

## 2 The Meaning and Measurement of Economic Development

### Scope of the Chapter

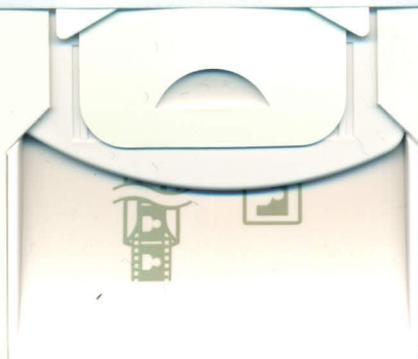
This chapter discusses the meaning, calculation, and basic indicators of economic growth and development; the classification of rich and poor countries; the price-index problem; the distortion in comparing income per head between rich and poor countries; adjustments to income figures for purchasing power; alternative measures and concepts of the level of economic development besides income per head; the problems of alternative measures; and the costs and benefits of economic development.

### Growth and Development

A major goal of poor countries is economic development or economic growth. The two terms are not identical. Growth may be necessary but not sufficient for development. **Economic growth** refers to increases in a country's production or income per capita (Box 2-1). Production is usually measured by **gross national product (GNP)** or **gross national income (GNI)**, used interchangeably, an economy's total output of goods and services. **Economic development** refers to economic growth accompanied by changes in output distribution and economic structure. These changes may include an improvement in the material well-being of the poorer half of the population; a decline in agriculture's share of GNP and a corresponding increase in the GNP share of industry and services; an increase in the education and skills of the labor force; and substantial technical advances originating within the country. As with children, growth involves a stress on quantitative measures (height or GNP), whereas development draws attention to changes in capacities (such as physical coordination and learning ability, or the economy's ability to adapt to shifts in tastes and technology).

The pendulum has swung between growth and development.<sup>1</sup> A major shift came near the end of the UN's first development decade (1960–70), which had stressed economic growth in poor countries. Because the benefits of growth did not often spread to the poorer half of the population, disillusionment with the decade's progress

<sup>1</sup> Immediately after World War II, scholars and third-world governments were concerned with wider objectives than simply growth. However, the Nobel laureate W. Arthur Lewis (1955:9) set the tone for the late 1950s and 1960s when he noted that "our subject matter is growth, and not distribution."



**BOX 2-1. COMPUTING GROWTH RATES**

Assume that in 2003, GNI for India is Rs. (rupees) 25,000 billion and its population 1067 million, so that **GNI per capita** is Rs. 23,430. The GNI in 2004, Rs. 31,533 billion, must be divided by the **GNI price deflator**, 110 (corresponding to an annual inflation rate of 10 percent) to give a GNI of Rs. 26,866 billion at constant (2003) prices. This figure, divided by the population in 2004, 1085.5 million, nets a GNI per capita of Rs. 24,750. **Real economic growth** (growth in GNI per capita) from 2003 to 2004 is (if expressed in 2003 constant prices)

$$(24,750 - 23,430/23,430) \times 100 = 5.6 \text{ percent}$$

This growth rate is used by such organizations as the World Bank for average annual growth rate, 2003–04. At a 2004 exchange rate of Rs. 50 = \$1, India's GNI per capita of Rs. 29,049 is US\$580 (at 2004 prices), used by the World Bank as GNI per capita. We need to adjust nominal GNI per capita by using the PPP exchange rate, that rate at which the goods and services comprising the GNI cost the same in both India and the United States. Using  $P = 6.13$ , the price level of GNI or purchasing-power adjusted GNI, gives PPP\$3,555 per capita, a more accurate indication of the average Indian's purchasing power expressed in U.S. dollar terms.

was widespread, even though economic growth exceeded the UN target. In 1969, Dudley Seers signaled this shift by asking the following questions about a country's development:

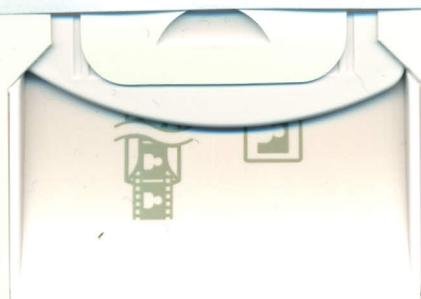
What has been happening to poverty? What has been happening to unemployment? What has been happening to inequality? If all three of these have become less severe, then beyond doubt this has been a period of development for the country concerned. If one or two of these central problems have been growing worse, especially if all three have, it would be strange to call the result "development," even if per capita income has soared. (Seers 1969:3–4)

At the U.N. Millennium Summit in September 2000, world leaders adopted the Millennium Development Goals (MDGs), setting "targets for reducing poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women" (U.N. Development Program 2000). The project is directed by Columbia University's Jeffrey Sachs, with advice from senior representatives from U.N. agencies and an International Advisory Panel, with independent experts in relevant fields, supported by the research of thematically-orientated task forces.

The MDGs, using 1990 as a benchmark, set targets for 2015. The targets include

1. reducing the people suffering from hunger and living on less than a dollar a day from one of six billion (17 percent) to half that proportion;<sup>2</sup>

<sup>2</sup> According to the U.N. Development Program (2003:2–3) and the World Bank (2003h:58–60), the \$1/day poverty rate for 2000 was 17 percent. Two economists contend that the World Bank's approach is flawed methodologically, thus overstating poverty. Surjit Bhalla's (2002:150) estimates poverty at 13 percent. If we use Xavier Sala-i-Martin's (2002:34–42) estimate of 7 percent, the world already reached the MDG target in the late 1990s (Chapter 6).



2. ensuring that all boys and girls complete primary school (at present, 113 million children do not attend school);
3. promoting gender equality and empowering women by eliminating gender disparities in primary and secondary education by 2005, and at all levels by 2015 (at present, two-thirds of illiterates are women);
4. reducing by two-thirds mortality among children under five years (presently 11 million children die before their fifth birthday, mainly from preventable illnesses);
5. reducing the percentage of women dying in childbirth by three-fourths (now one in 48 die in childbirth, despite the fact that virtually all countries have safe programs for mothers);
6. halting and reversing the spread of HIV/AIDS, malaria, tuberculosis, and other diseases (at present, 40 million people live with HIV, including five million newly infected in 2001, despite the fact that Brazil, Senegal, Thailand, and Uganda show that the spread of HIV can be stemmed);
7. ensuring environmental sustainability, by reversing the loss of environmental resources, reducing by half the proportion of people without access to safe drinking water by 2015, and achieving significant improvement in the lives of at least 100 million slum dwellers (now "more than one billion people lack access to safe drinking water and more than two billion lack sanitation"); and
8. developing a global partnership for development, including an open trading and financial system, a commitment to good governance, reducing the debt burden of developing countries, reducing the poverty of least developed countries, providing productive employment for youth, providing access to affordable essential drugs in developing countries, and making available the benefits of new technologies, especially in telecommunications (U.N. Development Program 2002b).

During the first decade of the 21st century, world leaders discussed how to finance projects embodying these goals (a U.N. conference in Monterrey, Mexico, March 2002), interim progress reports, and final recommendations.

The United Nations points out development goals achieved in the past: eradicating smallpox (1977), reducing diarrhoeal deaths by half (during the 1990s), and cutting infant mortality rates (the annual number of deaths of infants under one year of age per 1,000 live births) to less than 120 (in all but 12 LDCs by 2000) (U.N. Development Program 2003:31). Thus, although most MDG goals appear daunting, we can expect some progress.

Timothy Besley and Robin Burgess (2003:3–22) estimate that in LDCs, the elasticity of poverty with respect to income per capita (percentage change in poverty/percentage change in income per capita) is  $-0.73$ , meaning that a doubling in average income will reduce poverty rates by 73 percent. The annual growth rate in per capita income needed to halve world poverty by 2015 is 3.9 percent. If you assume that world regions continue their 1960–90 growth, only the growths of East Asia and the Middle East will exceed the rates needed to halve regional poverty by 2015.

However, Africa's prospect is not as bright as that of the remaining LDCs. David Sahn and David Stifel (2003:23–52) use African demographic and health surveys to examine likely progress in achieving MDG goals. African countries are not on target to achieve any of the first six goals tested (numbers 5 and 6 include proxies), with rural areas, where most African reside, faring worse than cities. Still, the authors find increases in enrollment rates, declines in infant and child mortality and maternal death rates, and (although there is no MDG goal) improved living standards in the 1990s, the baseline for projecting linear and log-linear target paths.

The international community has especially focused upon Africa. The Economic Commission for Africa (1985:3) described Africa's economic situation in 1984 as the worst since the Great Depression, and Africa as "the very sick child of the international economy." ECA's 1983 25th anniversary projection of previous trends to 2008 envisioned the following nightmare of explosive population growth pressing on physical resources and social services:

The socio-economic conditions would be characterized by a degradation of the very essence of human dignity. The rural population, which would have to survive on intolerable toil, will face an almost disastrous situation of land scarcity whereby whole families would have to subsist on a mere hectare of land. Poverty would reach unimaginable dimensions, since rural incomes would become almost negligible relative to the cost of physical goods and services.

The conditions in the urban centers would also worsen with more shanty towns, more congested roads, more beggars and more delinquents. The level of the unemployed searching desperately for the means to survive would imply increased crime rates and misery. But, alongside the misery, there would continue to be those very few who, unashamedly, would demonstrate an even higher degree of conspicuous consumption. These very few would continue to demand that the national department stores be filled with imports of luxury goods even if spare parts for essential production units cannot be procured for lack of foreign exchange. (Economic Commission for Africa (ECA) 1983:93–94)

Unfortunately, the projection of the ECA is proving correct. Africa's GDP per capita was lower in the 1990s than it was at the end of the 1960s (World Bank 2000a:1). When expressed in purchasing-power parity dollars (discussed later), Africa's average GDP is the lowest in the world, even lower than South Asia's (India, Pakistan, Bangladesh, and Sri Lanka). Moreover, life expectancy in sub-Saharan Africa, reversing the global trend, has declined to the level of 1975, 46 years (inside front cover table), primarily because of the high adult prevalence of HIV/AIDS.

