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Concepts and Measurement

In September 2000, the Millennium Summit of UN members issued the Millennium Declaration. That declaration defined eight Millennium Development Goals (MDGs), an integrated global commitment to significantly reduce human poverty and underdevelopment by 2015. The 2002 World Summit on Sustainable Development in Johannesburg slightly extended but primarily reaffirmed those goals. The MDGs include eighteen elaborated targets and forty-eight mostly quantifiable indicators.

The first goal, reduction of poverty and hunger, calls for the dual targets of halving by 2015 the proportion of people around the world who live on less than $1 per day and the proportion who suffer from hunger. The three more specific indicators that accompany the poverty target and broaden attention to poverty are as follows:

1. The proportion of the population below $1 per day at purchasing power parity (PPP).
2. The poverty gap ratio, $1 per day.
3. The share of the poorest quintile in national income or consumption.

The very specific conceptualization and measurement of poverty embedded in the first MDG is extremely useful, and this report relies heavily upon it for much the same reason as do the UN, the World Bank, and others who pursue poverty reduction, namely that the definition is clear and the indicators are available. However, debate continues about how more generally and ideally to define and measure poverty, and this chapter reports on that debate in two parts.

The first part begins with fundamental conceptual issues related to the meaning and measurement of poverty. We discuss issues related to the conceptualization of poverty in income terms, beginning with the presentation of two groups of poverty measures (headcount/headcount ratio and poverty gap). The discussion then presents the ideas of relative

poverty and proceeds further to explore the notion of capabilities as a broader foundation for understanding poverty.

The rest of the chapter addresses some of the many complications confronting practical efforts to apply measures and to forecast poverty futures. Our critical focus in the second part is on the most influential approach to poverty measurement, that of the World Bank.

The Concept and Measurement of Poverty

There is a vast literature on the definition and measurement of poverty. Caterina Ruggeri Laderchi, Ruhi Saith, and Frances Stewart (2006: 11) compare four approaches to poverty definition—monetary, capability, social exclusion, and participatory:

> The considerable lack of overlaps between the different approaches means that targeting according to one type of poverty will involve serious targeting errors in relation to other types. Moreover, definitions also have implications for policy. While a monetary approach suggests a focus on increasing money incomes (by economic growth, or redistribution), a capability approach tends to lead to more emphasis on the provision of public goods. Social exclusion draws attention to the need to break down exclusionary factors, for example, by redistribution and antidiscrimination policies.

Ruggeri Laderchi and her colleagues make a good point about conceptualization affecting policy. A largely monetary approach has steered this volume toward domestic and international policy levers (see Chapters 7 and 8) that mainly seek to increase money incomes. Antidiscrimination policies do not figure prominently in the list of interventions for the simple reason that they do not directly influence an aggregate income-based poverty measure; indeed, there is no structure in our model to assess such policies.

A focus primarily on income and interventions to enhance it is important because it is difficult to envision a poverty assessment methodology in which an increase in money incomes would be *bad* for poverty reduction. Nonetheless, attention to human capability is also critical, and this chapter will explore Amartya Sen's approach to defining and using capabilities, related in part to health and education. It will direct much more limited attention to social exclusion and participation.

Income Poverty: Absolute Measures

The common general intuition is that **poverty** exists when a group of people cannot attain a "minimum" level of well-being. The minimum could be at least partly dependent upon the prevailing standards of society and therefore measure **relative poverty**, an issue to which the discussion will return. However, there are dimensions of well-being, such as biological minimums in nutrition, that might actually define **absolute poverty** in a manner that can allow comparison of people across societies.

Many complications can arise in setting income-based poverty levels in either absolute or relative terms. Gary Fields (2001) identified four questions:

1. Is the basis income or consumption, and how comprehensively will either one be measured?
2. What is the income-receiving unit: individual, family, per capita, or adult equivalent?
3. Will there be a single poverty line or will there be separate ones for urban and rural areas or different regions of the country?
4. Is the poverty line income determined scientifically, politically, subjectively, or as a matter of convenience?

In the following sections we discuss two groups of absolute income poverty measures: (1) the poverty headcount and headcount ratio and (2) the poverty gap within the general class of measures that are more sensitive to the deprivation of poorer people.

The poverty headcount and headcount ratio

Poverty headcount is defined as the number of people in a population who fall below a specified poverty line, such as $1 per day. From that we can derive the poverty **headcount ratio**, the fraction (normally percentage) of the total population that is poor.

These two measures have features that make them very attractive and widely used. First, they are simple in both concept and measurement.

Although the MDGs include very specific targets and indicators for poverty, conceptualization and measurement of poverty require broader perspectives.

Both monetary and capabilities approaches help in understanding poverty.

When we are told that 1 billion persons in the world are poor using a poverty line of U.S.$1 per person per day, the extent of poverty seems obvious. Second, they are universal, in that they potentially allow direct comparison of people anywhere in the world. Third, the data for use of the measures have been widely gathered via surveys around the world—they are available.

The measures also have many weaknesses. The headcount's most significant blind spot is that the measure is insensitive to the depth of deprivation among the poor. For example, a person well below the poverty line, earning only a few cents per day, may be said to be suffering much more than a person with daily income just below a dollar. Therefore the headcount does not satisfy a desired measurement property called **strong monotonicity**, which states that a poverty index must show less poverty in response to any increase in a poor person's income. Unfortunately, if large numbers of people moved from an income of 50¢ per day to 75¢ per day, a poverty headcount based on $1 per day would show no change.

