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THE DEVELOPMENT GAP AND THE MEASUREMENT OF POVERTY

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Introduction

This chapter focuses on three major topics: first, the development gap in the world economy and the measurement of the world distribution of income; second, the measurement of global poverty and the problems associated with the use of per capita income as a measure of development; and third, the construction of alternative measures of economic and social development, including the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI) developed by the Oxford Poverty and Human Development Initiative, and both published in the *Human Development Report* of the United Nations Development Programme (UNDP).

To measure the development gap, and the degree of income inequality across countries of the world, we consider:

- the absolute gap between the richest and poorest country (the range)
- the relative gap between the richest and poorest countries
- the dispersion of income per capita around the average level of per capita income for all countries
- the Gini ratio, which is derived from the Lorenz curve of the income distribution.

Using the Gini ratio, we distinguish between **international inequality**, which takes each country's per capita income as just one observation (regardless of the distribution of income within countries) and **global inequality**, which takes account not only of the distribution of income between countries but also within countries (using household survey data). We show that international and global inequality have both risen since the beginning of the nineteenth century, but the major cause of global inequality today is inequality between nations, not inequality within nations.

It is important to recognize, however, that when measuring income inequality and poverty, the measures of income per head in US$ at official exchange rates are not necessarily a good measure of the purchasing power of local currencies (or what is called **purchasing power parity**, **PPP**), because official exchange rates do not take account of the much cheaper price of non-traded goods in poor countries relative to richer countries. We show how PPP is measured, and discuss in general the comparability of per capita incomes between countries, and the use of per capita income as an index of development.

Turning to the measurement of poverty, we discuss the World Bank's criterion of absolute poverty, which is $1.90 a day at PPP, and give the **headcount index** of the numbers living below this level of income across different regions of the world. The concept of the **poverty gap** is also discussed, because the headcount index does not take account of how far below the poverty line people live. Another method of measuring poverty is the **food energy method**, which measures the income necessary to buy a certain nutritional intake in different countries.

The World Bank claims that it puts poverty reduction at the heart of all the work that it does, and in its *World Development Report 2000/2001* (World Bank, 2000a), it proposed a three-pronged strategy for poverty reduction: promoting opportunity, facilitating empowerment and enhancing security. The meaning of these concepts is discussed in this chapter. Growth is, of course, central to poverty reduction, but how fast the poverty rate falls with growth (to meet the Sustainable Development Goal, for example) depends on the elasticity of the poverty rate with respect to growth.

To overcome the limitations of taking a single measure of per capita income as an index of development, the UNDP annually constructs a Human Development Index (HDI) and also publishes a Multidimensional Poverty Index (MPI). The HDI is based on three variables: life expectancy at birth, educational attainment (measured as the geometric mean of the average and expected years of schooling), and the standard of living measured at PPP. The MPI is also based on three dimensions of poverty: education, health, and standard of living, but with several sub-dimensions

of poverty as well. The rankings of countries by their level of per capita income are not the same as the rankings of countries by the HDI or MPI indices, because some countries devote more resources to social expenditure than others, particularly on education and health.

Finally, we consider the question of whether poor countries are ever likely to catch up with the rich, and we reach the pessimistic conclusion that it will take the average poor country at least 100 years to achieve the current living standards in developed countries and probably 300 years for poor countries to equalize living standards with developed countries if they manage to grow, say, 1% faster than the rich countries. But this, of course, cannot be taken for granted.

The development gap and income distribution in the world economy

By any measure one cares to take, the evidence is unequivocal that the world's income is distributed extremely unequally between nations and people. There are many ways of classifying these divisions in the world economy. First, at a very basic level, there is the division between rich industrialized countries, mainly concentrated in the northern hemisphere, and poorer non-industrialized (or semi-industrialized) countries in the southern hemisphere – often referred to in the development literature as the 'North–South divide'.

Second, there is the division between continents: between the developed continents of Europe and North America on the one hand, and the continents of Asia, Africa and Latin America on the other. But the countries of Asia, Africa and Latin America are by no means homogeneous. They have many characteristics, and obstacles to development, in common, but there is also much that divides them, not least their economic performance since the 1960s, with Southeast Asia, China and India forging ahead, Africa left behind, and Latin America in the middle (often prone to financial crises).

Third, the World Bank, which was established by the Bretton Woods Agreement in 1944 as a development agency to lend to poor countries, classifies countries in its annual *World Development Report* into three broad categories: low-income, middle-income and high-income countries, with the middle-income countries split into lower middle-income and upper middle-income.

Table 2.1 lists the low-income and lower middle-income countries, and these are the countries normally thought of as developing countries. There are 36 low-income countries mainly concentrated in Africa, and 48 lower middle-income countries spread across the different continents. Table 2.2 gives the population and average level of per capita income in current dollars measured at the official exchange rate, and at PPP for 2014. We see that for low-income countries with a population of 622 million, the average level of income per head is only $629 at current dollars and $1,570 at PPP (or roughly $5 a day). For lower middle-income countries, with a population of nearly 3 billion, the average level of per capita income is $2,012 at current dollars and $6,000 at PPP (or roughly $16 a day). Compare these figures with an average income per head in high-income countries of roughly $40,000 (or just over $100 day). The discrepancies are huge. The richest country in the world is currently Norway, with an income per head of $66,330 at PPP, and the poorest countries are Democratic Republic of the Congo, with an income per head of $650, and Burundi with $770.

Measures of inequality and historical trends

1. One measure of dispersion is **the range** or **absolute income gap** between the richest and poorest countries. This gap is almost bound to grow over time if both the rich and poorest countries

Table 2.1   List of low-income and lower middle-income countries

Low-income countries		
Afghanistan	Gambia, The	Myanmar
Bangladesh	Guinea	Nepal
Benin	Guinea-Bissau	Niger
Burkina Faso	Haiti	Rwanda
Burundi	Kenya	Sierra Leone
Cambodia	Korea, Dem. Rep.	Somalia
Central African Republic	Kyrgyz Republic	South Sudan
Chad	Liberia	Tajikistan
Comoros	Madagascar	Tanzania
Congo, Dem. Rep.	Malawi	Togo
Eritrea	Mali	Uganda
Ethiopia	Mozambique	Zimbabwe
Lower middle-income countries		
Armenia	India	Samoa
Bhutan	Kiribati	São Tomé and Príncipe
Bolivia	Kosovo	Senegal
Cameroon	Lao PDR	Solomon Islands
Cape Verde	Lesotho	Sri Lanka
Congo, Rep.	Mauritania	Sudan
Cote d'Ivoire	Micronesia, Fed. Sts.	Swaziland
Djibouti	Moldova	Syrian Arab Republic
Egypt, Arab Rep.	Mongolia	Timor-Leste
El Salvador	Morocco	Ukraine
Georgia	Nigeria	Vanuatu
Guatemala	Pakistan	Vietnam
Guyana	Papua New Guinea	West Bank and Gaza
Honduras	Paraguay	Yemen, Rep.
Indonesia	Philippines	Zambia

Source: World Bank, website.

experience positive growth. For example, if the richest country, Norway, grows at 1%, this adds roughly $700 to the level of per capita income in Norway, while the same growth rate adds only $6–$7 dollars to the per capita incomes of the Democratic Republic of the Congo or Burundi. These countries would have to grow at 700% for the absolute gap between themselves and Norway to be narrowed. But even the gap between the richest and poorest country is an understatement of the degree of income inequality in the world economy because it compares only the *average* income for poor and rich countries. If the income per head of the poorest people in poor countries is compared with the income per head of the richest people in rich countries, the absolute gap is even wider.

2. A second measure of dispersion, or division in the world economy, is the **relative income gap**, which is the ratio of the richest country (or group of countries) to the poorest country (or

Table 2.2   Population and income per capita, 2014

	Population, millions	Gross national income per capita, $	PPP gross national income per capita, $
World	7,261	10,787	14,931
Low income	622	629	1,570
Middle income	5,240	4,666	9,673
Lower middle income	2,879	2,012	6,000
Upper middle income	2,361	7,901	14,179
Low and middle income	5,862	4,238	8,811
East Asia and Pacific	2,021	6,156	11,872
Europe and Central Asia	264	6,892	13,580
Latin America and Caribbean	525	8,990	14,053
Middle East and North Africa	357	4.222	11.834
South Asia	1,721	1,496	5,299
Sub-Saharan Africa	973	1,638	3,382
High income	1,399	38,274	40,749

Source: World Bank, 2015.

group of countries). At present, the ratio of income per head of the richest to the poorest country is approximately 700:1, and the ratio of income per head in the low-income countries to the high-income countries is approximately 60:1 at current exchange rates. This relative income gap is unprecedented historically. A necessary condition for the relative income gap to narrow is that the poorest countries grow faster than the richest.

3. A well-known statistical measure of dispersion is the **standard deviation (SD)**, or the square root of the variance, which measures the average sum of the squared deviations of each country's per capita income from the average (or mean) income for all countries. Formally, the SD is measured as:

$$SD = \sqrt{\frac{\sum_{i=1}^{n}(Y_i - \overline{Y})^2}{n}}$$

where Y_i is the per capita income of country i; $\overline{Y}$ is the average level of per capita income of the whole sample, and n is the number of countries. In the growth and development literature, movements in this ratio, up or down, are referred to as 'sigma (σ) divergence or convergence', respectively.

4. There is the **coefficient of variation**, which is the SD divided by the mean of the sample ($\overline{Y}$). This normalizes the SD because there is a positive correlation between the mean and the SD.

5. But the most widely used measure of income inequality is the so-called **Gini ratio**, derived from the **Lorenz curve**, which in this field of enquiry relates to the distribution of income in relation to the distribution of population across countries or groups of countries. Three

measures or concepts of inequality need to be clearly distinguished in using the Gini ratio. First, there is **international inequality**, with each country treated as a single unit and given equal weight in the measure. Second, there is weighted international inequality, with each country treated as a single unit but **weighted by its size of population**. Third, there is **world** or **global inequality**, which takes the individual person (or household), not the country, as the unit of measurement, and therefore takes into account not only differences in income *between* countries, but also between people *within* countries. Each measure has its own purpose, and there is no theoretical reason why the measures should move together (although, in practice, they tend to, taking a long historical perspective).

