Summary

The central target of the Millennium Development Goals (MDGs) is to halve, between 1990 and 2015, the proportion of people in developing countries whose income is less than $1/day. To measure progress toward this goal it is necessary to compare poverty rates across countries.

The World Bank measures world poverty by (a) establishing a dollar-valued poverty line (now $1.25 per person per day in 2005 dollars), (b) converting it to local currencies using purchasing power parity (PPP) exchange rates, (c) using local consumer price indexes to determine the local-currency poverty line for any given year, (d) estimating Lorenz curves from household survey data, (e) thereby inferring local poverty rates and levels, and (f) aggregating the results by region and worldwide. The World Bank reports that the $1.25/day poverty rate fell from 52 percent of the population of developing countries in 1981 to 25 percent by 2005, with the biggest decline occurring in East Asia (from 78 percent to 17 percent) and almost no reduction in Sub-Saharan Africa.

This approach has been criticized for using a poverty rate that is not rooted in theory; for being overly sensitive to measurements of PPP exchange rates; for not using poor-person price indexes to inflate poverty lines locally; and for not adequately recognizing the uncertainties in poverty measurement in India and China, where half of the population of the developing world lives. An alternative approach would be to compute poverty levels and rates based on basic needs, for each country (as set out in chapter 3), but this approach has its own methodological problems, and is time and labor intensive.
Household survey data understate income (and expenditure). When reconciling the results with national accounts it is tempting, but often misleading, to gross up the income of every household by the same proportion to achieve consistency with the measure of national income. Over the long run, economic growth powers poverty reduction, but in the short run the link is weaker.

**Learning Objectives**

After completing the chapter on *International Poverty Comparisons*, you should be able to

1. Describe the main target of the Millennium Development Goals.
2. Justify the need to make international comparisons of poverty.
3. Identify those parts of the world where poverty has fallen most quickly, and least quickly, since 1981, according to the World Bank.
4. Summarize the methodology used by the World Bank to compute world poverty rates, and explain
   - the role played by the initial choice of poverty line,
   - the need to use purchasing power parity (PPP) exchange rates,
   - the use of domestic consumer price indexes to adjust local currency poverty lines to the survey year, and
   - how the poverty rate and level is measured using a Lorenz curve and poverty line.
5. Explain and evaluate the main elements of the criticisms of the World Bank approach to measuring world poverty.
6. Explain how world poverty could be measured using a cost of basic needs approach.
7. Summarize the challenges involved in reconciling household survey data (where income and expenditure are typically undervalued) with national accounts data.
8. Recognize that while economic growth drives poverty reduction in the long run, this need not be the case in the short run.

**Introduction**

The first target of the MDGs is to halve, between 1990 and 2015, the proportion of people in the developing world living on less than $1/ day.¹ This naturally leads to a simple question: Are we on track to meet this goal? But to answer this question we need to be able to compare poverty rates across countries.
The World Bank and other donor and lender agencies have limited resources. Many are interested in channeling these scarce resources to countries where poverty is especially high. But to do this one again needs to be able to compare poverty rates across countries.

The approach taken by the World Bank (see, for example, Chen and Ravallion 2004, 2008) measures world poverty based on a modest amount of information from over 600 household surveys, coupled with data on purchasing power parity (PPP) exchange rates and domestic consumer price indexes. We first set out this approach, and then address two main issues: First, how should survey data be reconciled with national accounts? The difficulty here is that when one adds up consumption based on household budget survey (HBS) data, the result is typically smaller than one would expect based on national income data. Second, would it be preferable instead to use a cost of basic needs approach to measure poverty rates in each country—an approach that would avoid the use of PPP exchange rates but require more detailed examination of survey data?

Overview of Poverty Analysis

To recapitulate briefly, the key steps in the measurement of poverty are to specify a minimal socially acceptable level of income or consumption (the poverty line), implement a representative survey in which the corresponding income or consumption concept is measured, and choose and calculate a specific poverty measure. The most common implementation of these steps is to have a fixed, monetary, consumption-based threshold for poverty, with data coming from a household survey, and poverty measured as the percentage of individuals with per capita consumption below the poverty line (the headcount measure).

Even at this broad level, notice the subtle restrictions that have already emerged; we are defining poverty in absolute and not relative terms; we tend not to focus on nonmonetary measures of well-being, such as health; poverty is a concept that applies to individuals but is measured from household data; and in practice, we nearly always use the headcount measure, even though this is just one of many possible measures.

Chapter 2 discussed the need to identify the preferred indicator of welfare according to which the poverty line will be specified. For economists, the choice of indicator typically boils down to income versus consumption. There tends to be a preference for measuring poverty using consumption, especially for developing countries in which participation in the formal labor market (and the associated income paper trail) is generally limited. First, it is consumption that appears in utility functions. Second, consumption corresponds more closely to “permanent income.” Third, the conceptual advantage of consumption over income is strengthened by data considerations. The measurement of income suffers from
deliberate understatement, measurement error, and omission of key components (for example, capital gains on infrequently marketed assets).

However, consumption also poses difficult measurement issues, especially bearing in mind that it requires data on both quantities and prices. There is relatively good experience worldwide with measurement of nondurable consumption. But we should also be including the service flow from all durable goods, and only some household surveys attempt to do this. With a perfect rental market in durable goods, this would be easy: consumption service flow would correspond to the market or shadow rent on the durable good, which in turn would equal depreciation plus opportunity cost. But durable goods markets exist for few goods and can be thin even when they do exist. We are therefore forced to make essentially arbitrary assumptions about depreciation, and the opportunity cost, of durable goods used by the poor; in particular, the standard procedure of using market interest rates as a measure of opportunity cost may make little sense for the poor, who have constrained access to capital markets.