Absolute poverty measures differ on many important characteristics, including their responsiveness to distribution.

Nor does headcount satisfy **distributional sensitivity**, which requires that any transfer from a poor person to a less poor person must also show an increase in poverty because the less poor person has a lower level of need. Ironically, if a poor person transferred enough money to a less poor person to lift the recipient above the poverty line, the poverty headcount would fall, contrary to commonsense notions of poverty reduction. A related problem with headcount is that if a poor person were to die from poverty-related deprivation and disease, poverty as measured by this index would show a decrease. That certainly seems perverse.[1]

The poverty gap and the FGT family of measures

The poverty gap, another widely used measure, is the average (normalized) income shortfall among the poor, expressed as the average shortfall as a fraction of the poverty line. The IFs model calculates the poverty gap and its various power functions, as well as the headcount and headcount ratio.

The poverty gap measure is responsive to the distance of people below the poverty line and therefore does exhibit strong monotonicity. Still, problems persist. If an individual just below the poverty line were to receive a large enough income gain to escape poverty, the average income among the remaining poor would fall, and therefore poverty would rise. And if one individual moved from 50¢ to 30¢ per day, whereas another moved from 70¢ to 90¢ per day, they would offset each other. Our commonsense notions of poverty would say that the loss of 20¢ per day at a lower level is more significant than the gain of 20¢ at a higher level (the property of distributional sensitivity).

A variation of the measure can reduce the impact of the first weakness and eliminate the second weakness. The poverty shortfall of poor individuals can be used as a weighting scheme to give more weight to the poorer individuals. For instance, the gap of individuals below the poverty line can be squared. A popular family of such indexes is the one developed by James Foster,

Box 2.1 The Foster, Greer, and Thorbecke family of poverty measures

The FGT index, which has been used with increasing frequency in macroeconomic models incorporating poverty analysis, has many desirable properties. In addition to having the monotonicity and distributional sensitivity properties, it also has the property of being **additively subgroup decomposable**. That means that the index is decomposable by subgroups (according to region, income class etc.) among the poor. It can also be used to measure specific types of poverty. Thus, for instance, this index can take into account the intensity of food poverty for different groups of poor people, which is done by looking at the deprivation of calories. The poverty measure is given by:

$$p = 1/n \sum (Gj/z)^a$$

where n = *total population*
q = *the number of poor*
z = *the poverty line*
Gj = *food expenditure shortfall of the jth individual* ($j = 1,2,\ldots,q$)

In many studies, a value of "a = 2" is used, which satisfies both the monotonicity and transfer axioms of Amartya Sen.

Source: Khan and Weiss (2006).

Joel Greer, and Erik Thorbecke (FGT). Box 2.1 gives further technical details.

There are other weaknesses of all standard absolute poverty measures. For instance, public goods and negative externalities do not often enter into the calculations of poverty indexes, but arguably they should.[2] Haider Khan (1994a, 1997a) shows theoretically that under even an egalitarian distribution of bads, proper use of environmental accounting would show rather more poverty under most circumstances than do our standard measurements.

Setting absolute poverty levels

The establishment of useful absolute poverty levels is also complicated. The widespread use of $1 per day at purchasing power parity, often referred to as the level of **extreme poverty**, is closely related to the rough correspondence between that level and the ability to acquire enough food to avoid calorie-related malnutrition.[3] It is not a coincidence that global counts of those suffering extreme poverty and those suffering malnutrition are similar. Box 2.2 explains purchasing power parities.

Montek S. Ahluwalia, Nicholas Carter, and Hollis Chenery (1979) first identified an absolute international poverty measure for comparison across countries. In doing so they used the International Comparison Project's (ICP's) earliest version of purchasing power parity data to explore global levels (see Kravis, Heston, and Summers 1978a, 1978b).[4] They set the poverty line based primarily on data from India. The level chosen was $200 per capita, the forty-fifth percentile of income in India in 1970 ICP dollars, which in 1985 dollars is quite close to the more contemporary $1-per-day level. That initial specification of poverty level also corresponded roughly with access to 2,250 calories per day.

Since 1990 the World Bank (see Ravallion, Datt, and van de Walle 1991) has relied upon a head-count measure of poverty based on a perception that extreme poverty exists with incomes of less than $1 per day at 1985 PPP. One dollar per day was subsequently converted to $1.08 per day at 1993 prices measured at PPP, but the shorthand, casual reference to $1 per day remains common and will be the practice in this study also.[5]

Unfortunately, the adjusted value is very controversial. Critics such as Thomas W. Pogge and Sanjay G. Reddy (2003) have argued that the basket of goods used for PPP calculation does not reflect consumption by the poor and that changing the base year for the $1-per-day poverty definition from 1985 to 1993 is not innocuous (since they potentially yield different poverty numbers; there is no easy way to convert one line to the other).

