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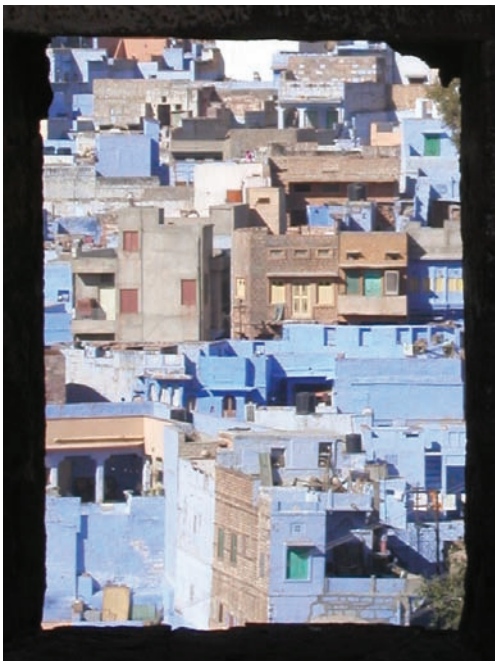


The Future of Poverty: Framing Uncertainty

Exploring reasonable ranges for proximate drivers will frame the uncertainty of poverty forecasts and the likely outer range of human leverage.

How much leverage is available in reducing poverty globally and in specific regions and countries of the world? Another way of asking the same question is, how rapidly and substantially can we shift patterns of base case forecasts of poverty like those in Chapter 5? The proximate drivers (economic growth, population growth, and income distribution) can help frame an answer to the question. We have some understanding of the general range of uncertainty for each of those drivers. Varying them accordingly, one at a time and collectively, will frame the range of uncertainty about the future of poverty. That is the purpose of this chapter.

This volume has emphasized, however, that the search for levers and strategies of actions must focus on the deeper forces that drive economic and population growth and of income distribution. Human action, such as passing laws or changing government spending patterns, does not directly increase income or make income distributions more equitable. Such action can, however, lead to improved governance, more investment in education or R&D, or increased transfer of tax receipts from rich to poor, all of which in turn can indirectly change income and its distribution. The next two chapters will therefore explore the relationship between strategies of intervention, as individual actions or in poverty reduction packages (see, again, their discussion in Chapter 3), and the proximate drivers. Chapter 7 will do so at a high level of geographic differentiation and Chapter 8 at the level of country groupings, countries, and even regions within countries.

Framing Uncertainty with Proximate Drivers

Average income and income distribution are proximate drivers of poverty. That is, of course, true with respect to the poverty *rates* within a population, but not true with respect to the *absolute number* of people living in poverty. To incorporate into the analysis the number of people living in poverty requires the addition

of population size to the proximate driver list. That addition is also important because of the many interactions between demographic and economic growth.

Population

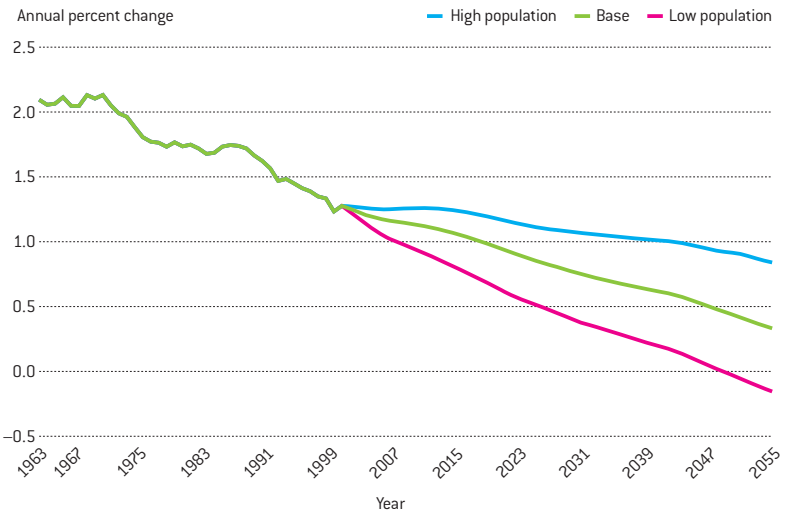
Chapter 5 compared the base case of International Futures (IFs) with Pardee with the population forecasts of the United Nations and others. Two additional forecasts built around the base case can provide reasonable higher and lower estimates for global and regional populations between now and midcentury and identify the impact that such framing scenarios might have on poverty. Figure 6.1 shows the global growth rates of population historically and in the frame-building forecasts. The interventions to create the high and low population forecasts were variations on the endogenous fertility rate forecasts of the base case, scaled so as to create something close to the well-known UN high and low population forecasts.[1] Interventions to the model for these and all other framing scenarios began in 2000, so as to represent the maximum variation that was possible beginning in the year during which the global community set the Millennium Development Goals (MGDs).

The UN high variant scenario appears very improbable, because it would require a bit more than 1.1 percent global annual population growth through 2050. The global rate in 2005 was 1.2 percent, and that rate has been falling quite sharply. That is, the UN high forecast would require something very close to today's global population growth over the first half of this century, following forty years during which the global rate dropped by nearly half and momentum for further decline has built.

Figure 6.2 shows the implications that alternative population forecasts have on the total number of people living on less than $1 per day, using the lognormal formulation. The difference is relatively modest by 2015, but very substantial by 2050.