Africa's political milieu, authoritarian and predatory rule and widespread civil wars, militate against economic growth. Evidence from Africa reinforces cross-national findings, a refutation of Singapore's former prime minister Lee Kuan Yew's thesis (Sen 1999:15), that democratization is directly related to the level and rate of economic growth. In 1988, only 5 (Botswana, Gambia, Mauritius, Senegal, Zimbabwe) of 47 sub-Saharan countries were multiparty democracies (Bratton and van de Walle 1997; Ndulu and O'Connell 1999:51). By 2004, the number of democracies had not increased much. Indeed, a majority of the democratically elected regimes

in Africa contrive to hold elections to satisfy international norms of “presentability,” and ignore political liberties, the rule of law, and separation of power (Nafziger and Auvinen 2003:114–31).

Claude Ake (1996:18, 42) writes: “With independence African leaders were in no position to pursue development; they were too engrossed in the struggle for survival. . . . [Indeed] instead of being a public force, the state in Africa tends to be privatized, that is, appropriated to the service of private interests by the dominant faction of the elite.” Political elites extract immediate rents and transfers rather than providing incentives for economic growth. Clientelism or patrimonialism, the dominant pattern in Africa, is a personalized relationship between patrons and clients, commanding unequal wealth, status, or influence, based on conditional loyalties and involving mutual benefits. In Nigeria’s second republic (1979–83), Richard Joseph (1987:8) labeled this phenomenon *prebendalism*, referring to “patterns of political behaviour which rest on the justifying principle that such offices should be competed for and then utilized for the personal benefit of officeholders as well as their reference or support group.” Prebendalism connotes an intense struggle among communities for control of the state. Corruption is endemic to political life at all levels in Nigeria and many LDCs. Political leaders use funds at the disposal of the state for systematic corruption, from petty survival venality at the lower echelons of government to kleptocracy at the top.

Two-way causation links the increase in civil wars in Africa to its dismal growth record (Nafziger, Stewart, and Väyrynen 2000; Nafziger and Auvinen 2003:41–42; Collier 2000) (negative per-capita growth, 1974–90, and barely positive in the 1990s) (World Bank 1996a:77; World Bank 1996f:18). Indeed, Stewart, Huang, and Wang (2000:7) indicate that Africa had by far the greatest number of deaths (direct and indirect) from wars, 1960 to 1995, as a proportion of the 1995 population: 1.5 percent, compared to 0.5 percent in the Middle East, 0.3 percent in Asia, and 0.1 percent in Latin America.

Nigeria is a clear example of ECA’s foreboding. By the late 1970s, Nigeria, fueled by oil wealth, had surpassed South Africa as Africa’s nominal GDP leader, and was classified as a middle income country in 1978–80 (World Bank 1980i:110–11; World Bank 1982i:110–11, 122–23). The contrast between the 1960s to 1970s and the first decade of the 21st century is remarkable. To be sure, visitors in the central cities notice that the urban elite (perhaps 10 percent of the population) is prosperous, with automobiles, cell phones, and refrigerators. Moreover, some villages have electricity (though erratic) and piped water, virtually unavailable in 1965.

But these pockets of prosperity hide Nigeria’s massive income disparities. The World Bank (2003i:236–37) ranks Nigeria as having the 15th highest Gini index of income inequality in the world (113 countries ranked), with the highest 10 percent of income earners enjoying 40.5 percent of income, whereas the lowest 10 percent claims only 1.6 percent. Also 91 percent of the population, the highest among 90 countries listed, lives below the international poverty line of \$2 a day (in 1993 prices).

From 1965 to 2004, Nigeria’s average material well-being fell. This decline included that of average nutritional levels (the proportion of the population

undernourished rose substantially), average consumer spending, access to health care, and infrastructure (transport and communications degraded from inadequate maintenance). The shares of Nigeria's shrinking middle class have plummeted. Many middle-level professionals, teachers, and civil servants were marginalized in 2004; in 1965, they had perquisites of automobile loans and housing.

Alienation in 2004 may even be more widespread than in 1965, just before the civil war. The impoverished people of the oil delta area have protested the high unemployment and lack of public goods and social services amid the wealth of foreign companies and their domestic collaborators. Ethnic and sectarian strife is rampant. The federal government consistently lacks accountability for hundreds of millions of dollars collected from petroleum exports and revenues. To get a picture of present-day Africa, you can multiply Nigeria's ills several times (Nigeria, whose poverty and corruption may be representative of much of Africa, has one-sixth to one-seventh of the population of Africa).

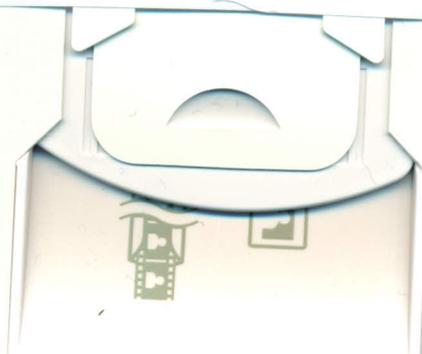
In Nigeria, Ethiopia, and Zambia, neither growth nor development took place in the last quarter of the 20th century. In Kenya and Malawi, growth took place without much development. In most of Asia and parts of Latin America, both growth and development took place (inside front cover table).

Economic development can refer not only to the *rate* of change in economic well-being but also to its *level*. Between 1870 and 1998, Japan had a rapid rate of economic development. Its real (inflation-adjusted) growth rate in GNP per capita was about 2.6 percent yearly (Chapter 3), and there was substantial technical innovation, improved income distribution, and a decline in the share of the labor force in agriculture. In addition, Japan has a high level of economic development – its 2003 nominal per capita GNI, \$34,510, placed it among the four richest countries in the world (inside front cover table). Other measures indicate most Japanese are well fed and housed, in good health, and well educated. Only a relative few are poor. This book will use both meanings of economic development.

## Classification of Countries

When the serious study of development economics began in the late 1940s and early 1950s, it was common to think of rich and poor countries as separated by a wide gulf. The rich included Western Europe, the United States, Canada, Australia, New Zealand, and Japan; the poor included Asia, Africa, and Latin America.

The boundary between rich and poor countries, overly simple then, has become even more blurred during the first decade of the 21st century. Today, an increasing number of the high- and upper-middle-income countries are non-Western, and the fastest-growing countries are not necessarily the ones with the highest per capita GNP. Those countries considered to be poor in 1950 grew at about the same rate as rich countries during the subsequent three decades (see Chapter 3). A few of the poor countries in 1950 – such as Taiwan, Singapore, South Korea, Malaysia, Thailand, and Mexico – grew so much more rapidly than some higher-income countries in



1950 (Argentina, Uruguay, Venezuela, and New Zealand,<sup>3</sup> for example) that the GNI per capita of the countries of the world now forms a continuum rather than a dichotomy.<sup>4</sup>

Several GNP per capita rankings shifted substantially between 1950 and 2003. Among present-day Asian, African, and Latin American LDCs listed in both GNP per capita rankings for 1950 in a World Bank study (Morawetz 1977:77–79) and for 2003 from sources in the inside front cover table, Venezuela fell from first to thirteenth, Uruguay from second to sixth, Peru from 11th to 22nd, and Bolivia from 31st to 56th, being overpassed by war-affected Japan, Taiwan (which rose from thirty-fifth to first), and South Korea, which vaulted from forty-fifth to second. In Africa, Morocco, engaged in conflict with Algeria over the Spanish Sahara and with local labor unions over social policy, declined from 17th to 32nd; Zambia, with rapidly falling relative world copper export prices after the mid-1970s, fell from 22nd to 77th; and Ghana, with chronic cedi overvaluation and low farm prices that discouraged export expansion until the 1980s, dropped from a two-way tie for 15th and 16th to 59th. During this period, Taiwan and South Korea, then 43rd and 46th, respectively, but since graduating to the high-income category, leapfrogged Ghana, as did Malaysia, Turkey, Colombia, and Indonesia, as well as Thailand, which rose from 49th to 14th.

The classification of development used by the World Bank (2003h and inside back cover) divides countries into four groups on the basis of per capita GNI. In 2003, these categories were roughly low-income countries (\$1,000 or less), lower-middle-income countries (\$1,001–3,000), upper-middle-income countries (\$3,000–9,000), and high-income countries (\$9,000 or more). Each year, the boundary between categories rises with inflation, but few countries shifted categories between 1974 and 2003.

Sometimes the high-income countries are designated as developed countries (DCs) or the North, and middle- and low-income countries as developing, underdeveloped, or less-developed countries (LDCs), or the South. *Underdeveloped* was the term commonly used in the 1950s and 1960s, but it has since lost favor. Perhaps all countries are underdeveloped relative to their maximum potential. However, the

<sup>3</sup> New Zealand, ranked sixth in GNP per capita in the OECD in 1970, slipped to the bottom among OECD countries as a result of rapid inflation in the 1970s and the early 1980s. After that, an overzealous effort to keep inflation in check restricted growth, contributing to a further relative drop for New Zealand (Economist 2002:31–33).

<sup>4</sup> Graduating from developing to developed country is not merely of academic interest, as the U.S. Agency for International Development (and other aid agencies) withdrew the GSP (generalized system of tariff preferences, discussed in Chapter 17) to several graduates in the late 1980s. The GSP had accounted for more than 10 percent of U.S. exports to prosperous LDCs such as South Korea, Taiwan, Hong Kong, and Singapore; as much as 5 to 10 percent of these countries' exports may have been diverted to other countries as a result of the loss of the U.S. GSP. Additionally, the World Trade Organization/General Agreements of Tariffs and Trade (WTO/GATT), which sets rules for international trade, had expected reciprocity among developed countries in trade agreements but extended preferential treatment to developing countries (Koekkoek 1988:947–957). However, under the GATT Uruguay Round (1986–94), DCs expect tariff reciprocity from LDCs.