Before describing how the Lorenz curve is constructed and the Gini ratio is measured, however, it needs to be said in advance that a single statistic does not say what is happening *within* the distribution, and, in particular, what is happening at the extremes of the distribution. Ratios of extremes, such as the income of the poorest 10% of the world's population compared with the richest 10% (often called the **Kuznets ratio**), or income of the poorest countries compared with the richest, can say as much, if not more, about income inequality and social justice than any integral measure. In fact, the Gini ratio may indicate convergence or less inequality, while the ratio of extremes is increasing. For discussion of the conceptual problems relating to analysis of the world distribution of income, see Atkinson and Brandolini (2010).

Consider now Figure 2.1. On the vertical axis is measured the percentage of income, and on the horizontal axis is measured the percentage of population. To draw the distribution of income (the Lorenz curve) first rank each country, groups of countries, or groups of individuals in ascending order according to the ratio of the percentage of income they receive and the percentage of population they represent; then cumulate the observations, and plot them on the diagram. To give a

Figure 2.1 Lorenz curve diagram
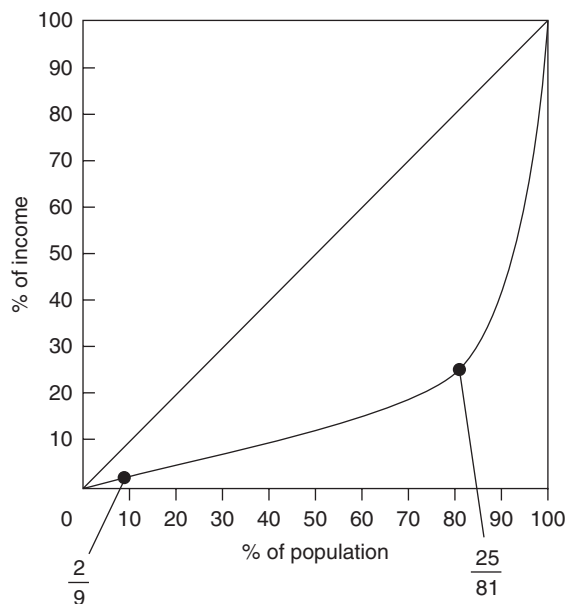
simple example, suppose we take the World Bank's division of countries into low, middle and high income, and that low-income countries contain 9% of the world's population and receive only 2% of world income, middle-income countries contain 72% of the world's population and receive 23% of world income, and rich countries contain 19% of the world's population and receive 75% of world income. The cumulative distribution of income in relation to population would then be 2/9, then 25/81 (when middle-income country figures are added), and finally 100/100 when the rich countries are added.

These points are plotted in Figure 2.1 and the curve joining them is the Lorenz curve. The diagonal 45^0 line on the diagram shows an equal distribution of income. The position of the Lorenz curve in relation to the 45^0 line therefore gives a visual impression of the degree of inequality. The closer the Lorenz curve, the more equal the distribution, and the more 'bowed' the curve, the more unequal the distribution.

The Gini ratio is calculated as the area between the Lorenz curve and the $45°$ line divided by the area of the triangle it lies within. If the Lorenz curve is coincident with the $45°$ line, the Gini coefficient would be zero – complete equality. If one person received all the world's income, the Lorenz curve would follow the horizontal and vertical axes and the Gini coefficient would be one. When we examine international and global inequality, what we find is that through time, at least since the early 1900s, the Lorenz curve has been shifting outwards, and the Gini ratio has been rising, although according to some investigators, it may recently have levelled off, albeit at a high level. A central estimate for the current level of international inequality would be a Gini ratio of 0.54, and for global inequality a Gini ratio of 0.67. But, as we shall come to see, estimates vary depending on factors such as the sample of countries taken, how income is measured – whether by per capita income or household income – and whether income is measured at official exchange rates or at PPP rates.

There have been many recent studies measuring and summarizing what has been happening to international and global inequality historically (e.g. Milanovic, 2005, 2016; Bourguignon and Morrisson, 2002), and particularly since the 1950s (e.g. Norwegian Institute of Economic Affairs, 2000; Sala-í-Martin, 2002; Maddison, 2003; Ghose, 2004; Wade, 2004; Sutcliffe, 2004; Svedberg, 2004; Milanovic, 2005, 2016). What does the evidence show? We distinguish between international inequality (unweighted and weighted by population) and global (or world) inequality.

International inequality (unweighted and population weighted)

The unweighted Gini ratio of international inequality takes each country as one unit, regardless of population size, and assumes that each person within the country has the same average income. The distribution of income within the country is not considered. It is countries that are the focus, not people. The ratio is basically, therefore, a measure of whether or not countries are converging with each other, not whether the distribution of income across individuals in the world is becoming more or less equal. What does the evidence show? Using the best historical data available (Maddison, 2001; Bourguignon and Morrison, 2002) for 26 countries covering nearly 80% of the world's population, the Gini ratio in 1820 was approximately 0.2. This is very low by current standards. Two hundred years ago, international differences in income per head were not great. Maddison (2003) and Easterlin (2000) show that the ratio of

per capita income of the richest to the poorest country in 1820 was only 3:1, compared with nearly 700:1 today.

Table 2.3 shows the evolution of the unweighted Gini ratio through time, rising consistently to 0.54 in 2013 – a more than doubling of income inequality in the space of nearly 200 years. Some of the increase may be spurious due to the larger sample of countries used to calculate the ratio, but Milanovic (2005, 2016) shows that for the same 26 countries as used for the 1820 calculations, the Gini ratio still rises to just over 0.5 in 2000. For the period since the Second World War, the Gini ratio shows an increase for a consistent set of over 100 countries from 0.45 in 1952 to a peak of 0.58 in 2002. Since then, it has been falling slightly due to the fast growth of China and India, and some African countries because of the rise in commodity prices (Bourguignon, 2015).

Turning now to the population-weighted measure of international inequality, Table 2.3 tells a slightly different story. It shows the Gini ratio peaking at 0.6 in 1988 and falling consistently to 0.47 in 2013. This implies that poor countries with large populations must have been growing faster on average than richer countries with smaller populations. In the 1950s and 1960s, this was due to the fast growth of some of the big Latin American countries, such as Brazil and Mexico, and Japan and South Korea, all using trade protection of one form or another. In the 1990s and 2000s, the decline in the weighted Gini ratio has been largely due to the rapid growth of a small number of poor populous Asian countries, especially India and China. Ghose (2004), in his study of 96 countries over the period 1981 to 1997, finds that the weighted Gini ratio fell by 0.7% per annum,

Table 2.3   A comparison of Gini ratios

	International inequality		Global (or world) inequality		
Year	**Unweighted**	**Population weighted**	**Milanovic (2005, 2016)**	**Bourguignon and Morrisson (2002)**	**Sala-í-Martin (2002)**
1820	0.20	0.12		0.50	
1870	0.29	0.26		0.56	
1890	0.31	0.30		0.59	
1913	0.37	0.37		0.61	
1929	0.35	0.40		0.62	
1938	0.35	0.40			
1952	0.45	0.57		0.64	
1960	0.46	0.55		0.64	
1978	0.47	0.54		0.66	0.66 (1970)
1988	0.53	0.60	0.68		0.65
1993	0.56	0.59	0.70	0.66 (1992)	0.64
1998	0.56	0.57	0.69		0.63
2002	0.58	0.56	0.71		0.63 (2000)
2005	0.57	0.54	0.70		
2008	0.55	0.51	0.69		
2011	0.54	0.48	0.67		
2013	0.54	0.47			

Sources: Adapted from Milanovic, 2005, Table 11.1; Milanovic, 2016.

but only 17 of the 76 developing countries in the sample converged on the per capita income of the 20 developed countries. The majority of poor developing countries diverged. Despite the fall in the ratio since 1988, it is still high and much higher than the estimate of 0.12 in 1820. In other words, for a large part of the past two centuries, the world's poorest and most populous countries have fared badly compared with the smaller, rich countries of the world. China and India are now reversing the trend, but for how long remains to be seen.

Global (or world) inequality

The Gini ratio of global (or world) inequality takes into account not only differences in average per capita income between countries, but also differences in income per capita within countries. Because internal income distributions are never equal, the measure of global inequality is bound to be higher than the unweighted measure of international inequality. It also means that changes in the global distribution of income are an amalgam of forces, including what is happening to the distribution of income between countries, what is happening to population growth in rich and poor countries, and what is happening to the distribution of income within countries. What does the evidence show? As far as the historical record is concerned, Bourguignon and Morrisson (2002) have tried to measure inequality among world citizens back to 1820 using a sample of 33 countries (or groups of countries) and measuring domestic income inequality by taking decile income shares (with the top decile of income earners divided into two). The results are shown in Table 2.3 above. It can be seen that the global Gini ratio in 1820 was already 0.5, more than double the level of international inequality, implying that domestic inequality was as great, if not greater, than international inequality. Through time, global inequality has increased, but because of rising international inequality, not because of even greater inequality within countries. On the contrary, domestic income inequality, at least until recently, has shown a decrease historically, particularly in the richer countries of the world. Bourguignon and Morrisson calculate that within-country inequality accounted for 80% of global inequality in the first half of the nineteenth century, when most countries were more or less at the same income level, but by 1950, within-country inequality accounted for 40% of global inequality because of the increase in inequality between countries. Today, the contribution is about 20%. The Gini ratio of global inequality seems to have peaked in the early 2000s at 0.71 and has since declined (Bourguignon, 2015). But conflicting forces are at work. Population-weighted international inequality is falling because of the fast growth of India and China, but income distribution within some countries is widening, such as between the urban and rural sectors of China and India and in some developed countries such as the USA and countries of Europe. If the income distribution within countries was falling, the global Gini ratio would evidence a greater fall.

Sala-í-Martin (2002) covers the period 1970–98, taking the income distribution of 125 countries and aggregating them. Despite the much larger sample, the calculated global Gini ratios are remarkably similar to those of Bourguignon and Morrisson. The estimate for 1970 is 0.66, gradually falling to 0.63 in 2000 (see Table 2.3). The explanation for the slight fall is that the lower 'tail' of the aggregated income distribution has shifted rightwards more dramatically than the upper 'tail', largely due to developments in China and India. Fast growth in these two countries has lifted millions of people above the poverty line, and has reduced the relative income gap with richer countries, and this has been enough to just offset the worsening income distribution within China and India, as mentioned earlier. Still, we have evidence again of global inequality on a vast scale.

