

7



Changing the Future of Poverty: Human Leverage

■ *Within the total range of possible human leverage, how powerful are specific choices?* ■

Human leverage has great potential to reduce global poverty. Much action is already underway to apply leverage, and the base case forecast presumes that such action will continue. Chapter 6 framed the general magnitude of possible incremental leverage by examining a reasonable range of variation in the proximate drivers of poverty. The purpose of this chapter is to explore the choices that might most effectively exercise that discretionary leverage—to drill down toward policy one more level from the framing discussion. The first several sections seek to identify the points of leverage, those actions that can further influence the proximate drivers of poverty, and to map reasonable magnitudes for intervention.¹ Then we explore whether there are any silver bullets available, any actions that hold disproportionate potential for accomplishing incremental poverty reduction.² The final subsection turns to packaging of multiple actions and to looking at synergies and trade-offs among them.

Operationalizing the Levers

The International Futures (IFs) with Pardee model explicitly represents by no means all the structures and drivers desirable for a full analysis of human leverage with respect to economic and population growth and distribution (see Table 3.1 for an extensive listing), but it does contain substantial numbers of them. In reality, many of the identified “levers” of this discussion will remain rather aggregated, more “subdrivers” than true policy levers.

Levers below the proximate drivers often affect more than one driver. For instance, investments in human capital affect population, economic growth, and distribution. Increased international trade can affect both economic growth and distribution. It therefore makes little sense to proceed by discussing levers as if they were related to single proximate drivers. Instead, as discussed also in Chapter 3, although the distinctions are also not always clear between largely domestic and largely international actions, that division is generally apparent

and organizes our discussion. The same reality lies behind the ordering of the Millennium Development Goals (MDGs), the first seven of which focus on primarily domestic measures and the last of which, the global compact, turns to largely international leverage.

Tailoring the interventions: Geographic focus

“One size does not fit all” is one of the many clichés of the development world. Clearly, appropriate intervention packages for development generally and for poverty reduction specifically vary by region of the world, by country, and even by subregions within countries. Because of the global and long-term focus of this volume and the IFs simulation on which it builds, this chapter will not take analysis down to the country level. Instead it will stay at the regional (subcontinental) level, and Chapter 8 will consider selected countries.

What regional breakdown of the globe can be helpful in our analysis? Chapters 5 and 6 used the World Bank regions to provide some continental level information on poverty and to make comparison with World Bank results possible, but those units are too highly aggregated for policy analysis. Similarly, the six basic groupings of the UN are continental: Africa, Asia, Europe, Latin America (including the Caribbean), North America, and Oceania. The United Nations’ regions and subregions for statistical reporting are, however, much closer to what is needed (see Appendix 4 to this volume).³ For instance, that set divides Africa into Eastern, Middle, Northern, Southern, and Western. It divides Asia into Eastern, South-Central, South-Eastern, and Western (covering the Middle East up through the Caucasus).

No geographic representation is perfect for every purpose, and the divisions of the UN have obvious limitations in analyzing poverty or other Millennium Development Goals. For instance, the UN region of Eastern Asia puts Japan together with China. For the purposes of this analysis, we have put Japan, along with Hong Kong, the Republic of Korea, and Taiwan (not a member of the United Nations and its regionalization but represented in IFs) into an Eastern Asia Rich region and left China together with North Korea and Mongolia in Eastern Asia Poor. That serves us better because

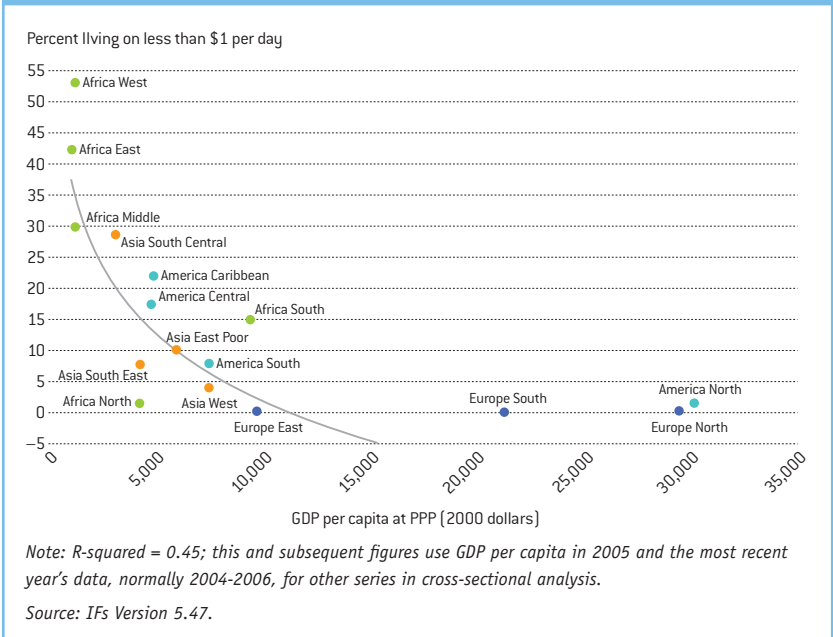
it separates countries essentially without extreme poverty from those with significant rates of it. Similarly, we have put Australia and New Zealand into a new Oceania Rich, leaving the mostly Micronesian countries in Oceania Poor. We placed Mexico with the United States and Canada in North America, partly to prevent it from dominating Central America in statistical analysis. Weaknesses remain, such as the inclusion of Israel with considerably poorer countries of the Middle East. Ultimately, country-level analysis, such as in the appendixes to this volume, is necessary. Yet the rest of this chapter will show that regional analysis can generate many insights.

Tailoring the interventions: Magnitude

The exploration for reasonable magnitudes of policy intervention will draw on cross-sectional analyses like that of Figure 7.1, showing contemporary conditions in regions as a function of gross domestic product (GDP) per capita. Specifically, we will look for typical structural patterns and how regions perform with respect to them. Such analysis follows a tradition going back at least to Hollis Chenery and Moises Syrquin (1975) and picked up again by Jeffrey Sachs (2005: 74–89) in his recommendations for clinical analysis of development patterns. Sachs emphasized that it is unreasonable to

● Leverage needs to be tailored to the specifics of regions and situations. ●

Figure 7.1 Poverty as a function of GDP per capita



assume that the poorest countries can attain the same levels of performance on many key lever variables, such as governance quality, as can rich countries. Economic development level often poses significant resource and capability constraints on what is likely or probable—even on what is possible.

For instance, in Figure 7.1 a steeply downward sloping relationship relates GDP per capita and poverty rates, with extreme poverty largely disappearing by \$10,000 per capita. The composition of countries within regions confuses this somewhat because the Baltic republics introduce some poverty into northern Europe, as Mexico does with North America; our statistical analysis, in contrast to our displays, is always at the country level. Yet it is striking that Southern Africa has a considerably higher poverty rate than Northern Africa, even at a higher level of GDP per capita. That suggests a structural problem, namely distribution.

The unfolding analysis in this chapter will, of course, focus on structural patterns of variables offering potential policy leverage. When regions (and later countries) appear to underperform relative to their peers at comparable economic levels, for instance with respect to educational spending or economic freedom, that will suggest at least the possibility that interventions on that dimension

may be possible and productive. The extent of deviation from typical patterns will suggest also the rough magnitude of feasible change.

Primarily Domestic Drivers and Levers

Most domestic leverage potentially enhances economic growth, which in the long run has the greatest impact on poverty. This section will, however, look first at leverage with respect to population size. It then turns to economic growth, initially focusing on the traditional drivers of labor force and capital stock and then shifting attention to the critical drivers of productivity growth. Attention directly to distribution will close the domestic analysis.

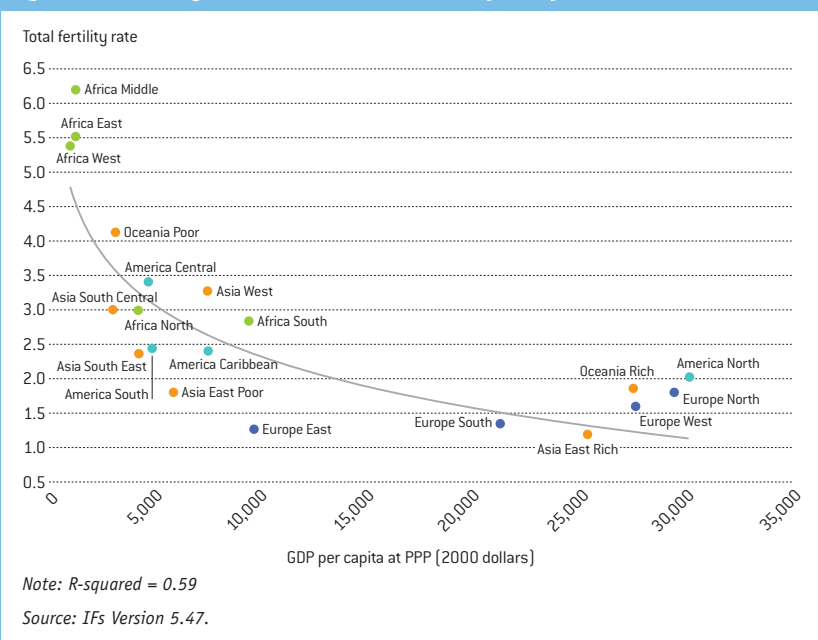
Fertility

With respect to population size, the key drivers are fertility rate and life expectancy, and to a lesser degree migration. Most leverage with respect to fertility operates through improvements in human capital, and the discussion of economic growth will return to that. Here the primary focus is on fertility rate.

Figure 7.2 shows the contemporary relationship between GDP per capita and fertility across world regions. Although many country-level exceptions persist, note that all but four regions have already reduced total fertility rates (TFR) to 3.5 or below. The exceptions are Middle (or Central) Africa, Western Africa, Eastern Africa, and the poorer countries of Oceania. The base case of IFs forecasts that fertility rates above replacement levels may still characterize these regions by midcentury, respectively about 3.6, 3.2, 2.8, and 2.2. In contrast, all other developing regions reach replacement fertility by 2050.

It is, of course, no accident that the three regions with the highest fertility also have the lowest GDP per capita. Yet in the IFs base case, the three African regions reach GDP per capita levels between \$2,300 and \$5,000 by 2050, putting them at the approximate level of Southeast Asia today, a region that has already approached replacement fertility. Achievement of fertility rates near replacement thus appears a realistic goal for these African regions. The intervention structured for IFs posits the reduction of TFR in Eastern Africa, Western Africa, and poorer Oceania by 33 percent relative to the base case, phased in over thirty years,

Figure 7.2 Fertility rates as a function of GDP per capita



and a reduction in Middle Africa by 45 percent, phased in over forty-five years. Thus fertility for each of those regions is brought to replacement levels by 2050.⁴ It would be possible to posit accelerated TFR reduction in a number of other regions shown in Figure 7.2, but because their rates are already fairly low and dropping, the impact on population growth relative to patterns of the base case would not be terribly great.

Does the leverage exist to make such a demographic intervention realistic? Past experience has definitely shown that active family planning programs or population policies, especially in association with activities to support maternal and child health and women's status more generally, can influence fertility independently of GDP per capita and historical cultural patterns, the two variables sometimes argued to determine fertility. Figure 7.3 indicates how strong such effects can be. It shows cross-sectional relationships between GDP per capita at PPP and total fertility rates in 1960, 1980, and 2005. There has been a sharp downward shift in those functions, especially after 1980. At all levels of GDP per capita, women in countries around the world are, on average, having about two fewer children across their lifetimes than they did in 1960. That is, not only income changes fertility—many other policies and practices offer leverage.

Labor and capital

With regard to economic growth, almost all contemporary models of it (IFs included) build on three immediate drivers: supplies of labor, levels of production capital, and multifactor productivity. The next subsection will return to the multiple factors that drive productivity.

Looking first at the labor force, there are multiple paths to increasing its size within the population. A number of the paths involve putting the unemployed and underemployed to work. Such efforts are essential for poverty reduction. In the long run, however, the size of the economically active population determines labor force size. In more developed countries, increasing retirement age has become or is becoming an important issue, but that is not such a significant issue in developing countries, where the greater issue is often female participation.

Female participation rates present a point of potentially substantial leverage for

many countries and regions (see Figure 7.4 for subregional detail). In Organization for Economic Cooperation and Development (OECD) countries, the female share of the official labor force (not counting unpaid domestic or farm labor) is nearly 43 percent. Surprisingly, for developing countries as a whole it is nearly 40 percent, and in China it is 45 percent.