### Review Questions

1. **International comparisons of poverty are needed for all of the following reasons except**

- A. To judge whether the World Bank is effective in its goal of achieving a world free of poverty.
- B. To identify where in the world the poorest people live.
- C. To determine each country’s contribution to the International Monetary Fund.
- D. To measure progress toward the attainment of the Millennium Development Goals.

2. **Which of the following is not part of the normal process of determining the poverty rate in a country?**

- A. It is necessary to impute the rental value of a household’s durable goods when measuring expenditure.
- B. A poverty line needs to be determined.
- C. Census data are required to determine the proportion of people who are poor.
- D. It is assumed that members of a household have the same level of welfare.

### International Poverty Comparisons

World Bank researchers Shaohua Chen and Martin Ravallion (2008) have recently undertaken a massive revision of their earlier estimates of developing world poverty. These new results are summarized in table 10.1; after commenting on the results, we discuss in more detail the underlying methodology used.
The most important finding is that the proportion of people in less-developed countries living on less than US$1.25 a day (in 2005 prices) more than halved between 1981 and 2005, falling from 52 percent to 25 percent. The absolute number of poor people also fell during this time, from 1.9 billion in 1981 to 1.4 billion by 2005, with three-fifths of this reduction occurring since 1999.

Of particular note are the rapid reduction in the poverty rate in East Asia between 1981 and 2005, largely a result of the drop in poverty in China (from 84 percent to 16 percent); the rise in poverty in Europe and Central Asia (mainly in the states of the former Soviet Union) in the 1990s; and the high and relatively steady poverty rates in Sub-Saharan Africa.

The reduction in the headcount poverty rate is robust to the choice of poverty line; if a $1/day line is used, the headcount poverty rate fell from 41 percent in 1981 to 16 percent in 2005; if the line is set at $2.50 per person per day, poverty fell from 75 percent in 1981 to 57 percent in 2005. However, the choice of poverty line matters when examining the absolute number of those in poverty: using the low poverty line of $1/day, there were 1.5 billion (extremely) poor people in 1981 and 0.9 billion in 2005, but if the bar is set at $2.50/day, there were 2.7 billion poor in 1981 and 3.1 billion in 2005, representing 48 percent of total world population, and 57 percent of the population of less-developed countries, at this latter date.

### Estimating Poverty in the Developing World

To compare (absolute) poverty across countries, it is first necessary to establish a poverty line. Chen and Ravallion (2008) argue that an appropriate standard is US$1.25 per person per day, in 2005 prices. They base this on the mean of the

### Table 10.1 Headcount Indexes: Percentage of Population in Developing Countries Living below $1.25/Day

<table>
<thead>
<tr>
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<th></th>
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<tbody>
<tr>
<td>East Asia and Pacific</td>
<td>77.7</td>
<td>65.5</td>
<td>54.2</td>
<td>54.7</td>
<td>50.8</td>
<td>36.0</td>
<td>35.5</td>
<td>27.6</td>
<td>16.8</td>
</tr>
<tr>
<td>China</td>
<td>84.0</td>
<td>69.4</td>
<td>54.0</td>
<td>60.2</td>
<td>53.7</td>
<td>36.4</td>
<td>35.6</td>
<td>28.4</td>
<td>15.9</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>1.7</td>
<td>1.3</td>
<td>1.1</td>
<td>2.0</td>
<td>4.6</td>
<td>4.6</td>
<td>5.1</td>
<td>4.6</td>
<td>3.7</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>11.5</td>
<td>13.4</td>
<td>12.6</td>
<td>9.8</td>
<td>9.1</td>
<td>10.8</td>
<td>10.8</td>
<td>11.0</td>
<td>8.4</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>7.9</td>
<td>6.1</td>
<td>5.7</td>
<td>4.3</td>
<td>4.1</td>
<td>4.1</td>
<td>4.2</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>South Asia</td>
<td>59.4</td>
<td>55.6</td>
<td>54.2</td>
<td>51.7</td>
<td>46.9</td>
<td>47.1</td>
<td>44.1</td>
<td>43.8</td>
<td>40.3</td>
</tr>
<tr>
<td>India</td>
<td>59.8</td>
<td>55.5</td>
<td>53.6</td>
<td>51.3</td>
<td>49.4</td>
<td>46.6</td>
<td>44.8</td>
<td>43.9</td>
<td>41.6</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>53.7</td>
<td>56.2</td>
<td>54.8</td>
<td>57.9</td>
<td>57.1</td>
<td>58.7</td>
<td>58.2</td>
<td>55.1</td>
<td>51.2</td>
</tr>
<tr>
<td><strong>All developing countries</strong></td>
<td><strong>51.8</strong></td>
<td><strong>46.6</strong></td>
<td><strong>41.8</strong></td>
<td><strong>41.6</strong></td>
<td><strong>39.1</strong></td>
<td><strong>34.4</strong></td>
<td><strong>33.7</strong></td>
<td><strong>30.6</strong></td>
<td><strong>25.2</strong></td>
</tr>
</tbody>
</table>