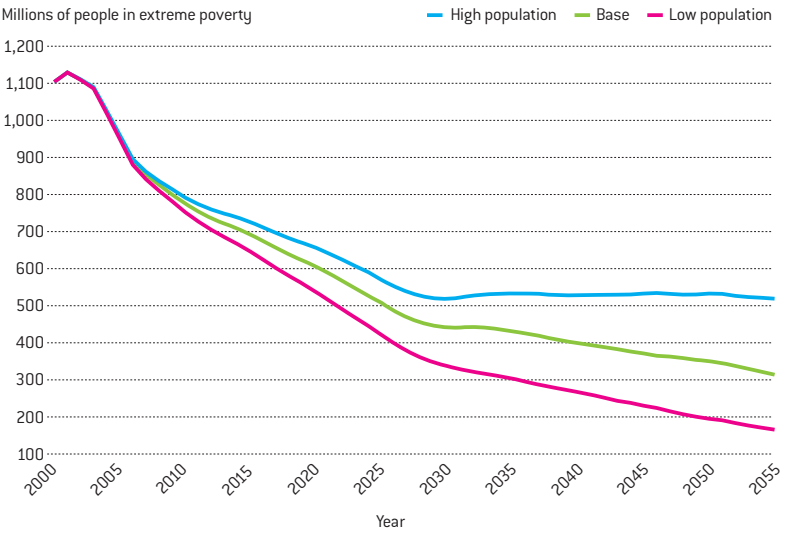
Population growth rates affect not just the number of people living on less than $1 per day. They affect also the percentage of people in poverty, which is lower in the low population scenarios. Although higher population contributes to somewhat higher total economic growth, it also places many burdens on developing societies that can slow per capita growth. For instance, it requires higher educational expenditures and places more demand on agricultural land. In contrast, slower demographic growth can make such expenditures and resources available at higher levels per capita and can also increase the portion of the population in their working years (a demographic dividend) across many years of the forecast horizon. Not surprisingly, the variation in the rate of poverty is not as great across demographic scenarios as the variation

Figure 6.1 A general range of uncertainty for global population growth rate



Source: IFs Version 5.47.

Figure 6.2 Extreme global poverty in population framing scenarios



Source: IFs Version 5.47.

Population growth rates not only influence the total number of people in poverty but also significantly change the poverty rate.

in the headcount. Yet it is significant, reaching more than 3 percent by 2050, reinforcing the importance of looking at population not just as a driver of numbers living in extreme poverty but as a driver of poverty rates.

Economic growth

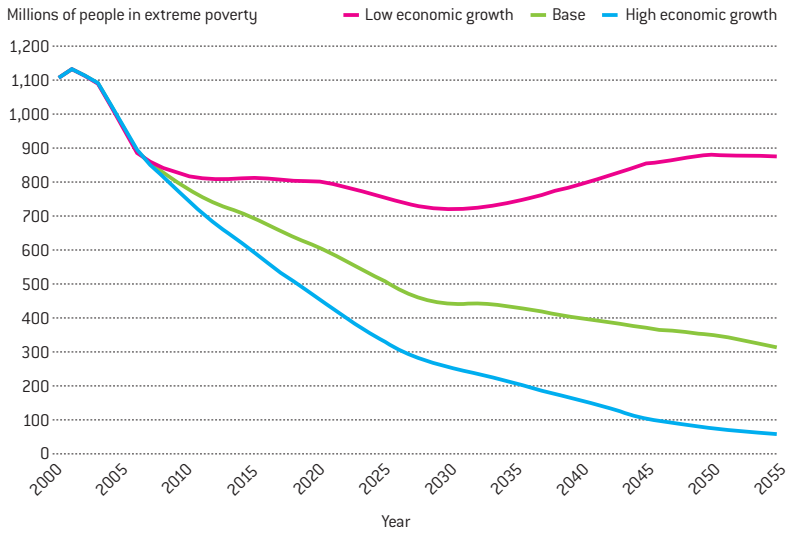
The interventions made to create the high and low economic forecasts were variations on the multifactor productivity forecasts of the base case, scaled globally so as to create something close to rates of gross domestic product (GDP) growth 1 percent faster or slower than those in the base case (refer to Figure 5.3 for rates in the base case). Because of greater uncertainty, we increased or decreased the rates of growth in sub-Saharan Africa, South Asia, and Latin America by about 1.5 percent. Because the historical pattern of economic growth, to which the base case is tied, has been so high for China, we increased its high case by only 0.5 percent and decreased its low case by 2.0 percent.

The framing cases represent annual global growth rates that range from 2.1 to 4.2 percent. Angus Maddison (2001: 126; see also Maddison 1995) estimated that the world economy grew at a rate of 1.6 percent from 1820 to 1950, at 3 percent between 1973 and 1998, and at 4.9 percent during the Golden Age from 1950 to 1973. It is important to reiterate that the forecasts in this book for the first half of the twenty-first century are scenarios for a period in which population growth rates are expected to continue a fairly substantial decline, in contrast to the history of most of the twentieth century, which included a rapid rise, peaking, and then some important initial decline in population growth rates. The three frame-building forecasts appear to capture the broad range of historical patterns fairly well.[2]

Figure 6.3 shows the possible implications of the three different GDP forecasts on poverty rates, using the lognormal formulation. Clearly, the headcount differences across GDP forecasts are substantial.

Not surprisingly, the alternative economic forecasts have a greater impact on poverty reduction than do the different population forecasts. For example, the variation in the percentage of people living in poverty in 2050 reaches 8–9 percent (within a given formulation), more than twice the variation seen across the population forecasts. Still, the variation in rates by 2015 within formulations is only about 2–4 percent, raising some serious questions about the extent of human leverage in poverty reduction over such a horizon, a theme to which we will return.

Figure 6.3 Extreme global poverty in economic framing scenarios



Source: IFs Version 5.47.

Distribution

Although global distributions of income across countries and among individuals regardless of their geographic location are very much of interest (we discussed them in Chapter 5 and will return to them in Chapter 7), the society is the basic level for calculation of poverty and therefore the appropriate level of analysis for framing scenarios around the implications of distribution.

The endogenous forecasts of income distribution within IFs are not strong enough to carry much weight in the analysis of future poverty levels. That is not a criticism of IFs relative to other forecasting efforts, but rather an absolute statement—authoritative long-term forecasts of domestic income distributions simply do not exist. Montek S. Ahluwalia, Nicholas Carter, and Hollis Chenery (1979) attempted to create distributional forecasts by relying upon the inverted U of the Kuznets curve, found in early cross-sectional analysis, but longitudinal analysis and even recent cross-sectional work has largely discredited that pattern.