Figure 7.3 Fertility rates as a function of GDP per capita across time

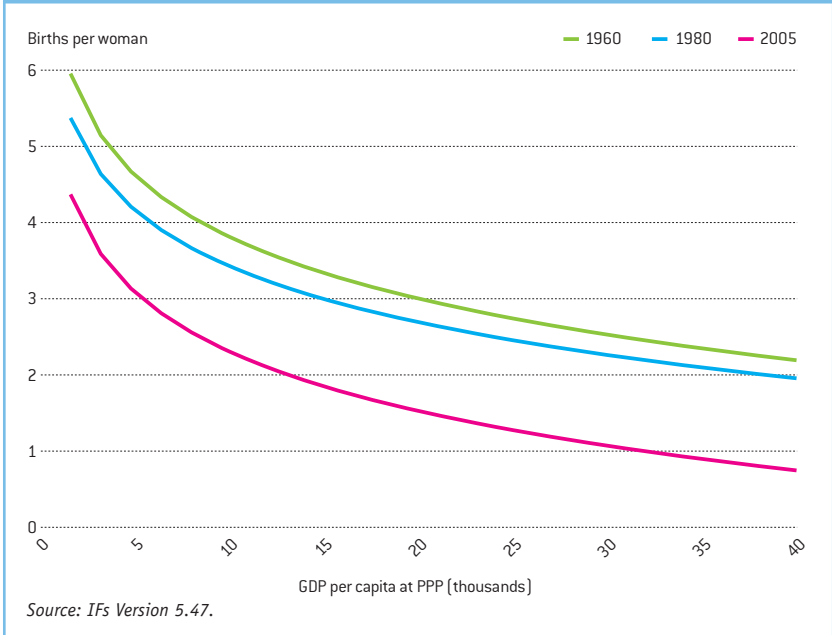
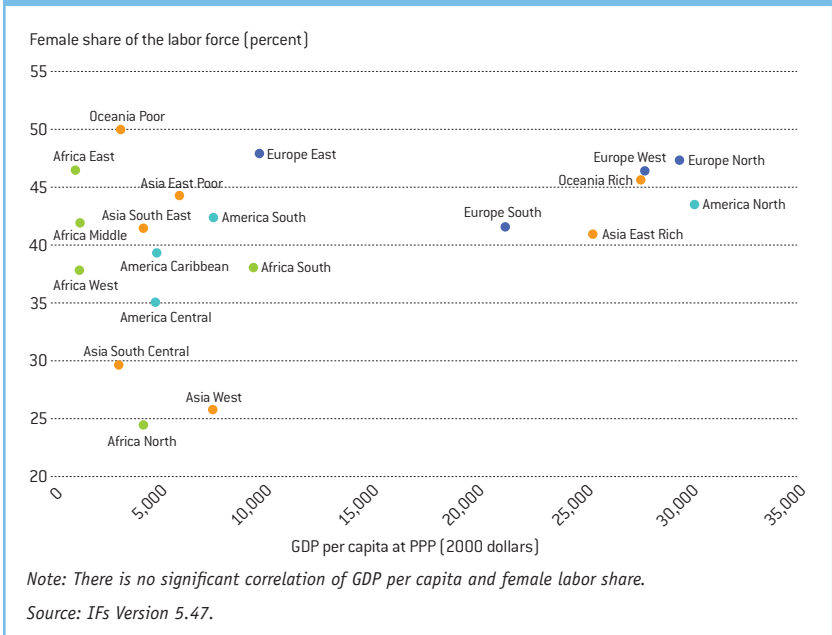


Figure 7.4 Female labor force share as a function of GDP per capita



But for India and the rest of South Asia, the female share of the labor force is only 33–34 percent, for Latin America and the Caribbean it is 36 percent, and for the Middle East and North Africa, it is very near 30 percent. Although statistics show it at 42 percent for sub-Saharan Africa as a whole (a total labor female share nearly as high as that for OECD countries), there appears to be considerable headroom for increase in female participation in official labor across much of the developing world.

From Figure 7.4, it is clear that the regions where increased female participation might be particularly significant are Northern Africa, Western Asia (the Middle East), South-Central Asia, and Central America, with less leverage in Western Africa, Southern Africa, and the Caribbean countries. In some of those regions the female labor shares have been rising. For instance, in Central America they have risen from about 19 percent in the early 1960s to over 35 percent.

The base case of IFs already builds in such increases, even in Northern Africa and Western Asia, where historical patterns have been quite flat and where the *Arab Human Development Report 2002* called for drawing on the half of populations now substantially excluded from the economy and many aspects of broader society. Thus the intervention structured for analysis on this lever is very modest, increasing female

participation in the formal labor force by only an additional 2–5 percent over fifty years, relative to the ongoing increases in the base case for the four lagging regions.

A central emphasis of development analysts over many, many years has been on increasing savings and investment rates. The reality now, however, is that the non-OECD countries invest a higher percentage of their GDPs than do OECD countries. China’s exceptionally high rates stand out (see Asia–East Poor in Figure 7.5). Even India and South-Central Asia more generally, however, have investment rates that match or exceed those of most developed countries.

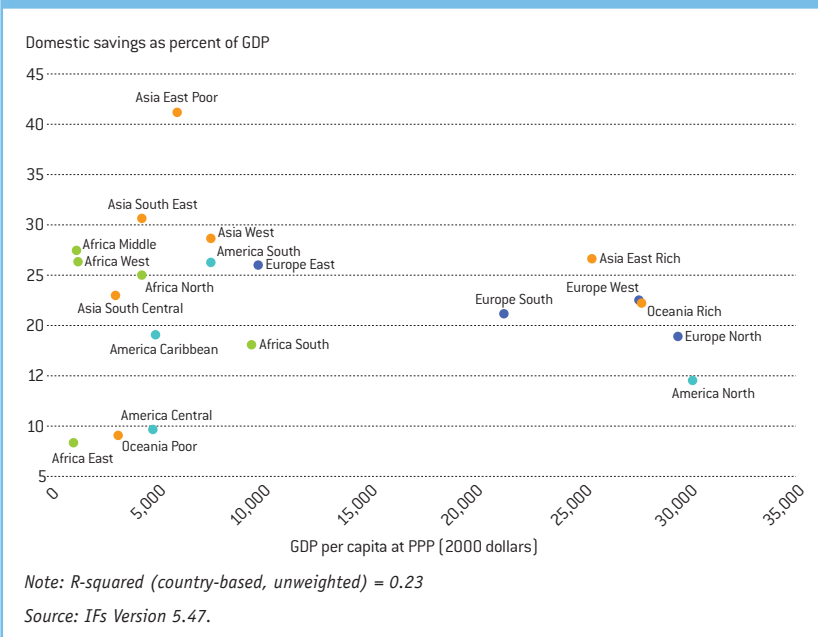
Nonetheless, investment rates in sub-Saharan Africa lag in absolute terms, and those in South Asia could almost certainly rise somewhat above current rates, which are very modest by standards of the Asian tigers and China.⁵ The intervention lever doubled savings and investment rates in Eastern Africa, Oceania Poor, and Central America over twenty-five years relative to the base case. The reason for the slow phase-in of the intervention, in addition to the fact that such changes are generally very slow in coming about, is that rapidly increasing rates of savings in poor countries will, of course, reduce consumption, at least in the interim, and therefore actually increase rather than decrease consumption-based poverty rates. The intervention increased savings/investment rates for Southern Africa and for the Caribbean by 50 percent over twenty-five years (raising, for example, a rate of 18 percent to 27 percent). It increased rates for South Central Asia, South America, Western Asia, Eastern Europe, Northern Africa, Middle Africa, and Western Africa by 30 percent.

One significant problem with any direct intervention on behalf of higher savings and investment rates is that the actual policy levers are not at all clear. Raising savings and investment is not like increasing educational spending. In fact, doing so may require improved governance, enhanced human capital, and much else.

Driving productivity: Human capital

Figure 3.6 elaborated the key multifactor productivity term, initially by dividing its drivers into six types of capital: human capital, social capital, institutional capital (governance),

Figure 7.5 Savings as portion of GDP as a function of GDP per capita



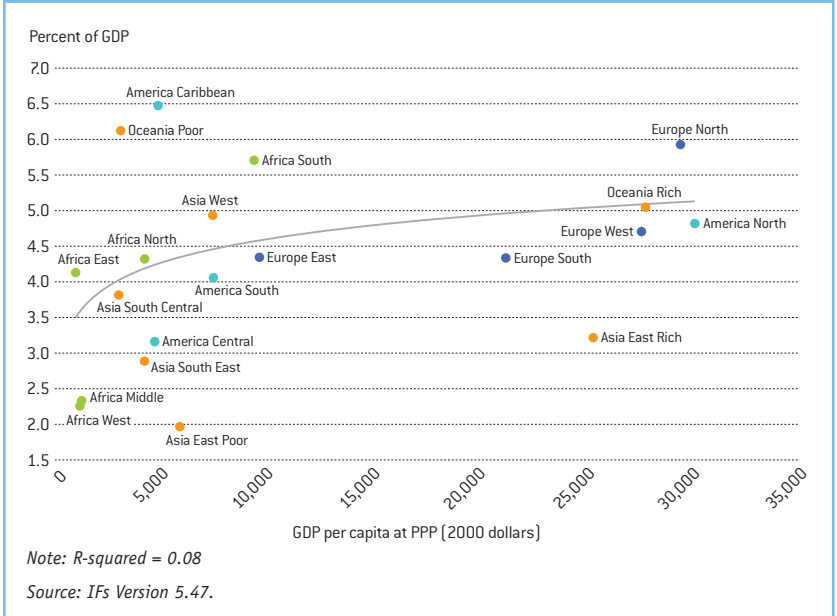
infrastructure capital, natural capital, and what might be called the stock of knowledge, or knowledge capital. They, in turn, have drivers and levers that influence them. To explore the details of potential leverage, we start with human capital, specifically education and health, and move progressively through other forces that drive multifactor productivity.

The lever manipulated in IFs with respect to education is government spending on education and health (see Appendix 5 to this volume for more information on all the levers explored herein). Figures 7.6 and 7.7 show the rates of public spending on education and health as portions of GDP by global region. Like most figures in this analysis, they draw upon data from the World Bank's World Development Indicators.

Weighted by economic size, the governments of the world spend about 4.3 percent of economic product on education, a rate that has been fairly stable since the mid-1990s and was higher in earlier years. In comparison, they spend about 6 percent of economic product on health, up from about 5 percent in the early 1990s. (Both can be compared with about 2.4 percent on military spending, down very considerably since the end of the Cold War.) The developing regions of the world that fall considerably below average educational spending rates are Western Africa, Middle Africa, and the poorer countries of East Asia.⁶ Because of the dominance of China in the latter grouping and the common perception that Chinese investment in human capital is high, that may be surprising. But, in fact, China has set a relatively near-term goal of spending 4 percent of GDP on education, up from only about 2 percent for most of the 1990s and through 2004.⁷

For the intervention, a multiplier ramped up spending increases on education to bring those regions below 4 percent of GDP up to about that level. Specifically, for Western Africa, Middle Africa, and Asia-East Poor, the increases were 80 percent of their base, phased in over fifteen years. The reasoning behind the phase-in of the intervention is that it is difficult or impossible, both in terms of the supply of funds and in terms of plans for school expansion or improvement, to introduce major increases immediately. For Southeast Asia and Central America, the increase was 35 percent over fifteen years. For the regions of South-Central Asia, Eastern Africa, Northern Africa, Eastern Europe, and South America,

Figure 7.6 Public spending on education as a function of GDP per capita



increases of 20 percent were phased in over ten years. The logic behind intervening also in this second set of countries is that, even though they are close to the global average, additional spending may be beneficial.

Higher levels of education are often goals in and of themselves, as in the MDGs. And education has a wide range of potential benefits beyond enhancing economic productivity, including impacts on fertility and socialization. Yet major debates rage in the development literature around the degree to which higher education spending can achieve development goals such as increased economic productivity and poverty reduction. Among others, William Easterly (2001) concluded that the supply-side push for education has not been effective, at least in the absence of other types of developmental activities focused heavily on encouraging and supporting entrepreneurial activities that put education to work. Another supply-versus-demand debate focuses within education itself over whether providing educational opportunity really works in comparison to demand-side emphases such as providing assistance to families who send their children to school. This study cannot fully address the debates that surround all the interventions explored here.⁸ In brief, the IFs model does include a positive relationship between the educational level of the working-age population and economic growth

(via productivity; see Hughes 2005a), based on empirical studies such as Robert J. Barro (1999b), Barro and Xavier Sala-i-Martin (1999), Barry Bosworth and Susan M. Collins (2003), Emanuele Baldacci et al. (2004), and Derek Chen and Carl Dahlman (2004).