**Memo items**

- LDC poverty rate at $1.00 a day: 41.4 34.4 29.8 29.5 27.0 23.1 22.8 20.3 16.1
- LDC poverty rate at $2.00 a day: 69.2 67.4 64.2 63.2 61.5 58.2 57.1 53.3 47.0
- LDC poverty rate at $2.50 a day: 74.6 73.7 71.6 70.4 69.2 67.2 65.9 62.4 56.6

*Source: Chen and Ravallion 2008, table 7. Also available on the World Bank’s PovcalNet.*

*Note: LDC = Less-developed country. $1.25 refers to prices in 2005, converted to local currency equivalents using purchasing power parity exchange rates.*
poverty lines in the poorest 15 countries in their sample. The mean level of consumption per person in these countries was US$1.40 per day in 2005; once consumption per person rises above about US$2.00 per day, the poverty line itself begins to rise, as we saw in chapter 3. It appears that the poverty line is robust to the choice of the set of poor countries used to compute it.

Before these recent revisions, the World Bank used a “dollar a day” poverty line. It was actually based on the purchasing power of US$1.08 per person per day in 1993, and in their earlier work Chen and Ravallion (2001, 2004) argued that this line was representative of the poverty lines used in very poor countries at that time.

A major practical problem arises in the conversion of local poverty lines, which are denominated in local currencies, into US dollars, and vice versa. The problem arises because the official (or market) exchange rate is a poor guide to measuring the relative costs of living in different countries: a dollar in Boston (USA) buys less than 43 rupees in India, even when the exchange rate is 43 rupees per U.S. dollar (as was the case in mid-2008). Someone living on $500 per month in the United States would be poor; in India they would be comfortably off.

So why do exchange rates not reflect the relative purchasing powers of different currencies? The answer is that tradable goods (for example, TVs, basmati rice) have similar prices everywhere—allowing for transport costs, of course. This is not true of nontradable goods. For instance, a simple haircut in Hanoi (Vietnam) costs $0.33, while in Boston (USA) it costs $12. Despite this price differential, it does not make sense for people to fly from Boston to Hanoi to get a haircut. The standard solution to the exchange rate problem is to recompute incomes, for different countries, in a common set of international prices. First done on a large scale by the UN-sponsored International Comparison Project, this is the basis for PPP cross-country comparisons of per capita GDP.

To see how this works, suppose that we want to compare two countries, the “USA” (which uses dollars and has a million people) and “India” (which uses rupees and has 2 million people). For simplicity, suppose that these economies only produce wheat and education, with the latter only involving the cost of teachers. Assume that the USA has 1,000 teachers, each paid $30,000 annually; and produces 40,000 tons of wheat annually at $250/ton. As table 10.2 shows, total GDP will then be $40 million, for a GDP per capita of $40 per year.

Assume further that the exchange rate is 46 rupees per dollar. Wheat is a tradable good, so roughly should cost the same everywhere. Thus, in India a ton of wheat will cost 11,500 rupees. And let us suppose that teachers in India are paid 36,800 rupees annually (equivalent to $800 annually when converted at the exchange rate). No doubt, many Indian teachers would like to move to the USA to earn a higher salary, but visa restrictions do not permit this; thus, the salary differential persists. As may be seen from table 10.2, total GDP will be 174.8 million rupees, or 87.4 rupees per capita.
CHAPTER 10: International Poverty Comparisons

Using the exchange rate, Indian GDP is just $1.90 per capita, or 4.8 percent of the U.S. level. Yet, it is clear that this does not do justice to the volume of goods and services produced in India, and thus understates India’s real GDP relative to that of the USA.

One solution would be to value GDP in both countries using U.S. prices. This gives a GDP per capita of $16.50 for India, or 41.3 percent of the U.S. level of $40. Alternatively, one might value GDP in both countries using Indian prices. This gives a GDP per capita of 496.8 rupees for the USA; now the Indian level is 17.6 percent of the U.S. level. In short,

<table>
<thead>
<tr>
<th>GDP per capita</th>
<th>USA</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using exchange rate, in $</td>
<td>40.00</td>
<td>1.90</td>
</tr>
<tr>
<td>Using U.S. prices ($)</td>
<td>40.00</td>
<td>16.50</td>
</tr>
<tr>
<td>Using Indian prices (rupees)</td>
<td>496.8</td>
<td>87.4</td>
</tr>
</tbody>
</table>

So, although it is clear that using exchange rates to compare GDP per capita is not generally appropriate, we are left with the difficult issue of what common set of prices to use instead. There is no entirely satisfactory answer to this question.

Note the numbers in our example also allow us to compute the PPP exchange rate. If U.S. prices are used, India’s GDP of Rs 87.4/capita is worth $16.50, which implies a PPP exchange rate of Rs 5.3/$. Alternatively, if Indian prices are used, the US GDP of $40.00 is worth Rs 496.80, which implies a PPP exchange rate of Rs 12.4/$. Both of these are very different from the official (or market) exchange rate of Rs 43/$.

Review Questions

3. According to the World Bank, the “$1/day” poverty rate approximately halved between 1980 and 2001, and most of the reduction was due to rapid reductions in poverty in China and India.

- True
- False
- Uncertain
Until about 2000, World Bank estimates of poverty used estimates of the PPP exchange rates for 1993, based on work done by the International Comparison Project (ICP) run by the United Nations and the University of Pennsylvania (the Penn World Tables). Subsequent estimates augmented these exchange rates with PPP estimates undertaken by the World Bank’s Development Data Group. These estimates all showed a strong “Penn effect”—the observed finding that market exchange rates systematically understate the incomes of less-developed countries.