Milanovic (2005, 2016) has also undertaken the Herculean task of bringing together 300 household sample surveys of income and expenditure for over 100 countries for selected years from 1988 to 2011, covering 80–90% of the world's population. The calculated global Gini ratio

using household income or expenditure measured at PPP is 0.68 in 1988 and 0.67 in 2011 (see Table 2.3). These estimates are remarkably similar to those of Sala-í-Martin, despite the difference in samples and the measure of income. Bourguignon (2015) gives a figure of 0.691 for 2010. These results are confirmed by Edward (2006) using national consumption distributions and collating them into a global distribution measured at PPP in US$ for 1993 and 2001. The global Gini ratio is estimated at 0.610 for 1993 and 0.614 for 2001. Just over 80% of this inequality is the result of between-country differences.

All the evidence and studies show a massive degree of inequality in the world distribution of income, which shows some recent improvement but may not last if growth in China and India slows and the income distribution within countries gets worse. This development gap naturally extends into other aspects of human welfare such as health, nutrition, life expectancy, education, employment opportunities and so on, as we shall come to see later in this chapter and in Chapters 3 and 7. The UNDP (1997) has described the world as 'gargantuan in its excesses and grotesque in its human and economic inequalities'. This is, of course, a normative statement, but economists should not be afraid of making normative statements, as Basu (2006) does when he argues that:

> the hiatus between the richest and the poorest people is too large, and the extent of poverty on earth is unacceptable. I like to believe that there will come a time when, looking back at today's world, human beings will wonder how primitive we were that we tolerated this.

Many other statistics can be given to illustrate the grotesque inequalities that exist. The richest 1% of people in the world receive as much income as the bottom 60%. Or, to put it another way, the 60 million richest people receive as much income as 2.7 billion poor. The total income of the richest 25 million Americans is equal to the total income of 2 billion of the world's poorest people. The assets of the world's 400 billionaires (mostly in rich countries) exceed the total amount of income of nearly one-half of the world's total population.

The most evocative graph comes from Wade (2001), who divides the world's population up into equal 20% shares (quintiles) from poorest to richest, and then shows the percentage of income that each share receives. Interestingly, and ironically, the picture resembles a champagne glass with a very narrow stem in the hands of the poor and a wide open bowl (containing the champagne) in the hands of the rich (Figure 2.2).

Below we discuss some technical problems concerning the measurement and comparability of per capita income across countries, and the measurement of poverty itself.

Figure 2.2   Distribution of world income (percentage of total, with quintiles of population ranked by income)
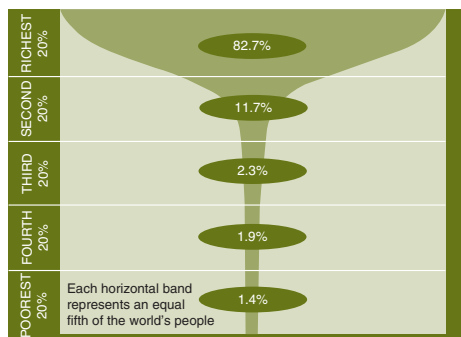
Source: Wade, 2001, based on Figure 3.2 in UNDP, 1992.

The measurement and comparability of per capita income

When using per capita income (PCY) figures to measure poverty, to classify countries into rich and poor, and to compare the rate of development in different countries over time, the difficulties of measuring real per capita income and real living standards between countries must be continually borne in mind. There are two issues to discuss. The first concerns the problems associated with national income accounting, particularly in developing countries. The second is the need to convert each country's per capita income in its own *domestic* currency into a common unit of account (e.g. the US$) so as to be able to make meaningful international comparisons of living standards. This leads to the topic of **purchasing power parity (PPP) estimates of PCY.**

Turning first to national income accounting, the first point to bear in mind is that only goods that are produced and sold at a price in the market are included in the value of national income, measured by either the output or the expenditure method. Much output in developing countries never reaches the market, particularly in the rural sector where production is for subsistence purposes. If no allowance is made for the subsistence sector, this will bias downwards the calculation of national income, and therefore PCY. This point also implies that growth rates will tend to have an upward bias as a result of the extension of the money economy and the shift of economic activities from the household and subsistence sector to the marketplace. Part of the growth in developing countries may be a statistical illusion arising from the changing balance between the informal subsistence sector and the modern exchange sector.

Second, there is the sheer practical difficulty of measuring money national income in a rural economy where communications are bad, illiteracy is rife, and accounting procedures are rudimentary. Differences in the extent of the subsistence economy between developing countries, and differences in the ease and difficulty of collecting data, may markedly influence estimates of national income, and therefore of per capita income differences, between these countries and the rest of the world. Attempts are made in developing countries to make some allowance for production that never reaches the marketplace, but the estimates are likely to be subject to a wide margin of error.

Some testimony to the role that the subsistence sector must play in the economies of most developing countries is provided by the inconceivability that 10% of the world's population could remain alive on less than $1,000 per annum. But this is not the whole story.

Purchasing power parity (PPP)

The other part of the story, and probably the major part, concerns the understatement of living standards in developing countries when their national incomes measured in local currencies are converted into US$ (as the common unit of account) at the official rate of exchange. If the US$ is used as the unit of account, the national per capita income of country X in US$ is given by:

$$\frac{GNP_X}{Population} \div \text{Exchange rate}$$

For example, if the GNP of country X is 100 billion rupees, its population is 5 million, and there are 10 rupees to the dollar, then the per capita income of country X in dollars is:

$$\frac{100 \text{ billion}}{5 \text{ million}} \div 10 = \$2,000$$

But if the living standards of the two countries are to be compared by this method, it must be assumed that 10 rupees in country X buys the same living standard as $1 in the USA. It is well known, however, that official exchange rates between two countries' currencies are not good measures of the PPP between countries, especially between countries at different levels of development. The reason is that exchange rates are largely determined by the supply of and demand for currencies based on goods and assets that are traded (the prices of which tend to be equalized internationally) but living standards depend also on the prices of **non-traded goods**, which are largely determined by unit labour costs, and these tend to be lower the poorer the country. As a general rule, it can be said that the lower the level of development and the poorer the country, the lower the price of non-traded goods relative to traded goods and the more the use of the official exchange rate will *understate* the living standards of the developing country measured in US$.

Let us give a simple example. The motor car is an internationally traded good. Suppose that the dollar price of a particular model of car is $10,000 and there are 10 rupees to the dollar. Ignoring transport costs, tariffs and so on, the price of the car in India will be $10,000 $\times$ 10 $=$ 100,000 rupees, otherwise a profit will be made by dealers buying in the cheapest market and selling in the most expensive. The forces of demand and supply (and arbitrage) will equalize the price of traded goods. But let us now consider a non-traded good such as a haircut. Suppose a haircut in the USA costs $10. At the official exchange rate of 10 rupees to the dollar, a haircut in India should be 100 rupees. But suppose that, in fact, it is only 25 rupees. This would mean that as far as haircuts are concerned, the value of the rupee is underestimated by a factor of four. The PPP rate of exchange for haircuts alone is $10 $\div$ 25 rupees, or $1 $=$ 2.5 rupees. If the national income of country X measured in rupees was divided by 2.5 instead of 10, the national income of country X in dollars, and therefore PCY in dollars, would now be four times higher: $8,000 per head instead of $2,000 per head, as in the example above.

As development proceeds, the ratio of the price of non-traded goods to traded goods tends to rise as wage levels in the non-traded goods sector rise but productivity growth is slow – slower than in the traded goods sector. **To make meaningful international comparisons of income and living standards, therefore, what is required is a measure of PPP, or a real exchange rate, between countries.**

There are several methods of constructing PPP ratios in order to make binary comparisons (one country with another) or 'multilateral' comparisons, in which the currency of any one of a group of countries can act as the unit of account without altering the ratios of living standards between countries.

The most common way of constructing a PPP ratio between two countries (say, India and the USA) is to take a representative, comparable basket of goods and services in both countries, and then take the weighted average of prices, where the weights (w_i) reflect the proportion of expenditure on each good in total expenditure. The PPP rate of exchange between India and the USA is therefore:

$$PPP = \frac{w_{il}P_{il}}{w_{iUS}P_{iUS}},$$

where P_{il} is the price of the good in India and P_{iUS} is the price of the good in the USA.

The difference between estimates of PCY at the official exchange rate and PPP estimates of PCY for, say, the low-income countries, can be seen in Table 2.2 (p. 30). The difference is quite large. At the official exchange rate, the level of PCY is only $629 per annum, but at PPP it is $1,570, or more than double. In other words, in low-income countries, a person's income would be able

to buy more than *twice* the goods and services that the official exchange rate would suggest. Notice that in high-income countries, there is hardly any difference between the two estimates because wage costs per unit of output in the non-traded goods sector match those of the traded goods sector.

Per capita income as an index of development

Now let us turn to the question of the use of per capita income figures as an index of development and for making a distinction between developed and developing countries, as well as between rich and poor. While there may be an association between poverty and underdevelopment and riches and development, there are a number of reasons why some care must be taken when using per capita income figures alone as a measure or indicator of development (unless underdevelopment is *defined* as poverty and development as riches). Apart from the difficulty of measuring income in many countries and the difficulty of making intercountry comparisons, using a single per capita income figure to separate developed from developing countries is inevitably somewhat arbitrary, because it ignores such factors as the distribution of income within countries, differences in development potential and other physical indicators of the quality of life. It is not so much a question of whether or not low-income countries should be labelled 'underdeveloped' or 'developing', but what income level should be used as the criterion for separating the developed from the developing countries, and whether all high-income countries should necessarily be labelled 'developed'. In many ways, it should be the *nature* and *characteristics* of the countries that determine which income level should be used as the dividing line. It also makes sense to categorize separately the oil-rich countries, which have high per capita incomes but cannot be regarded as developed by the criteria discussed in Chapter 1.