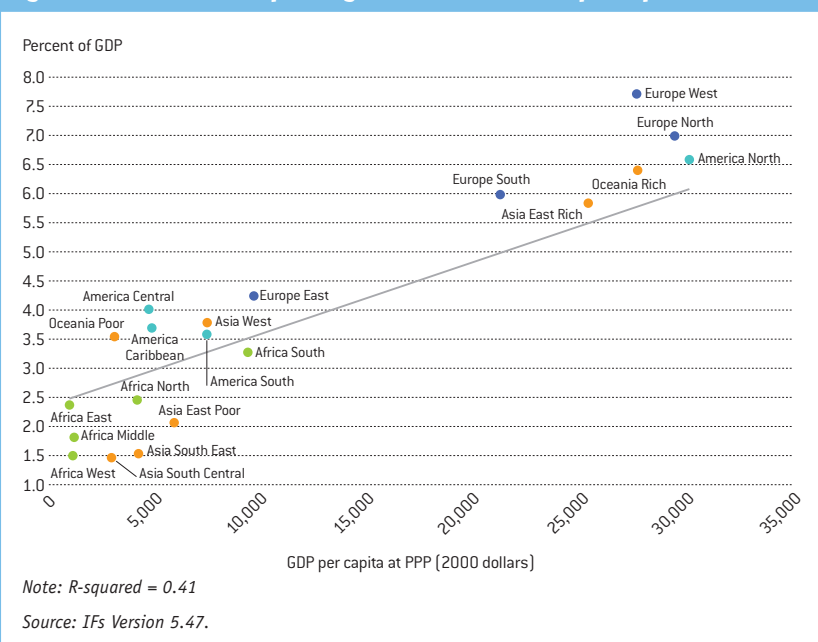
The implementation of higher spending on education within IFs has trade-offs, because spending on education competes with spending for other purposes such as health and the military. In addition, because of the cohort structure of those being educated and the population more generally, the payoff of education, in terms of larger portions of the population with more years of education, requires considerable time to manifest itself (spending is a flow, but human capital is a slowly accumulating stock).

Figure 7.7 portrays a relationship between the rates of spending on health and GDP per capita that is quite different from the one underlying spending on education. Specifically, there is a clear upward-sloping relationship between economic development level and health spending around which the regions of this analysis cluster relatively closely. South-Central Asia and Southeast Asia are below the line of that relationship, as are Western and Middle Africa, while Central America, the Caribbean, and Eastern Europe are above it. On the basis

of the clear upward slope of the relationship, it is reasonable to argue that health is so fundamentally important that countries simply spend what they can, consistent with overall philosophies of the roles that government should have in social spending (the Asian societies actually spend proportionately less than the African ones). Spending levels do not appear to reflect differential burdens of disease faced by the societies (e.g., the tropical disease burden of African countries).

Whatever the explanation for positioning of regions on Figure 7.7, the basis for differentiating interventions by region is not as obvious as for education. Instead of targeting specific values by region, the intervention ramped up a 20 percent increase in health spending relative to the base case for all developing countries over a ten-year period. With respect to the magnitude of the intervention, non-OECD countries spend about 3 percent of their GDP on health. On top of natural increases tied to higher GDP per capita, the intervention raises that portion to more than 4 percent by midcentury, still quite a bit below that of OECD countries. The implementation within IFs again sets up trade-offs and some time lags (for instance, in affecting life expectancy levels). Not surprisingly, significant debates characterize the development literature around the developmental benefits of health spending, just as they surround investment in education.

Figure 7.7 Public health spending as a function of GDP per capita



Driving productivity: Social capital and governance

Moving from human capital to social capital and governance, there are multiple elements of the way in which societies are organized and governments function that fall generally under those rubrics. Deep cultural patterns, such as levels of social trust, define social capital. The focus here, however, is heavily on (1) governance, both the quality of it (effectiveness and level of corruption) and (2) freedom or openness, political and economic.

The World Bank's project on governance has usefully distinguished among three aspects: (1) the process by which governments are selected, monitored, and replaced; (2) the capacity of the government to effectively formulate and implement sound policies; and (3) the respect of citizens and the state for the institutions that govern economic and social

interactions among them (Kaufmann, Kraay, and Mastruzzi 2003: 2; see also Kaufmann, Kraay, and Zoido-Lobaton 1999).

Interestingly, and rather disappointingly for most democrats, the empirical literature has found that it is only the second and third of these three dimensions that appear to have a significant impact on productivity, not the first (Hughes 2005a).

This analysis explores three elements related to governance. First, and directly related to the second dimension of the Bank's categorization, is governance effectiveness. On the World Bank's five-point scale, OECD countries are about 1.2, and non-OECD countries are about -0.3 (see Figure 7.8). A 20 percent, or about 0.5-point shift, was introduced for developing countries (as defined by the World Bank).⁹

Second, and related to the "sound policies" of the Bank's second dimension, analysts widely believe economic freedom (Gwartney, Lawson, and Holcombe 1999; Gwartney et al. 2007) affects economic performance. On a ten-point scale, OECD countries now average about 7.6, and non-OECD countries average about 6.3. Both sets have been quite stable since 2000 but over a longer period have moved toward greater economic freedom (see Figure 7.9). The intervention accelerates the upward shift in the non-OECD world by 20 percent (about 1.2 points) over ten years.

Third, and directly relevant to the World Bank's third dimension of governance, studies have found government corruption to be significantly related to economic performance. Both the World Bank's scale and Transparency International's (TI's) corruption perception index measure its level.¹⁰ On the TI measure, the OECD countries average about 6.6 (higher values indicate better transparency), and the non-OECD countries average about 3.0. There thus appears to be even more "headroom" on reducing corruption than on other governance measures. The intervention introduced is a 30 percent improvement on base case values, but over twenty years instead of ten.

Figure 7.10 focuses on corruption only for the developing regions. It is obvious that Middle Africa and Eastern Europe are the farthest below the upward-sloping pattern created by the regions shown. The intervention for the former was an improvement of 40 percent; for the latter it was 60 percent.

Figure 7.8 Governance effectiveness as a function of GDP per capita

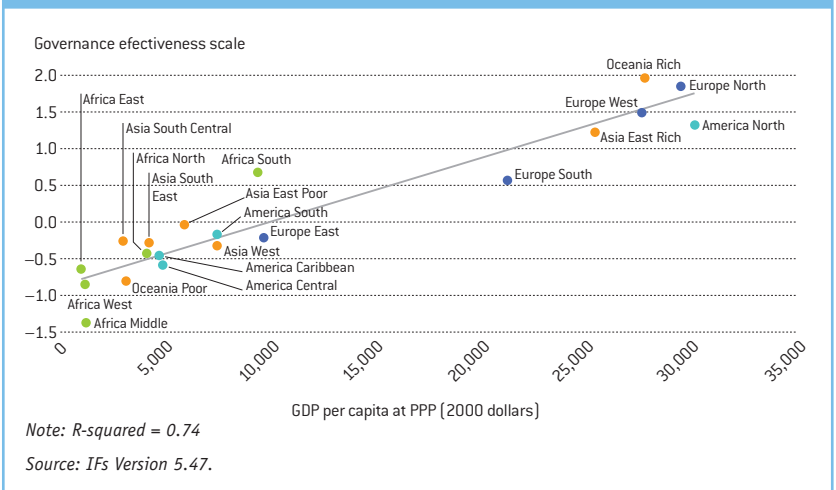


Figure 7.9 Economic freedom as a function of GDP per capita

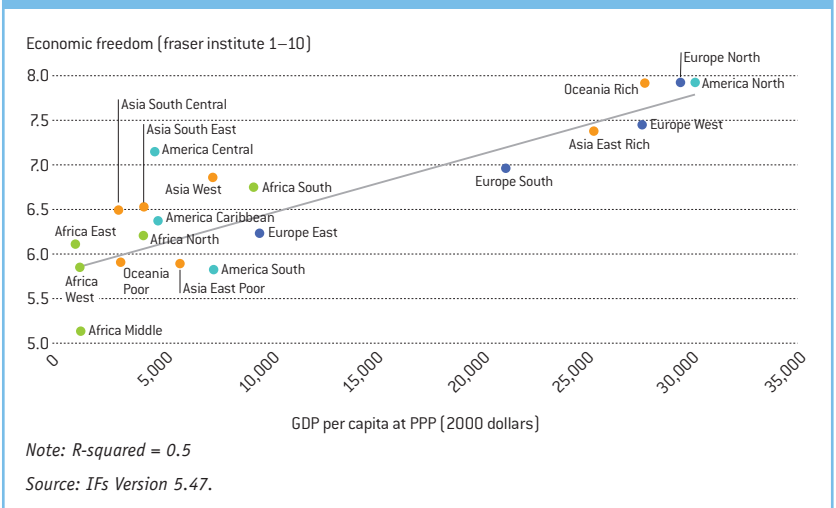
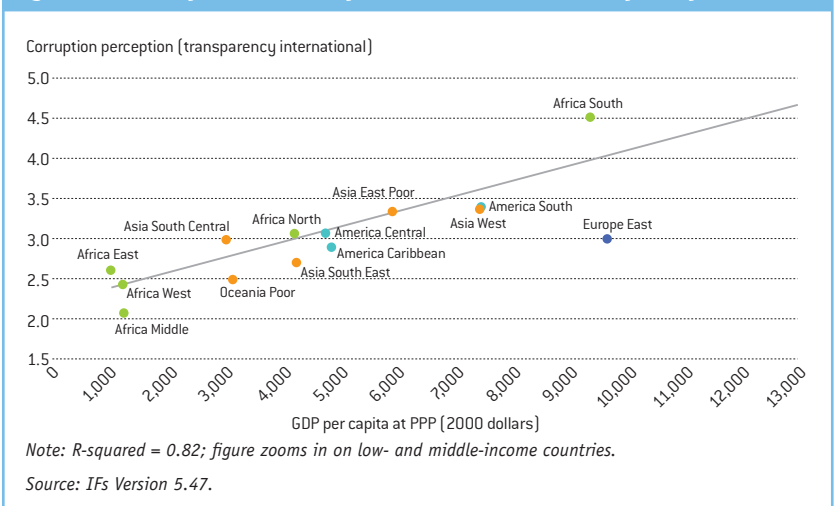


Figure 7.10 Perceptions of corruption as a function of GDP per capita



The analysis could have tapped many other measures of governance and the broader concept of social capital. For instance, Hernando de Soto (2000) and others have pointed to the definition and protection of property rights as especially important. And we must raise one important caveat with respect to the interventions around governance as now implemented in International Futures—there is no cost associated with them. That may not be dramatically unrealistic, because many of the interventions “simply” require turnover in government and perhaps some domestic and outside pressure. But the path to achieving improved governance and the costs of following that path are unclear. Unfortunately, the extensive calls in academic and policy literature for improvement of governance inadequately identify the still deeper levers that will accomplish it.¹¹

Driving productivity: Infrastructure capital

Developing countries often have substantially underdeveloped infrastructures of many kinds, a weakness especially associated with poverty in rural areas and remote regions. IFs includes representations of infrastructure for roads (not for other transportation infrastructure, so roads must be a proxy), electricity, telecommunications, and modern computing (including networking).

The level of infrastructure development in OECD countries is generally vastly superior

to that in non-OECD countries. Because infrastructure consists of so many different elements, however, it is not easy to assess the differences. The World Economic Forum (WEF) used surveys to build a seven-point scale of perceived infrastructure quality (Figure 7.11). As with so many other measures of development, there is a close relationship between it and GDP per capita, upward-sloping and generally linear.¹² The regions at the bottom of the tail (Eastern, Western, and especially Middle Africa) have the most obvious infrastructure deficiencies. So, too, does Southern Europe, although given that survey respondents ranked its infrastructure well below that of Southern Africa, they may have applied somewhat different expectations, a danger of perception-based measures.