A more ambitious round of PPP computations was undertaken in the 2005 round of the ICP: more countries were covered, including, for the first time, China, and the price comparisons were more extensive and accurate. The most striking result of these recent revisions is that the Penn effect is less pronounced than originally thought. In other words, official exchange rates do not understate less-developed country incomes by as much as had been believed. Some of the effects of the revision are dramatic: using the 2005 ICP data, China’s GDP per capita was $4,091, while previous PPP estimates had put it at $6,750.

Given a dollar-denominated poverty line, such as $1.25 a day, and a PPP exchange rate, it is straightforward to compute the poverty line in local currency. Chen and Ravallion (2008) use local consumer price indexes to compute the poverty line in other years.

**Example:** Suppose that the poverty line is $1.25 in 2005, and the PPP exchange rate in that year is 10 pesos/US$. This gives a poverty line of 12.50 pesos in 2005. We can now back into the peso value of the poverty line in 2003 and 2004 using the local consumer price index, as shown in the table at the top of p. 187.
interpolate a poverty rate for the intervening years. Note that here, as always, such comparisons require that the surveys be designed so that they are comparable over time.

Given estimates of poverty rates for (almost) all countries for (almost) all years since 1981, one can trace the evolution of worldwide poverty over time, as well as its geographical distribution.

Further Methodological Considerations

Although the procedure outlined above is clean and relatively straightforward, there are a number of methodological problems of which one needs to be aware.

The first problem is that the computation of PPP exchange rates is based on comparing the costs, in different countries, of a basket of goods and services—teachers and grain in our simplified example—that reflects the average consumption patterns in a country. This is not generally appropriate when our concern is with comparing living standards for the poor.

Conceptually, the answer is not too difficult, as Deaton (2003b) emphasizes: to construct a PPP exchange rate that is appropriate for determining a poverty line, take a benchmark consumption basket of the poor in one country and price it directly in the other countries.

Example: To illustrate, using our example, suppose that the poorest quarter of the population in “India” collectively uses the services of 100 teachers and 2,400 tons of grain. This is worth $3.6 million when valued directly in dollar prices and Rs 31.28 when valued directly in rupees, which gives a PPP exchange rate for the poor of Rs 8.7/$. In this case the “poor-PPP” exchange rate, at Rs 8.7/$, is closer to the market exchange rate (Rs 43/$) than is the “average” PPP exchange rate (Rs 5.3/$), and the use of the average PPP exchange rate—which is standard practice—would lead to the construction of a poverty line for India that is unduly low. To the extent that poor households consume relatively high amounts of tradable (relative to nontradable) goods, there would be a tendency for this procedure systematically to understate poverty lines in poor countries.

In practice, such computations are almost never done. They may not even be practical; it may be impossible to value the consumption basket of a poor Indonesian (cassava, rice, chili sauce, dried fish) in the United States (or other comparator country, such as India), where the diets of the poor are entirely different. There
is also an urban bias in many of the PPP price baskets. A fuller discussion, including attention to related index number problems, is given in Alatas, Friedman, and Deaton (2004).

A second problem is that for a number of countries, PPP exchange rates are imputed, rather than estimated directly using micro-level price data. This is usually done by estimating a regression along the lines of

\[
er_{PPP}/er = a + b \times \text{literacy rate} + c \times \text{food consumption/capita} + \ldots
\]

where \(er_{PPP}\) is the PPP exchange rate, and \(er\) is the market exchange rate, for countries for which PPP computations have been made.\(^4\) The estimated equation is then used to predict the PPP exchange rate for the remaining countries. Although some imputation may be unavoidable, we must recognize that it is a noisy and imperfect procedure.

The third problem is that measures of PPP exchange rates change over time. Indeed, an implication of the Penn effect is that as a country becomes richer, the gap between the PPP exchange rate and the market exchange rate narrows and eventually vanishes. Furthermore, PPP exchange rates can be affected by changes in a country’s economic structure—for instance, if a country finds oil. Chen and Ravallion (2008) use just the 2005 version of PPP exchange rates to link currencies, even though they report poverty rates over a period of almost 25 years. An implication is that the degree of poverty reduction is likely to be overstated in (fast-) growing economies such as China.

One might be tempted to use the 1985 and 1993 versions of PPP exchange rates, rather than the 2005 version, for computations of the poverty rate in the earlier years. Unfortunately, the revisions to the earlier PPP exchange rates have been substantial, raising doubts about the viability of the earlier measures, at least for some countries.

In determining the poverty line within a country over time, the 2005 poverty line is adjusted using the local consumer price index (CPI). The problem here is that the CPI tracks a basket of goods consumed by the average consumer, and may not be a good guide to how the cost of living for the poor has evolved. In principle, it would be desirable to construct and use a “poor person’s price index,” but this is rarely done in practice.