Given both the weak basis for forecasting and slow change historically in domestic distributions, a fundamentally flat forecast is a reasonable pattern for the base case. As with population and economic growth, framing cases were created that attempt to provide general outer boundaries for change in average Gini coefficients in the first half of the century. In both framing cases, exogenous changes in domestic distributions enter gradually over the entire fifty-year period, cumulatively shifting initial Gini coefficients upward or downward by about 0.06 points, or 15 percent, relative to the base case.[3]

Figure 6.4 begins the analysis of the impact that different forecasts of distribution can have on forecasts of poverty levels, looking once again at the number of those living in extreme poverty as calculated by the lognormal formulation. One of the most interesting aspects of it (and the patterns with the cross-sectional formulation also) is the asymmetry between the impact of greater inequality and greater equality relative to the base case. In the early years, the asymmetry is largely a function of the turn of the base case toward somewhat greater inequality. That is partially a composition issue, because the global computation is weighted by population, which is growing more rapidly in developing countries where inequality tends to be higher. In the longer run, however, the global average of domestic Gini coefficients in the base case returns to a value close to initial conditions, which suggests that there must be a deeper basis for the asymmetry.

The core of the explanation involves Africa. An increasingly large share of the global poor over time are in sub-Saharan Africa. In the IFs base case forecast, African income distributions become somewhat worse, while those in other parts of the world improve. It is important to inveigh again against attributing too much credibility to such a forecast, but accelerated economic development often does increase inequality. If it were to happen in Africa, the difference in poverty level forecasts between the base case and the high inequality case would be relatively small.

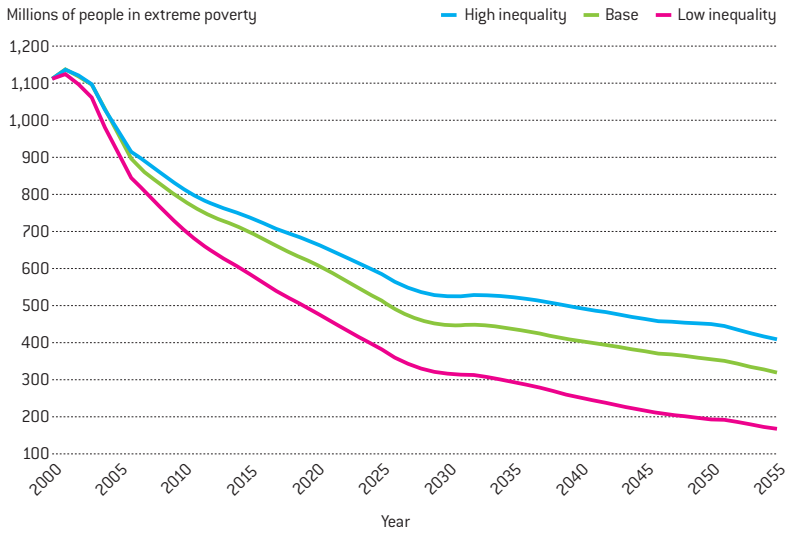
Comparing only the high and low inequality forecasts (so as to avoid the complications of the pattern of inequality in the base case), the differences in poverty rates for the lognormal formulation in 2015 are 3.2 percent. That is quite comparable to the differences by 2015 across the economic growth scenarios. In contrast, the differences by 2050 are less great across forecasts based on differing income distribution than they are across different growth forecasts. This result has implications for the next chapter, in which different types of interventions are considered. Specifically, distribution changes can be as important as growth in the short run in lowering poverty rates, but growth will prove more important than distributional changes in the longer run.

Proximate drivers in combination

Attention to the combined impact of the proximate drivers completes the framing of futures for poverty reduction. Although it is, of course, extremely unlikely that the world would experience, for instance, a combination of high population growth, low economic growth, and worsening inequality, such a forecast helps us understand the likely upper limits for poverty through the first half of the century—the "worst case." Similarly, a combination of low population growth, high economic growth, and decreasing inequality lets us examine the likely lower limits for poverty—the "best case."

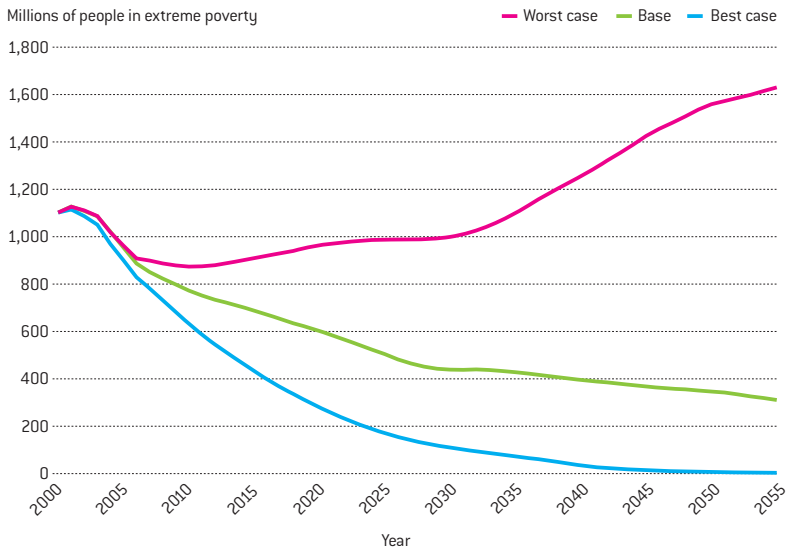
The worst case and the best case are the worst and best only in the limited terms of the sets of individual drivers that have been examined in this chapter. One can, of course,

Figure 6.4 Extreme global poverty in inequality framing scenarios



Source: IFs Version 5.47.

Figure 6.5 Extreme global poverty in combined framing scenarios



Source: IFs Version 5.47.

imagine a future in which economic growth of most of the developing world collapses, even reversing the gains of China and India, perhaps as a result of a massive global wave of avian flu or great political unrest. Similarly, the worst and best cases obviously diverge substantially on either side of the base case, psychologically conferring more credibility to it. Presumably, the unfolding reality of the next fifty years is more likely to be close to the base case than to the extreme cases, but the base case also remains a very low probability forecast. The analyses in this study should help us think about possible futures, not lead us to believe that we can predict them.