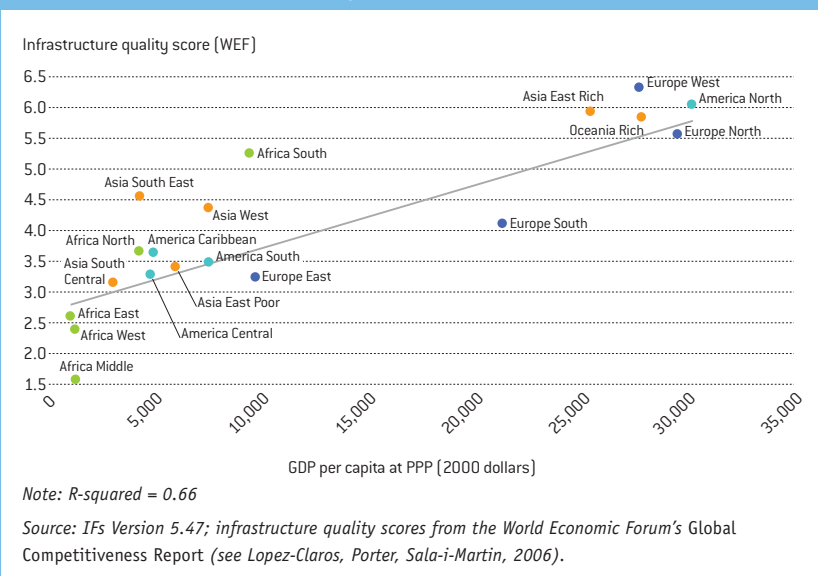
The intervention involved improving the infrastructure of non-OECD countries generally by a factor of 1.2 (20 percent), with that in Middle Africa targeted for an 80 percent improvement. Developing infrastructure takes time, so the increase relative to the base would be phased in over thirty years. One significant analysis risk of this particular intervention is that, as with governance, the model does not yet represent any cost of the improved infrastructure; there will eventually be a flow of government and/or private funding that, like expenditures on health and education, will restrict spending elsewhere. Thus the net benefits are almost certainly exaggerated in this analysis, unless substantial outside resources are available.

Driving productivity: Natural capital

It is possible to define a natural capital category in addition to human and social capital. That category can include the stock of biological and physical resources available to the society, such as forests, fossil water (from slowly or nonrecharging aquifers), and fossil fuels. Many analysts frame any discussion of natural capital in terms of the economy’s draw upon environmental services (Banzhaf and Smith 2002; Millennium Ecosystem Assessment 2005). Others have sought to define a “real” or “green” GDP that excludes the drawing down of stocks of natural capital such as that implicit in deforestation’s contribution to GDP.

The IFs model does not represent environmental services or green GDP. Nonetheless, one of the

Figure 7.11 Infrastructure quality as a function of GDP per capita



most significant inputs to the economy from natural capital is energy. And when supplies are restricted and prices rise, as in the 1970s and in 2006–2008, the economy can suffer considerably. In part, higher energy prices make inefficient a portion of the productive capital of the economy and can lead to its removal from production. IFs includes a rough calculation of such an effect so that an intervention affecting energy price does affect productivity. In addition, of course, higher prices set in motion financial transfers domestically and internationally.

To explore the relationship between energy and poverty, this study considered the implications should non-OECD countries substantially accelerate the pace of development of renewable energy. Since the contribution of renewables is so low in the base case, the intervention steadily increased the production of them relative to the base case, rising to a 50 percent increase in 2050. The intervention helps protect non-OECD countries from the energy price increases of the base case as global fossil fuel supplies are run down (global peak oil is reached and passed by midcentury); it has the additional benefit of improving trade and current account balances.

Driving productivity: Knowledge

Moving from natural capital to knowledge stock, expenditures on R&D by non-OECD countries are important to both knowledge creation and acceleration of its diffusion from high-income countries. Whereas R&D spending as a portion of GDP is in the 2.5 percent range for OECD countries, it is closer to 1.0 percent for non-OECD countries (see Figure 7.12). The intervention assumed a 20 percent increase on that base for non-OECD countries, phased in over twenty years. Educating the skilled personnel and creating the facilities needed are slow processes.¹³

Openness to trade (and financial flows) is another important mechanism for knowledge diffusion. Protectionist measures can harm developing countries by slowing the flow of new technology. The next subsection will explore global cooperation on opening markets, including actions by developed countries, but unilateral trade openness (thus making it primarily a domestic action) can reduce the costs of imports and the technology that selected imports carry.

Figure 7.12 R&D spending as a function of GDP per capita

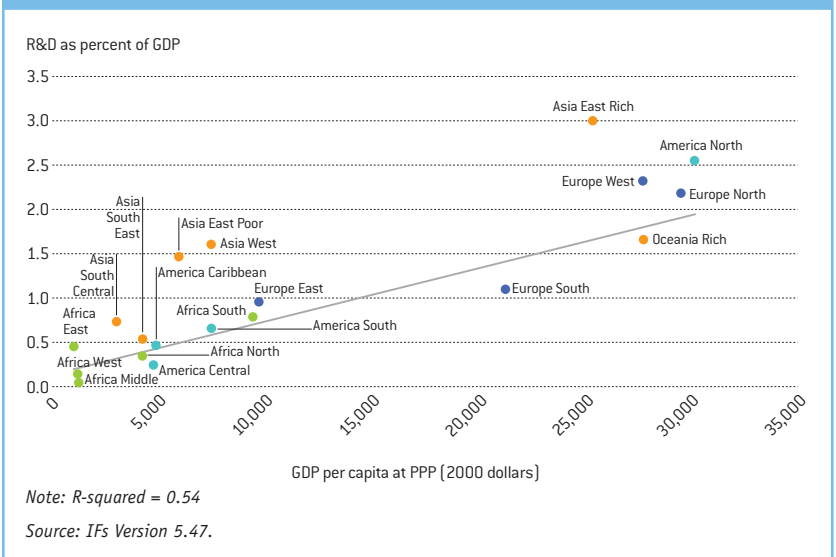


Figure 7.13 Trade openness as a function of GDP per capita

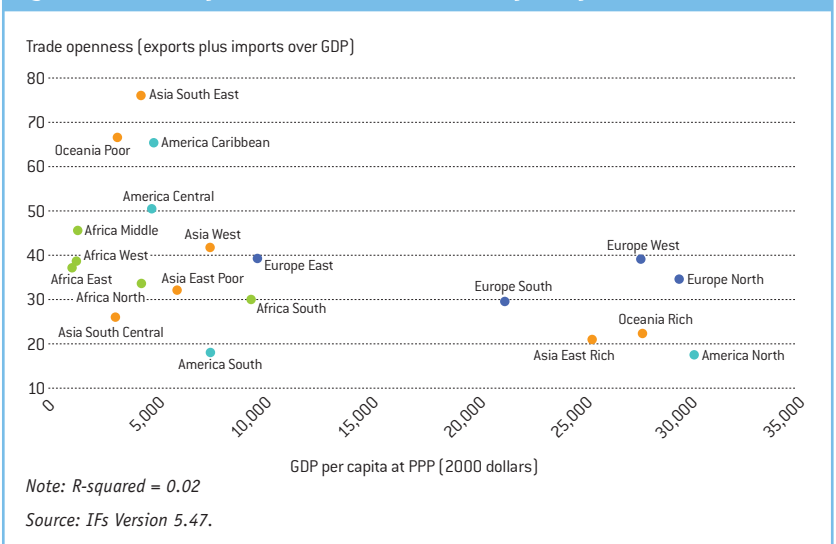


Figure 7.13 shows a standard measure of trade openness: exports plus imports as a share of GDP. By that measure, low- and middle-income regions are, on average, as open as high-income countries.¹⁴ Many are, of course, relatively small countries that depend on the outside world for a wide range of goods as well as for markets. A better but not easily available measure would be the extent of market protection. South-Central Asia, and especially South America, are not only relatively less open than other developing countries but, on the whole, relatively more protectionist. The intervention with respect

to trade openness thus focused on those two regions and reduced the effective price of external goods and services in their markets by 20 percent over twenty years.

Domestic transfers

Domestic interventions discussed to this point have focused on increasing growth, implicitly assuming that income distribution, if not fundamentally unaffected, would at least not deteriorate enough to associate growth in the economy with an increase in poverty. Figure 7.14 shows, however, how dramatically income distributions vary across the developing regions; it is important to consider the prospects for improvements that would reduce poverty levels.

There are options for directly supporting the incomes of the poor. A very considerable literature discusses enhancing social protection and the social safety net for those who need it most in poor countries.¹⁶ The consensus is that it is strongly desirable to adopt mechanisms that reinforce participation in the workforce (such as payment for labor on infrastructure development projects) or that directly target the health, education, and nutrition of the poor (such as food payments for the families of children attending school). Targeted conditional transfer (TCT) programs such as Progressa in Mexico, Bolsa Escola in urban Brazil, and PETI in rural Brazil have generally been quite effective (Sedlacek, Ilahi, and Gustafsson-Wright 2000).

The model distinguishes skilled and unskilled households, and the latter generally have lower incomes.¹⁶ Thus transfers across those groups bring the Gini coefficient down. Because of the social accounting matrix (SAM) in IFs, the increase in transfers to the unskilled affects not just household accounts but also government accounts. For instance, the secondary impacts include reduced transfers to skilled households; decreased spending on items such as pensions, education, health care, or the military; and increased government spending overall with related higher taxes and impacts in other ways on firms and households. In short, the transfers are far from a free lunch, and growth-reducing effects via other paths in the model could partially or totally offset the direct benefits of them.

The intervention assumes away all the complications of actually setting up such transfers and simply increases the domestic transfers to unskilled households relative to the base case over twenty years. It doubles domestic transfers for seven clusters of countries where substantial improvements in distribution appear possible in Figure 7.14: Southern Africa, South America, Central America, the Caribbean, Middle Africa, Oceania Poor, and Asia-East Poor. For Western Africa, Eastern Africa, and Western Asia, it increases transfers by 50 percent.

Primarily International Drivers and Levers

Turning to primarily international deep drivers, most involve transfers across sets of agents. As Chapter 4 discussed, IFs with Pardee represents such transfers, domestic and international, in a social accounting matrix structure that links governments, households, and firms in a variety of financial interactions.

A survey

Figure 7.15 sketches many potential monetary flows between and within external and domestic environments. It is important to note that the flows are not just economy-to-economy linkages in the aggregate, or even government-to-government, but rather involve a broader range of agent classes of the kind that SAMs represent. For instance, the flows include the increasingly important remittances by workers to families and friends who most often reside in poorer countries and also the very important

Figure 7.14 Gini as a function of GDP per capita at PPP

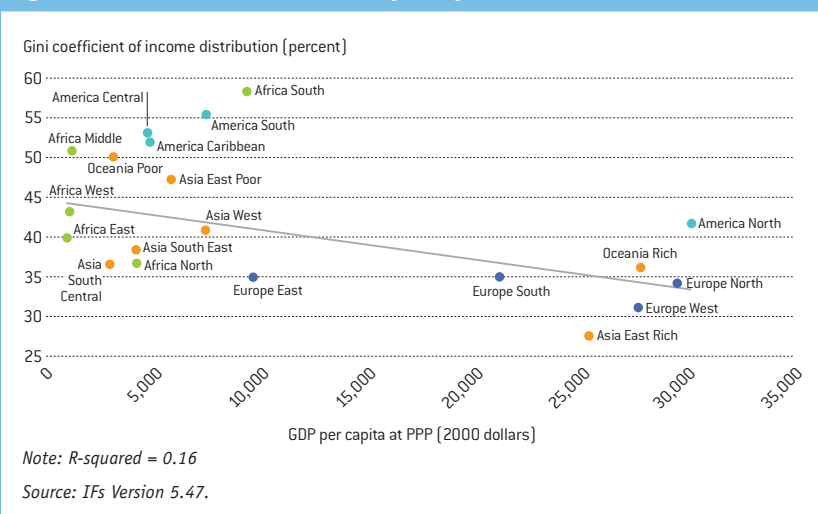
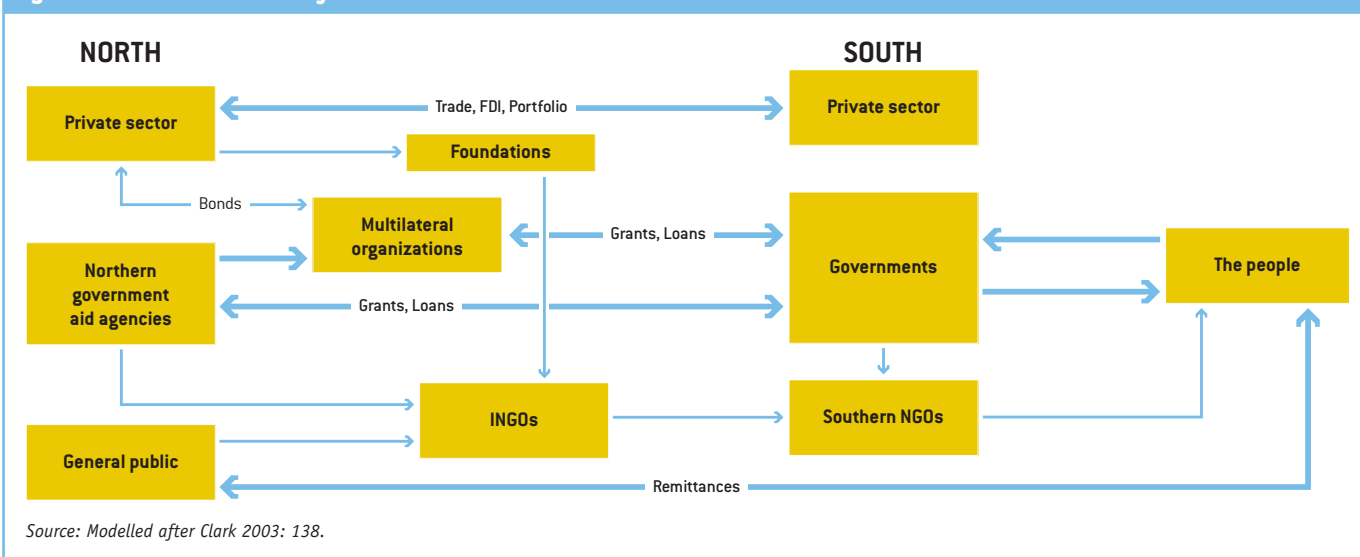


Figure 7.15 A schematic of key international transfers



foreign direct investment (FDI) and portfolio flows that occur among firms and households in more and less developed countries. Some international flows are overwhelmingly in one direction, but a large number of flows, such as bond purchases and FDI, accumulate over time and set up two-way flows or reversals of patterns over time. IFs represents and allows analysis of most of the larger flows in the diagram, those represented by bold lines.