A common argument is that the adjustment to 1993 was far below the inflation rate of the dollar over those eight years and that the adjusted level should therefore actually be much higher. For instance, Nanak Kakwani (2004a) converted poverty lines constructed in the late 1990s for ten low-income countries into 1993 PPP dollars using the relevant consumer price indices (CPIs) and PPP exchange rates. He found that the poverty lines diverged from the $1.08 per day World Bank's standard. For Gambia, the line was the highest, at $2.52 per day.

Martin Ravallion (2002a: 4) offered a spirited reply to criticism around inflation-based adjustment:

> The naive approach of simply adjusting the old line upwards for inflation in the US would ignore the fact that there has been (in effect), a PPP devaluation of poor countries relative to the US over the period. For example, China's and Indonesia's poverty lines at 1985 PPP are almost identical to their poverty line at 1993 PPP; India's poverty line at 1993 PPP is only 17 percent higher than its poverty line at 1985 PPP. Yet adjusting the 1985 $1/day line for US inflation would entail an upward increase of roughly 50 percent. In other words, if we had simply

Setting absolute poverty levels for comparison across countries and adjusting them for inflation are far from trivial tasks.

Box 2.2 Purchasing power parity

Economic measures such as gross domestic product, income, or household consumption are often compared across countries by converting values to a common unit such as dollars using official market exchange rates (MER). Doing so is useful but ignores the very different purchasing power that a dollar has in different countries. Economic measures can also be converted into common units by computing purchasing power parity (PPP) between countries. To do so, a standard market basket of goods is identified, priced in local currencies, and used to compute the PPP exchange rate.

Typically, poorer countries have higher income and consumption levels when PPP rates are used. For China, for instance, the income levels are about 2.5 times as high (recently revised downward), partly because the official MER is maintained at a low rate, but even developing countries that allow currencies to float freely typically have a PPP rate that is substantially higher than the MER.

In order to make the $1-per-day poverty rate truly comparable across countries, the PPP rate is used.

We need to use monetary measures of absolute poverty that supplement that of extreme poverty.

> adjusted the $1/day line for inflation in the US between 1985 and 1993 we would have obtained a poverty line which is well above the median of the 10 lowest poverty lines at 1993 PPP, and so could no longer claim to be the poverty line that is typical of poor countries. That would certainly entail a recalibration of the ruler.

In spite of the ongoing debates, the analysis of this report accepts the World Bank's numbers from recent surveys using the $1.08 standard as the best calculations available of extreme poverty headcount and rates. Because our base forecasting year is 2000 and because most economic data are now presented in constant 2000 dollars, our preference would have been to convert the $1.08 level from 1993 dollars into 2000 dollars; but the difficulty that even the World Bank has in adjusting the level across base years argues strongly against doing so.

Nonetheless, this report looks fifty years into the future. It would be unreasonable to expect the most common measure of absolute poverty to be unchanged during this period. Moreover, for selected regions of interest to us, including the transition economies of Eastern Europe, $1 per day is already not a very useful benchmark. We therefore frequently use the $2 per day standard (actually $2.15 at 1993 PPP), sometimes referred to as **moderate poverty**.

Relative poverty measures should supplement those for absolute poverty, particularly as incomes rise.

More generally, our use of lognormal representations of income distributions (see Chapters 3 and 4), allows the estimation of poverty headcount and rate at essentially any level of interest, for instance, $10 per day. The same foundations allow the estimation of a percentile level (such as the poorest quintile) and the inverted calculation of the income level that separates that quintile from the rest of the population (see again the third indicator for the first MDG target at the beginning of this chapter).

Income Poverty, Relatively Speaking

Is poverty in the eye of the beholder? Some people have thought so. Indeed, there is little doubt that people in different parts of the world feel subjectively different senses of deprivation relative to reference groups in their own societies. Thus, a $1 per day poverty line, even for all "developing" countries, seems quite arbitrary and is usually justified by underlining the need for a uniform comparison of the success or failure of poverty reduction strategies followed by different developing countries. In contrast, a relative poverty measure may be attractive in assessing a subjective sense of well-being within a particular country.[6]

"Relative poverty" really embodies two separate ideas and sets of measures. On the one hand, there is poverty relative to some group within a population. For instance, a group that is relatively the poorest (e.g., the poorest 10, 20, or 40 percent) is identified, and the poverty measure is taken to be the average real income at a certain time of this "poorest" group.

On the other hand, there is poverty relative to average national incomes. For example, Martin Ravallion, Gaurav Datt, and Dominique van de Walle (1991) show empirically that the poverty lines used in countries tend to increase with their consumption levels. Abdel Gadir Ali (1997) quite forthrightly defends raising the poverty line as the mean increases. He claims that this is "obvious to us, Africans living amidst poverty." Although there are different ways of adjusting the poverty line as a function of the mean income or consumption, the easiest such adjustment is to raise the former in proportion to any increase in the latter. This will clearly lead to a continuously redefined relative poverty measure.[7]

The Capabilities Approach to Poverty

Some basic issues

Income allows comparison across individuals. The use of income-based poverty measures implicitly builds on an assumption that some degree of income equality, either the collective surpassing of an absolute poverty line or of a line relative to others in society, is desirable. But is income the right metric?