Figure 6.5, using the lognormal formulation, shows the wide range of possible futures in the three scenarios for global headcount of those living on less than $1 per day. Table 6.1 summarizes the numerical forecasts of global poverty, across formulations as well as across time and by headcount and rate. In the best case scenario, both lognormal and cross-sectional formulations suggest that extreme poverty could be nearly eliminated by midcentury. Remember that extreme poverty kills through malnutrition and bad health, so that is a marvelous prospect—a slaying of one Horseman of the Apocalypse that all cultures recognize as fundamentally threatening. At the same time, remember also that crawling out of that condition requires only an income of $1 per day, hardly suggesting that the world's poor would be doing very well in absolute terms. The last section of this chapter returns to the richer portrait of what the different scenarios mean with respect to poverty defined more broadly.

Even in the worst case, it appears very probable that the numbers and percentage of those living in the worst poverty will decline for the next ten to fifteen years. That has a great deal to do with the momentum of economic growth in China and India; growth rates a percent or two below recent levels would not fully stop their forward movement. In contrast, however, the longer-term future of poverty reduction has much to do with sub-Saharan Africa, where what seem reasonable swings in economic growth could make a substantial difference. In the worst case, numbers in poverty could actually rise again, and the percent living in poverty could flatten out.

One of the remarkable aspects of Table 6.1 is that, even in the worst case scenario, the lognormal formulation suggests that humanity

Table 6.1 Extreme poverty in combined framing scenarios

	Combined proximate driver framing scenarios					
	Worst case		Base case		Best case	
Poverty numbers (millions)	**2015**	**2050**	**2015**	**2050**	**2015**	**2050**
Lognormal	913	1,561	692	350	437	10
Cross-sectional	1,151	1,654	998	569	799	112
Poverty rates (percent)						
Lognormal	14.5	16.1	11.2	3.7	7.2	0.1
Cross-sectional	18.3	17.0	16.1	6.9	13.2	1.6

Source: IFs Version 5.47.

will come very close to accomplishing the first Millennium Development Goal of bringing the poverty rate down by half by 2015. (As we proceed through the discussion of this chapter, it will be useful for the reader to keep in mind the MDG target for extreme poverty; given the World Bank (2008: 46) estimate of 28.7 percent in 1990 for developing countries, that target is 14.3 percent in 2015.) Goals set by the global community have historically been almost always missed. But this global goal is very likely to be achieved, thanks substantially to the progress in China. Regional attention to South Asia in the shorter run and sub-Saharan African throughout the forecast horizon is, of course, needed, and later sections and chapters will provide it.

Insights from the analysis of framing scenarios with proximate drivers

The analysis of frame-building forecasts provides overall insights about the combined impact of the proximate drivers of poverty:

- There is great uncertainty with respect to the course of human poverty, but there appears to be a considerably higher probability that both numbers in poverty and rates of poverty will fall than that they will rise (sub-Saharan Africa excepted, and subject to further analysis).
- Uncertainties related to forecasting formulations are considerable, even in the relatively near-term horizon of 2015.[4] The lognormal and cross-sectional formulations vary by 5–7 percent in their anticipated reduction of global poverty rates by 2015. Somewhat surprisingly, they exhibit less variation by midcentury, in part because of the boundary effects of approaching zero extreme poverty.
- Uncertainties related to drivers are also very considerable and give rise to estimates of poverty that vary as much as 5–7 percent by 2015 and 16 percent by 2050.
- To put in contexts such ranges of uncertainty surrounding formulations and drivers, the ones through 2015 are, although important, less than about half of the absolute reductions anticipated in the base case between 2002 and 2015 by either the World Bank or IFs.
- Given that each of the proximate drivers is subject to very considerable human influence via collective and conscious action, humanity appears to have had (from the perspective of 2000) considerable influence with respect to poverty levels and rates, most likely within the same general range of 5–7 percent before 2015 and 16 percent by 2050.
- The variation in poverty rates of 5–7 percent by 2015 is, however, the result of contrasting extreme assumptions about all proximate drivers. Because conscious human action is unlikely to cause swings in the proximate drivers nearly as large as the ranges selected for this frame-building analysis of the drivers, it is likely that potential human influence on poverty rates is considerably less than those outer-range values. In fact, it might be reasonable to guess that incremental human action is unlikely to result in swings of much more than half those magnitudes, perhaps 3 percent by 2015 and 8 percent by 2050. This is important context for the analysis in Chapter 7 of the power of deep levers.

Even in the worst case scenario, the world will probably reach the Millennium Development Goal for poverty in 2015.

Framing Uncertainty with Integrated Scenarios

The purpose of this chapter is to frame the potential scope of human leverage with respect to poverty reduction. The method used in the last section, namely varying each proximate driver toward the outer limits of what seems likely, is very helpful. It is also, however, somewhat crude. The best and worst case scenarios, a simple summing across the three drivers, are extreme. Moreover, they are not tied to any fundamental assumptions about human decisions or constraints imposed by technology or the environment.

Another approach to framing the future of poverty is the use of coherent, integrated scenarios. Forecasters have developed many different scenario sets for global futures.[5] Those sets are of interest for several reasons. First, they normally try to map a broad range of likely human futures. Second, those alternative futures often reflect implicit or explicit assumptions about different patterns of human development, including alternative beliefs concerning the extent to which humans can steer their own systems.

We may have the ability to reduce global extreme poverty by about 8 percent by 2050 relative to an already strong downward trend.

Third, however, those scenarios also remind us that the future is not simply a matter of different human action patterns. Within good scenarios of the long-term future, some broad aspects of uncertainty are not particularly susceptible to human action and have the character of physical unknowns. For instance, the fragility of the global biological and physical environment, so that human actions might disturb equilibria and tip systems, is to a considerable degree unknown. So are ultimately recoverable fossil fuel resources and rates of advance in technology.

In 1995 the Stockholm Environmental Institute convened one of the most influential efforts to think deeply about long-term futures, the Global Scenario Group (GSG), "as an independent, international and interdisciplinary body to engage in a process of scenario development." [6] The GSG process gave rise to three scenario classes, or families, widely used in longer-term global analysis. Its Conventional Worlds scenarios (Market Forces and Policy Reforms) serve as something close to base case portrayals of global futures. Its Barbarization scenarios (Breakdown and Fortress World) provide detail on how things could go badly wrong. And its Great Transitions scenarios (Eco-Communalism and New Sustainability Paradigm) convey visions for long-term futures that give priority to human development, social stability, and environmental quality as pillars of sustainable development.