Acronyms abound to describe the different stages of development. Perhaps the most amusing set is attributable to the Brazilian economist Roberto Campos, who distinguishes five categories of countries: the HICs, PICs, NICs, MICs and DICs. These stand for hardly industrialized countries, partly industrialized countries, newly industrialized countries, mature industrialized countries and decadent industrialized countries. The HICs and the PICs would certainly cover all the low-income countries and at least the lower half of the middle-income countries. The NICs cover most of the upper half of the middle-income countries – Brazil, Mexico, Hong Kong and Singapore being prime examples. The MICs and DICs cover most of those countries classified as 'industrial market economies', with the exception of New Zealand and Australia, which have become rich through agriculture.

But bearing in mind the arbitrariness of per capita income, it is still very convenient to have a readily available and easily understandable criterion for classifying countries, and perhaps per capita income is the best single index we have. It also has one positive advantage, namely that it focuses on the raison d'être of development: raising living standards and eradicating poverty. And, in the last resort, per capita income is not a bad proxy for the social and economic structure of most societies. If developing countries are defined on the basis of a per capita income level so as to include most of the countries of Asia, Africa and Latin America, striking similarities are found between the characteristics and development obstacles of many of the countries in these continents. These include:

- A high proportion of the labour force engaged in agriculture with low productivity.
- A high proportion of domestic expenditure on food and necessities.

- An export trade dominated by primary products and an import trade dominated by manufactured goods.
- A low level of technology and poor human capital.
- A high birth rate coupled with a falling death rate.
- Savings undertaken by a small percentage of the population.

There are, of course, some countries that on a per capita income basis are classified as developed and possess many of the above-mentioned characteristics (e.g. some oil-producing countries), but the exceptions are few, and the reverse of this situation would be unusual. Also, these countries have many social problems in common, such as growing unemployment in urban areas, inegalitarian income distributions, and poor health and standards of education – about which we shall say more later.

In general, therefore, it can be said that per capita income may be used as a starting point for classifying *levels* of development, and can certainly be used to identify the *need* for development. The only major reservation that we shall have to consider later concerns the case of geographically dual economies, where an aggregate per capita income figure can disguise as great a need for the development of a sizeable region within the country as the need for the development of the country itself.

There is a difference, however, between using per capita income as a guideline for classifying countries into developed or underdeveloped at a point *in time* and using the growth of per capita income as an index of development *over time*. The difficulty of using per capita income for the latter purpose is the obvious one that if, in a particular period, per capita income did not grow because population growth matched the growth of a country's total income, one would be forced into the odd position of denying that a country had developed even though its national product had increased. This is an inherent weakness of linking the concept of development to a measure of living standards.

This leads on to the distinction between **growth** and **development**. Development without growth is hardly conceivable, but growth is possible without development. The upswing of the trade cycle is the most obvious example of the possibility of growth without development; and examples of abortive 'take-offs' are not hard to find where countries have grown rapidly for a short time and then reverted to relative stagnation. Historically, Argentina is a case in point. On the other hand, development is hardly possible without growth; but development is possible, as we have suggested, without a rise in per capita income. It would be a strange, rather purposeless type of development, however, that left per capita income unchanged, unless the stationary per capita income was only temporary and a strong foundation was being laid for progress in the future. The ultimate rationale of development must be to improve living standards and welfare, and while an increase in measured per capita income may not be a sufficient condition for an increase in individual welfare, it is a necessary condition in the absence of a radical redistribution of income and the provision of basic needs to the poor.

Measuring poverty

The World Bank defines poverty as the inability of people to attain a minimum standard of living. The World Bank's 1990 and 2000/2001 *World Development Reports* were devoted to a consideration of the measurement, magnitude and nature of poverty in developing countries, and how to tackle it. This definition gives rise to three questions. How do we measure the standard of living?

What is meant by a *minimum* standard of living? How can we express the overall extent of poverty in a single measure?

The most obvious measure of living standards is an individual's (or household's) real income or expenditure (with an allowance made for output produced for own consumption). The same level of real income and expenditure in different countries, however, may be associated with different levels of nutrition, life expectancy, infant mortality, schooling and so on, which must be considered as an integral part of 'the standard of living'. Measures of living standards based on per capita income, therefore, may need to be supplemented by further measures that include these other variables. Later in this chapter, we discuss the attempt by the UNDP to construct a Human Development Index, and the Oxford Poverty and Human Development Initiative to construct a Multidimensional Poverty Index, which take some of these factors into account.

To separate the poor from the not so poor, an arbitrary per capita income figure has to be taken that is sufficient to provide a minimum acceptable level of consumption. There are two main ways of setting a consumption poverty line in order to measure poverty and make comparison across countries: the **PPP method** and the **food energy method**. As we have seen above, a country's PPP is defined as the number of units of the country's currency required to buy the same amount of goods and services in the domestic market as a dollar in the USA. The World Bank publishes the PPP levels of per capita income for all countries and regions of the world (see Table 2.2 on p. 30). For the measurement of poverty, to give an example, the PPP poverty line could be set at, say, $60 per month or $720 per annum. By definition, people on this PPP poverty line in any country have the purchasing power to obtain the same level of consumption of any person on the poverty line in any other country. But the composition of the consumption bundle is very likely to differ. The PPP poverty line is not explicitly linked to nutritional intakes derived from different consumption bundles, so there are likely to be intercountry differences in nutrition on the PPP poverty line.

The **food energy method** of setting a consumption poverty line is one way of dealing with this problem by defining a minimum internationally agreed calorie intake line, and converting consumption bundles into calorie intakes using the nutritional values of consumption goods (with non-food goods having a zero value). The problem here, however, is that consumers in different countries may choose different combinations of food and other goods, which then require different incomes to meet nutritional requirements. Indeed, the nature of the society and the stage of development reached may *require* different combinations. What are regarded as optional extras in some countries may be necessities in others. The UN's Food and Agriculture Organization defines undernourishment as 'food intake that is continuously insufficient to meet dietary energy requirements'.

A consumption-based poverty line can therefore be thought of as comprising two elements: an objective measure of the expenditure necessary to buy a minimum level of nutrition; and a subjective additional amount that varies from country to country, reflecting the cost to individuals of participating in the everyday life of society.

All this is in theory. In practice, to measure the extent of extreme poverty in the world, the World Bank takes $1.90 a day at PPP at 2011 prices as the cut-off point. This used to be $1.25 a day at 1995 prices (and before that at approximately $1 a day), but the revised poverty line was introduced in 2014 to reflect the rising cost of basic food, clothing and shelter. The real value of $1.90 a day at 2011 prices is the same as $1.25 a day at 2005 prices.

Given the poverty line, the simplest way to measure the amount of poverty is by the **headcount index**, which simply adds up the number of people who fall below the poverty line, which can also be expressed as a proportion of the total population, giving the **poverty rate**. In 2012, there were just under 900 million, or nearly 13% of humanity, living in extreme poverty. The numbers in poverty and the poverty rates for different areas of the world are shown in Table 2.4. Sub-Saharan

Africa has by far the highest incidence of extreme poverty, with 43% of the population living on less than $1.90 a day – a staggering figure. Students reading this book might like to try the experiment of living on such a meagre sum, and see how they fare.

Paul Collier (2007) once called those living on less than $1 a day **the bottom billion**. On the new estimates of absolute poverty, the 'bottom billion' have become the 'bottom 900 million' caught in the four 'poverty traps' he identifies: the conflict trap (civil wars); the natural resources trap (the curse of natural resources – see Chapter 3); the trap of being landlocked with bad neighbours; and the trap of bad governance in a small country.

One weakness of the headcount index, however, is that it ignores the *extent* to which the poor fall *below* the poverty line, so that comparisons between countries, or over time, using only the headcount index or the poverty rate, do not tell the full story. To overcome this weakness, the concept of the **poverty gap** is used and measured. This measures the proportionate gap between the average level of income below the poverty line and the poverty line itself. For example, if the poverty line is $1.90 a day and the average income for the poor below the poverty line is $1.50 a day, then the poverty gap is ($1.90 − $1.50)/$1.90 = 0.21 or 21%. The poverty gap for different regions of the world is shown in Table 2.5. It can be seen that the poverty gap is by far the highest in sub-Saharan Africa at 16.47%.

Table 2.4   Absolute poverty and poverty rates, 1990 and 2012

Global and regional poverty at the poverty line of $1.90 per day (at 2011 PPP)				
Region	**Number of poor in millions**		**Poverty rate, % of population**	
	1990	**2012**	**1990**	**2012**
East Asia and Pacific	996	147	60.6	7.2
Europe and Central Asia	9	10	1.9	2.1
Latin America and the Caribbean	78	34	17.8	5.6
Middle East and North Africa	14		6.0	
South Asia	575	309	50.6	18.8
Sub-Saharan Africa	288	389	56.8	42.7
World	1,959	897	37.1	12.7

Source: World Bank, 2015.

Table 2.5   Poverty gap at $1.90 a day (2011 PPP) (%)

	2012
East Asia and Pacific (developing only)	1.47
Europe and Central Asia (developing only)	0.58
Latin America and Caribbean (developing only)	2.64
Low income	18.6
Lower middle income	4,69
Low and middle income	4.35
Middle East and North Africa (developing)	
Sub-Saharan Africa (developing only)	16.47

Source: World Bank, 2015.

The difference for every individual could also be summed and expressed as a proportion of total GDP. This would give the proportion of total income that would have to be redistributed to raise everyone above the poverty line.

The focus of the World Bank is now very much on poverty eradication. When Robert McNamara was president of the World Bank in the 1970s, he defined absolute poverty as 'a condition of life so degraded by disease, illiteracy, and malnutrition and squalor, as to deny its victims basic human necessities – [a condition] so limited as to prevent the realisation of the potential of the genes with which one was born'. In May 1992, Lewis Preston, the then president of the World Bank, declared that poverty reduction will be 'the benchmark by which our performance as a development institution will be measured'. And in the *World Development Report 2000/2001*, James Wolfensohn, the then president, wrote: 'Poverty amidst plenty is the world's greatest challenge. We at the Bank have made it our mission to fight poverty with passion and professionalism, putting it at the centre of all the work that we do' (World Bank, 2000a). Jim Yong Kim, the current president, has said: 'I want to eradicate poverty. I think there is a tremendous passion for that in the World Bank.' As Collier (2007) writes: 'an impoverished ghetto of 1 billion people [is] increasingly impossible for a comfortable world to tolerate'.