The final problem is that the raw survey data may not be publicly available, so one is obliged to estimate the poverty rate based on tabulated data—for instance, data on expenditure per capita by quintile. The procedure that is typically used, and which also underpins the World Bank’s interactive PovcalNet program,\(^5\) is to fit a Lorenz curve to the data, apply the chosen poverty line, and read off the poverty rate. The procedure works relatively well, except at the tails of the distribution; but it is an approximation, so there is necessarily some loss of information in the process.
Survey Data and National Accounts

Standard measures of poverty are constructed from household budget surveys (HBS). Thus, standard measures incorporate the HBS sampling frame and the HBS measure of consumption. The potential problems with this source have been long known but acquired new relevance with research on “pro-poor growth,” which looks at the extent of poverty reduction arising from economic growth. There were some findings for the 1990s that poverty was not falling at the rate we would expect given economic growth, especially in India, yet there was no evidence of rising measured inequality; so where did the growth “go?”

A typical HBS is designed to be a representative sample (for example, via the most recent census). But even using a representative sample as a basis, the sample drawn from it can be systematically biased. There are actually two problems:

- **Nonresponse bias.** There is strong evidence that rich households are less likely to comply with HBS reporting.
- **Underreporting bias.** It is a general rule that richer households, when they do respond to a survey, are more likely to understate their true income (or expenditure).

These effects probably reflect a desire to conceal income or consumption, as well as the opportunity cost of time spent responding to a survey.

The first result is that upper-income households are underrepresented in the HBS, so the headcount measure of poverty is potentially overstated.

But this is not the end of the story. The macroeconomic national accounts will “see” the transactions of upper-income households in their expenditures, so they...
are reflected in key aggregates (national income or private consumption or both). There is a universal tendency for “average” national accounts consumption to be higher than “average” consumption as measured by grossing up the figures from the HBS. Furthermore, this gap is not simply an invariant level effect—it is systematically related to the level of development and the growth rate. As a rule of thumb, national accounts consumption exceeds HBS consumption and the divergence increases as per capita GDP rises. Deaton (2003b) reports that HBS consumption averages 86 percent of national accounts consumption, and grows about half as rapidly.

One solution to the underreporting problem is to adjust the HBS figures upward. Suppose that national consumption, based on extrapolation from HBS data, is $80 million, but national accounts indicate consumption of $90 million. Then one could adjust the HBS data by scaling consumption upward, that is, multiplying everyone’s reported consumption by 1.125 (= 90/80). This would, of course, reduce the measured poverty rate.

The net effect of underreporting plus rescaling is unclear, as the example in table 10.3 shows. Suppose a society has 12 individuals, with incomes as shown in the first row of the table, and a poverty line of 130. The true headcount poverty rate is 33.3 percent. If a rich individual does not respond, the observed poverty rate rises to 36.4 percent. But if an effort is made to scale all incomes upward, the observed poverty rate would be 18.2 percent, which represents an overadjustment because one is adjusting all income categories for underreporting when the problem is confined to high-income individuals. Underreporting can have a similar effect, as the bottom panel in table 10.3 shows, in that it would raise the observed poverty rate; however, rescaling runs the risk of understating poverty, again because the problem of underreporting is not found equally in all income groups, but is generally believed to be a greater problem for high-income individuals.

**Why HBS and National Accounts Totals Differ**

Part of the difference in consumption measured by the HBS and by national accounts reflects different concepts of consumption. National accounts, but typically not HBSs, measure the imputed rent on housing, imputed financial intermediation (the savings-lending interest rate gap), and consumption by nonprofits. The HBS does provide a better stock-flow link than the national accounts (which do not measure changes in stocks at all), so in principle, the HBS allows “sustainable” consumption out of financial income to be separated from consumption resulting from drawing down assets. However, the practical usefulness of this feature is limited by the fact that households may not report the relevant data correctly. Furthermore, neither source properly measures consumption of publicly provided goods (such as schooling), access to which plausibly varies with income.
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Table 10.3 Illustrating the Effects of Response Bias and Underreporting

<table>
<thead>
<tr>
<th>Individual number</th>
<th>Headcount index ( P_0 ) (percent)</th>
</tr>
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<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
<td></td>
</tr>
<tr>
<td>Headcount index ( P_0 ) (percent)</td>
<td></td>
</tr>
<tr>
<td>Response bias</td>
<td></td>
</tr>
<tr>
<td>True income/capita</td>
<td>80 100 110 121 140 220 270 310 400 490 620 750</td>
</tr>
<tr>
<td>Observed income/capita with response bias</td>
<td>80 100 110 121 140 220 270 310 400 490 620 Not reported</td>
</tr>
<tr>
<td>Scaled income/capita to adjust for response bias</td>
<td>101 126 139 153 177 278 341 391 505 618 783 — 18.2</td>
</tr>
<tr>
<td>Underreporting</td>
<td></td>
</tr>
<tr>
<td>True income/capita</td>
<td>80 100 110 121 140 220 270 310 400 490 620 750</td>
</tr>
<tr>
<td>Observed income/capita with underreporting</td>
<td>80 100 108 121 125 220 250 300 400 450 560 600</td>
</tr>
<tr>
<td>Scaled income/capita to adjust for underreporting</td>
<td>87 109 118 132 136 240 272 327 436 490 610 654 25.0</td>
</tr>
</tbody>
</table>

Source: Author’s illustration.

Note: To rescale for response bias, divide the sum across individuals of true income per capita by the sum across individuals of observed income per capita, then multiply by the observed income per capita for each individual. A similar adjustment is made to rescale for underreported income. The poverty line is 130.