Building on the global scenario group: The Global Environment Outlook

The GSG scenarios were one of the key sources of inspiration for a set of four related scenarios elaborated in the UN Environment Programme's (UNEP's) *Global Environment Outlook 3* and again used in the *Global Environment Outlook 4*. Box 6.1 describes the variations developed by the UN Environment Programme (2002).

Although environmental issues obviously have a prominent place in the analysis done for GEO scenarios, their framing of uncertainty extends widely to key issues such as demographic and economic growth and technology and globalization processes. As true scenarios, rather than simpler alternative forecasts, each represents a quite different but potentially coherent pattern of global evolution with associated human interventions: (1) focusing on free markets and globalization processes, (2) intervening with policies directed toward human capital and environmental quality, (3) changing cultural and behavioral patterns toward sustainability, and (4) separating into competing groups within and across countries.

Box 6.1 Global Environment Outlook scenarios

Markets First. "The private sector, with active government support, pursues maximum economic growth as the best path to improve the environment and human well-being. Lip service is paid to the ideals of the Brundtland Commission, Agenda 21, and other major policy decisions on sustainable development. There is a narrow focus on the sustainability of markets rather than on the broader human environmental system. Technological fixes to environmental challenges are emphasized at the expense of other policy interventions and some tried-and-true solutions." (UNEP 2007: 400)

Policy First. "Government, with active private and civil sector support, initiates and implements strong policies to improve the environment and human well-being, while still emphasizing economic development. *Policy First* introduces some measures aimed at promoting sustainable development, but the tensions between environment and economic policies are biased towards social and economic considerations. … The emphasis is on more top-down approaches, due in part to desires to make rapid progress on key targets." (UNEP 2007: 400–401)

Security First. "Government and the private sector complete for control in efforts to improve, or at least maintain, human well-being for mainly the rich and powerful in society. *Security First*, which could also be described as *Me First*, has as its focus a minority: rich, national, and regional. It emphasizes sustainable development only in the context of maximizing access to and use of the environment by the powerful." (UNEP 2007: 401)

Sustainability First. "Government, civil society and the private sector work collaboratively to improve the environment and human well-being, with a strong emphasis on equity. Equal weight is given to environmental and socioeconomic policies, and accountability, transparency and legitimacy are stressed across all actors.{AU: Sectors? ED} As in Policy First, it brings the idealism of the Brundtland Commission to overhauling the environmental policy processes at different levels"[1] (UNEP 2007: 401).

1 Compare this also with the sustainability scenario developed in European Commission–sponsored TERRA project (Hughes and Johnston 2005).

Many experts helped create the GSG scenarios, develop the GEO versions of them, and examine the specific implementations of those scenarios within IFs. For instance, the GEO-4 process relied on regional teams to consider the forecasts produced within each scenario, as well as the specific assumptions that generated model results, and to provide feedback for improvement of the story lines. GEO-4 used IFs to map demographic and economic drivers and to add richness to the stories of alternative technological and social futures.

Comparison of the UNEP GEO scenarios with best and worst case forecasts

Are these integrated scenarios associated with significantly different forecasts of poverty? If so, what is the character of that association? How does the range of poverty vary across the integrated scenarios relative to the broad framing scenarios?

Table 6.2 helps address those questions. It provides poverty forecasts (using the lognormal formulation) from the UNEP GEO scenarios in comparison with the best and worst case forecasts.[7] The first two columns look at the World Bank's set of developing countries as a whole. The UNEP GEO scenarios capture much of the same variation in the GDP and population drivers as the best and worst cases, although that variation tends to be narrower.

None of the GEO scenarios produce GDPs in 2050 as high as the best case scenario, and none produce population in 2050 as high as the worst case scenario. Because the driver range is narrower in the UNEP forecasts, and because the UNEP forecasts exhibit very little variation on income distribution, it should not be a surprise that the variation in their poverty forecasts is more limited than that of the best and worst case forecasts. Already by 2015, that variation is reduced in developing countries as a group from about 7 percent between best and worst cases to only 3 percent. And by 2050 the range is narrowed from nearly 16 percent to just over 7 percent. Because the four GEO scenarios purposefully span a wide range of possible futures, this result reinforces the earlier conclusion that the impact of incremental human leverage (remember that the base case already represents much applied leverage) might be less significant than often argued, especially by 2015. And it reinforces the expectation that packages of interventions might only swing poverty rates about half as much as the total difference between worst and best cases. Yet not surprisingly, all four of the GEO scenarios suggest levels of extreme poverty in the developing world as a whole that fall below the MDG target of 14.3 percent by 2015.

Turning to sub-Saharan Africa, Table 6.2 suggests much the same set of conclusions. The two proximate drivers that vary across the four UNEP GEO scenarios, GDP and population, lead to poverty reduction that is within the general range of the best and worst cases, but the variation is very considerably less. The World Bank's (2008: 46) estimate of poverty rates for sub-Saharan Africa in 1990 was 44.6 percent, setting up an MDG of 22.3 percent. None of the GEO scenarios achieve that by 2015, although "policy first" and "sustainability first" do bring the rates to about 25 percent.

The variation in UNEP GEO scenarios is similar to, but somewhat less than, that of the worst and best case scenarios.

Table 6.2 Extreme poverty (percent) in the GEO and IFs framing scenarios

	Developing countries		Sub-saharan Africa		South Asia	
GEO Scenarios	**2015**	**2050**	**2015**	**2050**	**2015**	**2050**
Markets first	11.1	3.7	29.8	12.8	13.6	1.9
Policy first	10	1.8	25.3	8.5	12.7	0.9
Security first	12.5	8.6	30.1	28.2	16.1	5.4
Sustainability first	9.8	1.5	24.5	7.8	12.5	0.7
Framing Scenarios						
Best case	7.2	0.1	21.7	0.6	7.8	0.5
Base case	11.2	4.2	29.4	14.2	13.7	2.2
Worst case	14.5	16.1	33.8	40.5	18.1	11.5

Source: IFs Version 5.47.