Meeting the Sustainable Development Goal of poverty reduction

To meet the Sustainable Development Goal of reducing extreme poverty to 1% of the world's population by 2030 will require high sustained growth in the poorest countries. To calculate the growth required to go from the 2015 poverty rate to 1%, the elasticity of the poverty rate with respect to the growth of per capita income needs to be determined. As a rough guide, it is estimated by the World Bank (see Ravallion, 2013) that every 1% increase in per capita income leads to a 1.7% reduction in the poverty rate. This calculation, however, also depends on the distribution of income within countries. More equal countries cut poverty further and faster than unequal ones. In the most unequal countries, a 1% increase in income cuts the poverty rate by less than 1%, while in more equal countries a 1% increase in income reduces the poverty rate by as much as 4%. Ravallion (2013) calculates that if developing countries maintain their post-2000 growth performance, the number of extremely poor people will fall from the current level of 900 million to 200 million by 2030, or 3% of the world's population. This would be a remarkable achievement. To reach the 1% poverty target, however, would require an increase in household consumption of 7.6% per annum – an unrealistically high level.

Tackling poverty from the 'grass roots'

Poverty not only means low income and consumption, and low levels of human development in terms of education and healthcare, but also feelings of powerlessness, vulnerability and fear, because poor people are not free, and are exposed to greater risk, living on the margin of subsistence.

What it means to be poor is well illustrated in the World Bank's study *The Voices of the Poor* (World Bank, 2000b), which asked 60,000 poor people in 60 countries to articulate their feelings about their physical and mental state. Some of the answers are contained in Case example 2.1, which are both moving and revealing. Feelings of helplessness, humiliation and lack of self-esteem are paramount.

Case example 2.1   **The voices of the poor**

Poor people in 60 countries were asked to analyse and share their ideas of well-being (a good experience of life) and 'ill-being' (a bad experience of life). Well-being was variously described as happiness, harmony, peace, freedom from anxiety, and peace of mind. In Russia, people say 'well-being is a life free from daily worries about lack of money'. In Bangladesh, 'to have a life free from anxiety'. In Brazil, 'not having to go through so many rough spots'. People describe ill-being as lack of material things, bad experiences, and bad feelings about oneself. A group of young men in Jamaica ranks lack of self-confidence as the second biggest impact of poverty: 'Poverty means we don't believe in self, we hardly travel out of the community – so frustrated, just locked up in a house all day.'

Although the nature of ill-being and poverty varies among locations and people – something that policy responses must take into account – there is a striking commonality across countries. Not surprisingly, material well-being turns out to be very important. Lack of food, shelter and clothing is mentioned everywhere as critical. In Kenya, a man says: 'Don't ask me what poverty is because you have met it outside my house. Look at the house and count the number of holes. Look at my utensils and the clothes I am wearing. Look at everything and write what you see. What you see is poverty.'

Alongside the material, physical well-being features prominently in the characterizations of poverty. And the two meld together when lack of food leads to ill health – or when ill health leads to an inability to earn income. People speak about the importance of looking well fed. In Ethiopia, poor people say, 'We are skinny', 'We are deprived and pale', and speak of a life that 'makes you older than your age'.

Security of income is also closely tied to health. But insecurity extends beyond ill health. Crime and violence are often mentioned by poor people. In Ethiopia, women say, 'We live hour to hour', worrying about whether it will rain. An Argentine man says, 'You have work, and you are fine. If not, you starve. That's how it is.'

Two social aspects of ill-being and poverty also emerged. For many poor people, well-being means freedom of choice and action and the power to control one's life. A young woman in Jamaica says that poverty is 'like living in jail, living in bondage, waiting to be free'.

Linked to these feelings are definitions of well-being as social well-being and comments on the stigma of poverty. As an old woman in Bulgaria says: 'To be well means to see your grandchildren happy and well dressed and to know that your children have settled down; to be able to give them food and money whenever they come to see you, and not to ask them for help and money.' A Somali proverb captures the other side: 'Prolonged sickness and persistent poverty cause people to hate you.'

The following quotations are an illustration of what living in poverty means:

Certainly our farming is little; all the products, things bought from stores, are expensive; it is hard to live, we work and earn little money, buy few things or products; products are scarce, there is no money and we feel poor.
                          (from a discussion group of poor men and women, Ecuador)

We face a calamity when my husband falls ill. Our life comes to a halt until he recovers and goes back to work.

                                        (poor woman, Zawyet Sultan, Egypt)

Poverty is humiliation, the sense of being dependent on them, and of being forced to accept rudeness, insults, and indifference when we seek help.

                                        (poor woman, Latvia)

Source: World Bank, 2000b.

The World Bank proposes a three-pronged strategy for poverty reduction: **promoting opportunity, facilitating empowerment and enhancing security**.

Promoting opportunity is partly about expanding economic opportunities for poor people through the process of economic growth, and partly about expanding the asset base of poor people and increasing the return on those assets. The major causes of individual poverty can be linked to a lack of assets and/or a low return on assets. Important assets to enable people to grow out of poverty include natural assets, such as land; human assets, such as education and health; financial assets, including access to credit, and social assets, such as networks of contacts. The return on assets once acquired depends on the institutional framework of a country, the performance of the economy, and what is happening in the world economy. The state has a role to play in expanding poor people's assets because markets do not work well for poor people owing to lack of access, power and collateral. The state can help in three major ways: first, by using its power to redistribute resources; second, through institutional reforms to deliver services more effectively, particularly in the fields of health and education; and third, by facilitating the engagement of poor people in programmes that help them to acquire assets, such as land and credit.

A growing economy is absolutely crucial for poverty reduction as emphasized by the World Bank's Commission on Growth and Development headed by the Nobel Prize-winning economist Michael Spence (World Bank, 2008). Poverty cannot be reduced in a stagnant economy. The Commission finds a strong negative association across countries between the average growth of income and consumption and the *share* of people living on less than $1 per day. A 1 percentage point growth of income below the average is associated with a 2 percentage point increase in the share of people living in poverty.

On the other hand, similar rates of growth of countries are associated with different rates of poverty reduction. This is the result of existing inequalities in the distribution of income, assets and access to opportunities. Growth is much more effective in reducing poverty where the income distribution is more equal than where there are big inequalities. The World Bank estimates that when inequality is low, growth reduces poverty by nearly twice as much as when inequality is high.

Facilitating empowerment is a new departure in the thinking of the World Bank compared with its 1990 Report. Empowering poor people means strengthening the participation of poor people in decision-making, eliminating various forms of discrimination – ethnic, religious, sexual – and making state institutions more accountable and responsive to poor people. The great challenge here is to tackle the institutional structures of poor countries that continue to marginalize, discriminate against and disenfranchise vulnerable sections of society. The law, the Church, bureaucrats and local elites, and customs and traditions all play a part. The state has a role to play in helping to empower people by:

1. Curbing corruption and harassment, and using the power of the state to redistribute resources for actions benefiting the poor.
2. Ensuring that the legal system is fair and accessible to the poor.
3. Making sure that the delivery of local services is not captured by local elites.
4. Encouraging the participation of poor people in the political process.
5. Galvanizing political support for public action against poverty.

Enhancing security means reducing poor people's vulnerability to the various forms of insecurity that affect people's lives, such as economic shocks, natural disasters, crop failures, ill health, violence, wars and so on, and helping people to cope with these adverse shocks when they occur. The wide range of risks that poor people are exposed to is highlighted in Case example 2.2. This vulnerability to risk requires a range of insurance mechanisms for managing risk, such as health and

Case example 2.2

Poor people's exposure to risk

Poor people are exposed to a wide range of risks.

Illness and injury

Poor people often live and work in environments that expose them to greater risk of illness or injury, and they have less access to healthcare. Their health risks are strongly connected to the availability of food, which is affected by almost all the risks the poor face (natural disasters, wars, harvest failures and food price fluctuations). Communicable diseases are concentrated among the poor, with respiratory infections the leading cause of death. A recent study of poverty in India found that the poor are 4.5 times as likely to contract tuberculosis as the rich and twice as likely to lose a child before the age of two.

Illness and injury in the household have direct costs (for prevention, care and cure) and opportunity costs (lost income or schooling while ill). The timing, duration and frequency of illness also affect its impact. A study of South India found that households can compensate for an illness during the slack agricultural season, but illness during the peak season leads to a heavy loss of income, especially on small farms, usually necessitating costly informal borrowing.

Old age

Many risks are associated with ageing: illness, social isolation, inability to continue working, and uncertainty about whether transfers will provide an adequate living. The incidence of poverty among the elderly varies significantly. In most Latin American countries, the proportion of people in poverty is lower for the elderly than for the population at large. In contrast, in many countries of the former Soviet Union, the incidence of poverty is above average among the elderly, particularly among people 75 and older. Women, because of their longer life expectancy, constitute the majority of the elderly, and they tend to be more prone to poverty in old age than men. The number of elderly people in the developing world will increase significantly in coming decades with the rapid demographic transition.

Consultations with poor people show that income security is a prime concern of the elderly, followed closely by access to health services, suitable housing and the quality of family and community life. Isolation, loneliness and fear all too often mark old people's lives.

Crime and domestic violence

Crime and domestic violence reduce earnings and make it harder to escape poverty. While the rich can hire private security guards and fortify their homes, the poor have few means to protect themselves against crime. In 1992 in São Paulo, Brazil, the murder rate for adolescent males in poor neighbourhoods was 11 times that in wealthier ones. Poor people frequently voice their fear of violence and the resulting powerlessness: 'I do not know whom to trust, the police or the criminals.'

Crime also hurts poor people indirectly. Children exposed to violence may perform worse in school. A study of urban communities in Ecuador, Hungary, the Philippines and Zambia showed that difficult economic conditions lead to destruction of social capital as involvement in community organizations declines, informal ties among residents weaken, and gang violence, vandalism and crime increase. Violence and crime may thus deprive poor people of two of their best means of reducing vulnerability: human and social capital.

continued overleaf

Case example 2.2	**Poor people's exposure to risk** – *continued*

Unemployment and other labour market risks

Labour market risks include unemployment, falling wages, and having to take up precarious and low-quality jobs in the informal sector as a result of macroeconomic crises or policy reform. The first workers to be laid off during cutbacks in public sector jobs are usually those with low skills, who then join the ranks of the urban poor; a pattern observed in Africa and Latin America during the structural adjustment reforms of the 1980s and early 1990s. The East Asian crisis also had pronounced effects on labour markets, with real wages and non-agricultural employment falling in all affected countries. As state enterprises in Eastern Europe and the countries of the former Soviet Union were privatized, poverty increased among displaced workers with low education and obsolete skills, not qualified to work in emerging industries.