In 1995, the World Bank announced that South Korea became the first country to graduate from a borrowing country to a contributor to the Bank's loan funds for LDCs (Kansas City Star 1995:B-6).

term *underdeveloped*, like *less developed*, has declined in use recently, not because it is inaccurate, but because officials in international agencies consider it offensive. And the term *developing countries* appears to be a euphemism when applied to parts of sub-Saharan Africa that grew (and developed) very little, if at all, from the 1970s through the first decade of the 21st century. Nevertheless, this book uses the latter term, as it is widely understood within the world community to refer to countries with low and middle GNP or GNI per capita.<sup>5</sup>

The 134 Asian, African, and Latin American members of the UN Conference on Trade and Development (UNCTAD) often are referred to as the **third world**, a term originating in the early post-World War II decade.<sup>6</sup> By refusing to ally themselves with either the United States or the Soviet Union, nonaligned nations forged a third political unit in the United Nations. Today, the term has lost its original meaning, no longer connoting nonalignment but distinguishing the low-and middle-income economies of the developing world from the **first world**, the high-income capitalist countries, where capital and land are owned by private entities; and the **second world** socialist, or centrally directed countries, where the government owns the means of production.

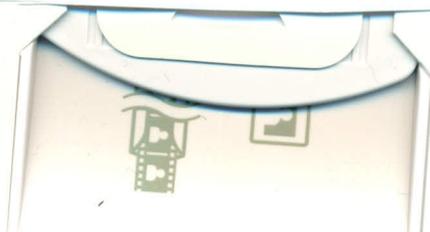
Contrary to Western usage, the second world described its economic system as **socialism** rather than communism. In Marxian terminology, communism refers to a later stage of development when distribution is according to needs, money is absent, and the state withers away. With the collapse of the Soviet Union in 1991, and the transition of the formerly socialist economies of Russia, East-Central Europe, and Central Asia toward a capitalist or mixed economy, only Cuba and North Korea are still socialist. Even Sweden, a **social democracy**, with an emphasis on taxes and transfers to redistribute income, and France, with **indicative planning**, which states government expectations, aspirations, and intentions but not authorization (see Chapter 18), are classified in the first world.

The term second world is rarely used now, especially since 1989–91, when Eastern Europe, the former Soviet Union, Mongolia, China, and Vietnam have been moving, albeit haltingly, toward the end of transition, with the Communist Party's loss of monopoly political power, the private sector accounting for the majority of GDP, and the market becoming the "dominant coordinator of economic activities" (Svejnar 2002:25 and Kornai 1999). By the mid-to late 1990s, virtually all formerly socialist economies in Europe had passed their inflection point, the lowest point, for real GDP since 1989.

This generally rising trend following an early abrupt five-year or so decline still meant that real GDP per capita, 1989 to 2001, had fallen about one-third in Russia, more than one-half in Ukraine, and 10 to 40 percent in the rest of the former Soviet Union. By 2001, only four formerly socialist European nations had attained their

<sup>5</sup> I have rejected "emerging market" as reflecting the perspective of the DC investor in or seller to LDCs, and "emerging nation" as a euphemism not preferable to "developing country" or "developing nation."

<sup>6</sup> The purpose of UNCTAD or Group of 77, a permanent organization first convened with 77 members in 1964, is to enhance the position of LDCs in the world economy. The Group of 77 comprises four-fifths of the population of the world and one-fifth of its GNI.



1989 real GDP by 2001: Poland, which reached its 1989 level in the mid-1990s, and Slovenia, Hungary, and Slovakia, achieving 1989 levels in the late 1990s. Unemployment rose to 16 percent of the labor force in Poland, 10 percent in Russia, and 7–19 percent in the rest of East-Central Europe in 2000 (Svejnar 2002:9–11). Some states of the former Soviet Union are not likely to attain their 1989 real GDP until near the end of the first (or even the second) decade of the 21st century. With the widespread overestimation of the pre-1989 output of the former European and Soviet socialist countries, and the collapse of their output just after 1989, these countries are now included among developing (mostly middle-income) countries.

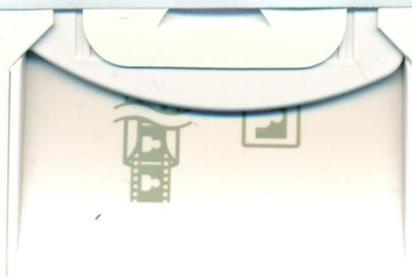
Branko Milanovic and Shlomo Yitzhaki (2001), in decomposing a global income distribution, ask, “Does the World Have a Middle Class?” between the first and third worlds, and answer “No.” Their division gives new meaning to the concept of a tripartite world. The first world, richer or equal to real GDP per capita in Italy (PPP\$8,000 or more in 1999), represents 16 percent of the world’s population, and the third world, with income equal or less than Brazil’s (PPP\$3,470, about equal to the official poverty line in Western Europe), comprises 78 percent of the world. Only 8 percent is left for the world’s middle class! This three-part grouping, leaving very little overlap, captures more than 90 percent of global inequality.<sup>7</sup> Chapter 6 discusses the components of global income inequality further.

The South Commission, chaired by the late Julius K. Nyerere, an articulate spokesperson for the poor who was head of government in Tanzania from 1961 to 1985, declares that “The primary bond that links the countries and peoples of the South is their desire to escape from poverty and underdevelopment and secure a better life for their citizens” (South Commission 1990:1). Yet economic interests still vary substantially between and within the following types of developing countries: (1) the 26 **economies in transition**<sup>8</sup> (East-Central Europe and the former Soviet Union, all low- and middle-income countries except high-income Slovenia), recognized as separate by the South Commission (*ibid.*, pp. 3–4); (2) the eight members of the **Organization of Petroleum Exporting Countries**, or OPEC (not including high-income Kuwait and the United Arab Emirates); (3) the 48 poorest countries, designated as **least developed countries**, seven listed and starred in the cover table; and (4) 106 other developing countries.

The label “economies of transition” (implying a passage to the market) may be a euphemism of the DCs. Those citizens experiencing falling standards of living in the 1990s and first decade of the 21st century fear destitution before they arrive at the promised land of long-run equilibrium. Indeed, by 1995, in Russia, Ukraine, Lithuania, Poland, Hungary, Romania, Bulgaria, and Slovakia, the former ruling Communist Party (reincarnated as a socialist or social democratic party and opposed to central planning) had won a parliamentary plurality back from transient ruling

<sup>7</sup> Another division is that the world’s lower class walks or hitches rides, the middle class rides bicycles or takes public transport, and the upper class drives automobiles and may take airline flights.

<sup>8</sup> These low- and middle-income countries resisted classification as “developing countries,” despite widespread similarities to them in problems of stabilization and reform (see Chapter 19).



parties or cliques committed to rapid economic reform and liberalization. Still, as Chapter 19 indicates, today's economics structure is very different from that of the early 1990s.

Among OPEC members, high- and upper-middle-income economies are Kuwait, Libya, Saudi Arabia, Venezuela, the United Arab Emirates, and Gabon. Iran dropped from upper-middle-income status after the oil output disruptions during the 1979 Iranian revolution and the 1980–88 Iran-Iraq war, and Iraq also fell from the same status after the war with Iran, the U.N.-imposed trade ban in the 1990s, and the U.S.-led invasion of 2003. (Alnasrawi 2000:92 estimates that Iraq's GDP fell 82 percent from 1980 to 1998.) Indonesia, fluctuating between low-income and lower-middle-income status, and low-income Nigeria, each with populations of more than 90 million, lack substantial surpluses, spending most foreign exchange on basic import requirements, such as machinery, equipment, food, and raw materials.

In 1971, the United Nations designated 25 countries with a low per capita income, low share of manufacturing in gross product, and low adult literacy rates as **least developed**. A number of countries asked to be so designated, hoping to obtain economic assistance, especially from the United Nations. Since then, the United Nations has added other criteria to this list of marginalized economies, including low levels of human development (on indicators such as life expectancy, per capita calorie supplies, and primary and secondary school enrollment rates), natural handicaps (such as a small population, severe climatic risks, landlockedness, and geographical isolation), and low economic diversification. The list of countries has grown to 48 (including Afghanistan, Angola, Bangladesh, Burkina Faso, Burundi, Cambodia, Congo Kinshasa, Ethiopia, Haiti, Liberia, Malawi, Mali, Mozambique, Myanmar or Burma, Nepal, Niger, Rwanda, Somalia, Sudan, Tanzania, Uganda, Yemen, and Zambia), overlapping greatly with low-income countries. Most least developed countries, however, are small. Most U.N. supporters of this program feared that DCs would treat the proposal seriously only if the number of countries were clearly limited. Thus, populous countries, such as India, Pakistan, Vietnam, and Nigeria (and even Kenya) were not included (Simonis 1991:230–35; Blackwell 1986:40–41; for criticism, see Selwyn 1974:35–42).

The four **Asian tigers**, South Korea, Taiwan (China-Taipei), Singapore, and Hong Kong (the largest investor in and a major recipient of investment from China, and a part of China since 1997) are included among the **newly industrializing countries** (NICs). The four, which have been growing rapidly despite stumbling temporarily in the 1997–98 Asian financial crisis, are industrially diversified and high-income countries. Nine less advanced economies, Mexico, Brazil, Malaysia, Turkey, Argentina, India, China, Portugal, and South Africa, among others, are sometimes included among NICs (Sewell, Tucker, and contributors 1988:204).

China, a lower-middle country on a GNI per capita basis, has a GNI PPP of \$5,625 billion, second to the \$10,110 billion of the United States in 2002, and ahead of Japan's \$3,315 billion (World Bank 2004h:252–253). GNI is an indicator of potential military and diplomatic strength. If China's total growth continues to

to exceed that of the United States, China may surpass the United States by the second to third decade of the 21st century.

LDC debtors, such as Argentina, Brazil, Bangladesh, Kenya, and Côte d'Ivoire, have been interested in the expansion of official loan facilities, especially to finance oil imports. Their attempts to improve financing were directed at OPEC countries. Nevertheless, OPEC countries have maintained an alliance with oil-importing, developing countries on a broad range of economic and political issues in international forums.