Review Questions

8. Survey data suffer from nonresponse bias and underreporting bias, typically leading to

- A. An overstatement of the headcount poverty rate and an understatement of the degree of inequality.
- B. An overstatement of the headcount poverty rate and an overstatement of the degree of inequality.
- C. An understatement of the headcount poverty rate and an understatement of the degree of inequality.
- D. An understatement of the headcount poverty rate and an overstatement of the degree of inequality.
Overall, though, the consumption of items missed by the HBS is correlated with wealth, both in cross-section and over time. The growth process reinforces the gap because the national accounts register the increase in market-based consumption as an economy grows—not all of which represents true economic growth. Similarly, growth shifts activities from the informal to the formal sector. However, and we will return to this point later, it is precisely because the national accounts tend to better reflect the process of wealth accumulation that the HBS measure could still be a “truer” measure of consumption for the poor.

**Debate 1: Is World Poverty Falling?**

The current debate about poverty trends is centered on the appropriate measure of consumption. Bhalla (2002) argues that the national accounts measure is more accurate. Thus, he measures the distribution of consumption from the HBS, but adjusts the level upward to correspond to the national accounts. This method results in a much lower level of measured poverty in India, because the divergence between the two sources is severe in India; and the method predicts much more optimistic trends in poverty reduction than standard projections. In fact, it implies that the world has already met, or will soon meet, the MDGs for poverty.

This debate has been conducted in most detail for India, which, because of its size, matters significantly for global poverty monitoring. However, the issues are germane for other countries as well.

Critics have focused on the fact that Bhalla uses the HBS to get the distribution of consumption but the national accounts to get the mean. He is thus assuming a very specific type of measurement error in the HBS—that all of it is in the mean, and none is in the variance. Conversely, there is an assumption that the national accounts have less measurement error in the mean than does the HBS. It is highly unlikely that the measurement errors take exactly this form. In reality, both sources have errors in both mean and variance.

Consider in particular the national accounts estimate of consumption. The fundamental macroeconomic identity gives
GDP \equiv C + I + G + X - IM, \quad (10.1)

where C is consumption spending, I is investment, G is government spending on goods and services, X is exports, and IM is imports.

In most cases, consumption spending is estimated as a residual, obtained from estimated final production (that is, GDP) less net exports, investment, and government consumption (for which relatively good data exist). For a poor country, the production estimate begins as physical volume (for example, projected crop yields multiplied by estimated crop area), and is then converted to values. This is coupled with a fixed coefficient assumption for the rest of the production sector (for example, the allocation of goods to intermediate versus final usage). Notice the multiple entry points for error.

The information on distribution may also be suspect. Practitioners of the national accounts method often use the published income or consumption quintiles (as opposed to the unit-level survey data), which may disguise severe problems in the underlying data. Of course, in this respect it is unfair to blame researchers for their use of quintile data, because the unit-level data are often not publicly available.

In any event, the direction of errors induced by the acknowledged flaws in the HBS is not clear. Even if the underrepresentation of upper incomes causes the HBS to underestimate mean and variance, the “true” distribution may not have a greater mass below the poverty line than the estimated one. However, the national accounts consumption adjustment, being a pure scale adjustment, clearly reduces the headcount measure.

This seemingly technical debate about data sources has been conducted against the background of an increased orientation in international development policy toward achieving results, and specifically an expectation that the cumulative official resource flows to developing countries and the associated initiatives (such as Poverty Reduction Strategy Papers and the Highly Indebted Poor Countries initiative) should by now have led to an appreciable reduction in poverty. However, countries that have been considered success stories in their pursuit of these new development frameworks (Uganda, for instance) have displayed disappointing rates of poverty reduction relative to per capita GDP growth.

Increased research attention has therefore been directed to the issue of “pro-poor growth,” namely, the extent to which those at the lower end of the income distribution benefit from the growth process. It is the antithesis of this approach to simply ascribe the mean rate of consumption growth to the entire distribution, which assumes that the benefits of growth across the income distribution are neutral. A fuller discussion of the decomposition of poverty changes into growth and distribution components is given in chapter 11, along with some recent examples that show that, in the short run at least, changes in distribution have an appreciable effect on the extent to which economic growth translates into lower poverty rates.
The assumption that national accounts data represent a simple grossing up of household budget survey data is a problem for the consumption categories where the two measures do not overlap and where consumption patterns differ systematically across the income distribution. Nevertheless, these arguments cut both ways; if we acknowledge that the HBS data do seem to miss some aspects of growth, whether it is safe to use them to study pro-poor growth can be questioned. All our information about income distribution comes from the HBS, meaning that we know very little about the distribution of national accounts consumption, yet it is this distribution that may drive public perceptions of the equality of the growth process.

Finally, as with many seemingly tempestuous disputes in economics, some of the apparent differences between different schools of thought weaken in the face of pragmatism. For instance, Karshenas (2004) advocates a hybrid approach to measuring poverty in which HBS and national accounts are combined, in recognition of potential errors in both. Similarly, while World Bank researchers have doggedly defended their reliance on survey data, they use national accounts consumption growth data to extrapolate their poverty counts between survey years and to generate forecasts of poverty reduction.

Debate 2: Is World Poverty Really Falling?