In his preface to *Inequality Reexamined*, Sen suggests it is not:

> The central question in the analysis and assessment of equality is, I argue here, "equality of what?" I also argue that a common characteristic of virtually all the approaches to the ethics of social arrangements that have stood the test of

> time is to want equality of *something*—something that has an important place in that particular theory. Not only do the income egalitarians … demand equal incomes, and welfare-egalitarians ask for equal welfare levels, but also classical utilitarians insist on equal weights on the utilities of all, and pure libertarians demand equality with respect to an entire class of rights and liberties. (Sen 1992a: ix; italics in the original)

Sen argues that what we need to equalize is not income or utility but human capabilities. A crucial distinction is between **functionings** and **capabilities**: "'functioning' is an achievement such as a level of nourishment or general state of health, and a 'capability' is the ability to achieve" (Kakwani 2006). Capabilities so defined do not lend themselves to easy measurement. In an essay discussing the empirical issues in making the capability approach operational, Sebastian Silva Leander (2005: 4) notes:

> The question of how best to capture capabilities when measuring poverty has yet to be resolved at the conceptual level and hence, there is no consensus on how to proceed with this at the empirical level. The hard fact is that it is extremely difficult (arguably impossible) to observe capabilities in practice. And while it may be possible to approximate a very crude version of this concept by estimating vectors of achievable functionings, this will not take into account the concerns relating to agency and autonomy (i.e., why a person chooses or not to execute his attainable functionings), which are an important component of Sen's critique of neoclassical theory.

Underlying the capabilities perspective is thus a respect for individual diversity. One may choose the best possible functionings for oneself from all available ones. Poverty or deprivation in general is thereby redefined as not just inadequate income, but as more fundamental inadequacies of capabilities.

At the same time, the principle of equalizing capabilities in Sen's analysis of development leads to a policy of redistributing resources toward certain socially and economically disadvantaged groups (thereby linking the capabilities approach to those of social exclusion and participation). It is useful to underline the *social* nature of capabilities. Khan (1998) pointed out that without a concrete set of social, political, and economic institutions in the background, the concept of capabilities remains intractable and suggests the use of the term "social capabilities."

Since 1990, the United Nations, through its *Human Development Reports (HDRs)*, has supported the use of measures of human development and human capabilities.[8] Among other things, that has resulted in the formulation of the human development index (HDI). In addition to national income per capita, the HDI includes other capabilities-based functionings such as life expectancy and literacy rates (see Box 2.3 for more details). One does not have to accept the specific form of the United Nations' human development index to see the usefulness of moving beyond consumption- and income-based measures.

More recently, the UNDP has developed the human poverty index (HPI). It is a composite index measuring deprivations, as opposed to achievements, in the same three basic dimensions captured by the HDI (see, again, Box 2.3). Sakiko Fukuda-Parr (2006) reported that the correlation between the HPI and the $1-per-day poverty measure is weak.[9] Countries such as Pakistan and Yemen, which have lower levels of income poverty, have higher levels of HPI, whereas the situation is reversed in a country such as Tanzania. Similar reversals are seen in the rankings of per capita gross domestic

A capabilities-based approach to assessing poverty has much merit, and the HDI can help.

Box 2.3 The United Nations Human Development Index (HDI)

The UN HDI is a composite measure of several human development factors such as income, literacy, education, and life expectancy. Many consider it the standard measure of human development or well-being for countries. The United Nations Development Programme (UNDP) developed the HDI in 1990 under the guidance of Mahbub ul Haq. The UNDP provides it annually in its *Human Development Reports*.

The HDI aggregates measures of three basic dimensions of human development: standard of living, basic knowledge acquisition, and the expected length of life. Knowledge is measured by adult literacy rate (given two-thirds weight) and the combined primary, secondary, and tertiary school enrollment rate (one-third weight). Standard of living is measured by a log of gross domestic product (GDP) per capita at purchasing power parity (PPP), capped with a maximum that can rise over time. Finally, length of the average life is measured by life expectancy at birth.

Source: UN 2007.

product (GDP) and HDI. Therefore, higher incomes do not automatically translate into lower poverty in this framework.

The relationship between income poverty and capability poverty

In spite of imperfect correlations, there is a direct relationship between the two primary approaches to understanding poverty. As income grows, other things being equal, realization of capabilities also increases. In addition, improvement of basic education or health care confers greater ability to generate income so as to escape income poverty.

Antipoverty policy should not concentrate solely on reducing income poverty, although that should be an important component. The fundamental issues associated with poverty and deprivation should be understood in terms of the freedoms people have and the lives they can actually lead; capabilities are themselves essential.

This contrast can be seen in several different areas connected to human well-being. As Sen illustrates, in the United States African Americans are poorer in terms of income than American whites; when compared to the rest of the world, however, African Americans are far richer, thus softening this inequality. But when other measurements of capability, such as the basic capability to live to a mature age, are considered, the situation looks very different. As a racial group, African Americans have a higher mortality rate than American whites. Furthermore, in some parts of the United States, the average life expectancy of an African American male is lower than that in some developing countries, which constitutes a very significant deprivation of capabilities. In the same light, focusing in Europe on the ability to be employed and the negative effects of unemployment, despite income support, paints a troubling picture.

Box 2.4 Chronic versus transient poverty: Where the poor are and why they are poor

It is important to understand that identifying poverty is not a simple problem because poverty has many different aspects and several dimensions. Two of the most important types of poverty uncovered by recent research are known as chronic and transient poverty.