Fluctuations in demand for labour often disproportionately affect women and young workers. Most public sector retrenchment programmes have affected women's employment more than men's, and women are more likely than men to work for small firms, which tend to be more sensitive to demand fluctuations. As incomes fall, poor households try to increase their labour market participation, especially for women and children.

Harvest failure and food price fluctuations

Weather-related uncertainties (mainly rainfall), plant disease and pests create harvest risk for all farmers, but technologies for reducing such risks (irrigation, pesticides, disease-resistant varieties) are less available in poor areas. Between 1994 and 1996, less than 20% of all cropland was irrigated in low- and middle-income countries (only 4% of such land was irrigated in sub-Saharan Africa).

Fluctuations in food prices are a related risk. Since poor households spend a large part of their income on food, even small price increases can severely affect food intake. Households that meet their food needs through subsistence agriculture are less vulnerable than households that have to buy all their food.

Liberalization of markets often boosts the price of staples – a benefit to small farmers if they are net sellers of food. Those hurt are the urban poor and the landless rural poor, as net food buyers, and farmers who engage in seasonal switching, selling food after the harvest when food is plentiful and cheap and buying it when it is scarce and expensive. Where transport facilities are good, traders can step in and equalize prices over the year through arbitrage, but such infrastructure is lacking in many areas.

Source: World Bank, 2000a.

old-age insurance, unemployment insurance and workforce programmes, social funds and cash transfers, microfinance programmes, insurance against crop failures and price instability and so on.

The World Bank points out, however, that promoting opportunities, facilitating empowerment and enhancing security are *necessary* conditions for tackling poverty, but not *sufficient* conditions in an interdependent, global economy. International action is also required to help poor people in at least five ways:

- Promoting global financial stability and reducing the risks of economic crisis.
- Opening up markets (particularly in developed countries) to the goods of poor countries.
- Encouraging the production of international public goods that benefit poor people; for example the control of disease, agricultural research and the dissemination of knowledge.

- More foreign aid and debt relief.
- Giving a greater voice to poor countries and peoples in the global forums and multilateral institutions of the world, such as the World Bank, the IMF and the WTO.

Randomized control trials (RCTs)

One of the most interesting and useful ways to find out which is the most effective way to fight poverty at the micro-level is to conduct **randomized control trials (RCTs)**, which is the approach taken by the Abdul Latif Poverty Action Laboratory set up by Abhijit Banerjee and Esther Duflo at the Massachusetts Institute of Technology in 2003, and described in their bestselling book *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty* (2011). RCTs enable anti-poverty policies to be based on scientific evidence rather than hunch or custom. As the authors argue: 'ideology, ignorance and inertia often explain why good-intentioned [anti-poverty] policies fail'. Research officers located in five offices around the world have completed, or are engaged in, over 250 experiments in more than forty countries.

The essence of an RCT is to take a random group of people or families to conduct an experiment and then to compare the results of the experiment on the group with another random sample (or control group) not subject to the experiment, and to see whether the experiment leads to a significant change in behaviour or outcome. For example, there was a microcredit experiment in Hyderabad (India) on whether microcredit works to help poor people. Fifty-two neighbourhoods were chosen at random to receive microcredit help and 52 other neighbourhoods were taken as a control group. After eighteen months, there was clear evidence of microcredit working.

In the fields of education and health, RCTs show that financial incentives work. Immunization camps against preventable diseases are very successful where people are rewarded for attending. Free chlorine dispensers next to water sources; free worming pills and free nutritional supplements also 'work'. Conditional cash transfers to families that send children to school have proved effective in Brazil (the Bolsa Familia programme) and Mexico (Oportunidades). In the field of population control, trials show that the provision of family planning services makes very little difference to fertility unless there is a demand for them and women are seen alone for advice. Teenage pregnancies have been reduced where girls have been provided with free school uniforms to stay in school rather than roam the streets.

Poor people live surrounded by huge risks to their livelihoods (see Case example 2.2), and the way they cope by diversifying activities is very inefficient. The challenge here is for governments to assist the development of insurance markets through education and subsidizing insurance premiums.

One way for poor people to expand their asset base is to borrow, but from moneylenders it is expensive, and the formal banking system is not interested in lending to the poor with no collateral. This is the challenge of the microcredit movement (see Chapter 13). The alternative to borrowing for investment is prior saving, and RCTs show the important role that mobile phone banking can play in encouraging small saving and dealing with small accounts.

These are just some of the fields in which RCTs have taken place. While the results can be interesting, there are limitations of such trials; in particular, it may be difficult to generalize the results of RCTs because they are context specific. Evaluation may be conducted on only one specific sample, the trial may be implemented in such a way that it cannot be replicated, and if a *specific* programme is implemented, a slightly different programme may not have the same results. Also, the evaluation of a trial itself may cause both treatment and comparison groups to alter their behaviour for the period of the experiment, leading to false inferences.

Notwithstanding these limitations, and that the trials are generally small scale, RCTs are beginning to make a major contribution to our understanding of the causes of poverty, the solution to poverty (what works and what does not), and what types of incentives poor people need to improve their health, value education and escape from the poverty trap.

Human Development Index (HDI)

To overcome the limitation of taking a single measure of PCY as an index of development and the problems of using PCY as a measure of living standards, the UNDP has developed the **Human Development Index (HDI)**. This index gives a measure of the economic well-being of nations that does not necessarily accord with the usual measure: the level of per capita income. As the UNDP says in its *Human Development Report* (2014): 'although GNP growth is absolutely necessary to meet all essential human objectives, countries differ in the way that they translate growth into human development'. The UNDP defines human development as 'a process of enlarging peoples' choices'. This depends not only on income but also on other social indicators such as life expectancy, health, education and literacy.

Originally, the HDI was based on three variables: life expectancy at birth; educational attainment measured by a combination of adult literacy (two-thirds weight) and combined primary, secondary and tertiary school enrolment ratios (one-third); and the standard of living measured by real PCY at PPP. An arithmetic average was taken of the three indices calculated. In 2010, the construction of the index changed. First, some of the variables changed, and second, the method of aggregation changed from an arithmetic average of the indexes to a geometric mean. The variables for the construction of the HDI are:

- Life expectancy at birth
- Educational attainment measured as the arithmetic mean of the average years of schooling, and expected years of schooling
- Gross national income per head at PPP.

These four variables are shown in columns 2, 3, 4 and 5 of Table 2.6 for 10 countries with very high human development, 10 countries with high human development, 10 countries with medium human development, and 10 countries with the very lowest human development, and also for regions of the world. To construct the index, fixed minimum and maximum values are taken for each of the variables. For life expectancy at birth, the range is 20–85 years. For average years of schooling, the range is from 0–15 years. For expected years of schooling, the range is 0–18 years. For per capita income at PPP, the range is from $100–$75,000 (taking logs). For any component of the HDI, the individual indexes can be computed according to the general formula:

$$\text{Index} = \frac{\text{Actual value } - \text{ Minimum value}}{\text{Maximum value } - \text{ Minimum value}} \tag{2.1}$$

Each index thus ranges from zero to 1. If the actual value of the variable is the minimum, the index is zero. If the actual value of the variable is equal to the maximum value, the index is one. Case example 2.3 shows how the index is calculated for Costa Rica.

There is not always a close correspondence between the ranking of countries by their HDI and their ranking by per capita income. For example, many of the oil-producing countries, such as Qatar, Kuwait, Angola and Equatorial Guinea have much lower HDI rankings than per capita income rankings because they don't use their riches for education and health, while countries

Table 2.6 Human Development Index and its components, 2013

HDI rank	Country	Human Development Index 2013	Life expectancy at birth (years)	Mean years of schooling (years)	Expected years of schooling (years)	Gross national income per capita, PPP$
Very high human development						
1	Norway	0.944	81.5	12.6	17.6	63,909
2	Australia	0.933	82.5	12.8	19.9	41,524
3	Switzerland	0.917	82.6	12.2	15.7	53,762
4	Netherlands	0.915	81.0	11.9	17.9	42,397
5	United States	0.914	78.9	12.9	16.5	52,308
6	Germany	0.911	80.7	12.9	16.3	43,049
7	New Zealand	0.910	81.1	12.5	19.4	32,569
8	Canada	0.902	81.5	12.3	15.9	41,887
9	Singapore	0.901	82.3	10.2	15.4	72,371
10	Denmark	0.900	79.4	12.1	16.9	42,880
High human development						
50	Uruguay	0.790	77.2	8.5	15.5	18,108
51	Bahamas	0.789	75.2	10.9	12.6	21,414
51	Montenegro	0.789	74.8	10.50	15.2	14,710
53	Belarus	0.786	69.9	11.50	15.7	16,403
54	Romania	0.785	73.8	10.7	14.1	17,433
55	Libya	0.784	75.3	7.5	16.1	21,666
56	Oman	0.783	76.6	6.8	13.6	42,191
57	Russian Federation	0.778	68.0	11.7	14.0	22,617
58	Bulgaria	0.777	73.5	10.6	14.3	15,402
59	Barbados	0.776	75.4	9.4	15.4	13,604
60	Palau	0.775	72.4	12.2	13.7	12.823
Medium human development						
103	Maldives	0.698	77.9	5.8 b	12.7	10,074
103	Mongolia	0.698	67.5	8.3	15.0	8,466
103	Turkmenistan	0.698	65.5	9.9 s	12.6 p	11,533
106	Samoa	0.694	73.2	10.3	12.9 t	4,708
107	Palestine, State of	0.686	73.2	8.90	13.2	5,168
108	Indonesia	0.684	70.8	7.5	12.7	8,970
109	Botswana	0.683	64.4	8.8	11.7	14,792
110	Egypt	0.682	71.2	6.4	13.0	10,400
111	Paraguay	0.676	72.3	7.7	11.9	7,580
112	Gabon	0.674	63.5	7.4	12.3	16,977