Even in the best case, Africa is unlikely to reach the 2015 poverty goal.

Looking at South Asia, all the above conclusions remain valid. The World Bank's (2008: 46) estimate for poverty in the region in 1990 was 41.3 percent. All four GEO scenarios cut that by more than half in 2015. Although the GEO scenarios by 2015 tend to be closer to the IFs base case or the worst case framing scenario than to the best case, by 2050 all four scenarios show near elimination of extreme poverty.

These scenarios and their implementation in the IFs system all have weaknesses, of course. Consider one significant example for South Asia. Global oil prices rose rapidly after 2000 and in 2007–2008 reached more than $130 per barrel, about five times the price of 2000 in real terms. There is much uncertainty about how prices will change through 2015, much less 2050. The U.S. Department of Energy's Energy Information Agency publishes *International Energy Outlook* annually, and the 2007 volume presented three pricing scenarios through 2030, with prices in that year of $36, $59, and $100 per barrel in 2005 dollars (U.S. Department of Energy 2007: 12–13).

The base case of IFs builds in very little economic impact from higher oil prices. If the price spike of 2007–2008 were to persist for several years, however, even eroding over time to as low a value as $36, it could have substantial impact on developing countries, especially regions as dependent on imported oil as South Asia. In 2015 the region's poverty rates could be 18.5 percent instead of the 13.7 percent of the base case. Interestingly, such a rate would actually be higher than the worst case scenario of Table 6.2, already said to be worst only in the context of the assumption set explored earlier.

Table 6.2 merits a final comment. Since each of the GEO scenarios that reduce poverty relative to the base case have different orientations, one might conclude that the potential exists for combinatorial intervention packages that are more positive than any one of them alone. We should recognize, however, that some aspects of the integrated GEO-4 scenarios may be incompatible, at least philosophically, if not in terms of directly conflicting actions. The fact that each constitutes a plausible world is one of their greatest strengths in helping frame the study of the future of poverty. The GEO scenarios thus suggest that we should temper expectations for very large impacts from incremental interventions beyond the processes already set in motion in the base case. Let us keep this recognition in mind as we explore specific interventions and packages of them in Chapter 7.

Framing the Future of Poverty More Fully

Until this point in this chapter, our focus has been on developing countries as a whole, and we need to begin the geographic disaggregation that the next two chapters will continue. In addition, although the $1 per day measure of income poverty is very useful and the first Millennium Development Goal greatly popularized it, poverty is a much more complex phenomenon than rates of extreme poverty alone can assess. Consideration of additional poverty measures can more fully frame our understanding of the range of possible poverty futures and the leverage available to shape them.

A more extensive look at income poverty

Table 6.3 moves beyond extreme poverty by looking at two other income poverty measures, the percent of those living on less than $2 per day and the poverty gap. It provides 2000 data, along with framing forecasts for 2030 and 2055 across the set of developing-country regions normally used by the World Bank in its analysis, breaking out the Chinese and Indian giants. The insights from that table concerning extreme poverty include the following:

- Absolute poverty rates in 2000 were not greatly different in India and sub-Saharan Africa, but the future of those rates is very different in scenarios from the worst case to the best case. The reason lies largely in the higher economic growth rates of India, but India's lower population growth rates also make a positive contribution to poverty reduction.
- Even in the worst case, India will almost certainly greatly reduce extreme poverty by 2030 and be well on the road to eliminating it by 2055.
- In addition to sub-Saharan Africa, the region most in danger of stagnation with respect to poverty reduction may be Latin America and the Caribbean. The reason lies again in relatively low per capita economic growth.

- The developing countries of Europe and Central Asia, as well as those of the Middle East and North Africa, suffer quite low rates of extreme poverty and are making considerable progress in reducing even those.

Life on less than $1 per day is called absolute or extreme poverty because such income is considered the borderline for survival. It is no coincidence that about 1 billion people live at that level and that about 800 million global citizens, roughly the same number, are considered

Table 6.3 Income poverty in combined framing scenarios

	Percent of people living on less than $1 per day				
		Worst case		Best case	
	2000	2030	2055	2030	2055
East Asia and the Pacific	15.2	4.4	3.3	0.4	0
China	16.5	2.9	2.2	0.1	0
Europe and Central Asia	4.5	0.8	0.9	0.1	0
Latin America and the Caribbean	10.2	11.2	8.7	1.4	0.2
Middle East and North Africa	4.8	3.2	1.9	0.1	0
South Asia	28.5	12.3	10.5	1.1	0
India	35.4	10.7	3.2	0.2	0
Sub-Saharan Africa	43.9	33.4	39.2	6.4	0.4
Total developing countries	***21.5***	***13.1***	***15.9***	***1.7***	***0.1***
	Percent of people living on less than $2 per day				
		Worst case		**Best case**	
	2000	**2030**	**2055**	**2030**	**2055**
East Asia and the Pacific	49.7	19.1	13.7	3.0	0.1
China	49.2	15.1	11.4	1.4	0.0
Europe and Central Asia	19.5	5.2	5.9	0.5	0.0
Latin America and the Caribbean	25.7	25.6	19.6	5.4	0.8
Middle East and North Africa	26.2	17.0	8.4	1.6	0.0
South Asia	70.0	44.5	33.4	8.2	0.6
India	79.9	44.6	20.9	6.1	0.0
Sub-Saharan Africa	76.2	65.7	65.1	25.6	7.0
Total developing countries	***53.9***	***36.6***	***34.6***	***8.6***	***1.6***
	Poverty gap relative to the $1 per day poverty line				
		Worst case		**Best case**	
	2000	**2030**	**2055**	**2030**	**2055**
East Asia and the Pacific	5	1.4	1.9	0.1	0
China	5.5	0.8	0.6	0	0
Europe and Central Asia	1.1	0.2	0.2	0	0
Latin America and the Caribbean	3.7	4.5	3.6	0.5	0
Middle East and North Africa	1.4	1	0.6	0	0
South Asia	9.2	3.7	3.6	0.3	0
India	11.6	2.9	0.8	0	0
Sub-Saharan Africa	19.6	14.7	18.9	2	0.1

Source: IFs Version 5.47.