Chronic poverty persists in spite of economic growth and interventions such as temporary transfers of income. The chronically poor are almost always poor throughout their lives and often pass this condition to future generations. In general, they benefit the least from economic growth and standard development projects. If and when the chronically poor have employment, it is insecure and often at very low wages. Many live in rural areas, urban slums, and conflict zones and often suffer mild to extreme health problems. Children, the elderly, and people with disabilities are particularly affected by chronic poverty. The chronically poor are the "invisible" poor; development projects often have little or no positive effects on their situations. Barriers to accessing resources and pursuing opportunities are the main reasons for the persistence of chronic poverty.

Those suffering **transient poverty** are not *always* in an economic and social situation that could be called "poor." They are the "sometimes poor." They are at risk of becoming chronically poor. They suffer many of the same risks and lack of opportunities to gain access to productive assets and lack basic capabilities. Transient poverty is particularly common in economies that are undergoing some type of transition, such as the Russian economy.

It has been estimated that in the world today there are between 300 and 420 million people trapped in chronic poverty. The chronically poor live in all regions of the world, with the largest numbers residing in South Asia. Additionally, the nations with the highest levels of chronic poverty, roughly 40 percent, are in sub-Saharan Africa. In terms of actual numbers of chronically poor individuals in the various regions of the world, 121.3 million reside in sub-Saharan Africa, 84.9 million in East Asia and the Pacific, and 187.5 million in South Asia, 28 million individuals are chronically poor and residing throughout the rest of the world.

Why are they poor? Although the picture differs slightly from country to country, both financial and physical asset holdings are among the major determining factors as to which households will suffer either of these aspects of poverty. For example, in China the lack of physical capital is a significant determining factor for both chronic and transient poverty; however, large household size and low level of education for the head of household determine chronic but not transient poverty. Isolation in remote rural areas is often associated with chronic poverty as well.

Events such as natural disasters, internal and external wars, and disease can promote the continuance of chronic poverty and transform transient poverty into chronic poverty. There could also be social and economic barriers arising from a caste system, as in India, or from belonging to groups that are generally discriminated against, such as the Indios in Latin America, the Burakumin in Japan, or women almost everywhere.

In the *Chronic Poverty Report*, the Chronic Poverty Research Center of the University of Manchester offers several suggestions for a framework of action for handling the problems presented by chronic poverty. Many of these suggestions also apply to transient poverty. Promoting livelihood security is a key step in helping the world's poor. This is especially pertinent when considering the effects of disease, war, and disasters on the chronically and transient poor. Also, ensuring access to opportunities and providing the means to access resources and capabilities are important in preventing both aspects of poverty. Additionally, there is a pressing need for empowering the chronically and transient poor to overcome the discriminatory factors that they face. In this light, basic education turns out to be an important part of a general antipoverty strategy. Finally, national and international efforts should focus on providing the needed resources to the geographical areas where the (chronically) poor are located. Thus the spatial dimension of poverty must be recognized as an important strategic variable in thinking about poverty reduction strategies (more on this in Chapter 3).

Source: Chronic Poverty Research Center 2005; World Bank, Attacking Poverty, World Development Report 2000–2001.

To summarize, there are at least three critical areas in which the capabilities approach can help us understand the dimensions of deprivation, and hence poverty and its effects, better than income-based measures can. One is the specificities of deprivation in concrete, nonincome dimensions such as health or literacy. The second is the variability in people's ability to convert income to concrete functionings and capabilities. Finally, the *social* capabilities approach helps focus attention directly on the institutions that help or hinder individuals to various degrees in realizing concrete achievements. Gender discrimination is an obvious but not the only illustration of this point. Similarly, the capabilities approach could be helpful on the important issue of chronic versus transient poverty (see Box 2.4).

The measurement of poverty in this book

In considering measures tied to capabilities and functionings, a few common themes emerge.

- Except for the HDI and HPI, most of the measures tied to capabilities and functionings have been applied to small groups of countries. Measures that attempt to more completely capture the nonincome facets of poverty are hard to generalize across countries, and data to support them are less readily available than those for the income-based measures.
- The application of capability-based measures appears very limited and when implemented captures functionings (achievements) such as nourishment rather than true capabilities (the ability to achieve). The HPI, though available for a broad cross-section of countries, is ultimately based on functionings.

It is important not to lose track of the reality that poverty is much more than an income-based phenomenon. Expansion of human capabilities and the freedom of action to which they give rise lie at the heart of human development.[10] Our forecasts in this report will, nonetheless, use mainly income- or consumption-based measures of poverty. We will supplement attention to income by some measures of education and health and by the HDI and HPI, all of which are considerably more difficult to forecast. Except for these supplements, the current state of the art appears to offer no alternate measure to income that can be broadly and consistently applied to study global poverty across countries and time.

The Consequences of Conceptualization and Measurement Perspectives

The strengths and weaknesses of poverty concepts and measurements are not abstract. Very often, those who are closest to the poor, for instance field representatives of nongovernmental organizations (NGOs), see a variety of problems that may not always be apparent from more conceptual perspectives. They may begin with the nature of headcount ratio indexes widely used, but the problems go well beyond a critique of this special class of poverty measures.[11] In particular, there are problems that merit discussion related to the balance between the extent of poverty and the resources directed at addressing it, aggregation of poverty into single numbers, policy time horizons for even helpful interventions, and market and nonmarket aspects of poverty.