Table 7.1 provides an approximate idea of the annual magnitude of some of the international flows during the early years of the twenty-first century. It identifies trade, foreign direct investment, worker remittances, portfolio investment, and foreign aid as giving rise to the greatest financial flows, roughly in that order, and therefore being especially important levers to explore.

Table 7.1 Rough magnitude of annual international transfers			
Source/type	To all World Bank developing countries	Of which to sub-Saharan Africa	Nonfinancial issues/impact
Export receipts, total	\$3,400 billion	\$190 billion	Facilitates imports
Export receipts, agricultural	\$180 billion	\$8 billion	Poorest often earn
Net foreign direct investment	\$200 billion (\$285 billion in and \$85 billion out; highly variable)	\$8 billion (\$10 billion in and \$2 billion out; highly variable)	Carries technology
Worker remittances	\$190 billion	\$7 billion	Often to the poorest, but perhaps not in Africa
Net portfolio investment	\$65 billion (highly variable)	\$7 billion (highly variable)	Hot money; market and financial discipline, but also disruption
Bilateral aid	\$57 billion (of which 55% is grants)	\$20 billion (of which 80% is grants)	Often targeted, conditional
World Bank (IBRD and IDA)	Near balance in and out	Near balance in and out	Development consulting and direction
IMF	Near balance in and out	Near balance in and out	Technical assistance, conditionality
Context			
GDP	\$8,200 billion	\$420 billion	
Foreign debt	\$2,700 billion	\$215 billion	
Government spending	\$1,700 billion	\$120 billion	
Population	5,400 million	740 million	

Source: IFs Version 5.47 Database.

Trade and foreign direct investment

Trade interventions on behalf of poverty reduction can take two quite different forms. The first involves a multilateral movement toward trade openness (see again Figure 7.13) of the kind associated with past rounds of global trade negotiations and the proposals of the Doha round of the World Trade Organization.¹⁷ In IFs freer trade is simulated across all sectors of the economy, reducing the effective prices of goods and services in trade without differentiating between the overt protectionism of duties and the more complicated manifestations of subsidies and nontariff barriers to trade (Ferrantino 2006). For the purposes of this analysis, the effective prices were reduced by 20 percent over twenty years. The direct impact of that intervention on trade levels is substantial—by midcentury, global trade as a portion of GDP rises about 7 percent relative to the base case. The forward linkage of that higher trade to economic performance is largely via its impact on productivity.

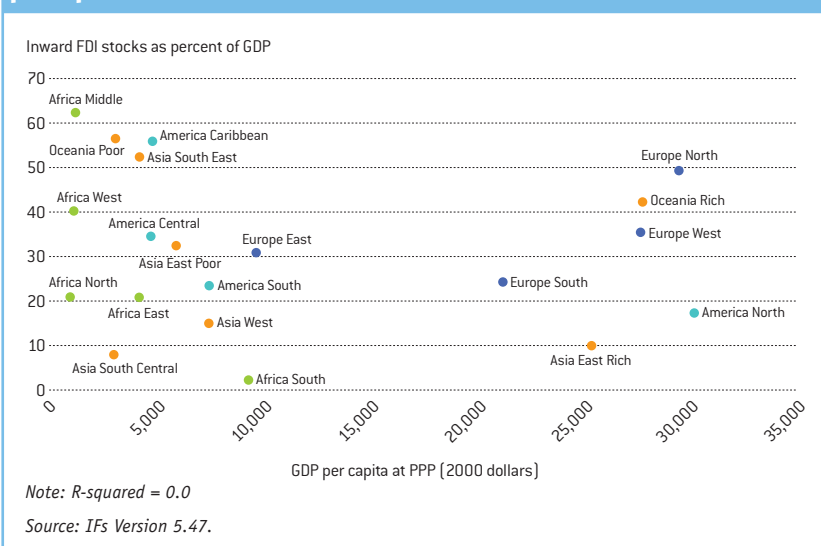
The second type of trade intervention is export promotion, a pattern that has been very effective in a number of the rapidly growing Asian economies. Because export promotion has already been significant in much of East Asia, the intervention explored here focused on sub-Saharan Africa and South-Central Asia (including India). By midcentury, exports of the two regions rose by 25–30 percent relative to the base case.¹⁸

Foreign direct investment has fundamentally different characteristics than trade. A key difference is that it creates stocks that set up reverse flows of profits. Figure 7.16 shows those stocks as a portion of GDP. Some of the poorest regions of the world, including Middle Africa, have been substantial net recipients of such investment and therefore have large stocks, primarily in industries focused on extraction of raw materials. The fact that FDI comes in many different flavors with very different patterns of spillover to other economic sectors makes it difficult to evaluate the potential costs and benefits of increased flows. Moreover, FDI has a complicated relationship with local investment, sometimes supplementing it and sometimes replacing it (Moran, Graham, and Blomström 2005), as well as with the quality and transparency of local governance.

The intervention explored in this analysis is a doubling of FDI inflows to all non-OECD countries except China, to which base flows are already extremely high, and Middle Africa, for which base stock levels in extractive industries are already very high. The doubling is relative to the base case and is phased in over thirty years. The growth rate of total global FDI was increased over thirty years by 30 percent so as to prevent the intervention from simply diverting investment flows from among developed countries, where most global flows occur.

Although currently quite a bit smaller overall than FDI, portfolio investment to the emerging equity markets of developing countries has grown quickly in the last two decades. This path provides considerably “hotter” money, and the ease of reverse flows contributes to financial crises (Bouchet, Clark, and Gros Lambert 2003). Nonetheless, the prospects for further increases with development are strong, and the base case builds on them. The intervention doubles the net inflows relative to the base case for all non-OECD countries and increases the total volume of global flows by 30 percent so as to limit diversion effects. The real impact of portfolio investment will, however, be different from that of FDI and probably less beneficial. It tends not to carry as much incremental investment with it and also does not carry technology. In IFs it affects only current and capital accounts.

Figure 7.16 Stocks of foreign direct investment as a function of GDP per capita



Worker remittances

Worker remittances have increased dramatically in recent years and now rival FDI as a source of annual inflows.¹⁹ They have come to be an especially important source of development funds for several reasons. First, many remittances flow directly to the poorest families in recipient countries (although in some of the world's poorest countries, like those in Africa, it is the somewhat more well-to-do who emigrate and send back funds). Second, unlike the loan portion of foreign aid and unlike FDI, there are no future reverse flows tied to the remittances. Figure 7.17 shows the level of net worker remittance receipts as a portion of GDP. The Caribbean countries and Central America now obtain the most benefit, with Northern Africa in a fairly distant third place.

Remittances are tied heavily to levels and patterns of immigration. The intervention in this analysis increases global immigration by 50 percent over twenty years relative to the base case, which automatically increases remittances by similar proportions. Given the high number of immigrants already in many countries and some backlash against them, the increase might be unreasonably great. At the same time, however, aging populations in developing countries and fertility rates below replacement levels are creating offsetting pressures for such increases.

Foreign aid

Over most of the postcolonial period, a great hope of many proponents for accelerating development and poverty reduction has been foreign aid. At one point advocates called for rich countries to raise their aid as a portion of GDP to 1 percent. In recent decades the target of 0.7 percent has been repeatedly urged, and the inclusion of a Global Compact as part of the MDGs revitalized that call—see Figure 7.18 for the actual rate of donation as a portion of gross national income (GNI), by donor country. Because, however, of the very low rates of giving by the two largest global donor economies, United States and Japan, and because many other large developed countries like Germany are also significantly below that target, the OECD countries as a whole give something closer to 0.25 percent of GDP as aid.

The intervention investigated in this study is a more modest but still challenging rise

Figure 7.17 Net worker remittances received as a function of GDP per capita

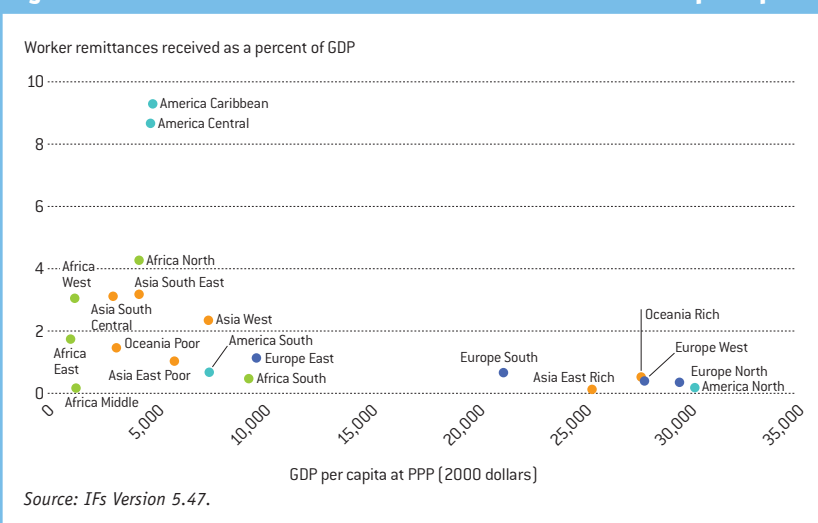
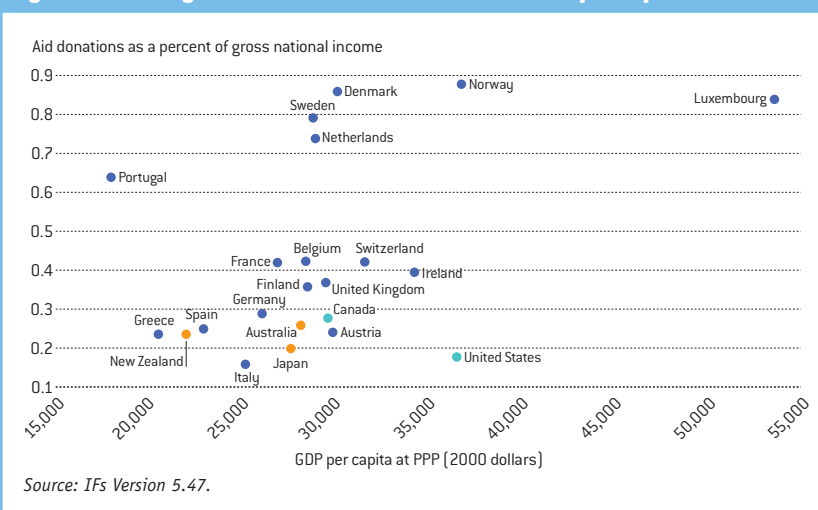


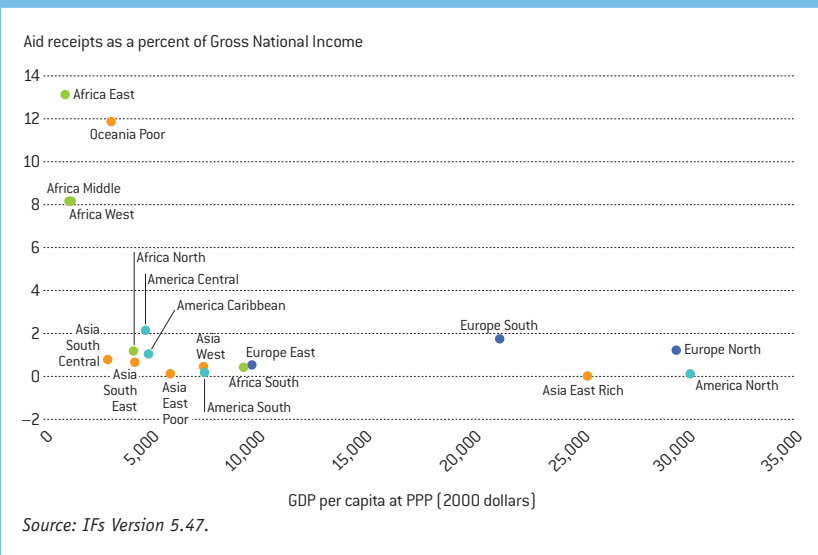
Figure 7.18 Foreign aid donations as a function of GDP per capita



over fifteen years to 0.5 percent of GDP for all countries in Figure 7.18 who have historically been below that level. That intervention increases the annual flow of donations in 2010 by \$50 billion relative to the base case and in 2020 by \$100 billion (compare that with the Millennium Project's recommendation for a global partnership goal of an increase in the range of \$40–60 billion).