continued overleaf

Table 2.6   Human Development Index and its components, 2013 – *continued*

HDI rank	Country	Human Development Index 2013	Life expectancy at birth (years)	Mean years of schooling (years)	Expected years of schooling (years)	Gross national income per capita, PPP$
Lowest human development						
178	Mozambique	0.393	50.3	3.2	9.5	1,011
179	Guinea	0.392	56.1	1.6	8.7	1,142
180	Burundi	0.389	54.1	2.7	10.1	749
181	Burkina Faso	0.388	56.3	1.3	7.5	1,602
182	Eritrea	0.381	62.9	3.4	4.1	1,147
183	Sierra Leone	0.374	45.6	2.9	7.5	1,815
184	Chad	0.372	51.2	1.5	7.4	1,622
185	Central African Republic	0.341	50.2	3.5	7.2	588
186	Congo, Democratic Republic of the	0.338	50.0	3.1	9.7	444
187	Niger	0.337	58.4	1.4	5.4	873
	Regions					
	Arab States	0.682	70.2	6.3	11.8	15,817
	East Asia and the Pacific	0.703	74.0	74	12.5	10,499
	Europe and Central Asia	0.738	71.3	9.6	13.6	12,415
	Latin America and the Caribbean	0.740	74.9	7.9	13.7	13,767
	South Asia	0.588	67.2	4.7	11.2	5,195
	Sub-Saharan Africa	0.502	56.8	4.8	9.7	3,152
	Least developed countries	0487	61.5	3.9	94	2,126
	Small island developing states	0.665	70.0	7.5	11.0	9,471
	World	0.702	70.8	7.7	12.2	13,723

Source: UNDP, 2014.

such as Bangladesh, the Philippines, Ghana, Peru, Cuba and some of the Pacific Islands have high HDI rankings compared with per capita income because they invest in human development–education and health.

Multidimensional Poverty Index (MPI)

Poverty is not only about lack of income and low levels of education and health. It has many other dimensions. This is recognized by the **Multidimensional Poverty Index (MPI)**, developed by Alkire and Santos (2010) with the **Oxford Poverty and Human Development Initiative**, and

Case example 2.3

Calculating the HDI for Costa Rica

- Life expectancy at birth in Costa Rica is 79.93 years
- Mean years of schooling is 8.37
- Expected years of schooling is 13.50
- Gross national income per capita at PPP is $13,011.7

Now plug these values into the general formula, equation 2.1 above, to derive an index (I) for each of the variables.

$$\text{Health index} = \frac{79.93 - 20}{85 - 20} = 0.922$$

$$\text{Mean year of schooling index} = \frac{8.37 - 0}{15 - 0} = 0.558$$

$$\text{Expected years of schooling Index} = \frac{13.50}{18} = 0.750$$

$$\text{Education index} = \frac{0.558 + 0.750}{2} = 0.654$$

$$\text{Income index} = \frac{\ln (13,011.7) - \ln (100)}{\ln (75,000) - \ln (100)} = 0.735$$

The HDI is the geometric mean of each of the three indexes:

$$\textbf{HDI} = (I_{health} \times I_{education} \times I_{income})^{1/3}$$

where the education index is the mean of the two education variables.
The HDI for Costa Rica is therefore:

$$(0.922 \times 0.654 \times 0.735)^{1/3} = 0.763$$

This ranks Costa Rica 68th in the world, which puts it in the high human development category – but as we saw in Case example 1.1, it ranks much higher on other indexes of economic development and happiness. It is brought down by its relatively low level of per capita income compared with its educational performance and life expectancy.

Source: UNDP, 2014.

published by the UNDP's *Human Development Report* since 2010. It represents an internationally comparable measure of acute poverty covering more than one hundred developing countries. Three main dimensions of poverty are identified – education, health and standard of living – and each has various indicators, as shown in Table 2.7. In total, there are 10 indicators with their weights attached. Data on each indicator are collected at the household level and a person is identified as poor if they are deprived of at least one-third of the weighted indices. This is the cut-off point (c). In other words, if c is greater than 33.3%, the household (and everyone in it) is multidimensionally poor. If c is greater than 50%, the household is 'severely poor'.

The MPI index is the product of two measures: the multidimensional headcount ratio (H) and the intensity (or breadth) of poverty (A). The headcount ratio is the proportion of the population that is multidimensionally poor:

$$H = q/n \tag{2.2}$$

where q is the number of people who are multidimensionally poor and n is the total population. The intensity of poverty (A) is the sum (for poor households only) of the household deprivation

Table 2.7   Multidimensional Poverty Index and its components, 2014

Dimensions of poverty	Indicator	Deprived if …	Weight
Education	Year of Schooling	No household member has completed five years of schooling.	1/6
	Child School Attendance	Any school-aged child is not attending school up to class 8.	1/6
Health	Child Mortality	Any child has died in the family	1/6
	Nutrition	Any adult or child for whom there is nutritional information is malnourished.	1/6
Living Standard	Electricity	The household has no electricity.	1/18
	Improved Sanitation	The household's sanitation facility is not improved (according to MDG guidelines), or it is improved but shared with other households.	1/18
	Improved Drinking Water	The household does not have access to improved drinking water (according to MDG guidelines) or safe drinking water is more than a 30-minute walk from home, roundtrip.	1/18
	Flooring	The household has a dirt, sand or dung floor.	1/18
	Cooking Fuel	The household cooks with dung, wood or charcoal.	1/18
	Assets Ownership	The household does not own more than one radio, TV, telephone, bike, motorbike or refrigerator and does not own a car or truck.	1/18

Source: UNDP, 2014.

scores multiplied by the number of people in the household divided by the total number of poor people (q):

$$A = \frac{\sum_h c_{jh}i}{q} \qquad (2.3)$$

where c_j is the deprivation score of the household, i is the number of people in the household, and h is the number of households.

Let us give a numerical example. Table 2.8 gives data for four households with different numbers of people in each.

Take household 1 with 4 persons. In only two categories is it 'poor': one or more children have died (weight 0.167), and the household uses only 'dirty' cooking (weight 0.056). The sum of the deprivation scores is 22.2%, which is less than the cut-off of 33.3%, so the household is not poor. By the same calculations, households 2, 3 are 4 are poor. For all these poor households, the headcount ratio (H), applying equation (2.2), is:

$$H = \frac{(7 + 5 + 4)}{(4 + 7 + 5 + 4)} = 0.800$$

The intensity of poverty (A) (for households that are poor) is:

$$A = \frac{(72.2)7 + (38.9)5 + (50.0)4}{(7 + 4 + 5)} = 0.563$$

Table 2.8 Hypothetical household data

		Households			Weights
Indicators	1	2	3	4	
Household size	4	7	5	4	
Education					
No one has completed five years of schooling	0	1	0	1	16.7%
At least one school-age child not enrolled in school	0	1	0	0	16.7%
Health					
At least one member is malnourished	0	0	1	0	16.7%
One or more children have died	1	1	0	1	16.7%
Living conditions					
No electricity	0	1	1	1	5.6%
No access to clean drinking water	0	0	1	0	5.6%
No access to adequate sanitation	0	1	1	0	5.6%
House has dirt floor	0	0	0	0	5.6%
Household uses 'dirty' cooking fuel (dung, firewood or charcoal)	1	1	1	1	5.6%
Household has no car and owns at most one of: bicycle. motorcycle, radio, refrigerator telephone or television	0	1	0	1	5.6%
Results					
Household deprivation score, c (sum of each deprivation multiplied by its weight)	22%	72.2%	38.9%	50.0%	
Is the household poor (c > 33.3%)?	No	Yes	Yes	Yes	

Note: 1 indicates deprivation in the indicator; 0 indicates non-deprivation
Source: UNDP, 2014.

that is, the average poor person is deprived in 56.3% of the weighted indicators. The MPI index (H × A) is therefore: MPI = 0.8 × 0.563 = 0.490.

The index can be compared over time and across countries, and the different contributions of education, health and the standard of living deprivation to the total index can also be calculated. There is a close correlation between the ranking of countries by their MPI and their HDI. Table 2.9 below gives countries where more than 50% of the population live in multidimensional poverty. The total number of people living in multidimensional poverty in the 28 countries listed is nearly 400 million out of a total of nearly 800 million overall. This latter figure is less than the number of individuals living on less than $1.90 a day because typically a family consists of more than one person so that family income is more than $1.90 a day. The MPI does not take account of income – only the consequences of a lack of income.

Can poor countries ever catch up?

If living standards are largely determined by the level and growth of productivity, the interesting question is whether developing countries will ever catch up with the performance of rich industrialized countries. There are at least three possible mechanisms by which catch-up may occur:

1. It is sometimes argued that the larger the gap between a poor country's technology, productivity and per capita income and the level of productivity in advanced countries, the greater

Table 2.9   Countries with more than 50% of the population living in multidimensional poverty

Country	% of population	No. of people (000)
Afghanistan	66.2	17,116
Bangladesh	51.2	75,610
Benin	71.8	5,897
Burkina Faso	84.0	12,875
Burundi	80.8	7,553
Central African Republic	77.6	332
D.R. Congo	74.0	46,278
Cote d'Ivoire	58.7	11,772
Ethiopia	87.3	78,887
Gambia	60.4	901
Guinea	82.5	8,278
Guinea-Bissau	77.5	1,168
India	53.7	63,199
Liberia	83.9	2,883
Madagascar	66.9	15,774
Malawi	66.7	10,012
Mali	86.6	10,545
Mauritania	61.7	2,197
Mozambique	69.6	17,246
Niger	89.3	15,408
Rwanda	69.0	7,669
Senegal	74.4	9,247
Sierra Leone	72.5	4,180
Somalia	81.2	7,106
Tanzania	65.6	29,842
Uganda	69.9	24,712
Yemen	52.5	7,714
Zambia	64.2	7,600

Source: UNDP, 2014.

the scope for a poor country to absorb existing technology and catch up with richer countries. Technology is thought of as a public good, so for a given amount of technological investment, a poor country can reap high returns because it has paid none of the development costs. Clearly, there also has to be the willingness and ability to invest and the capability to absorb new technology. A productivity gap is a necessary but not a sufficient condition for catch-up by this means.