Poverty incidence and resource availability

People involved in ground-level operations experience increasing pressure on their ability to provide services to the poor when their absolute number increases, even though the national or even regional statistics may show a decline in the percentage of poverty. If there is a limited amount of food to be distributed to the poor or a limited amount of shelter for them, it is their absolute number that really matters for the adequate provision of these services. With budget constraints that often cannot be relaxed as the absolute number of poor increases, the per capita service provision has to decline.

Improvements in measurement might indicate a poverty decline even when nothing has changed. That is what apparently happened in Ghana in the 1990s (Kanbur 2004). Since the 1980s, the household income expenditure surveys have improved a great deal. Previously omitted elements, such as production for home consumption, regional price variations, and

This study, although heavily focused on income poverty, also looks to capabilities.

imputation of use value to dwellings, are now routinely taken into account.

Disconnects between measurement and reality can work in the opposite direction as well. Information on public services provision is still not well integrated into these surveys. Although surveys sometimes contain separate modules on health, education, and infrastructure, these measures are rarely integrated fully into the income- or consumption-based measures of poverty estimates for households.

The problem of aggregation

Regional or group disaggregations may also pull in different directions, leading to different perceptions regarding trends in poverty at different levels of aggregation, a "poverty decomposition problem." For example, Ravi Kanbur (2004) cites the case of Ghana, where during 1987–1991 national poverty declined, as did rural poverty, but urban poverty actually rose. In Mexico in 1994, exactly the opposite regional trends were observed along with a decrease in national poverty.

Until disaggregation in analysis becomes routinely possible, we can begin with the basic understanding that different people who may be equally well informed may nevertheless look at different levels of analysis and assess them differently. As Kanbur (2004) and many practitioners, particularly NGO staff at the local level, have underlined, the more nuanced distribution and character of poverty (including the chronic/transient distinction) may be of as much relevance as percentage reductions in headcounts.

Thinking across time

Another set of issues in poverty reduction analysis flows from varying time horizons of different analysts considering the impact of poverty reduction policies. For example, economic theorists considering growth-oriented policies often think in equilibrium economics terms. That is, they focus on the results of policies after an economy has had the time to adjust to a policy intervention, perhaps five to ten years in the future.

Practitioners on the ground may shake their collective heads in disbelief at such perspectives, pointing out that the short run—even today or tomorrow—may be what really matters for the poor, especially the poorest.

The discussion in Chapter 7 of the impact of increased savings and investment rates on poverty in the short and long run illustrates this issue. Although increased saving may ultimately help drive economic growth and reduce poverty, its immediate and shorter-run impact on consumption levels can be significant, especially in the poorest countries and populations. The key question here has to be how to ensure the protection of the more vulnerable among the poor. More disaggregated policy-oriented models are really needed to address these issues.

Markets are not the only institutions

The assumption of most economists is that the perfectly competitive market structure is a reasonable approximation of the context for analysis of poverty, and there is no question that income levels and distributions are essential foundations. Approaches to poverty analysis rooted in an understanding of capabilities and social exclusion look, however, to a wider context. Embeddedness of the poor refers to their connections, or lack thereof, with all the economic, social, and political institutions that affect their lives (Khan 2003). Both (often imperfect) market and nonmarket institutions shape poverty. For instance, the existence or nonexistence of unions in the formal sector and the absence of bargaining power in the informal sector are features of particular socioeconomic structures in which the poor are embedded. Although it is very difficult to represent such features of societies in models, the analysis should not ignore them.

Controversies Related to Measurement and Data

Concepts should translate into measurement and data. Yet even measurement of the simplest concept of poverty, namely income poverty headcount, is plagued with some significant problems.

National income accounts versus household survey data

The core of the World Bank's empirical approach to determining how many people earn less than $1 per day (as in Table 1.1) is the use of country-based surveys. The number

of surveys has steadily expanded, reaching 454 across ninety-seven developing countries in the analysis by Shaohua Chen and Martin Ravallion (2004) that provided much of the poverty data used by the Millennium Project (2005) in its elaboration of proposals for meeting the MDGs. Such surveys allow an understanding of distributions of income or consumption levels across national populations and the specifications of shares associated with deciles or quintiles of population (or even the manipulation of data at the individual respondent level). The data have gradually become more freely available and easy to use.

Unfortunately, the country-level values obtained for household consumption from surveys are not the same as the values provided by aggregate national account statistics (NAS) and tend to be lower, especially for poorer countries. Moreover, the ratio between the values based on survey and national account statistics has been decreasing over time, thereby increasing the discrepancy between the two measurement approaches.

The two approaches thus give very different estimates for the levels of poverty and for its pattern of change. Both are imperfect approaches to poverty measurement. The great advantage of the survey approach is that it allows more rigorous checks on the quality and consistency of the underlying data, and it still remains the first choice for most of those working in the field. However, there are reasons to believe that household surveys may underreport the total value of household consumption (for example, the value that must be imputed for public services like schooling and health care) and that some of what the surveys miss will affect the poor. Hence the underlying data from the World Bank (see, again, Table 1.1) may significantly overestimate global poverty[12] and understate the degree of actual poverty reduction.[13] It has also been argued that national accounts statistics overstate consumption and its growth.