The poverty gap measure shows the depth of poverty in Africa and helps explain why the poverty headcount is hard to reduce.

malnourished. Obviously, however, even doubling that income threshold to $2 per day leaves those who live below it at very considerable risk. Approximately 2.5 billion people, nearly 40 percent of humanity, live below that level, sometimes referred to as moderate poverty. Approximately half of those in the developing world live below $2 per day. Again, the forecasts suggest a number of insights:

- Not surprisingly, poverty at $2 per day will be more persistent than poverty at $1 per day. Reductions by 2030 are proportionately smaller, and it persists in sub-Saharan Africa through 2055 even in the best case.
- More surprisingly, poverty at this level should be reduced by 2055 to one-third or less of populations in regions other than sub-Saharan Africa, even in the worst case.
- Even though the Middle East and North Africa, including many very oil-rich countries, do not have a very large percentage of people living on less than $1 per day, they have a great many living below $2.
- In scenarios involving significantly slower economic growth, like those around the worst case framing scenario, the developing world could still be burdened with more than one-third of its population in moderate poverty by 2055. Even China could have quite high levels by then.

One of the key difficulties with headcount measures of poverty is that they give no idea of how far below the identified poverty line individuals might be. In contrast, the poverty gap measure assesses the mean shortfall from the poverty line, treating those above the poverty line as having zero shortfall. The measure expresses the shortfall as a percentage of the poverty line. Thus in Table 6.3, the mean shortfall in sub-Saharan Africa in 2000 is nearly 20 percent, almost twice that of India. In contrast, the extreme poverty headcount percentage for sub-Saharan Africa in 2000 was 43.9 percent, not that much more than the 35.4 percent for India. Thus the poverty gap measure indicates that the depth of poverty in Africa is considerably greater than in India. In addition to higher forecasts of economic growth in India, that recognition helps us understand why Africa, unlike South Asia, is unlikely to meet the MDG goal for poverty headcount rate by 2015 even in the best case scenario and why, in the worst case scenario, extreme African poverty stays very high.

Turning to capabilities

Chapter 2 emphasized that poverty, in the widely accepted conceptualization of Amartya Sen, is ultimately rooted in human capabilities and that it is important, therefore, to look at a broad set of such capabilities when assessing the extent and depth of poverty. The most recognized set of capabilities is that tapped by the UNDP's human development index (HDI).[8] Specifically, the HDI aggregates capabilities on three subdimensions: a decent standard of living, a long and healthy life, and knowledge. Indicators used by the UNDP for those three dimensions include, respectively, GDP per capita at purchasing power parity (logged); adult literacy and gross aggregate enrollment rates at the primary, secondary, and tertiary levels; and life expectancy. Table 6.4 reports conditions in 2000, as well as framing forecasts for the same three dimensions and approximately the same indicators.

Not surprisingly, given the breadth of poverty indicated by headcount percentage and the depth as indicated by the poverty gap (see, again, Table 6.3), the GDP per capita of sub-Saharan Africa in 2000 fell below that of other regional groupings. The low GDP per capita in sub-Saharan Africa relative to that of India helps explains the greater relative severity of poverty in Africa. At the other end of the spectrum, both developing Europe and Central Asia, and Latin America and the Caribbean, had GDPs per capita in 2000 at or above $6,500 at purchasing power parity. Those levels are totally consistent with the low rates of extreme poverty and the relatively small size of the poverty gap within the developing countries of Europe and Central Asia. In the case of Latin America, however, the rates of extreme poverty are more than double those of developing Europe and Central Asia, in spite of a slightly higher per capita GDP. Great intercountry variation within Latin America explains part of the combination of relatively high income and high poverty, but not all of

it. Very substantial domestic inequality also explains much of the phenomenon. Brazil is an obvious example. In 2000 it had a GDP per capita of over $7,300, but still had an extreme poverty rate of about 8 percent and a poverty gap of nearly 3 percent. Even Argentina, with a GDP per capita in 2000 of $12,000, had a poverty rate of nearly 5 percent.

The Middle East and North Africa demonstrates a pattern with a different combination of income and poverty. Although the GDP per capita in 2000 was only $4,200,

Table 6.4 HDI components in combined framing scenarios

	GDP per capita at purchasing power parity (in 1,000s of dollars)				
		Worst case		Best case	
	2000	2030	2055	2030	2055
East Asia and the Pacific	3.8	9.8	12.8	17.6	40.5
China	3.9	11.5	15.2	21.2	48.7
Europe and Central Asia	6.3	13.6	18.5	19.9	48.3
Latin America and the Caribbean	7.1	9.2	12.0	18.5	50.7
Middle East and North Africa	4.2	7.5	10.2	13.0	38.7
South Asia	2.6	4.9	7.3	9.9	35.0
India	2.4	5.1	9.1	10.7	42.3
Sub-Saharan Africa	1.6	1.8	2.3	3.9	13.7
Total developing countries	***3.8***	***6.9***	***8.5***	***13.3***	***35.9***
	Life expectancy (years at birth)				
		Worst case		Best case	
	2000	2030	2055	2030	2055
East Asia and the Pacific	67	76	80	81	87
China	69	79	83	85	89
Europe and Central Asia	64	73	79	77	83
Latin America and the Caribbean	68	72	76	78	85
Middle East and North Africa	66	72	76	77	87
South Asia	62	68	73	75	86
India	62	70	77	76	89
Sub-Saharan Africa	45	56	58	62	73
Total developing countries	***63***	***69***	***71***	***75***	***84***
	Primary education completion rates (percent)				
		Worst case		Best case	
	2000	2030	2055	2030	2055
East Asia and the Pacific	107	100	98	102	100
China	112	102	100	102	100
Europe and Central Asia	96	100	99	101	100
Latin America and the Caribbean	103	98	97	101	100
Middle East and North Africa	93	101	99	103	100
South Asia	68	98	98	105	104
India	63	105	102	107	106
Sub-Saharan Africa	61	78	90	91	98
Total developing countries	***87***	***95***	***96***	***101***	***101***

Source: IFs Version 5.47.

the poverty rate was a relatively modest 5 percent, half that of Latin America and even below that of Europe and Central Asia, two regions with considerably higher average incomes.