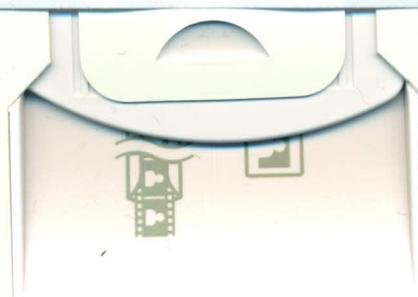
Many OPEC countries and oil-importing LDCs shared a concern with debt relief and rescheduling, economic adjustment, and macroeconomic stabilization. Additionally, most OPEC countries, despite their high per-capita GNP, face problems common to most of the developing world – high illiteracy, high infant mortality, and dependence on imported technology. The NICs (both four and nine), which rely heavily on manufactured exports, have been more interested in reduced DC trade barriers against manufacturers than in the reduced DC agricultural subsidies and primary commodity stabilization sought by Uganda, Malawi, Sri Lanka, and Honduras.

Still in 1974 to 1975, NICs (none then among high-income countries) and OPEC countries joined with other developing economies in the successful adoption by the U.N. General Assembly of a declaration on principles and programs to reduce the adverse impact of the international economic order on LDC development. This order includes all economic relations and institutions, both formal and informal that link people living in different nations. These economic institutions include international agencies that lend capital, provide short-term credit, and administer international trade rules. Economic relations include bilateral and multilateral trade, aid, banking services, currency rates, capital movements, and technological transfers. Amid the tepid response by DCs, LDCs have changed their strategies, eschewing comprehensive strategies on the world order but continually pressing for concessions on various fronts, including lobbying for reduced DC tariffs and subsidies in the World Trade Organization (WTO), which administers international trade rules; seeking debt reductions for highly-indebted poor countries; and tying U.N. millennium development goals to aid to decrease poverty and illiteracy.

## Problems with Using GNP to Make Comparisons over Time

Economists use national-income data to compare a given country's GNP or GNI over time. The inside front cover table shows the economic growth of 63 of 123 countries, 1973 to 1998. For example, Malaysia's growth in GDP per capita was 4.16 percent yearly. On the basis of a simple calculation, you might state, "This means that Malaysia's GNP capita in 1998 was 277 percent ( $1.0416^{25}$ ) of what it was in 1973." Yet a statement such as this, based on official growth figures, is subject to serious question as to accuracy.

Students know that the GNP price deflator affects government and World Bank figures for GNP and its growth. Whether the price deflator is 112.5, 125, 150, or another figure depends on which weighted price index is used. A number of countries,



especially in Africa and Eastern Europe, have not changed the quantity weighting of commodity prices since before 1972, despite substantial output structural change. Economic development changes prices with shifts in supply and demand. A newly modernizing country may find that a good, such as steel, which is of little importance in the output mix in the premodern era, looms large during the process of modernization. Whether the country uses early or late (sometimes premodern or modern) weights in devising a price index makes a substantial difference in determining how large the price deflator will be in adjusting GNP growth.

Let us use Malaysia to illustrate the price-index problem. In showing how Malaysia calculates its GNP price deflator, assume that Malaysia produces only two goods, electronic calculators and rubber boots. Suppose Malaysia produces 20 million electronic calculators at R400 apiece (with R the Malaysian currency ringgit) and 200 million pairs of rubber boots at R100 per ton in 1973, and 100 million calculators at R100 apiece and 400 million pairs of rubber boots at R200 per ton in 1998. The output of boots grew steadily as prices doubled, whereas the output of calculators increased fivefold and prices were cut substantially, as the industry benefited from large-scale economies and a rapidly-improving technology.

Malaysia may use the **Laspeyres price index**, applying base-period or 1973 (*not* late-year or 1998) quantities to weight prices. The aggregate price index

$$P = \frac{\sum p_n q_0}{\sum p_0 q_0} \quad (2-1)$$

where  $p$  is the price of the commodity produced,  $q$  the quantity of the commodity produced,  $0$  the base year (here 1973), and  $n$  the given year (1998).

$$\begin{aligned} P &= \frac{(20 \text{ m. calculators} \times R100) + (200 \text{ m. units of boots} \times R200)}{(20 \text{ m. calculators} \times R400) + (200 \text{ m. units of boots} \times R100)} \\ &= \frac{R42,000 \text{ million}}{R28,000 \text{ million}} = 1.5 \end{aligned}$$

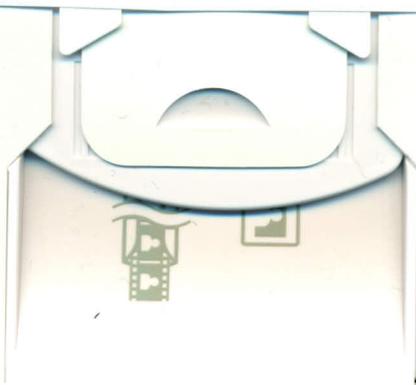
Many countries compute real growth (similar to Box 2-1) by using current price weights, similar to the **Paasche price index**, which applies terminal-year (1998) outputs for weighting prices, so that price index

$$P = \frac{\sum p_n q_n}{\sum p_0 q_n} \quad (2-2)$$

In Malaysia, then

$$\begin{aligned} P &= \frac{(100 \text{ m. calculators} \times R100) + (400 \text{ m. units of boots} \times R200)}{(100 \text{ m. calculators} \times R400) + (400 \text{ m. units of boots} \times R100)} \\ &= \frac{R90,000 \text{ million}}{R80,000 \text{ million}} = 1.125 \end{aligned}$$

In Malaysia, the GNP price deflator using the Laspeyres index, 1.5, exceeds that using the Paasche index, 1.125. To the extent that industries with more rapid growth, such as the electronic calculator industry, show relatively less rapid increases (or here even reductions) in price, a Laspeyres index, which uses base-period weights, will



show higher values than Paasche-type indexes, which use weights from a current period.<sup>9</sup> The Laspeyres index is biased upward and the Paasche index biased downward. Although the Fisher ideal index, a geometric average of the Laspeyres and Paasche indices, removes bias, it is not used much because of its complexity.

National-income statisticians may not find adequate price weights for wonder drugs and other new goods recently discovered. In "Viagra and the Wealth of Nations," Paul Krugman asks (1998:24), How do we compare today's price for a good not available at any price in 1973 – the Internet, fax machine, microwave oven, video-cassette player, automatic teller machine, music file transfer, or a drug to cure cancer, male impotence (Viagra), baldness, and Alzheimer's? What was the cost of a substitute for Viagra or electronic mail in 1973? Any imputation falls short of capturing the real improvements in today's living standards from a wider choice of goods and services.

### Problems in Comparing Developed and Developing Countries' GNP

International agencies generally do not collect primary data themselves. These agencies almost always base their statistical publications on data gathered by national statistical agencies that often use different concepts and methods of data collection. The United Nations has not yet successfully standardized these concepts and methodologies (Srinivasan 1994:3–27). But aside from these problems, there are other incomparabilities, especially between the GNPs of rich and poor countries.

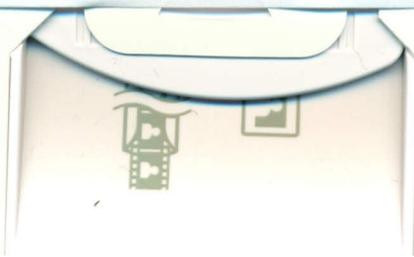
According to the cover table, per capita GNI or GNP varies greatly between countries. For example, compare the GNP per capita of India and the United States. The 2003 U.S. GNP per capita of \$37,610 is more than 70 times that of India's \$530. • Could an Indian actually survive for one year on less than the weekly income of an average American? In reality, income differences between developed and developing countries are very much overstated.

One difference is that developed countries are located in predominantly temperate zones, and LDCs are primarily in the tropics. In temperate areas such as the northern United States, heating, insulation, and warmer clothing merely offset the disadvantages of cold weather and add to GNP without increasing satisfaction.

Apart from this discrepancy, *the major sources of error and imprecision in comparing GNP figures for developed and developing countries are as follows:*

1. GNP is understated for developing countries, because a greater proportion of their goods and services are produced within the home by family members for their own use rather than for sale in the marketplace. Much of the productive activity of the peasant is considered an integral part of family and village life, not an economic transaction. The economic contribution of the housewife who grinds the flour, bakes the bread, and cares for the clothes may not be measured

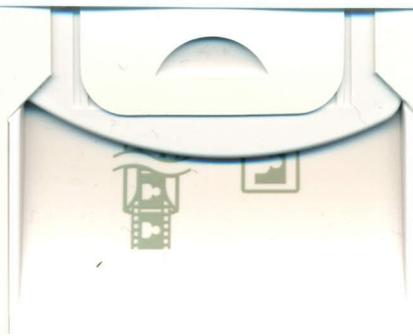
<sup>9</sup> A useful mnemonic device for remembering Laspeyres is "long time ago" and Paasche is "present."



in GNP in poor countries, but the same services *when purchased* are included in a rich country's GNP. In addition, subsistence farmer investments in soil improvements and the cultivation of virgin land are invariably understated in national income accounts. Although a shift from subsistence to commercial production may be slow enough to be dismissed in a country's GNP for three to five years, it is an important distortion for longer run or intercountry comparisons. Heston (1994:39) estimates that, in 1975 in LDCs, the mean share of the subsistence sector in GDP was 15 percent but does not estimate GDP's corresponding margin of error for GDP.

In some ways, distortions in income differences between the poor country and rich country are analogous to those between the United States in the 19th and 20th centuries. Although estimates indicate U.S. real per capita income for 1870 was one-eleventh what it was in 1998, adjustments would indicate a figure closer to one-fifth. Great-great-great-grandfather grew his fruits and vegetables, raised dairy cattle for milk and sheep for wool, and gathered and chopped firewood. Great-great-great-grandmother processed the food, prepared the meals, and sewed quilts and clothes for the family. But few of these activities added to national product. Today, their great-great-great-grandchild purchases milk, fruits, and vegetables at the supermarket, buys meals at restaurants, and pays heating bills – all items that contribute to national product. Moreover, our great-great-great-grandparents' grain output, when estimated, was valued at farm-gate price, excluding the family's food processing. Statistics show U.S. cereal product consumption increased by 24 percent from 1889 to 1919, although it decreased 33.5 percent if you impute the value of economic processes at home, such as milling, grinding, and baking (Usher 1968:15; Kuznets 1971:10–14). Analogously, most food consumed by the poor in low income economies is valued at the farm price, because most grow their own food or buy food at farm prices. Thus, part of today's increased GNP per capita (over that of our great-great-great-grandparents) occurs because a larger percentage of consumption enters the market and is measured in national income.