To whom should the additional foreign aid funds flow? That is, of course, a recurrent and highly contested question of the policy world. Figure 7.19 shows the pattern of aid receipts as a portion of GDP in the early twenty-first century (2005). Only three African regions and the poorer countries of Oceania receive

Figure 7.19 Foreign aid receipts as a function of GDP per capita



substantial portions of their GDP as aid. The argument over appropriate recipients of foreign aid is so intense in large part because these countries are (1) the poorest and thus *prima facie* the neediest and, (2) as shown in Figures 7.8–7.10, often the least well-governed. The intervention framed for this analysis simply left the pattern of recipients unchanged; variations in the pattern would be fairly easy to undertake with the IFs software for those who are interested.

There are, of course, many development experts such as Easterly (2001) who are very skeptical about foreign aid. Among the concerns raised is that it has several distorting effects upon recipients. One distortion is the so-called Dutch disease, normally associated with foreign exchange earnings from raw materials but also relevant to foreign aid. That is, aid receipts boost current accounts and put upward pressure upon exchange rates, undercutting the attractiveness of exports and thereby undermining the broad development of economic strength. IFs represents the working of these economic forces. Another distorting effect from aid is that of welfare dependency. Unearned income shapes incentive structures not just for individuals, but for societies. A particularly perverse variation of this can be the honeypot effect, whereby the access to flows by country leaderships leads to siphoning of the flows and more general corruption. IFs does not represent these sociopolitical forces.

Beyond the magnitude of aid flows, increasing attention has been given to the effectiveness of them, partly due to recognition of distorting effects beyond those mentioned above.²⁰ For instance, a large portion of aid is tied to expenditures in the donor country, reducing its effective value. Another significant portion of “aid” takes the form of loans and therefore requires repayment. The intervention here does not assume changed quality of aid.²¹

In addition to the direct bilateral flows of aid from donor countries (and from individuals via nongovernmental organizations, a flow not captured by IFs), there are flows via multilateral international financial institutions (IFIs), such as the International Monetary Fund (IMF), World Bank, and Asian Development Bank. As indicated in Table 7.1, the actual dollar value of financial flows from these institutions to developing countries is very small compared to the other flows discussed up to this point. Moreover, large portions take the form of loans, so net flows can often actually be from developing countries to the IFIs. The reality is that the primary contributions of the IFIs to development lie in the quality of the advice that they provide to client countries (which some critics also question) and in the fiscal stamp of approval that their review and lending provides to other lenders and investors who control considerably greater financial flows. The intervention doubles flows over ten years, and the model represents only the financial impacts, not ancillary benefits.

Technology transfers

Until this point, all the internationally oriented interventions have focused on financial flows. Other kinds of international interventions are possible. For instance, flows of technology are partly related to trade and investment but also are based on the willingness of rich countries to allow access to intellectual property. Technology also often flows as a result of the rich and poor engaging in explicit activities that develop and transfer technology, such as the Consultative Group on International Agricultural Research (CGIAR). Nongovernmental organizations, such as those that focus on medical technologies, facilitate other flows of special interest to developing countries. It is very difficult both to quantify such flows and to say what kind

of overall impact on growth they have. The earlier intervention built around FDI did not explicitly enhance the technological capabilities of recipients (only the financial effects are modeled), so the results of that intervention may underestimate the impact. It is not unreasonable to hypothesize that FDI increases, in combination with other measures to enhance technology flows, could add 0.2 percent to growth of multifactor productivity in developing countries. The intervention on technology studied here phased in that arbitrary impact over fifteen years.

Summarizing Drivers and Levers in IFs

Table 7.2 summarizes the levers identified in the above discussion for use primarily within countries (although many of them clearly have international ramifications) and those for use primarily across countries (although they all have domestic ramifications for developing countries). The appendix to this chapter, Summary of Interventions by Region, further elaborates the levers identified in this chapter and their specifications for implementation in the analysis to follow. Compare it with Table 3.1, which extracted a more complete list from the development literature. As that comparison will quickly illustrate, the levers available within IFs by no means exhaust the possible points of intervention in order to accelerate reductions in poverty rates. They do, however, touch on many interventions that development experts have identified.

As Archimedes pointed out long ago, not all levers have the same length and the same potential to move the world. The next section looks for those that offer the greatest leverage.

Silver Bullets?

Our uncertainty about the future is great. Our analysis of the weaknesses in our ability to measure poverty and to formulate relationships that accurately forecast it produced a wide range of possible futures for poverty in the framing exploration of Chapter 6. As we move from framing the ranges of poverty futures by continent using the proximate drivers, to exploring the sensitivity of poverty in subregions, to developing more policy-rooted levers for human action, the analysis may appear more precise, but great uncertainty remains. The ground shifts

from uncertainty about the assumptions that framed possible futures for demographic and economic growth and distribution to uncertainty about the relationships between deep drivers and such growth and distribution. The structures and parameters of the model are meant to represent much of what we know about such relationships theoretically and empirically, but they will inevitably be flawed.

As Chapter 1 emphasized, however, all action requires forecasting, even when the basis for it is less strong than we would like. Advocates of various policy positions sometimes provide estimates of the benefits from them (and should presumably always do so). For instance, in the early discussion of the potential benefits of the proposals in the Doha round of global trade negotiations, one World Bank estimate of their impact on poverty was that implementation could reduce the numbers in extreme poverty by 100 million. More recent analysis has considerably scaled back such estimates.²² Given the discussion in Chapter 6, concluding

Table 7.2 Internal and external levers for poverty reduction

Primarily Domestic Levers	Primarily International Levers
Factors of Production	Trade
Fertility reduction	High trade
High female labor	Export promotion
High investment	Foreign investment
Human capital	High FDI
High education spending	High portfolio flows
High health spending	Household transfers
Social capital/governance	High remittances
High government effectiveness	Government transfers
Low corruption	High foreign aid
High economic freedom	High IFI flows
Infrastructure capital	Technology
Extensive infrastructure	High technology
Natural capital	
High renewable energy	
Knowledge capital	
High R&D	
Low protection	
Domestic transfers	
High transfers	

that incremental human leverage might be able to move a maximum of 150–250 million from poverty, the original estimate assigned to trade alone appears improbably high.

The search for silver bullets in the fight on poverty, for those measures that can have the greatest impact, ideally with the lowest relative cost, is unending. Identification of prospective silver bullets changes over time and across philosophical viewpoints. In recent years the two most prominent candidates, in addition to the classics of trade and financial flow liberalization, tend to be (1) improved governance (by which is generally meant some combination of reduction of corruption, protection of property rights, and liberalization of markets) and (2) increased and more effective foreign aid (given considerable attention in the Millennium Project's recommendations for meeting the MDGs). In this section we want to give special attention to such potentially important levers but also explore more generally how a wide range of individual levers might contribute to the reduction of poverty.

In reading about the impact of various interventions in the sections to follow, it may be useful to review Table 1.1, which showed poverty headcounts and ratios in 1990, the base year for the Millennium Development Goals. In summary, in 1990 approximately 28.7 percent of the developing world's population lived on less than \$1 per day; the percentages for the two regions of greatest concern, sub-Saharan Africa and South Asia, were 46.7 percent and 43 percent, respectively. The target values for 2015 are, of course, half those percentage levels. Given the populations of the IFs base case, roughly also the UN median variant, our calculations of target numbers in 2015 for total developing world and the two regions are 890, 223, and 459 million, respectively. Are there silver bullets that might get us close to those numbers or below?

Internal leverage

Table 7.3 shows the individual impact of each of the domestic leverage points identified earlier, as forecast by IFs. The lognormal formulation (see Chapters 3 and 4) was used for the table, and it provides the base case for comparison. The results of the cross-sectional formulation are not shown, but Chapter 6 documented that it would provide higher forecasts.

In interpreting tables on domestic interventions and all other forecast results in this volume, it is essential to remember once again the first rule of forecasting: always distrust the results. Models (mental or computer-based) are oversimplifications of reality, sometimes brutally so. They are always prone to various errors of construction and use. *International Futures* is intended to collect and synthesize, as much as possible within the limits of these realities, the collective knowledge of a wide range of experts and to tie that knowledge to data and theory. We should still view results as further input into a thinking process, not as a substitute for it. Within these limits, the analysis of individual and combined domestic interventions supports several conclusions.

First, the results strongly support the conclusion from Chapter 6 that the incremental leverage available for poverty reduction by 2015 (relative to the base case, which builds in much action already underway) was very limited for policies beginning to take effect in 2007, when this analysis was undertaken. There is, at least in the combination of interventions, however, some quite significant leverage for policies by 2050. On a global basis, perhaps nearly 250 million fewer people would live in extreme poverty at midcentury with a combined package of incremental domestic interventions beginning in 2007 than without such interventions. What this pattern suggests, however, is that as important as the focus of the MDGs on 2015 is, policy analysis must take a longer time horizon, at least to 2030 (results not shown) and probably, even though results become more uncertain, as far into the future as midcentury.

Second, there appears no silver bullet to reduce poverty among the set of interventions examined. Almost all the interventions make some contributions to that goal, but the reductions associated with each of them individually are fairly modest.

Third, direct transfers to the poor are among the most effective single measures, and perhaps the only one that makes a significant contribution by 2015. Interestingly, however, by 2050 other interventions are as important or more so, especially fertility reduction. This pattern suggests the necessity of exploring further the time paths of the effects of

interventions. For instance, higher savings and investment actually have a detrimental impact in the near term, but that negative impact turns significantly positive over time. Because the intervention mentioned in Table 7.3 continues to ramp up investment over a long period, however, that pattern does not emerge clearly.

These time-dependent patterns reinforce one strategic argument about poverty and hunger reduction, namely the argument for a twin-track approach to pursuit of the MDG targets, as proposed by the UN Food and Agriculture Organization (UN FAO) and the World Food Program at the 2002 Monterrey conference on development financing (UN FAO 2005: 28).

Table 7.3 Internal levers explored (lognormal formulation)

Scenarios	Extreme poverty (millions)					
	Developing world	Sub-Saharan Africa	South Asia	Developing world	Sub-Saharan Africa	South Asia
	2015	2015	2015	2050	2050	2050
Base case	692	280	294	350	260	65
Fertility reduction	685	273	293	260	170	64
High female labor	691	280	293	347	258	64
High investment	724	293	311	324	241	58
High education expenditure	699	279	292	317	232	61
Effective govt.	686	278	290	311	232	58
Free markets	690	279	292	327	243	61
High infrastructure	691	279	293	327	244	61
High renewable	692	280	293	342	254	63
High R&D	691	279	293	343	256	63
Low protection	688	280	289	353	264	64
High transfers	673	265	293	275	180	64
All domestic combined	680	270	296	106	57	37
Scenarios	Extreme poverty (percent)					
	Developing world	Sub-Saharan Africa	South Asia	Developing world	Sub-Saharan Africa	South Asia
	2015	2015	2015	2050	2050	2050
Base case	11.2	29.4	13.7	4.2	14.2	2.2
Fertility reduction	11.1	29.0	13.7	3.3	11.6	2.2
High female labor	11.2	29.4	13.7	4.2	14.1	2.2
High investment	11.7	30.7	14.5	3.9	13.4	2.0
High education expenditure	11.1	29.3	13.7	3.8	12.8	2.1
Effective govt.	11.1	29.2	13.6	3.7	12.7	2.0
Low corruption	11.1	29.3	13.7	3.9	13.0	2.0
Free markets	11.1	29.3	13.7	4.0	13.3	2.1
High infrastructure	11.1	29.3	13.7	3.9	13.4	2.1
High renewable	11.2	29.3	13.7	4.1	13.9	2.1
High R&D	11.1	29.3	13.7	4.1	14.0	2.2
Low protection	11.1	29.4	13.5	4.3	14.4	2.2
High transfers	10.9	27.8	13.7	3.3	10.4	2.2
All domestic combined	11.0	28.8	13.9	1.3	3.9	1.2

Source: IFs Version 5.47.