Different contemporary patterns help shape the forecasts. The broad and deep poverty of Africa makes it likely to be persistent. The broad but somewhat less deep poverty of South Asia and India's high economic growth make the region the likely location for the greatest poverty reduction in the coming decade or two. Just as most analysts today are saying something along the lines of "global poverty reduction is very impressive, but attributable primarily to China—look at the problems of sub-Saharan Africa," in 2030 analysts may well be declaring how impressive global reduction is, attributing it primarily to South Asia, and saying "look at the problems of sub-Saharan Africa."

The second dimension of the human development index is a long and healthy life. In 2000 the values for all regions except South Asia and, especially, sub-Saharan Africa, were at or above global averages. The African values once again reinforce the breadth and depth of the continent's poverty. Moreover, in part because of HIV/AIDS, even the best case forecast does not exhibit much progress by 2015.

The third dimension of the HDI is knowledge. The UNDP puts two-thirds weight on the literacy indicator of knowledge and only one-third on the combined enrollment ratio across primary, secondary, and tertiary education levels. Literacy is difficult to measure consistently, however, and many analysts look to completion of primary education as a proxy measure of it. It is also one of the targets of the second MDG.

Table 6.4 shows the completion rates for primary education (those rates can exceed 100 percent when overage students return to complete primary school). On this measure, sub-Saharan Africa in 2000 actually was not far below South Asia. Both best and worst framing cases, however, suggest slippage by Africa by 2030. In fact, Africa appears highly unlikely fully to meet the MDG of universal primary education completion by 2030, much less 2015.

Having looked at all three dimensions of capabilities in the HDI, the reader may wish to glance back at the base case forecast of the measure in Table 5.5. Obviously, as an equally weighted index based on the three dimensions reviewed, its characteristics are an average of those seen on the individual dimensions and their indicators. In aggregate, the extent of poverty in sub-Saharan Africa is as clear from the HDI as from measures of individual capabilities, with South Asia in a better current position, but in turn quite far behind middle-income regions. Forecasts for Africa suggest a gap with all other regions that fails to narrow by midcentury, in spite of very considerable progress.

One size does not fit all. This cliché of development policy analysis deserves the regular repetition it receives. The starting points of different regions, and obviously of the countries within them, are very different. They differ not just on the level of poverty but on its character, as illustrated by different patterns across the various dimensions of poverty. Moreover, their current trajectories, and their possible or even likely patterns of development in coming decades, are quite different. The next chapters will need to be sensitive to that in looking at strategies for intervention.

Conclusion

Previous chapters demonstrated the importance of measurement and formulation when assessing historical data on poverty and when attempting to forecast future levels and rates of it. This chapter took the additional step of investigating the impact of very different economic and demographic growth patterns for the proximate drivers of poverty. It mapped the likely range of poverty by creating two framing forecasts, titled worst and best cases, but explained to be in reality better and less good (relative to the base case), since the future could potentially slip in either direction outside the boundaries set by them. It further explored the importance of deep drivers by looking at the possible influence on poverty of four integrated framing scenarios. Finally, it sketched some of the very large differences in poverty across regions and dimensions of poverty.

The findings should help shape our expectations for the more detailed and focused exploration of human leverage in the next chapter. We list the most important findings below:

- Because conscious human action is unlikely to cause swings in the proximate drivers as large as the ranges selected for them in the first section of this chapter, it is likely that human influence on extreme poverty rates for the developing world will be less than 5 percent. In fact, the integrated framing scenarios suggest that leverage is unlikely to result in swings of more than half those magnitudes, perhaps in the neighborhood of 2–3 percent relative to the base case. (Within sub-Saharan Africa, with its high poverty rates, however, the leverage appears considerably greater.)
- Incremental human leverage, on top of already substantial and critical efforts to reduce poverty, should not be downplayed or ignored simply because the likely swings in poverty rate as a result of applying it may not always appear huge. Reductions of 2–3 percent in the poverty rate of developing countries would mean the lifting of 150–250 million more people out of extreme poverty, the poverty that kills.

Human choices have the potential by 2050 to reduce the headcount of extreme poverty, the poverty that kills, by 150–200 million.

1 Specifically, the high population scenario increases fertility relative to the base case gradually over time, bringing it to values 50 percent higher than the base case in 2050. The low population scenario reduces fertility slowly relative to the base case for non-OECD countries only, bringing it down by 40 percent relative to the base case in 2050, while allowing OECD countries to stabilize long-term fertility rates at as low as 1.6, rather than at 1.8 in the base case.

2 The International Institute of Applied Systems Analysis (IIASA) and the World Energy Council (WEC) produced long-term scenarios of gross world product (Naki enovi , Grübler, and McDonald 1998: 6) with implicit annual growth rates between 2.2 percent and 2.7 percent. The Intergovernmental Panel on Climate Change (IPCC) scenarios from the third assessment report had annualized growth rates between 2.4 percent and 3.8 percent. Again, the framing forecasts above appear sufficiently broad so as to capture the range of futures that most analysts believe reasonable.

3 Using the Gini coefficient, income distribution in China worsened after 1980 by 0.15 or more. The distribution in India has remained much more stable.

4 Interventions to the model for these and all other framing scenarios began in 2000.

5 Hughes (2004b) mapped many of the scenario sets used in longer-term forecasting projects across different dimensions of uncertainty.

6 See http://www.gsg.org/gsgintro.html. Full documentation is in *Bending the Curve: Toward Global Sustainability* by Raskin et al. (1998) and Great Transition: The Promise and Lure of the Times Ahead by Raskin et al. (2002). See also Which World? Scenarios for the Twenty-First Century by Hammond (1998).

7 Dale Rothman of the International Institute for Sustainable Development (IISD) built upon the basic implementation of the GEO scenarios by the IFs team and refined and extended it with input from several of the modeling and regional teams that contributed to the GEO-4 process.

8 Although Sen was an adviser in the development of the HDI, he has often commented on its inadequacies as a measure. It is given prominence here for lack of an obviously better alternative.