The World Bank’s estimates of the fall in poverty since the early 1980s have been criticized by Sanjay Reddy and his coauthors (Pogge and Reddy 2003; Reddy and Minoiu 2006; Reddy, Visaria, and Asali 2006), and while few of the points they raise are new, they have argued them with considerable vigor. To recap, the methodology used by the World Bank (Chen and Ravallion 2004, 2008):

- Picks a poverty line (now $1.25 per person per day in 2005 prices)
- Uses PPP exchange rates to translate this into poverty lines in domestic currencies in 2005
- Uses domestic consumer price indexes to find the poverty line, in domestic currencies, for years other than 2005
- Applies the poverty line to expenditure distribution data that have been collected by 675 household surveys in 116 developing countries; where possible, original survey data are used, but often the computations are based on fitting Lorenz curves to published tabulated data from the surveys, to establish the number and proportion of people who are poor
- Establishes poverty rates and levels for three-year intervals, using interpolation for those cases where household surveys were undertaken on “off” years
- Aggregates the numbers for individual countries to provide poverty rates and levels by broad region and worldwide.
Each of these steps may be criticized, and the debate is summarized below. Ravallion offers a spirited defense of the World Bank’s approach, arguing that Reddy and his coauthors overstate the possible weaknesses of the Bank’s methodology, and have “sidestepped the problem” of setting up an international poverty line that reflects constant purchasing power over commodities (Ravallion 2008).

Review Questions

10. Bhalla adjusts household survey data on expenditures upward to ensure consistency with national accounts figures, and argues that the result is that the world is already close to meeting, or may even have met, the Millennium Development Goals for poverty reduction.

- True
- False
- Uncertain

11. Which of the following steps is not part of the World Bank’s methodology for computing the $1/day world poverty rate?

- A. Pick a poverty line that allows households to buy enough food and other basic needs.
- B. Use an average PPP exchange rate to translate the poverty line into domestic currency terms.
- C. Use a domestic consumer price index to find the appropriate poverty line, in domestic currency, for the years in which household surveys were undertaken.
- D. Measure the number of poor in a country by determining, based on fitting Lorenz curves, how many fall below the poverty line.

Choice of Poverty Line

Pogge and Reddy (2003) argue that the original “$1/day” poverty line—in effect, $1.08 per person per day in 1993 prices—is too low. They claim that this level is arbitrary and is not properly rooted in a “capabilities” (or basic needs) approach to measuring poverty, and they suggest that one could hardly survive on such a small amount in the United States; by implication, if this poverty line is appropriately translated into other currencies, it would be difficult to survive at such a low poverty line in those currencies, too. The revision of the poverty line to US$1.25 in 2005 prices would not alter this criticism.

A more recent article by Reddy, Visaria, and Asali (2006) no longer makes the case that the $1/day poverty line is too low. They compare poverty lines for Nicaragua, Tanzania, and Vietnam generated using a cost of basic needs approach (as outlined in chapter 3), with poverty lines based on the $1/day and $2/day standards. The results are displayed in table 10.4, and show that for Nicaragua and Tanzania the cost of basic needs approach actually gives a lower poverty line than the $1/day approach; however,
for Vietnam the cost of basic needs poverty line is close to the $2/day poverty line. The conclusion is clear: the $1/day or $2/day standard provides a poor approximation to the (relatively theoretically satisfactory) cost of basic needs approach, but does not necessarily systematically underestimate it.

Use of PPP Exchange Rates

There are two further distinct issues. The first involves the stability of PPP exchange rates over time, and the appropriateness of using an “average” PPP exchange rate. Pogge and Reddy (2003) note that when a new set of PPP exchange rates was published for 1993, superseding those of 1985, they led to considerable changes in measured poverty rates (using the $1/day poverty line); a similarly large set of revisions occurred when the 2005 PPP exchange rates were introduced. Thus, international comparisons of poverty are not robust to the measures of PPP exchange rates, many of which are, in any case, imputed using regression techniques rather than being based on direct price observations. Deaton (2003b) suggests that a pragmatic response is to avoid revising the PPP exchange rates too often; but eventually revisions become inevitable, and the problem re-emerges, and we know (theoretically from the Balassa-Samuelson effect, empirically from the Penn effect) that PPP exchange rates vary systematically over time, showing a faster appreciation in countries with more rapid economic growth.

The second problem is that the World Bank uses a PPP exchange rate that is applied to a broad basket of goods and services, and not necessarily the basket of goods and services that is relevant for poor households. Pogge and Reddy (2003) suggest that poverty (measured using the $1/day standard) is understated as a result, on the grounds that the poor mainly consume tradable goods, so the use of a PPP exchange rate overadjusts for price differentials. However, this is by no means self-evident, and merits further study.

Use of Consumer Price Indexes to Adjust the Poverty Lines over Time

Ideally, one would use a price index that reflects the costs faced by poor consumers, not by the average consumer, to adjust poverty lines over time, but this is rarely done.

Table 10.4 Poverty Lines Using $1/Day and $2/Day and Basic Needs Measures

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>$1/day</td>
<td>4,017</td>
<td>147,614</td>
<td>629,341</td>
<td>953,794</td>
</tr>
<tr>
<td>$2/day</td>
<td>8,034</td>
<td>295,227</td>
<td>1,258,682</td>
<td>1,907,588</td>
</tr>
<tr>
<td>Cost of basic needs</td>
<td>3,018</td>
<td>80,365</td>
<td>1,160,363</td>
<td>1,758,581</td>
</tr>
</tbody>
</table>

Sometimes it is possible to adjust the poverty line using an index of food prices, but this, of course, ignores the evolution of the prices of nonfood items, which constitute about a third of total expenditures for someone at the poverty line. The problems involved in finding appropriate price indexes are serious, as our discussion of the studies of poverty in Indonesia following the financial crisis of 1997 makes clear (see chapter 11).

