty incidence of distribution neutral growth (holding current distribution patterns constant) and pro-poor growth (in which the income of the population below the poverty line grows at twice the national rate).

Static redistribution

In a simple exercise the effect of doubling the total income share of all the people below the poverty line is considered, with an adjustment among the top 20 percent of the distribution. For practical purposes, this can be thought of as a hypothetical lump-sum transfer. Specifically, the size of the transfer received is inversely proportional to the income of the recipient. Figure 1 illustrates the impact. The black line shows the pre-redistribution pattern and the green line the post-redistribution pattern. Redistribution pushes the bottom end of the distribution up and to the right. For Kenya and, less spectacularly, Brazil and Mexico, the median poor household is taken above the poverty line. The figure shows that a doubling of poor people's income would have a large effect on the number of people in poverty and a relatively small impact on the income of the richest.

Figure 1 Doubling the income of the poor would take a small transfer from the rich

Income distribution before and after hypothetical wealth transfer



Note: The area under each curve represents 100% of people. The simulated distribution reflects a transfer proportionate to income from the richest 20% large enough to double the income of those below the poverty line. The size of the transfer received is inversely proportionate to income below the poverty line.
Source: Fuentes 2005.

Table 1 Pro-poor growth provides greater results

| | Kenya 1997 | Brazil 2002 | Mexico 2002 |
|--|------------|-------------|-------------|
| <i>Doubling the income share of poor people: static transfer from the richest quintile</i> | | | |
| Poverty rate decline | 23% to 4% | 22% to 7% | 16% to 4% |
| People out of poverty (millions) | 5 | 26 | 12 |
| Transfer as share of total household income (%) | 7.00 | 2.91 | 2.57 |
| Transfer as share of richest quintile's income (%) | 14.2 | 4.6 | 4.7 |
| <i>Year median household is out of poverty under different growth patterns</i> | | | |
| Simulation 1 (no change in distribution) | 2030 | 2041 | 2032 |
| Simulation 2 (pro-poor growth) | 2013 | 2022 | 2017 |

Note: The data for the national simulations are computed from household surveys that are the basis for the government's own poverty estimated and also underpin the World Bank's assessment of \$1 a day poverty.
Source: Fuentes 2005.

Dynamic pro-poor growth

In a dynamic model the distribution pattern changes over time. The simulation here compares the time horizon for the median poor household crossing the poverty line under distribution-neutral growth and under the pro-poor growth scenario. Under both scenarios average per capita growth rates are assumed to follow the observed trend between 1990 and 2002—a period chosen to reflect two full economic cycles.

Table 1 summarizes the main results from both simulations. For both Brazil and Mexico the static transfer required to double income below the poverty line is equivalent to less than 5% of the income of the richest population quintile. Poverty incidence falls sharply in both

countries: from 22% to 7% in Brazil and from 16% to 4% in Mexico. In Kenya less extreme disparities of wealth and a higher incidence of poverty mean that the incomes of the richest quintile would have to fall far more to finance the transfer, but the overall incidence of poverty still falls from 23% to 4%. For all three countries the pro-poor growth scenario reduces the time horizon for lifting the median household above the poverty line. For Brazil the time horizon falls by 19 years, for Mexico by 15 years and for Kenya by 17 years.

Calculations for the two scenarios are based on the following formulation. In the distribution-neutral simulation, the observed growth rate is imputed to each percentile so that:

$$Y_{it+1} = Y_{it} * e^{g_i} \text{ for every percentile } i.$$

The pro-poor growth simulation assumes a growth rate for the number of poor people twice the average growth rate observed in 1990–2002, with growth rate remaining constant so that:¹

$$Y_{jt+1} = Y_{jt} * e^{2g_j} \text{ for every percentile } j.$$

Percentile j is defined as those below the poverty line at the initial time t_0 .

$$Y_{it+1} = Y_{it} * e^{g_i} \text{ for every percentile } i.$$

Percentile i is defined as those above the poverty line at the initial time t_0 .

The growth rate gj is double the observed growth rate in 1990–2002. The growth rate gi is such that the overall growth rate of the economy remains constant over time. Given that the relative weights of each percentile change every year, gi in time t is slightly higher than gi in time $t + 1$.

The data are for average per capita income of households in 100 percentiles. The welfare indicator is after-tax per capita income for the household. International poverty estimates were used for Brazil and Kenya and national computations of poverty incidence for Mexico. The simulations used the 1990–2002 per capita growth rates as reported in *Human Development Report 2004* to capture two full economic cycles for Brazil and Mexico.² For Kenya, since observed growth rates are negative, an optimistic yet plausible per capita growth rate of 1 per cent was assumed.

Notes

¹ These assumptions have two implications. First, inequality will fall every year. Second, for the overall growth rate to remain constant, the growth rate for those above the poverty line will be smaller every year, as the share of income of poor people increases.

² Despite the presence of financial crises in both Brazil and Mexico during that period, the growth rates used are representative of long-term growth. Growth rates for 1970–2002 are lower in both countries. The difference in time horizon between growth patterns does not change significantly when using different growth rates.

Sources and selected readings

- Chen, Shaohua, and Martin Ravallion. 2004.** "How Have the World's Poorest Fared since the Early 1980s?" Policy Research Paper 3341. Washington, DC: World Bank.
- Cornia, Giovanni Andrea, ed. 2004.** *Inequality, Growth, and Poverty in an Era of Liberalization and Globalization*. Oxford: Oxford University Press.
- Deaton, Angus. 2003a.** "How to Monitor Poverty for the Millennium Development Goals." *Journal of Human Development* 4(3): 353–78.
- . **2003b.** *Measuring Poverty in a Growing World*. NBER Working Paper: 9822. Cambridge, Mass.: National Bureau of Economic Research.
- Dikhanov, Yuri. 2005.** "Trends in Global Income Distribution 1970–2015." Background note for *Human Development Report 2005*. New York.
- Fuentes, Ricardo. 2005.** "Poverty, Pro-Poor Growth and Simulated Inequality Reduction." Background note for *Human Development Report 2005*. New York.
- Kakwani, Nanak. 2004.** "Poverty Measurement Matters: An Indian Story." Brasilia: United Nations Development Programme, International Poverty Centre, Brasilia.
- Reddy, Sanjay G., and Thomas W. Pogge. 2003.** "How Not to Count the Poor." Columbia University, New York. [<http://www.columbia.edu/~sr793/count.pdf>]. May 2005.
- World Bank. 2001.** *World Development Indicators 2001*. Washington, DC: World Bank.
- . **2005.** *Global Economic Prospects 2005*. Washington, DC: World Bank.