2. GNP may be understated for developing countries, where household size is substantially larger than that in developed countries, resulting in household scale economies. Although it is not accurate to say that "two can live as cheaply as one," it is true that two can live more cheaply together than separately. India's average household size is 5.2 compared to the U.S.'s 2.6; moreover, a larger percentage of the average Indian household consists of children, who consume much less food than adults. If we adjust India's income to an equivalent-adult, equivalent-household (EAEH) income based on household size and children percentage, India's per capita income is roughly 10 percent higher (Firebaugh 2003:46–69, who provides EAEH adjustment. The EAEH adjustment in Africa is more than 10 percent, as its population growth rate and average household size are larger than India's; see Chapter 8).
3. GNP may be overstated for developed countries, because a number of items included in their national incomes are intermediate goods, reflecting the costs



of producing or guarding income.<sup>10</sup> The Western executive's business suits and commuting costs should probably be considered means of increasing production rather than final consumer goods and services, just as expenditures on smog eradication and water purification that add to national income are really costs of urbanization and economic growth. Furthermore, part of defense spending is a cost of guarding higher incomes, and not for national power and prestige.<sup>11</sup>

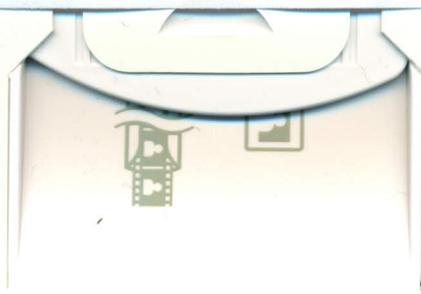
4. The exchange rate used to convert GNP in local currency units into U.S. dollars, if market clearing, is based on the relative prices of internationally traded goods (and not on purchasing power – see later). *However, GNP is understated for developing countries because many of their cheap, labor-intensive, unstandardized goods and services have no impact on the exchange rate, as they are not traded.* Many of the necessities of life are very low priced in dollar terms. In 2003, for example, rice – the staple in the diet of an Indian villager – cost 10 rupees (about 20 U.S. cents) per capita per day.<sup>12</sup> Also, services in India tend to be inexpensive. Thus, 2003 annual salaries for elementary teachers were about one-tenth as high as those in the United States – a case that surely overstates differences in the quality of instruction. (See Chapter 17, which indicates that recently trade in services has increased with enhanced globalization, which will reduce somewhat the scope for this distortion in the future.)
5. GNP is overstated for countries (usually developing countries) where the price of foreign exchange is less than a market-clearing price. This overstatement can result from import barriers, restrictions on access to foreign currency, export subsidies, or state trading. Suppose that in 2003 India's central bank had allowed the exchange rate to reach its free market rate, Rs. 85 = \$1, rather than the official rate of Rs. 44.20 = \$1. Then the GNP per capita figure of Rs. 23,430 would have been \$276 (23,430 divided by 85) rather than \$530 (23,430 divided by 44.20). On balance, other adjustments outweigh this effect, so that income differences between rich and poor countries tend to be overstated.<sup>13</sup>

<sup>10</sup> This statement is somewhat speculative, as intermediate-good output is difficult to measure. In addition, as LDCs become more affluent and urbanized, the percentage of their output devoted to intermediate goods has increased.

<sup>11</sup> When we use GNP as a measure of welfare, we do not inquire about the composition of output between civilian and military goods, between milk and cigarettes, or between pornographic literature and Shakespeare. Most economists assume, for example, that military spending, when it adds to national prestige and power, increases the satisfaction of its citizens. Yet countries such as Benin, which spend only \$6 per person on the military, have more resources available for civilian goods and services than Pakistan, which spends \$27 per person on the military (U.N. Development Program 1994:170–171; World Bank 1994:162–163).

<sup>12</sup> Sen (1992:115) argues that “money buys less of some types of commodities in the richer countries.” For example, in most U.S. localities, money cannot buy repairs for toasters or staplers, or the mending of shirts and sweaters.

<sup>13</sup> Kuznets (1974:333–336) argues that nonagricultural prices divided by agricultural prices are overstated in LDCs relative to DCs, thus exaggerating the importance of the fastest growing industrial sectors and the size of recent LDC growth. However, the finding of Maddison (1983:27–41) is the reverse of Kuznets's contention, indicating that, if anything, the nonagricultural sector's weight is understated in developing countries relative to that in developed countries.



## Comparison-Resistant Services

Comparison-resistant services, like health care, education, and government administration, which comprise more than 10 percent of most countries' expenditure, distort cross-national, but not necessarily DC-LDC, GNP comparisons. People do not buy a clearly defined quantity of university education, crime prevention, health maintenance, and forest management as they do food and clothing. The usual ways of measuring service output are unsatisfactory: by labor input cost or to use productivity differences for a standardized service (for example, a tonsillectomy) as representative of general differences (for example, in medicine) (Kravis 1984:1-57; Summers and Heston 1991:330-31).<sup>14</sup> However, because health care and basic education are labor intensive, a poor economy needs less money than a rich economy to provide the same services (Sen 1999:48).

## Purchasing-Power Parity (PPP)

The next sections, together with Chapter 4 on adjusted net savings and Chapter 13 on green national accounting, examine alternatives to GNP at existing exchange rates as a measure to compare economic welfare.

Earlier we pointed out that exchange rates omit nontraded goods, and that the relative prices of nontraded goods to traded goods are lower in developing than in developed countries. The International Comparison Project (ICP) of the U.N. Statistical Office and the University of Pennsylvania converts a country's GNP in its own currency into purchasing-power parity (or international) dollars (PPP\$) by measuring the country's purchasing power relative to all other countries rather than using the exchange rate.<sup>15</sup> Penn researchers Robert Summers and Alan Heston compute the price level of GNP ( $P$ ) as the ratio of the purchasing power parity (PPP) exchange rate to the actual (or market) exchange rate, where both exchange rates are measured as the domestic-currency price of the U.S. dollar. (GDP or gross domestic product, sometimes used, is income earned within a country's boundaries instead of gross national product, income accruing to a country's residents.)

<sup>14</sup> There are additional distortions in using GNP to measure welfare that affect comparisons, but not those between DCs and LDCs. Per-capita GNP figures do not consider differences in average work week and average leisure between two countries. In addition, GNP measures all activity generated through the market whether the activity is productive, unproductive, or destructive. An outbreak of influenza leading to greater drug sales increases GNP, although absence of the disease, by decreasing pharmaceutical consumption, reduces GNP. Likewise, durable buildings decrease future GNP because they reduce future construction demand. Wars or earthquakes may increase GNP, since they lead to reconstruction. Furthermore, during war, as tanks and bombers go up in smoke, the effective demand for new production may increase (Valaskakis and Martin 1980).

Another distortion is the black market, which is not adequately covered in official data. The black market originates in the process of evading or avoiding the fiscal or legal system (of prices or exchange rates). Srinivasan (1994:8-9) estimates that black-market income comprised 18 to 21 percent of official GDP in India in 1980-81. Although this share of GDP is probably larger than black-market income shares in U.S. GDP, how the relative share of black-market income varies generally between DCs and LDCs is not certain.

<sup>15</sup> More recently, the World Bank has computed PPPs, although Deaton (2003) is concerned that they are less stable and accurate than the previous U.N.-Penn figures.

The PPP exchange rate is that at which the goods and services comprising gross domestic product cost the same in both countries. If people around the world consumed a single commodity, such as rice, constructing PPP exchange rates would be simple. Analogously, the London *Economist* assumes only one good, the Big Mac, calculating the Big Mac PPP, the exchange rate at which this McDonald's hamburger costs the same in all countries.

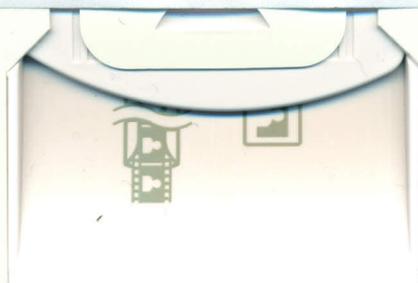
In 2003, a Big Mac price of Real 4.55 in Brazil and \$2.71 in the United States meant a PPP of Real 1.68 = \$1 compared to the actual exchange rate of Real 3.07 = \$1, so that  $P$  was 55 percent and the Real (Brazil's currency) was undervalued by almost 45 percent, indicating hamburgers were cheap in Brazil. Similarly, the South Korean Big Mac price of Wan 3537 indicates a PPP of Wan 1296 = \$1 compared to an exchange rate of Wan 1258 = \$1, with  $P$  of 1.03 percent. In 2003, the U.S. dollar was strong, with only a few currencies, such as the Swiss franc, overvalued; the Big Mac price of Sfr5.86 corresponds to a PPP of Sfr2.21, compared to the actual rate of Sfr1.30, with  $P$  170 so that the Swiss franc was overvalued by 70 percent (*Economist* 2003b:68; *Economist* 2003e).<sup>16</sup> In the real world, although the purchasing power of rupees, the Indian currency, Rs. 9.40 = \$1, the exchange rate is Rs. 50.71 = \$1, so that India's  $P$  is 18.8 percent of that of the United States. The nominal GNP per capita for 2001, \$460, divided by  $P$ , 18.8 percent, equals PPP\$2,450 or real GNP per capita.