The choice of analysts between data based on surveys and data based on national accounts statistics would not be so problematic if the calculations of the ratios of mean societal consumption of the two were fundamentally constant over time. Then the estimates of poverty might vary across methodologies, but the patterns of change over time would be fundamentally the same. The problem is exacerbated because there has been a strong tendency for the discrepancy to grow over time. Angus Deaton (2004:12) notes that the rate of consumption growth in surveys is about half that in national accounts. The low ratio in India is especially striking.

Surjit S.Bhalla (2002, 2003) argued in favor of national account statistics and used them to estimate changes in poverty in the 1990s. He calculated a much more rapid decline than has been found in the World Bank surveys. Xavier Sala-i-Martin (2002a, 2002b) and others have also used national accounts and have similarly reported rates of decrease in global poverty (and/or declines in global inequality) that exceed the assessments of the World Bank.

Deaton (2004) is among those who have attempted to analyze the strengths and weaknesses of the two data types. Although he did not fully resolve the issue, he provided insights relevant to doing so. With respect to national accounts, he notes the following:

- A number of expert observers have suggested that growth rates in China have been overreported in recent years; assuming overreporting by about 2 percent per year eliminates the difference in the pattern of change between national accounts and surveys (Deaton 2004: 14).
- Consumption in national account data is fundamentally a residual, calculated by measuring production and adjusting it for exports, imports, and other items. Moreover, other values often are rooted in physical volumes, converted to monetary terms with prices that are not always easy to determine, thereby complicating that residual computation (Deaton 2004: 28).
- National accounts can pick up some double counting of consumption, for instance, vegetable oil attributed both to household use and restaurants (Deaton 2004: 33).

With respect to surveys, Deaton suggests the following:

- Surveys may be subject to underreporting of income/consumption by the richest. If so,

The controversy over the use of national account statistics versus the use of surveys is significant.

it would explain why survey means tend to be lower than those of national accounts, and also suggest that surveys still capture relatively accurately the situation of those living in poverty.

- Surveys appear sensitive to a variety of selection and structural issues. For instance, recall of consumption expenditures over the previous thirty days (the traditional survey horizon) was shown in an Indian study to be 17 percent less than that over seven days (Deaton 2004: 34–35).
- Rapid urbanization could affect surveys over time because urban dwellers may have greater noncompliance with surveys (Deaton 2004: 27).
- Surveys are less likely than national accounts to pick up consumption on behalf of households provided by nonprofit institutions (Deaton 2004: 31).
- Surveys have incomplete coverage, leaving out groups such as students and the military (Deaton 2004: 34).

We use survey-based data to determine initial conditions and national account statistics in forecasting.

Recognizing the strengths and weaknesses in both approaches, Deaton concluded:

> The downward bias in survey measures of consumption almost certainly biases upwards the World Banks' global poverty estimates, and since it is unlikely that all of the growth discrepancy between surveys and the NAS is due to faults in the latter, the rate of poverty decline is likely downward biased. We need an international initiative to provide a set of consistent international protocols for survey design, as well as deeper study into the effects of nonsampling errors, particularly noncompliance. (2004: 41)

The PPP basket and base year changes

There are other issues that complicate the count of those living in poverty because international comparisons require a standard international poverty line. One is the appropriate calculation of the purchasing power parity exchange rate. The rates are based on prices of general bundles of consumer goods, not on bundles consumed specifically by the poor. And what is consumed by the poor varies over time. Yet changes in PPP exchange rates have significant effects on poverty estimates. In one dramatic instance, a recalculation of the PPP exchange rate removed poverty completely from a country.[14]

A second issue is the treatment of inflation in the context of PPP. Resetting the original poverty line from a base of 1985 to one of 1993 caused complications and became a minor part of the disagreement on the accuracy of the World Bank poverty estimates for the 1990s.

How should we proceed?

Debates in the poverty measurement literature are far from academic when it comes to exploring the possible futures of poverty and analysis of strategies for alleviating it. Given that the most significant debate is that between the use of surveys and national accounts, how should IFs use the two data levels in shaping its forecasting?

The short answer is simple: specification of initial conditions for the base year of the forecast should use survey data because they are the best source for judging contemporary poverty levels; forecasting of consumption levels, however, will inevitably be done at the macro level of national accounts, because it is impossible to forecast at the micro level of the households upon which surveys are based.

If we anticipate a continued divergence in the measurements of poverty from surveys and those from natural accounts, this inevitable link of simulation to national accounts could cause the results to build in a faster reduction of poverty rates than would an approach that in some fashion anticipates survey results. It is really not sensible, however, to expect that the ratio of poverty based on surveys to that based on national accounts can continue to decline significantly. This analysis does not anticipate that result.[15]

A somewhat longer answer, to be elaborated on further in subsequent chapters, is this:

- The analysis in this book begins in 2000 and uses estimates of poverty in that year or years close to it from World Bank sources, thereby essentially accepting the higher estimates for initial poverty levels from the survey data, rather than (1) computing poverty levels directly from national accounts or (2) creating values for 2000 from surveys

based on 1990 data and using national account forecasting thereafter (as Bhalla does). Thus the study must recognize some possible upward bias in its initial conditions and be a little cautious in comparison of results with 1990.