2. The process of development is characterized by a shift of resources from low-productivity agriculture to higher productivity industrial and service activities. Other things being equal, this should also produce a move towards convergence, to the extent that the resource shifts are greater in poor countries than in rich countries.

3. Mainstream neoclassical growth theory predicts convergence (see Chapter 4) because of the assumption of diminishing returns to capital. Rich countries with a lot of capital per head will

have a lower productivity of capital than poor countries. Thus, if tastes and preferences are the same, the same amount of saving and investment in poor countries should lead to faster growth than in rich countries.

The standard procedure for testing the convergence hypothesis is to do a simple correlation across countries between the rate of growth of per capita income (y) as the dependent variable and the *initial* level of per capita income (or productivity) as the independent variable, and to see whether the relation is significantly negative. If it is, this means that per capita income is growing faster in poor countries than in rich countries, which is a necessary condition for convergence to take place (often called **beta convergence** in the literature). One of the earliest studies of this type (Baumol, 1986) showed a strong inverse correlation between a country's productivity level and its average productivity growth among industrial countries and those at an intermediate stage of development, but no evidence of convergence as far as the poorer countries are concerned.

Zind (1991) focused on 89 developing countries and regressed the rate of growth of per capita income on the level of per capita income in 1960. He could find no evidence of overall convergence, but there was some evidence of convergence taking place between countries with relatively high per capita incomes. One reason appears to be that in these latter countries, there was a positive relation between per capita income and the rate of growth of investment per capita.

Another study by Dowrick (1992) across 113 countries showed that while there was some evidence of catch-up in the 1970s and 1980s, in the sense that growth rates were negatively related to initial levels of productivity, other factors caused per capita income growth to be faster the higher the level of per capita income, producing a *divergence* of living standards across the world.

Similarly, Pritchett (1997) takes 117 countries over the period 1960–88 and regresses the rate of growth of per capita income on the initial level of per capita income relative to the leading country and finds no evidence of unconditional convergence. It is interesting to note, however, that when differences in investment and schooling between countries are allowed for, the coefficient becomes negative, indicating conditional convergence. The problem is, however, that rich countries are able to save and invest more, and they devote more resources to education, which perpetuates their growth advantage.

It has been argued by some (see Eichengreen et al., 2011) that when poor countries reach middle-income status, they may get caught in a so-called **middle-income trap**, meaning that they exhaust the potential for fast growth which leads to middle-income status, and then they lack the capability to make the next step to high-income status. The fast growth stage is associated with the shift of resources from agriculture to higher productivity sectors, and then growth slows down because of a fall in total productivity growth, and countries lack the capability to produce higher value-added goods necessary to achieve developed country status. It is true that economies are unlikely to sustain growth rates of 6–10% per annum, as China has done over the past 30 years, but as long as per capita income growth is positive, poor countries will ultimately become rich, and if the growth of per capita income exceeds that of developed countries, there will ultimately be convergence. It is debatable, therefore, whether a middle-income trap exists in practice.

But an interesting question then arises: How long it will take for poor countries to catch up with the rich? Let us consider two issues:

1. Given the recent growth experience of the poor countries of roughly 3% per annum, how long will it take for the average poor country to reach the current average living standards of rich developed countries?

2. How long will it take for poor countries to catch up with rich countries, assuming that rich countries grow at 3% per annum and poor countries were to raise their per capita growth to

4% per annum. (Clearly, a necessary condition for catch-up is that poor countries do grow faster than rich countries, otherwise convergence is impossible.)

We can answer both questions using the simple compound interest formula:

$$S = P(1 + r)^n$$

where P is the 'initial' income level, and S is the sum to which the income level grows at an annual compound rate of interest, r, over n years.

The answer to the first question, assuming that the current level of per capita income in poor countries (P) is $1,200 per annum, and in rich countries (S) it is $25,000, and the recent growth performance of poor countries (r) has been 2% per annum, is that it would take 153 years for poor countries to reach the current standard of living of rich countries.[1]

The answer to the second question is that it would take nearly 300 years for the average poor country growing at 4% per annum to catch up with the rich country growing at 3% per annum, given the initial difference in the level of per capita incomes.[2]

The above calculations are sensitive to the initial income levels taken and the assumed future growth rates of poor and rich countries, but it is difficult not to reach the conclusion that the timescale of catch-up will be extremely prolonged.

It can be argued, of course, that world income equality is an impracticable ideal, and that the primary aim is not equality of living standards throughout the world but 'tolerable' living standards in all countries, which is a very different matter. This seems to be the position of the World Bank, which argued in its *World Development Report 2000/2001* that rising income inequality 'should not be seen as a negative', provided that incomes at the bottom do not fall, and the number of people in poverty falls or does not rise (World Bank, 2000a). The problem is defining 'tolerable' living standards, and specifying an acceptable income distribution at that average level of real income. The timescale involved to reach 'tolerable' living standards is clearly less than that required to eliminate the income gap entirely, but even so, if the average level of per capita income now enjoyed in rich developed countries is regarded as the tolerable level, we estimate it will take over a century for the average poor country to attain it on current performance. Can these countries wait that long?

On the other hand, it is easily forgotten that the rich–poor country divide in the world economy is a relatively recent phenomenon. All countries were once at subsistence level, and as recently as 200 years ago, at the advent of the British Industrial Revolution, the absolute differences in living standards between countries cannot have been great. The average per capita income of low-income countries today is approximately $1,500 per annum at PPP, and this is not far below the average level of real per capita income in Western Europe in the mid-nineteenth century, measured at current prices. If we regard $1,500 as only barely above subsistence, the major part of the present income disparities between developed and developing countries must have arisen over the twentieth century. Some countries, through a combination of fortune and design, have managed to grow much faster than others. The overriding influence has been industrialization and the technological progress associated with it. The close association between industrialization and living standards spells out the clear policy message that to base a development policy on agricultural activities *alone* would be misguided, however attractive such aphorisms as 'back to the land' and 'small is beautiful' may sound.

The concentrated impact of industrialization on living standards in the Western world is dramatically emphasized by the observation that if 6,000 years of 'civilized' human existence prior to 1850 is viewed as a day, the last century or so represents little more than half an hour; yet in this 'half-hour', more real output has been produced in developed countries than in the preceding

period. It is true that living standards in most developing countries have risen faster since 1950 than at any time in the past; but so too have the living standards in developed countries, and the gap between rich and poor countries continues to widen. Although development consists of more than a rise in per capita incomes, income disparities are the essence of the so-called 'development gap'.

Summary

- The development gap between rich and poor countries is huge. The absolute gap between the per capita income (PCY) of rich and poor countries is growing, and the ratio of the PCY of high-income developed countries to low-income developing countries is currently at a historical high of 60:1.
- The Gini ratio for international inequality has risen from 0.2 in 1820 to over 0.5. The Gini ratio for global inequality has risen from 0.5 in 1820 to over 0.6 today.
- This income gap and income inequality in the world economy manifests itself in other aspects of human welfare such as health, nutrition, life expectancy, education and employment opportunities (see Chapter 7). No wonder the UNDP (1997) has described the world as 'gargantuan in its excesses and grotesque in its human and economic inequalities'.
- The number of people living in the world on less than US$1.90 at PPP is 900 million. In Africa, nearly one-half of the population live on less than $1.90 a day.
- The average PCY of countries, even converted into PPP, is not always a good indicator of the development of a country, because it ignores the distribution of income and various aspects of human development such as education and health.
- Alternative measures of economic development and progress can be constructed such as the HDI and the MPI, which include measures of schooling, literacy, health, life expectancy and so on. Countries rank differently by PCY, HDI and MPI.
- The World Bank attempts to tackle poverty from the 'grass roots' by promoting opportunity, facilitating empowerment and enhancing economic security.
- At current rates of PCY growth in poor countries, it will take at least 100 years for the average poor country to reach the current living standards enjoyed by developed countries, and 300 years for living standards to be equalized. This is some measure of the development 'gap'.

| **Chapter 2** | **Discussion questions** |

1. How would you measure the development gap in the world economy?

2. How would you construct a Lorenz curve and calculate the Gini ratio for the measurement of income inequality?

3. What has been happening to the international and global distribution of income over time?

4. What difficulties arise in measuring and comparing the per capita incomes of poor countries using the US$ as the unit of account?

5. What do you understand by the concept of purchasing power parity (PPP), and how would you make PPP calculations of per capita income across countries?

| Chapter 2 | **Discussion questions** – *continued* |

6. What difficulties are encountered in the measurement of poverty?

7. What is the World Bank's 'grass roots' thinking concerning the attack on world poverty?

8. What are the strengths and weaknesses of randomized control trials (RCTs)?

9. What is the rationale for the UNDP to construct the Human Development Index (HDI)?

10. What variables are included in the Multidimensional Poverty Index (MPI)?

11. Are there any theoretical reasons for supposing that poor countries might catch up with the rich countries?

12. How would you analyse how fast poor countries have to grow to catch up with the rich countries?

Notes

1. Rearranging the formula for compound interest gives:

$$n = \frac{\log (S/P)}{\log (1 + r)}$$

and applying the assumed values gives:

$$n = \frac{\log (\$25{,}000/\$1{,}200)}{\log (1.02)} = 153 \text{ years}$$

2. The solution is obtained from the expression:

$$S_r (1 + r_r)^n = P_p(1 + r_p)^n$$

where S_r is the initial income of rich countries; P_p is the initial income of poor countries; r_r is the assumed growth rate of the rich country ($= 3\%$) and r_p is the assumed growth rate of the poor country ($= 4\%$). Therefore:

$$n = \frac{\log (\$25{,}000/\$1{,}200)}{\log (1.04) - \log(1.03)} = 287 \text{ years}$$

Websites on poverty and income distribution

World Bank www.worldbank.org/en/topic/poverty
UNDP (Human Development Report) http://hdr.undp.org
Oxford Poverty and Human Development Initiative www.ophi.org.uk/
Oxfam www.oxfam.org.uk
War on Want www.waronwant.org
UNU-WIDER www.wider.unu.edu/project/wiid-%E2%80%93-world-income-inequality-database
Stone Center on Socio-economic Inequality www.gc.cuny.edu/stonecenter
University of Texas, Inequality Project utip.lbj.utexas.edu