The Penn economists use a series of simultaneous equations to solve the PPP for 81 (60 in the mid-1980s and 34 in the 1970s) benchmark and quasi-benchmark countries and world average prices for 400 to 700 commodities and services, specified in detail for quantity and quality. The averaging, which uses a specialized multiple regression, is designed to consider the fact that not every country prices every item. If a country fails to price an item (for example, the rental of an apartment in a 20-year-old multistoried building, of 120 square meters, with central heating, and one bathroom), researchers calculate the cost of making appropriate quality adjustments to a substitute item that is directly observable. Indeed, the Penn researchers describe their basic procedure as the potato-is-a-potato rule. "A potato with given physical characteristics was treated not only as the same produce but also as the same quantity, whether it was purchased in the country or in the city, in January or in June, by the piece or by the bushel, and whether it was purchased at a retail market or consumed out of own production" (Kravis, Heston, and Summers 1983:31). For 57 nonbenchmark countries, the economists use a shortcut estimating equation in which PPP is a function of nominal GNP per capita, steel production per capita, telephone use, motor vehicles, and other variables (Summers and Heston 1991:327-68 and CD).

<sup>16</sup> Should MacDonal'd's open a franchise in India, it would probably not serve Big Macs, as many Indians refrain from eating beef for religious reasons.

John Williamson (1994:13) is not amused by Big Mac PPPs. He rightly indicates that the effort of the *Economist*, which interprets PPP in terms of the classic contention that the nominal exchange rate should reflect the purchasing power of one currency against another, is a "misconceived endeavor." Moreover, Williamson points out a major discrepancy between the Big Mac and Burger King Whopper index.

*Economist* (2004a:67) calculates a Starbucks' tall-latte index, comparing it to the Big Mac index.



The World Bank–Penn estimates indicate a  $P$  of 29.0 percent for sub-Saharan Africa, 19.6 percent for South Asia, 22.3 percent for East Asia and the Pacific, 38.2 percent for the Middle East and North Africa, 50.3 percent for Latin America and the Caribbean, 28.0 percent for East and Central Europe and Central Asia, and 96.5 percent for the high-income economies. The figure for sub-Saharan Africa means that its purchasing-power adjusted (I\$) GNP per capita, \$1,620, is 3.447 (1/.290) times its GNP converted into U.S. dollars at the existing exchange rate, \$470 (World Bank 2003h:235).

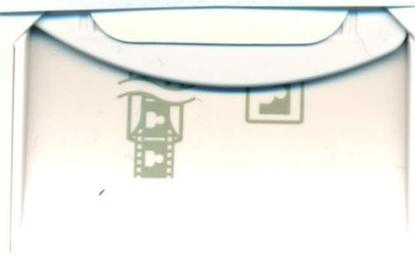
How much must an average-income earner in India have to earn in U.S. dollars to attain the same living standard (that is, same basket of goods) in the United States that the earner does in India? How does this dollar amount compare with the average income earned in the United States?

$P$  (or the price level of GNP), 18.4 percent for India, indicates that U.S. per-capita GNP is not 70 times but 13 ( $70 \times .184$ ) times that of India. (The percentage of GNP to GDP is from the CD from Summers and Heston 1991:327–68.) The U.S. per-capita expenditure on food is almost 11 times what it is in India, but this is only six times with adjustments in purchasing power. For staples such as bread, rice, and cereals, U.S. per-capita consumption is twice that of India but only 1.5 times as much with the adjustment (Kravis 1984:1–57; Summers and Heston 1988:1–25; Summers and Heston 1984:207–262; Kravis 1986:3–26; Kravis, Heston, and Summers 1978b; Kravis, Heston, and Summers, 1978a:215–242; Kravis, Heston, and Summers 1993; Summers and Heston 1991:327–368). Or, as Princeton’s Angus Deaton (2003) indicates, Rs. 442 would convert to \$10 at the official exchange rate but to \$44 at the “food” exchange rate.

Yet these comparisons do not provide answers to these two questions. You need to determine the dollar price of India’s basket of goods and services (wheat cakes, mangos, papayas, rice, sitars, brass tables, and so forth) in the United States and then compare this figure to the dollar price of U.S. average income. Although we cannot indicate the ratio of the dollar price of GNP per capita in the United States to that in India, the ratio is clearly less than 28. If Indians need to replicate their goods, and cannot substitute wheat bread for wheat cakes, oranges for mangos, potatoes for rice, violins for sitars, or wooden for brass tables, the ratio might be very low; indeed, it might cost the U.S. per-capita income to replicate these goods in the United States. How detailed the goods are specified determines how high the ratio is and how well off India appears.

Put the shoe on the other foot. How much must an average income earner in the United States earn in rupees to secure the same living standard in India that the person acquires in the United States? The rupee price of an average U.S. basket of goods (including milkshakes, hamburgers, computers, automobiles, rock-and-roll compact disks, and so forth) would be substantially more than 28 times the average Indian basket. The U.S. consumption basket would be more costly relative to the Indian basket the more Americans refuse, for example, to consume yogurt and vegetables instead of milkshakes and hamburgers.

Dan Usher (1968) suggests that you can compare income per capita more directly if you calculate the geometric average of (1) the ratio of the U.S. to Indian output of per



capita goods and services in relative prices in dollars, and (2) the ratio of the U.S. to Indian output of per capita goods and services in relative prices in rupees. We might expect this geometric average to correspond roughly to ICP results. Both analyses, however, assume no substitution in consumption resulting from changes in prices.

A majority of the 138 countries with PPP adjustments are either nonbenchmark countries (and thus based on an estimating equation) or quasi-benchmark countries, with substantial missing variables for commodities or services. The problems are even more serious when you require a reliable time series. The quality of data for former socialist countries is especially suspect. T. N. Srinivasan (1994:241) contends that Summers and Heston "use problematic procedures of extrapolation from data for a few years and countries to many more." Both nominal GNP and its PPP are subject to a margin of error.

PPP, based on calculating detailed prices for a large number of commodities, represents the product of substantial time and effort. Nevertheless, GNP PPP is relatively easy to interpret, and in recent years, readily available, as *Ps* and PPPs are assumed relatively stable from year to year (World Bank 2003h:245).

By and large, the greater the difference in per capita income between two countries, the greater the correction for purchasing power. Chapter 6 indicates that worldwide income inequality is reduced considerably when the gross product in developing countries is adjusted for purchasing power.

In this book, we use PPP national-income data when they are available, because they more accurately reveal relative material well-being.

### Measurement Errors for GNP or GDP Adjusted for Purchasing Power

What are the confidence intervals for gross product PPPs? (Whether we use GDP or GDP is not an issue, as the cross-national correlation of GDP and GNP is close to perfection [with  $r = 1.0$ ] for the world, according to Firebaugh 2003:34, 100). The Penn researchers assign letter grades from "A" to "D" for the quality of GDP estimates for each country, 1960 to 1989. The margin of error is: A =  $\pm 9$  percent (18 nations), B+ =  $\pm 12$  percent (7 nations), B =  $\pm 15$  percent, C+ =  $\pm 18$  percent (1 nation), C =  $\pm 21$  percent (34 nations), C- =  $\pm 24$  percent, D+ =  $\pm 27$  percent (11 nations), and D =  $\pm 30$  percent (38 nations) (Firebaugh 2003:111–112, 232; Summers, Heston, Aten, and Nuxoll 1994; Summers and Heston 1991: appendix 2). For China, a special case, comprising one-fifth of the world's population, the error is  $\pm 50$  percent (Firebaugh 2003:111).<sup>17</sup> Although there is no reliability grade for World Bank data after 1989, we can assume confidence intervals similar to earlier data.

This margin of error may shock many readers. Kravis and Lipsey (1990: abstract) contend that the margin of error for the worst GDP PPP estimates "is still a small range of error compared to that stemming from the use of exchange rates

<sup>17</sup> For example, as Chapter 19 indicates, Chinese growth rates are overstated as they are heavily based on growth in physical output rather than deflated expenditures. See Lardy (1992:150–155).

to convert own-currency to common currency measures of output.” Because nations are relatively consistent in procedures used over time, then the direction of bias is likely to be consistent over time, meaning that the margin of error for growth rates is much smaller (Firebaugh 2003:109–110, 232–232).

Derek Blades (1980:71–72) estimates that, given the errors of population growth and price weights used to aggregate output indicators, the confidence interval for the economic growth of LDCs may be as much as 2 to 3 percent. For Africa, Blades suggests an estimated growth of 0 percent in GNP per capita yearly, 1973 to 1998 (inside front cover table), together with a confidence interval of 3 percent, means an estimated growth rate that is likely to be between –3 percent and 3 percent.<sup>18</sup>

Additionally, there may be problems in estimates of sectoral aggregate output that distort GNP figures. In many LDCs, production estimates for domestic food crops, often the largest sector in the economy, are based on informal estimates agricultural officers make about whether output increased or decreased. Here even small errors may be of major importance. Assume GNP in 2003 is \$10,000 million. If GNP in 2004 is \$10,300 million, with a 5-percent margin, much from agriculture, the range is between \$9785 million (a 2.15-percent decrease in GNP) and \$10,815 million (an 8.15-percent increase).

## A Better Measure of Economic Development?

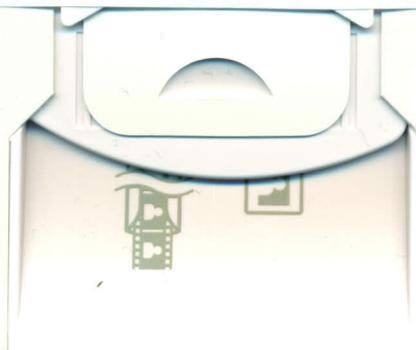
But even with the more precise U.N.–Penn figures, using income as a measure of development is a weak tool, and efforts have been made to replace GNP per capita with a more reliable measure – usually an index of several economic and social variables.

### THE PHYSICAL QUALITY OF LIFE INDEX (PQLI)

One alternative measure of welfare is the PQLI, which combines three indicators – infant mortality rate, life expectancy (at age one, to not overlap with infant mortality), and adult literacy rate, the ability to read *and* write in any language (in percentage). The first two variables represent the effects of nutrition, public health, income, and the general environment. Life expectancy is positively correlated with GNP per capita through the impact of GNP on incomes of the poor and public spending, especially on health care; indeed, GNP adds no extra explanation to those of poverty and public health expenditure (Sen 1999:44; Anand and Ravallion 1993). Infant mortality reflects the availability of clean water, the condition of the home environment, and the mother’s health. Literacy is a measure of well-being as well as a requirement for a country’s economic development (McLaughlin et al. 1979:129–133).