The first track focuses on growth in the productivity and longer-term income of the poor; the second track creates social safety nets and provides direct food and other basic assistance to the poor. Another common strategic argument is that some external assistance might be useful or necessary in the interim, in order to help pay some of the costs of long-term investments of various kinds. The next subsection will begin exploring that possibility.

Fourth, in spite of limited geographic differentiation in Table 7.3, there is some evidence of differential contributions of interventions to different regions. In particular, fertility reduction is much more important in Africa through midcentury than in South Asia.

Once again, one size does not fit all with respect to development policies.

External leverage

As with the domestically focused interventions, the internationally oriented ones may have important synergies and trade-offs. For instance, there is a logic to the globalization process that says that many interventions are likely to cluster together (an issue to which the next section will return). Table 7.4 presents the forecasts for each individual international intervention and their combination, using the lognormal formulation.

Subject to the same caveats with respect to the inherent inaccuracy of forecasting that were

Table 7.4. External levers explored (lognormal formulation)

Scenario	Extreme poverty (millions)					
	Developing world	Sub-Saharan Africa	South Asia	Developing world	Sub-Saharan Africa	South Asia
	2015	2015	2015	2050	2050	2050
Base case	692	280	294	380	260	65
High trade	694	284	293	329	244	62
Export promotion	700	284	298	345	257	63
High FDI	697	282	295	333	245	64
High portfolio	691	280	293	348	258	65
High remittances	689	279	292	336	250	63
High foreign aid	684	273	295	278	202	52
High IFI flows	692	279	294	337	247	64
High technology transfer	684	278	289	303	222	59
Combined international	686	278	293	194	145	32
Scenario	Extreme poverty (percent)					
	Developing world	Sub-Saharan Africa	South Asia	Developing world	Sub-Saharan Africa	South Asia
	2015	2015	2015	2050	2050	2050
Base case	11.2	29.4	13.7	4.2	14.2	2.2
High trade	11.2	29.8	13.7	4.0	13.4	2.1
Export promotion	11.3	29.8	13.9	4.2	14.1	2.1
High FDI	11.2	29.6	13.8	4.0	13.4	2.2
High portfolio	11.1	29.3	13.7	4.2	14.0	2.2
High remittances	11.1	29.3	13.7	4.1	13.7	2.2
High foreign aid	11.0	28.6	13.8	3.4	11.1	1.8
High IFI flows	11.2	29.3	13.7	4.1	13.5	2.2
High technology transfer	11.0	29.2	13.6	3.7	12.2	2.0
Combined international	11.1	29.1	13.7	2.4	8.1	1.1

Source: IFs Version 5.47.

provided earlier, we can draw general conclusions from Table 7.4. The conclusions reinforce those drawn from analysis of domestic interventions.

First, the leverage available for poverty reduction by 2015 (with interventions beginning in 2007) is very limited. With the partial exception of higher foreign aid, which potentially provides immediate resources for recipient societies, none of the interventions significantly reduce poverty by 2015. The model may exaggerate the impact of foreign aid, however, by adding aid to government revenues and via transfers to household income, thereby raising average income and reducing poverty. That pass-through to poor as well as rich is by no means certain in the real world. For instance, Santosh Mehrotra and Enrique Delamonica (2007: 326) calculate that less than 10 percent of aid flows to basic social services.

Second, there is again quite significant leverage for policies by 2050. The combined impact could be a reduction in global poverty of more than 150 million people.

Third, there still appear to be no silver bullets. There is one clear leader in overall magnitude of impact both by 2015 and in 2050. That is significantly increased foreign aid (subject to the uncertain assumption of effective use). And there is a second intervention with very substantial impact

by 2050, namely the greater availability of technology. In reality, both fail to be fully convincing silver bullets—foreign aid because the model does not represent well some of the negative or distorting sociopolitical impacts of aid (although the model does capture Dutch disease implications); technology because the model does not parcel out its presumed greater availability to the true deeper drivers, such as greater FDI inflows and even the skills that might return with the same temporary emigrants who send home remittances.

Intervention Packages

With a rough map of the impact of individual interventions and of domestic and international packages of them, the next obvious step is to search for strategic packages that maximize the potential for reducing poverty.

Simple additive combination

The easiest first step is simply to combine the domestic and international interventions explored in the last section. Table 7.5 does that. One quite remarkable thing about combining the interventions is that there appear to be as many or more synergies as trade-offs, particularly in the impact on poverty forecasts for 2015. That is, the reduction in the number of the poor brought about by the simultaneous introduction of all

Table 7.5 Combined levers explored (lognormal formulation)

Extreme poverty (millions) using log-normal formulation						
	Developing world	Sub-Saharan Africa	South Asia	Developing world	Sub-Saharan Africa	South Asia
Scenario	2015	2015	2015	2050	2050	2050
Base case	692	280	294	250	260	65
All domestic	680	270	296	106	57	37
All international	686	278	293	194	145	32
Domestic and international	670	264	296	48	30	10
Extreme poverty (percent) using log-normal formulation						
	Developing world	Sub-Saharan Africa	South Asia	Developing world	Sub-Saharan Africa	South Asia
Scenario	2015	2015	2015	2050	2050	2050
Base case	11.2	29.4	13.7	4.2	14.2	2.2
All domestic	11.0	28.8	13.9	1.3	3.9	1.2
All international	11.1	29.1	13.7	2.4	8.1	1.1
Domestic and international	10.8	28.0	13.9	0.6	2.1	0.3

Source: IFs Version 5.47.

Although there may be no silver bullets, packages of interventions can be powerful. ■

interventions into the simulation is closer to the sum of the reductions from individual packages than to the larger reductions of the individual packages (which would imply overlapping effects or trade-offs across interventions).

This finding provides some independent support for the approach advocated by the Millennium Project under the leadership of Jeffrey Sachs. The plan proposed by that large team was not labeled “big push” by the writers of the report, but is in fact an exemplar of that development strategy and is an aggregation similar in many ways to the IFs combined scenario. Paul Collier (2006b: 121; 2007), while disagreeing with the emphasis Sachs puts on aid, also suggests the need for a big push “country by country.”

Why would there be such synergies, and what are they? The most obvious and important one is that many of the interventions support economic growth. When one intervention increases economic growth relative to the base case, almost all other interventions take place on a higher base. For instance, educational and health expenditures rise with GDP, so an incremental percentage increase in a society already growing faster as a result of FDI or foreign aid will work from a higher base and have an even greater effect. There are also interacting positive feedback loops via broader human development variables, such as the impact of education on fertility.²³

Table 7.5 also reinforces the earlier conclusion that interventions vary in their

effectiveness across regions of the world.

Through midcentury, the domestically oriented interventions as a package have more impact on poverty reduction in sub-Saharan Africa than do the internationally oriented interventions. For South Asia, the two sets of interventions have a basically comparable impact.

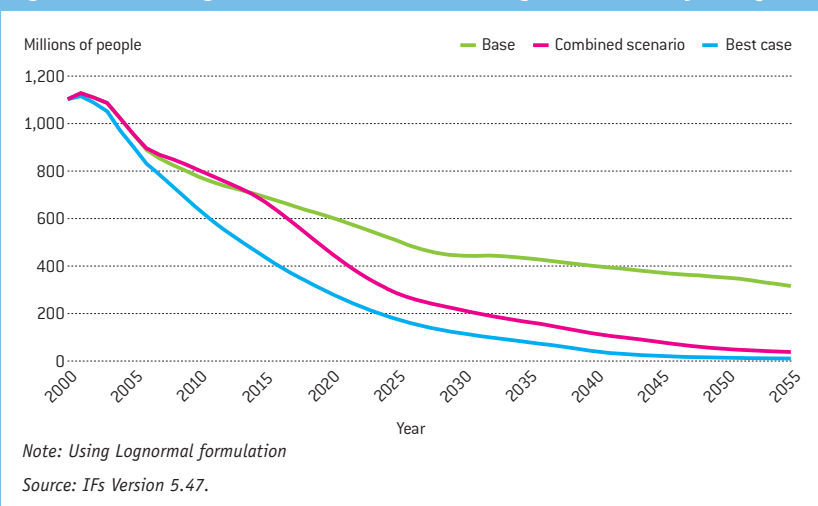
How well does the combined scenario do in reducing poverty? Figure 7.20 helps address that question. Chapter 6 framed this analysis of poverty by exploring what appear to be the outer limits of human potential to accelerate poverty reduction. It did so by creating a “best case” scenario (as well as a “worst case”) by direct manipulation of the proximate drivers of poverty, namely economic and population growth and distribution. Figure 7.20 shows the total number living in extreme income poverty in the base case, the best case, and the combined scenario.

The combined scenario reduces poverty considerably relative to the base case, pulling 285 million additional people out of extreme poverty by 2040 (270 million by 2055 as the numbers in the base case continue to decline). Not surprisingly, the combined scenario does not do as well as the best case, which was framed using costless assumptions about changed economic and population growth and redistributed economic well-being. In contrast, the combined scenario was built upward from large numbers of individual interventions, many of which do have real costs. As we have seen, for example, increases in savings and investment can actually reduce consumption and increase poverty in the short run. Thus it is quite impressive how well the combined scenario does over the longer term. The intelligent packaging of interventions does offer the opportunity to tackle poverty forcefully enough to push results toward the outer boundaries of reasonable expectations.

Strategic orientations

A future like that of the combined scenario is unlikely, however, for two related reasons. First, the full set of interventions would be very expensive. Although the costs to achieve the scenario would almost certainly be less expensive than the costs of continued poverty and lives lost, costs and benefits related to any policy intervention are seldom distributed

Figure 7.20 Framing and intervention scenarios: global extreme poverty



similarly across a population. Economists may talk about Pareto-superiority after compensatory transfers, but those asked to pay on the front end for benefits that quite obviously accrue to others will reasonably harbor doubts about ever receiving such compensation. Second, various philosophical tendencies divide development as a field, and practitioners support different strategic orientations. There are at least three easily identified clusters of initiatives that reappear in policy prescription. Chapter 3 (see especially Table 3.2) reviewed the components and some of the background of these strategies:

Domestic self-help

The most recent incarnation of this prescriptive orientation heavily emphasizes improved governance. The argument is that external resources and even internal expenditures are very often wasted if governance quality is inadequate. Clearly, corruption levels that divert resources to offshore bank accounts sap, if not fatally wound development efforts. Clearly, also, well-defined property rights encourage entrepreneurial behavior. Earlier incarnations of this prescription more often emphasized the development of human capital (as opposed, for instance, to military expenditures) or of basic infrastructure (in contrast for example, with large-scale show projects or, once again linking to governance, palaces for the privileged elite).

Outward, open orientation

The success of the Asian tigers drew everyone's attention to the possible benefits of export promotion, increasing trade (in contrast with import substitution), and the encouragement of large inflows of foreign direct investment. Advocates of globalization and liberalization have often pointed to this strategic orientation approvingly, although in reality many countries practicing export promotion have been ambivalent at best about the opening of domestic markets to trade or shorter-term financial flows. A contemporary variation on the general theme of external orientation concerns worker remittances and "brain circulation." In contrast to the fears of brain drain that characterized those tuned to domestic self-help, the arguments are that the remittances have often proven substantially larger than other international flows and the

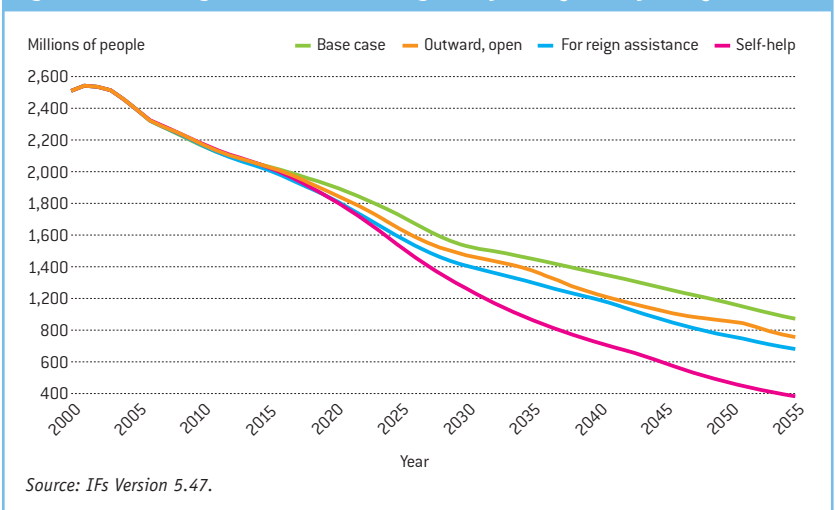
migrants frequently return with new skill sets and entrepreneurial patterns.