### Applying the Poverty Line to Household Survey Data

About half of all the people in the developing world live in China and India alone. It follows that the evolution of world poverty will depend heavily on the course of poverty in these two countries. Unfortunately, the data on poverty for these two countries have some serious problems. The surveys done in China in the 1980s were of questionable quality; and until recently there was no direct measure of China’s PPP exchange rate. A change in the survey methodology used in the “thick” round of the Indian National Sample Survey in 1999–2000 appeared to imply that poverty in India had fallen but little in the 1990s, which was hardly plausible given the rapid economic growth experienced during that decade. A number of efforts have been made to adjust the 1999–2000 numbers to make them more comparable with previous survey data (there is an extended discussion of this in chapter 16) but there remains considerable uncertainty about the true extent of poverty reduction in India during the period in question. Reddy and Minoiu (2006) present the results of a sensitivity analysis showing that it is just possible that the world poverty rate (using the $1/day level) did not fall in the 1990s, and it is more possible that the number of people in poverty did not fall during that decade. The real message here is that measures of world poverty are not yet robust enough to be used to make strong statements about progress in reducing poverty.

Pogge and Reddy (2003) argue that the World Bank approach to measuring world poverty is too flawed to be useful. Instead, they would ask every country to measure poverty using a cost of basic needs approach—they refer to it as measuring a “set of elementary capabilities,” but it comes to the same thing—based on the expenditure required to provide enough calories to live on, plus a reasonable nonfood component. This is an attractive, if not particularly new, idea. Why, then, has this approach not been used? The answer is that it is costly and has its own methodological problems.

The World Bank’s $1/day approach—now US$1.25 a day—makes parsimonious use of survey data; all that is really needed are the average expenditure level and a breakdown by, for instance, expenditure per capita quintiles, along with PPP exchange rates and consumer price indexes. A good researcher could input the data for hundreds of surveys into PovcalNet and come up with estimates of world poverty and its evolution in a matter of a few weeks. However, to implement a cost of basic needs approach,
researchers have to work with the underlying survey data, which is relatively tedious (and requires that the data be available, which is by no means always the case).

Over time, it is likely that most countries will have in-house analysts who can measure poverty using the cost of basic needs approach, following a consistent set of guidelines. But perfect comparability will never be achieved: surveys will ask different questions and in different ways; they will differ in sample size and design; they will use different techniques to measure food and other prices; they will use different methods to inflate prices over time. And one still has to address the issues of whether survey data need to be adjusted to be compatible with national accounts; whether one should use adult-equivalence methods; and how precisely to determine an appropriate level of nonfood (or even food) spending.

Perhaps these problems are no different from those faced by statisticians who compile national accounts data, even though they all follow the same UN guidelines. A similar effort might be worthwhile for poverty measurement—the compilation of a set of formal guidelines for measuring poverty using the cost of basic needs method.

**Review Questions**

12. Which of the following is not a criticism that Reddy and his co-authors have levied at the World Bank’s approach to measuring world poverty?

- A. Measured PPP exchange rates vary over time.
- B. The $2/day standard is too low.
- C. The data on poverty reduction on India are subject to considerable uncertainty.
- D. The use of a consumer price index does not necessarily reflect the evolution of prices of the goods and services consumed by the poor.

13. The World Bank’s approach to measuring world poverty requires less information from individual household surveys than would be required if one were to apply a cost of basic needs approach.

- True
- False
- Uncertain

**Conclusion**

We conclude by mentioning some current directions of research on the link between macroeconomic and poverty outcomes. It is now well documented that the elasticity of poverty with respect to growth varies over time and space, prompting investigation of what set of initial conditions makes this elasticity bigger. Furthermore, it is increasingly recognized that while growth remains central to poverty reduction—as the discussion of the Dollar and Kraay results in chapter 9 made clear—it is not the
only way to reduce poverty; particularly in the short and medium term, inequality also matters.

There are certain policies with modest immediate growth effects but strong poverty impacts, or in the terminology above, policies that lead to a high elasticity of poverty reduction with respect to growth. Prime examples are reforms to security of land tenure, microcredit, and the expansion of basic education. A strict focus on a growth-poverty link might overlook such policies.

Poverty analysts are also looking at methods to improve the measurement of consumption, with the objective of balancing the gain from better source data with the loss of comparability to previous data.

Notes

1. Information on the overall MDGs and progress toward them can be found at http://www.developmentgoals.org/.
2. The countries are Malawi, Mali, Ethiopia, Sierra Leone, Niger, Uganda, The Gambia, Rwanda, Guinea-Bissau, Tanzania, Tajikistan, Mozambique, Chad, Nepal, and Ghana (Chen and Ravallion 2008, 11).
3. For years in which there are no household surveys, Chen and Ravallion adjust the household survey data on consumption from other years by linking this information to the evolution of consumption in the national accounts; they then recompute the poverty rate using the consumption data thus interpolated.
4. Chen and Ravallion (2008) used PPP exchange rates for 98 of the 116 countries in their sample, and used PPPs based on regression models for Algeria, Costa Rica, the Dominican Republic, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Papua New Guinea, St. Lucia, Suriname, Timor-Leste, Trinidad and Tobago, Turkmenistan, and Uzbekistan.

References

Haughton and Khandker