Critics of this measure stress a close correlation between the three PQLI indicators and the composite index and GNP per capita. Nevertheless, figures on PQLI (between the most unfavorable performance in 1950, valued at 0, and the most favorable

<sup>18</sup> I have adjusted Blades’s statement to apply to 1973–98 growth rates shown in the inside front cover table (Blades 1980:71–72; Heston 1994:48–49).



figure, 100, expected by the year 2000) reveal exceptions to the correlation (see inside front cover table). For instance, China's life expectancy and infant mortality rates, matching those of the United States in 1940, were achieved at a per-capita income of \$490. By contrast, a relatively high per capita does not necessarily reflect widespread well-being, as in the case of affluent oil countries such as Saudi Arabia and Oman.

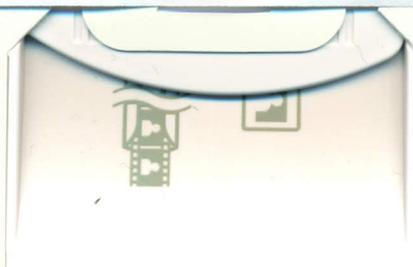
However, PQLI indicators are of limited use in distinguishing levels of development beyond middle-income countries. All three PQLI variables – life expectancy, literacy, and infant mortality – are highly related to per-capita income *until* nutrition, health, and education reach certain high levels, then the value of the variables levels off. These indicators have asymptotic limits reflecting biological and physical maxima (Hicks and Streeten 1979:572–575.) Thus, except for city-states Hong Kong and Singapore and affluent oil exporters Kuwait and the United Arab Emirates, all high-income countries have infant mortality rates below 10 per 1000, literacy rates of 98 percent or above (except for Portugal's and Singapore's 92 percent, Israel's 95 percent, and Greece's 97 percent), and a life expectancy of 75–80 years (except for South Korea with 73 years).

There are difficulties with PQLI not encountered with standard per-capita GNP data. Scaling and weighting a composite index, as with PQLI, present a problem, because rescaling raw data to a 0–1 range is somewhat arbitrary and there is no clear conceptual rationale for giving the core indicators equal weights. Moreover, 87 of 117 LDCs with PQLI figures have not compiled reliable data on life expectancy since 1980, and 60 LDCs lack data on adult literacy since 1980 (Srinivasan 1994b:238–243; Srinivasan 1994c:1–2). In addition, as scholars changed their estimates of the most favorable figures for components by 2000, the maxima and scaling for PQLI indicators have had to be changed. Furthermore, economists question the meaning of the PQLI growth rate, called the *disparity reduction rate*, not only because of the unreliable time-series data but also because most high-income countries are pressing near the practical maximum (99 to 100 percent for adult literacy, for example) for some indicators, giving little scope for growth.

#### **THE HUMAN DEVELOPMENT INDEX (HDI)**

The UN Development Program (UNDP) defines human development as “a process of enlarging people's choices. The most critical ones are to lead a long and healthy life, to be educated and enjoy a decent standard of living” (U.N. Development Program 1990:10). In the face of widespread assessment that the 1980s was a “lost decade” for developing countries, UNDP has argued that human development disparities between DCs and LDCs are much less than disparities in income per capita, and that human development narrowed considerably between DCs and LDCs while income gaps were widening (U.N. Development Program 1991:16–18). In its effort to measure human development, UNDP has constructed another alternative measure of welfare, the **Human Development Index**.

The HDI summarizes a great deal of social performance in a single composite index combining three indicators – longevity (a proxy for health and nutrition), education,



and living standards. Educational attainment is a composite of two variables: a two-thirds weight based on the adult literacy rate (in percentage) and a one-third weight on the combined primary, secondary, and tertiary gross enrollment rate (in percentage). Longevity is measured by average life expectancy (in years) at birth, computed by assuming that babies born in a given year will experience the current death rate of each age cohort (the first year, second year, third year, and so forth through the  $n$ th year) throughout their lifetime. The indicator for living standards is based on the logarithm of per capita GDP in PPP dollars.<sup>19</sup>

*Calculating the HDI.* To construct a composite index, you determine the maximum and minimum values for each of the three variables – in 2000, life expectancy, from 25 to 85 years, education, adult literacy from 0 to 100, gross enrollment rate from 0 to 100%, and GDP per capita (PPP US\$) from \$100 to \$40,000. You normalize the observed value for each of the three variables into a 0–1 scale. Then you express the performance in each dimension as a value between 0 and 1 by the following formula:

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

Let us compare the indexes and their calculation for India to those of the United States for 2000 (U.N. Development Program 2002:149–152).

*Calculating the life expectancy index:*

Maximum life expectancy = 85	India's life expectancy index = $(63.3 - 25)/(85 - 25) = 38.3/60 = 0.64$
Minimum life expectancy = 25	U.S. life expectancy index = $(77.0 - 25)/(85 - 25) = 52/60 = 0.87$

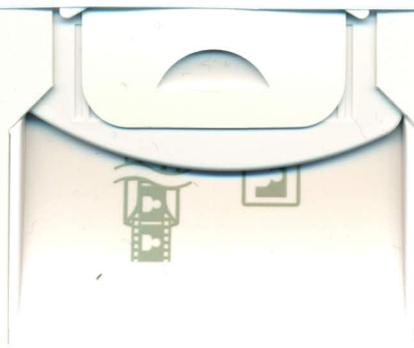
*Calculating the adult literacy index:*

Maximum adult literacy rate = 100	India's adult literacy index = $57.3/100 = 0.573$
Minimum adult literacy rate = 0	U.S. adult literacy index = $100/100 = 1.000$

*Calculating the combined primary, secondary, and tertiary gross enrollment rate:*

Maximum combined primary, secondary, and tertiary gross enrollment rate = 100	India's combined primary, secondary, and tertiary gross enrollment rate = $55/100 = 0.55$
Minimum combined primary, secondary, and tertiary gross enrollment rate = 0	U.S. combined primary, secondary, and tertiary gross enrollment rate = $95/100 = 0.95$

<sup>19</sup> Ranis, Stewart, and Samman (2005:27) show that "The correlations with under-five mortality [rate per 1,000 live births] yield exactly the same results as HDI. Under-five mortality also shows similar correlations with the basic elements of HD [human development] as with HDI... The under-five mortality rate has advantages for some purposes, since it is more precise in terms of changes over time and less complicated to calculate."



*Calculating the education index:*

India's education index =  $2/3$  (adult literacy index) +  $1/3$  (gross enrollment index) =  $2/3(0.573) + 1/3(0.55) = 0.382 + 0.1833 = 0.5653$ , which UN Development Program rounds off to 0.57

U.S. education index =  $2/3$  (adult literacy index) +  $1/3$  (gross enrollment index) =  $2/3(1.000) + 1/3(0.95) = 0.6667 + 0.3167/3 = 0.9834$ , rounded off to 0.98

*Calculating the GDP index:*

Logarithm of the maximum GDP per capita (PPP US\$) 40,000 = 4.6021  
 Logarithm of the minimum GDP per capita (PPP US\$) 100 = 2.0000  
 Logarithm of India's GDP per capita (PPP US\$) 2,358 in 2000 = 3.3725

India's GDP index =  $3.3725 - 2/4.6021 - 2 = 1.3725/2.6021 = 0.53$   
 Logarithm of U.S. GDP per capita (PPP US\$) 34,142 in 2000 = 4.53329  
 U.S. GDP index =  $4.53329 - 2/4.6021 - 2 = 2.53329/2.6021 = 0.97$

*Calculating the HDI:*

Once you calculate the dimension indices – life expectancy, education, and GDP, determining HDI is straightforward:

$$\text{HDI} = 1/3 (\text{life expectancy index}) + 1/3 (\text{education index}) + 1/3 (\text{GDP index})$$

For India, HDI =  $0.21 + 0.19 + 0.177 = .577$  For the United States, HDI =  $0.29 + 0.326 + 0.323 = 0.939$

U.N. Development Program (2002: 149–152, 253).

Some critics argue that development problems are essentially economic problems, a matter of stimulating economic growth. Richard Reichel (1991:57–67) finds that PPP per capita income explains a large proportion of other HDI components. The proportion of variation explained, or  $R^2$ , is 0.783 for life expectancy and 0.535 for literacy rate. He concludes that we do not need to measure human development separately from average income. However, most development experts and international agencies reject Reichel's position, arguing that income measures still neglect many important aspects of the development process, leaving much of human development unexplained (see also Trabold-Nubler 1991:236–243).

One example of a substantial divergence between HDI and income rankings is that of South Africa, which ranked 107th in GNP per capita but only 129th among 173 countries in HDI (U.N. Development Program 2002:149–152). Despite the introduction of a universal adult ballot in South Africa in 1994, the country's social indicators still reflect the legacy of decades of a white-ruled apartheid (racially separate and discriminatory) economy. South Africa, with 0.695 HDI, is not explained well by its GDP per capita (PPP\$9510), comparable to high-human-development economies Chile (0.833 HDI) and Poland (HDI 0.831). Rather, South Africa's HDI, about the same as Algeria, with roughly half the PPP\$ GDP per

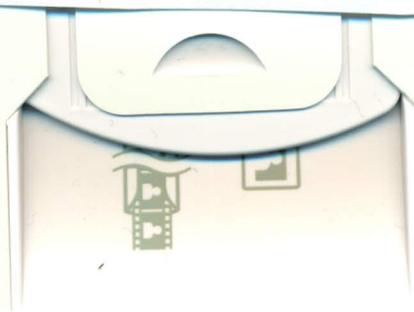
capita, and Syria, with less than half average real GDP, may better reflect its welfare ranking.