Foreign assistance

Those who are exceptionally poor have limited choices. Their freedom of action is restricted. For that reason, there has been a strong belief among many analysts that domestic self-help, and even sometimes external market orientation, are difficult to pursue without some external resources to jump-start the process. The target of foreign aid reaching 0.7 percent of GDP is one of the longest-standing specific prescriptions in development. The need to address high levels of indebtedness, especially for the poorest countries, also receives regular attention.

Exploring these three strategic orientations is subject to considerable risk of both misinterpretation and criticism from those who adhere strongly to one perspective or another. The representations of important linkages within models, including IFs, are not sufficiently strong to settle the debates. Even the details of how intervention specifications should be associated with the perspectives are uncertain. In spite of the risks, there is value in tentatively exploring the three perspectives. The arguments within and across them are too important to ignore. Figure 7.21 shows forecasts for global income poverty reduction, using the \$2 per day figure, for packages of the interventions clustered into the three strategic orientations and with the base case for reference.

Figure 7.21 Strategic orientations and global poverty at \$2 per day



Most important, each package reduces global poverty relative to the base case. The outward, open orientation, at least as configured in this analysis and as represented in the IFs model, delivers the least improvement. Interestingly, it contributes more to middle-income countries than to those with the lowest incomes (such as countries in sub-Saharan Africa) and to the population living on less than \$2 per day than to the population living on less than \$1.

The foreign assistance package scenario delivers somewhat more reduction in poverty worldwide, primarily because of its positive impact on sub-Saharan Africa. In South Asia it makes a contribution similar to that of the outward, open orientation.

The self-help strategy provides the greatest benefits quite consistently across all developing regions. It is important to stress, however, two aspects of that finding. First, the combined scenario (not shown in Figure 7.21) would further reduce those living on less than \$2 per day by more than 200 million by midcentury. Second, self-help is often actually attributable to the action of others. For instance, improved governance, reduced corruption, or more effective educational and health spending often benefit greatly from external examples, outside expertise, and even pressure brought to bear by the glare of a spotlight shone on self-serving or incompetent leadership and policies.

In short, each of the strategic orientations, although partisans frequently single them out as “the path” to reduced poverty and broader development, can make very important contributions. And the connections across them are sufficiently strong and mutually reinforcing that it is better to think of them as legs on a stool rather than as competitive perspectives. Human efforts to reduce poverty will benefit from resting on a stool with the stability provided by all three legs.

Conclusion

Substantively, there are significant interventions that can make great contributions to reducing global poverty. They require time to produce results, and because there are no true silver bullets, they achieve much more significant results in combination than individually. Are there packages of development proposals that, perhaps with

different combinations and better specification of possible interventions and strategic orientations, could better reduce poverty than any of those orientations individually and challenge the potential of the simple combined intervention scenario?²⁴ Almost certainly. For example, the UN Millennium Project (2005) developed *A Practical Plan to Achieve the Millennium Development Goals*, identifying many of the same interventions that this chapter has explored over a longer time horizon and elaborating them in considerable detail.²⁵

Methodologically, there are inherent differences between the structures of such plans and the structure of the analysis undertaken here. Many such plans are not fully concrete with respect to the magnitude and timing of interventions proposed. Plan developers also seldom have the capacity to look very systematically and globally at proposals as integrated packages. That has been the added value of the analysis here. At the same time, however, a model like IFs necessarily functions at a more highly macro level than proposals that typically come out of extended development analysis. These differences make the two approaches complementary rather than strictly comparable.

Appendix: Summary of Interventions by Region

The world as a whole

Global increase in FDI by 30 percent over twenty years; global increase in portfolio investment flows over twenty years; R&D expenditures increased by 20 percent over twenty years; global increase in migration by 50 percent over twenty years.

Developed countries

Foreign aid donations of at least 0.5 percent of GDP within ten years.

International financial institutions

Doubling of lending over ten years.

World Bank developing countries as a whole

Health spending increased 20 percent over ten years; governance effectiveness improved by about 20 percent on World Bank scale over ten years; economic freedom increased by about 20 percent on Fraser Institute scale over ten years; corruption decreased by about 30 percent

on the Transparency International scale over twenty years; infrastructure improved by about 20 percent over thirty years; renewable energy production increased, reaching 50 percent above the base case in 2050; an increase of technologically based productivity growth by 0.2 percent over ten years.

Africa

Eastern

Education spending increased 20 percent over ten years; savings and investment rates doubled over twenty-five years; transfers to unskilled households increased by 50 percent over twenty years; export promotion push leading to export growth of 25–30 percent relative to the base case by 2050.

Middle

Movement to replacement fertility over forty-five years (45 percent change relative to the base case); increased savings and investment by 30 percent over twenty-five years (e.g., 18 percent to 24 percent); education spending increased 80 percent over ten years; corruption decreased by about 40 percent on the Transparency International scale over twenty years; infrastructure improved by about 80 percent over thirty years; doubled transfers to unskilled households over twenty years; export promotion push leading to export growth of 25–30 percent relative to the base case by 2050.

Western

Movement to replacement fertility over thirty years (33 percent change relative to the base case); increased savings/investment by 30 percent over twenty-five years (e.g., 18 percent to 27 percent); education spending increased 80 percent over ten years; transfers to unskilled households doubled over twenty years; transfers to unskilled households increased by 50 percent over twenty years; export promotion push of leading to export growth of 25–30 percent relative to the base case by 2050.

Southern

Movement to replacement fertility over thirty years (33 percent change relative to the base case); increased savings/investment by 50 percent over twenty-five years (e.g., 18 percent to 27 percent); doubled transfers

to unskilled households over twenty years; export promotion push leading to export growth of 25–30 percent relative to the base case by 2050.

Northern

Movement to equal female labor force participation over forty-five years; education spending increased 20 percent over ten years.

Asia

South Central

Movement to equal female labor force participation over forty-five years; education spending increased 20 percent over ten years; increased savings and investment by 30 percent over twenty-five years; reduced protectionism lowered the cost of imports by 20 percent over twenty years; export promotion push leading to export growth of 25–30 percent relative to the base case by 2050.

Southeast

Education spending increased 35 percent over ten years.

East Poor

Education spending increased 80 percent over ten years; doubled transfers to unskilled households over twenty years.

West (Middle East)

Movement to equal female labor force participation over forty-five years; increased savings and investment by 30 percent over twenty-five years (e.g., 18 percent to 24 percent); transfers to unskilled households increased by 50 percent over twenty years.

Oceania Poor

Movement to replacement fertility over thirty years (33 percent change relative to the base case); savings and investment rates doubled over twenty-five years; transfers to unskilled households were doubled over twenty years.

The Americas

Caribbean

Increased savings and investment by 50 percent over twenty-five years (e.g., 18 percent to 27 percent); doubled transfers to unskilled households over twenty years.

Central

Movement to equal female labor force participation over forty-five years; doubled savings and investment over twenty-five years (e.g., 12 percent to 24 percent); education spending increased 35 percent over ten years; transfers to unskilled households doubled over twenty years.

South

Movement to equal female labor force participation; education spending increased 20 percent over ten years; reduced protectionism

lowered the cost of imports by 20 percent over twenty years; transfers to unskilled households doubled over twenty years.

Europe

Eastern

Savings and investment doubled over twenty-five years (e.g., 15 percent to 30 percent); education spending increased 30 percent over ten years; corruption decreased by about 60 percent on the Transparency International scale over twenty years.

- 1 Disagreements about possible levels of action are inevitable. The IFs model and the library of interventions for this analysis are available for any who wish to explore variations.
- 2 The Poverty Action Lab at MIT and much research does this at a micro level, complementing the macro analysis of this chapter.
- 3 See <http://www.un.org/depts/dhl/maplib/worldregions.htm#CAR> for a full membership list. This is also the regional set used by the Population Reference Bureau. The UN's regional commissions are organized on a different basis, with Western Asia (the Middle East, including Egypt) broken out of Asia and Oceania added to Asia and the Pacific.
- 4 Rwanda has targeted a maximum of three children much sooner using positive incentives.
- 5 Goldman Sachs (Poddar and Yi 2007: 12–13) pointed out that World Bank data show the savings rate in India rising from 12 percent in 1961 to nearly 30 percent in 2003 and calculated that the savings rate has increased by about 0.8 percent for every 1 percent decline in the demographic dependency ratio (young and old dependent population as a percentage of total population). They therefore posit a continuing rise in the savings rate that is not in the IFs base case.
- 6 Countries within regions vary substantially, however, and the analysis should ideally be at the country level (to which we turn in Chapter 8). Among the most egregious examples is the Caribbean region of the Americas, where Haiti spent about 1.5 percent of GDP for education and Cuba spent over 8.0 percent.
- 7 China Daily story at http://www.chinadaily.com.cn/english/doc/2006-03/06/content_527242.htm.
- 8 Still other important issues surround (1) the balance of social spending between basic social services such as primary education and broader spending; (2) the equity of social spending across income categories; and (3) the efficiency of social spending (see Mehrotra and Delamonica 2007).
- 9 For use in IFs, this index has been rescaled from 0 to 5; non-OECD countries average about 2.3. A 20 percent change on that base is about 0.5 points.
- 10 The IFs project generally uses the TI measure because it provides a considerably longer historical series.
- 11 A variety of initiatives for transparency in government finance, such as Publish What You Pay, clearly tackle the issue.
- 12 Because many index-based and more physically based measures (like life expectancy) saturate, and GDP appears not yet to do so, logarithmic-shaped functions are common in looking at relationships between such measures and GDP per capita. Hughes (2001) explored such relationships.
- 13 In 2006 China developed a plan to move R&D from 1.23 percent of GDP to 2.5 percent by 2020, a much more aggressive intervention. Analysis by the *Economist* (August 5, 2006: 39) identified the same constraints indicated here.
- 14 A relationship drawn to fit the regions would actually be downward sloping, but a relationship fit to the underlying countries would be nearly flat.
- 15 The World Bank Social Protection Discussion Papers are a good entry point into the literature.
- 16 It would be desirable to have many more categories of households, but data at a more disaggregated level are not extensively available across countries. The Global Trade Analysis Project (GTAP) provides it for these two categories.
- 17 The treatment of trade within IFs uses a pooled rather than bilateral trade representation, and there are other tools available for more detailed, bilateral exploration of the impact of trade initiatives, including the models of the Global Trade Analysis Project.
- 18 Specifically, the intervention pushed export growth upward by about 4 percent per year beyond the base case. The cumulative increase over the half century is quite a bit less than the integral of that annual 4 percent, however, because as with many other interventions, equilibration mechanisms (such as the competition for markets inherent in global trade) resist such an ongoing intervention.
- 19 Adams (2007) identified some of the problems with data on remittances, including (1) the exclusion of remittances that do not flow through official channels and (2) the classification by some central banks of remittances as other flows. Data may therefore underreport true flows. The study also importantly explores the use of remittances and concludes that they tend to support investment and entrepreneurial activity.
- 20 The OECD countries have set up a Network on Poverty Reduction (POVNET) to support implementation of the Paris Declaration on Aid Effectiveness.
- 21 The IFs model has a parameter to change the portion of aid that comes as loans, making such analysis possible.
- 22 *Economist*, December 10, 2005: 82. Another estimate was that implementation of Doha could reduce those living in poverty (using the \$2 per day definition) by 150 million (reported in "Europe's Farms vs. Free Trade," *Christian Science Monitor*, December 15, 2005: 1). The second estimate suggested the reduction in those living in extreme poverty (below \$1 per day) could be about 75 million.
- 23 Mehrotra and Delamonica (2007: 5) argue that such positive feedback loops across multiple dimensions of social and economic development operate at both micro and macro levels.
- 24 Experiments have been undertaken to link the Computer Assisted Reasoning System (CARS) of RAND and Evolving Logic (Lempert, Popper, and Bankes 2003) with IFs and to explore the space of interventions more deeply and systematically.
- 25 There is at least one key intervention that the Millennium Project did not highlight but that proved important here, especially for absolute numbers of the poor. Chapters 6 and 7 have shown how important family planning and associated population growth reduction could be in reducing poverty levels in sub-Saharan Africa by 2050. *The Practical Plan* did heavily emphasize rebuilding and strengthening networks of public health clinics, in part for the maternal care that does tend to reduce fertility rates. Yet the plan never really emphasized family planning's importance in its own right, and many political environments have been somewhat unfriendly to it in recent years.