- Analysis after 2000 in this book uses national accounts to drive poverty computations. To the degree that historical national accounts have biased economic growth rates upward, there may be some upward bias in our results as well. Our book depends on scenario analysis to explore the implications of substantially different patterns of economic growth.
- It does not appear reasonable to expect that the ratio of means from surveys and national accounts can continue to decline indefinitely and therefore simply to extrapolate future historical declines in that ratio. Nonetheless, the IFs modeling system allows an exogenous specification of change in the ratio for those who want to hypothesize continued decline in it.

Conclusion

This chapter has attempted two important stage-setting tasks for the rest of the book. The first set of fundamental issues addressed relates to the analytical task of pinpointing the meaning of poverty and the various conceptual issues associated with measurement. A survey of the literature shows both the richness of various approaches and the challenges each of them poses. The second set of issues relates to the actual empirical task of estimating poverty for policy purposes. Here the foundational approach of the World Bank naturally gains prominence. Yet in reviewing that approach, a number of conceptual, statistical, and policy issues arise.

Consideration of these conceptual issues, with a view to investigating the processes and policies for poverty reduction, logically leads us to consider what the drivers of poverty reduction are and what various poverty reduction strategies might be. They are the subjects of the next chapter.

1 Khan (2004) has introduced an axiom of biological stress and derived a new adjusted index to prevent such perverse results.

2 Public goods are characterized by nonexcludability and nonrivalry. Negative externalities are negative effects on other agents that are generated in production or consumption by agents engaging in market activities. In both cases there are important market failures.

3 Banerjee and Duflo (2006) documented the use of income by those living on less than one dollar a day and found that food expenditures were lower than expected, at 54–78 percent of the total.

4 The data on purchasing power parities has evolved over time with the use of Penn World Tables (PWT), which grew out of the ICP. In 2002 the PWT 6.1 replaced PWT 5.6. The PPP conversion factors were not created for analysis of poverty, however, and the use of them is therefore itself subject to some criticism and uncertainty (Kasrshenas 2004).

5 Bhalla (2002) questions whether a price differential of only 8 percent between 1985 and 1993 is reasonable.

6 The emerging literature on "subjective well-being approach to poverty" does not yet include a well-established poverty measure. See Kingdon and Knight (2004).

7 There are many examples of relative poverty lines, including half the median income (Fuchs 1969); two-thirds of the median income, as is done by the Luxembourg Income Study (Atkinson, Rainwater, and Smeeding 1995); and half the mean income, as is done by the European Union (Atkinson 1998; O'Higgins and Jenkins 1990). On some occasions, the World Bank uses two-thirds of the median income as a relative poverty measure.

8 The late Pakistani economist Mahbub ul-Haq initiated the HDRs. Key ideas came from Sen. Foster and Sen (1997, chap. A.7) and Sen (1992a, 1999) summarize Sen's work.

9 Our calculation of the R-square is about 0.4.

10 The interested reader can see the tables associated with this volume for extended forecasts of additional variables related to human development in all its dimensions. Future volumes will focus specifically on capabilities-based human development indicators, notably education and health.

11 See Khan (1997 a, 1997b, 1998, 2005a) for a more detailed discussion of the limitations of the headcount measure.

12 This debate was originally stimulated by alternative estimates for India based on national accounts statistics and was widened to include global figures in Bhalla (2002). A highly combative technical debate ensued; see Ravallion (2002a, 2002b) and Bhalla (2003). The dramatic claim in Bhalla (2002, 2003) was that because of the underestimate of poverty reduction in the World Bank data, the Millennium Development Goal of halving poverty between 1990 and 2015 had already been achieved by 2000. Probably few development professionals accept this proposition.

13 Deaton (2001) has an authoritative survey of the key issues. He rejects the approach in Bhalla (2002) of assuming that survey data are wrong in their average but correct in their distribution, stating "the last condition is a real stretch" (Deaton 2001: 135). Hence there is considerable doubt about the accuracy of the rapid fall in poverty found in Bhalla (2002).

14 Deaton (2001: 128) recounts how for the mid-1990s, Thailand was shown "as having only 0.1 percent of its population living on less than $1/day at PPP. This virtual elimination of poverty was cited in the *New York Times* by then Chief Economist [sic] of the World Bank Joseph Stiglitz as one of the consequences of the Asian economic miracle … but it is much more likely a tribute to inappropriate PPP conversion." Ravallion (2002a) summarizes the approach for international comparisons; see also Ravallion (2001).

15 It is possible that the two forecasting problems are in fact linked. The World Bank continues to assume that real GDP growth at market exchange rates (MER) and PPP are identical. The IFs system (see Chapter 5) posits that GDP growth for developing countries at PPP is slower that that at MER. The recent downward revision of PPP values for China and other countries provides support for the IFs approach. Deaton (2004: 14) has noted that a 2 percent downward revision of Chinese growth would reconcile poverty change using NAS and survey-based approaches. The difference in IFs forecasts between the two rates is actually 3 percent, more than enough to accomplish that reconciliation. The difference in growth rates of Chinese GDP at MER and PPP is, however, negligible in historical data series, suggesting either that the IFs presumption is false or that the two data series have been incorrectly aligned over time.