In 1992, the purchasing-power adjusted GDP per capita of black, Asian, and mixed-race South Africa was PPP\$1,710, about the same as Senegal's PPP\$1,680, and in excess of the PPP\$1,116 for Africa as a whole. Yet this low income for 36.1 million nonwhite South Africans stands in stark contrast to that of 7.3 million white South Africans, PPP\$14,920 income per capita, a figure higher than New Zealand's PPP\$13,970. Life expectancy, an indicator of health, was 62 in South Africa compared to 72 in Chile and Poland. But life expectancy was only 52 for black South Africans, 62 for Asians and mixed races, and 74 for whites, 54 for Africa generally, and 77 for DCs, whereas the adult literacy rate was 67 percent for nonwhites and 85 percent for whites (Nafziger 1988:18; Lecaillon, Paukert, Morrisson, and Germidis 1984:46; U.N. Development Program 1993:27, 136; U.N. Development Program 1994:14–17, 98, 130–131). Racial differences in human capital and discrimination based on social interactions, networks (from racially segregated housing), informal screening devices, self-reproducing educational disadvantages, and other socially based means persisted, resulting in no improvement in the relative status of majority black and mixed-race workers between 1992 and the late 1990s (Allanson, Atkins, and Hinks 2002:443–459).

HDI, when disaggregated regionally, can vary widely within a country. Kerala, a south Indian state with one of the lowest incomes per capita in the country but with a more favorable policy on female education and property ownership, communal medical care, and old-age pensions, surpasses the Indian average in the following categories: a life expectancy at birth of 77 years compared to 63 years, an infant mortality rate of 16 compared to 67 per 1,000, an adult literacy rate of 91 percent compared to 57 percent, a female literacy rate of 94 percent compared to 54 percent, and an HDI of 0.68 compared to 0.59 (World Bank 2004h:44–45; U.N. Development Program 2003:239; U.N. Development Program 1993:27, 136; U.N. Development Program 1994:14–17, 98, 130–131).

In 1994 in Chiapas state, the Zapatista army, representing Indian smallholders and landless workers or *campesinos*, rebelled against Mexico's ruling party, which they believed was responsible for their poverty and distress. In the state, PPP\$ GDP per capita was 43 percent below the national average and adult literacy 24 percent below the national average. During the first decade of the 21st century, Northeast Brazil lags behind Southern Brazil 71 to 54 years in life expectancy, 93 percent to 61 percent in adult literacy rate, and 40 percent in real GDP per capita, disparities larger than those in Mexico (World Bank 1993i:238–304; U.N. Development Program 1993:19, 135–137; U.N. Development Program 1994:98–99; World Bank 2003h; Sen 1992:126–127; U.N. Development Program 2003:62–63).

HDI does not capture the adverse effect of gender disparities on social progress. In 1995, the U.N. Development Program measured the **gender-related development index (GDI)**, or HDI adjusted for gender inequality. GDI concentrates on the same variables as HDI but notes inequality in achievement between men and women,



imposing a penalty for such inequality. The GDI is based on female shares of earned income, the life expectancy of women relative to men (allowing for the biological edge that women enjoy in living longer than men), and a weighted average of female literacy and schooling relative to those of males. However, GDI does not include variables not easily measured such as women's participation in community life and decision making, their access to professional opportunities, consumption of resources within the family, dignity, and personal security. Because gender inequality exists in every country, the GDI is always lower than the HDI. The top-ranking countries in GDI are Australia, the Nordic countries of Norway, Sweden, and Finland, North America (Canada and the United States), Belgium, Iceland, Netherlands, and the United Kingdom. The bottom six places, in ascending order for GDI, include Sierre Leone, Niger, Burundi, Mozambique, Burkina Faso, and Ethiopia; Afghanistan, ranked lowest in 1995 but lacks 2000 data. In these countries, women face a double deprivation – *low human development achievement and women's achievement lower than men* (U.N. Development Program 1991:72–79; U.N. Development Program 2002:222–242; 255–258).

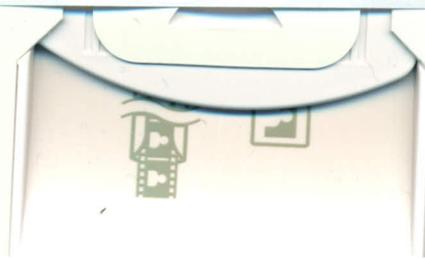
Many who agree that human development needs separate attention are critical of HDI. HDI has similar problems to those of PQLI – problems of scaling and weighting a composite index, the lack of rationale for equal weights for the core indicators, and the lack of reliable data since 1980. Additionally, school enrollment figures are not internationally comparable, as school quality, dropout rates, and length of school year vary substantially among and within countries.

Before 1994, the U.N. Development Program shifted the goalposts for life expectancy, education, and real GDP per capita each year, not allowing economists to measure growth over time; thus, a country's HDI could fall with no change or even an increase in all components if maximum and minimum values rose over time. In 1994, however, the U.N. Development Program set goalposts for HDI components that are constant over time so that economists, when they acquire HDI indices retrospectively, can compute growth over time (Chamie 1994:131–146; Behrman and Rosenzweig 1994:147–171; Srinivasan 1994b:238–243; Srinivasan 1994c:1–2; U.N. Development Program 1994:90–96).

The concept of human development is much richer and more multifarious than what we can capture in one index of indicator. Yet HDI is useful in focusing attention on qualitative aspects of development, and may influence countries with relatively low HDI scores to examine their policies regarding nutrition, health, and education.

## Weighted Indices for GNP Growth

Another reason why the growth rates of GNP can be a misleading indicator of development is because GNP growth is heavily weighted by the income shares of the rich. A given growth rate for the rich has much more impact on total growth than the same growth rate for the poor. In India, a country with moderate income



inequality, the upper 50 percent of income recipients receive about 70 percent (\$350 billion) and the lower 50 percent about 25 percent (\$150 billion) of the GNP of \$500 billion. A growth of 10 percent (\$35 billion) in income for the top-half results in 7-percent total growth, but a 10-percent income growth for the bottom-half (\$15 billion) is only 3-percent aggregate growth. Yet the 10-percent growth for the lower half does far more to reduce poverty than the same growth for the upper half.

We can illustrate the superior weight of the rich in output growth two ways: (1) as just explained, the same growth for the rich as the poor has much more effect on total growth; and (2) a given dollar increase in GNP raises the income of the poor by a higher percentage than for the rich.

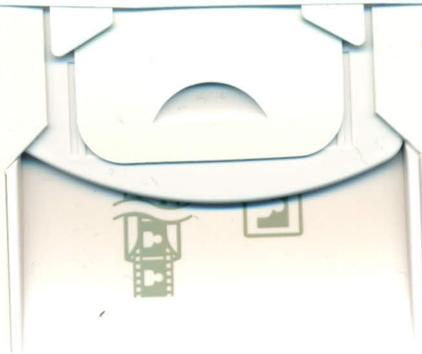
When GNP growth is the index of performance, it is assumed that a \$35 billion additional income has the same effect on social welfare regardless of the recipients' income class. But in India, you can increase GNP by \$35 billion (a 7-percent overall growth on \$500 billion) either through a 10-percent growth for the top 50 percent or a 23-percent increase for the bottom 50 percent.

One alternative to this measure of GNP growth is to give equal weight to a 1-percent increase in income for any member of society. In the previous example, the 10-percent income growth for the lower 50 percent, although a smaller absolute increase, would be given greater weight than the same rate for the upper 50 percent, because the former growth affects a poorer segment of the population. Another alternative is a **poverty-weighted index** in which a higher weight is given a 1-percent income growth for low-income groups than for high-income groups.

Table 2-1 shows the difference in annual growth in welfare based on three different weighting systems: (1) GNP weights for each income quintile (top, second, third, fourth, and bottom 20 percent of the population); (2) equal weights for each quintile; and (3) poverty weights of 0.6 for the lowest 40 percent, 0.3 for the next 40 percent, and 0.1 for the top 20 percent. In Panama, Brazil, Mexico, and Venezuela, where income distribution worsened, performance is worse when measured by weighted indices than by GNP growth. In Colombia, El Salvador, Sri Lanka, and Taiwan, where income distribution improved, the weighted indices are higher than GNP growth. In Korea, the Philippines, Yugoslavia, Peru, and India, where income distribution remained largely unchanged, weighted indices do not alter GNP growth greatly (Ahluwalia and Chenery 1974:38-42).

Is poverty-weighted growth superior to GNP-weighted growth in assessing development attainment? Maximizing poverty-weighted growth may generate too little saving, as in Sri Lanka of the 1960s, as the rich have a higher propensity to save than the poor (Chapter 14).

Although the different weighting systems reflect different value premises, economists usually choose GNP weights because of convenience and easy interpretation. Given present data, it is easier to discuss poverty reduction by using both GNP per capita and income distribution data than to calculate poverty-weighted growth.



**TABLE 2-1. Income Equality and Growth**

Country	Period	I. Income growth			II. Annual increase in welfare		
		Upper 20 percent	Middle 40 percent	Lowest 40 percent	(A) GNP weights	(B) Equal weights	(C) Poverty weights
Korea	1964-70	10.6	7.8	9.3	9.3	9.0	9.0
Panama	1960-69	8.8	9.2	3.2	8.2	6.7	5.6
Brazil	1960-70	8.4	4.8	5.2	6.9	5.7	5.4
Mexico	1963-69	8.0	7.0	6.6	7.6	7.0	6.9
Taiwan	1953-61	4.5	9.1	12.1	6.8	9.4	10.4
Venezuela	1962-70	7.9	4.1	3.7	6.4	4.7	4.2
Colombia	1964-70	5.6	7.3	7.0	6.2	6.8	7.0
El Salvador	1961-69	4.1	10.5	5.3	6.2	7.1	6.7
Philippines	1961-71	4.9	6.4	5.0	5.4	5.5	5.4
Peru	1961-71	4.7	7.5	3.2	5.4	5.2	4.6
Sri Lanka	1963-70	3.1	6.2	8.3	5.0	6.4	7.2
Yugoslavia	1963-68	4.9	5.0	4.3	4.8	4.7	4.6
India	1954-64	5.1	3.9	3.9	4.5	4.1	4.0

Note: Equal weights imply a weight of 0.2 for the upper 20 percent, 0.4 for the middle 40 percent, and 0.4 for the lowest 40 percent, whereas poverty weights are calculated giving weights of 0.1, 0.3, and 0.6, respectively.

Source: Ahluwalia and Chenery 1974:42.i.